# Patent Assignment Abstract of Title

**Total Assignments: 4**

**Application #:** 10285312 **Filing Dt:** 10/31/2002 **Patent #:** 7241034 **Issue Dt:** 07/10/2007
**PCT #:** NONE **Publication #:** US20030107898 **Pub Dt:** 06/12/2003
**Inventors:** James E. Smith, Anthony B. McDonald
**Title:** AUTOMATIC DIRECTIONAL CONTROL SYSTEM FOR VEHICLE HEADLIGHTS

**Assignment: 1**

**Reel/Frame:** 013729 / 0559 **Received:** 02/10/2003 **Recorded:** 02/06/2003 **Mailed:** 06/13/2003 **Pages:** 3
**Conveyance:** ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).
**Assignors:** SMITH, JAMES E. **Exec Dt:** 01/31/2003
MCDONALD, ANTHONY B. **Exec Dt:** 01/31/2003
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**Assignment: 2**

**Reel/Frame:** 020540 / 0476 **Received:** 02/22/2008 **Recorded:** 02/22/2008 **Mailed:** 02/22/2008 **Pages:** 30
**Conveyance:** ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).
**Assignor:** DANA CORPORATION **Exec Dt:** 01/31/2008
**Assignee:** DANA AUTOMOTIVE SYSTEMS GROUP, LLC
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**Assignment: 3**

**Reel/Frame:** 022813 / 0432 **Received:** 06/12/2009 **Recorded:** 06/12/2009 **Mailed:** 06/12/2009 **Pages:** 2
**Conveyance:** ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).
**Assignor:** DANA AUTOMOTIVE SYSTEMS GROUP, LLC **Exec Dt:** 05/26/2009
**Assignee:** STRAGENT, LLC
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LONGVIEW, TEXAS 75601
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**Assignment: 4**

**Reel/Frame:** 024045 / 0235 **Received:** 03/08/2010 **Recorded:** 03/08/2010 **Mailed:** 03/09/2010 **Pages:** 2
**Conveyance:** ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).
**Assignor:** STRAGENT, LLC **Exec Dt:** 12/16/2009
**Assignee:** BALTHER TECHNOLOGIES, LLC
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LONGVIEW, TEXAS 75601
**Correspondent:** THE CALDWELL FIRM, LLC
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DEPT. SVIPGP
DALLAS, TX 75229

Search Results as of: 07/28/2010 01:33 PM

If you have any comments or questions concerning the data displayed, contact PRD / Assignments at 571-272-3350.

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Web interface last modified: October 18, 2008 v.2.0.1

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| ***Notice of References Cited*** | Application/Control No. 90/011,011 | Applicant(s)/Patent Under Reexamination 7,241,034 | |
|---|---|---|---|
| | Examiner MY-TRANG N. TON | Art Unit 3992 | Page 1 of 1 |

**U.S. PATENT DOCUMENTS**

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Name | Classification |
|---|---|---|---|---|---|
| * | A | US-4,733,333 | 03-1988 | Shibata et al. | 362/40 |
| | B | US- | | | |
| | C | US- | | | |
| | D | US- | | | |
| | E | US- | | | |
| | F | US- | | | |
| | G | US- | | | |
| | H | US- | | | |
| | I | US- | | | |
| | J | US- | | | |
| | K | US- | | | |
| | L | US- | | | |
| | M | US- | | | |

**FOREIGN PATENT DOCUMENTS**

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Country | Name | Classification |
|---|---|---|---|---|---|---|
| | N | | | | | |
| | O | | | | | |
| | P | | | | | |
| | Q | | | | | |
| | R | | | | | |
| | S | | | | | |
| | T | | | | | |

**NON-PATENT DOCUMENTS**

| * | | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) |
|---|---|---|
| | U | |
| | V | |
| | W | |
| | X | |

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.



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(Also referred to as FORM PTO-1465)

# REQUEST FOR *INTER PARTES* REEXAMINATION TRANSMITTAL FORM

Address to:
**Mail Stop *Inter Partes* Reexam**
**Commissioner for Patents**
**P.O. Box 1450**
**Alexandria, VA 22313-1450**

**Attorney Docket No.:** ____________

**Date:** May 16, 2011

1. ☒ This is a request for *inter partes* reexamination pursuant to 37 CFR 1.913 of patent number 7,241,034 issued July 10, 2007. The request is made by a third party requester, identified herein below.

2. ☒ a. The name and address of the person requesting reexamination is:
Volkswagen Group of America, Inc.
2200 Ferdinand Porsche Drive
Herndon, Virginia 20171

b. The real party in interest (37 CFR 1.915(b)(8)) is: Volkswagen Group of America, Inc.

3. ☐ a. A check in the amount of $____________ is enclosed to cover the reexamination fee, 37 CFR 1.20(c)(2);

☐ b. The Director is hereby authorized to charge the fee as set forth in 37 CFR 1.20(c)(2) to Deposit Account No. ________________________ ; **or**

☒ c. Payment by credit card. Form PTO-2038 is attached.

4. ☒ Any refund should be made by ☐ check or ☒ credit to Deposit Account No. 11-0600 37 CFR 1.26(c). If payment is made by credit card, refund must be to credit card account.

5. ☒ A copy of the patent to be reexamined having a double column format on one side of a separate paper is enclosed. 37 CFR 1.915(b)(5)

6. ☐ CD-ROM or CD-R in duplicate, Computer Program (Appendix) or large table
☐ Landscape Table on CD

7. ☐ Nucleotide and/or Amino Acid Sequence Submission
*If applicable, items a. – c. are required.*

a. ☐ Computer Readable Form (CRF)
b. Specification Sequence Listing on:
i. ☐ CD-ROM (2 copies) or CD-R (2 copies); **or**
ii. ☐ paper
c. ☐ Statements verifying identity of above copies

8. ☐ A copy of any disclaimer, certificate of correction or reexamination certificate issued in the patent is included.

9. ☒ Reexamination of claim(s) 1-5 is requested.

10. ☒ A copy of every patent or printed publication relied upon is submitted herewith including a listing thereof on Form PTO/SB/08, PTO-1449, or equivalent.

11. ☒ An English language translation of all necessary and pertinent non-English language patents and/or printed publications is included.

[Page 1 of 2]

This collection of information is required by 37 CFR 1.915. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 18 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Mail Stop *Inter Partes* Reexam, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

12. ☒ The attached detailed request includes at least the following items:

a. A statement identifying each substantial new question of patentability based on prior patents and printed publications. 37 CFR 1.915(b)(3)
b. An identification of every claim for which reexamination is requested, and a detailed explanation of the pertinency and manner of applying the cited art to every claim for which reexamination is requested. 37 CFR 1.915(b)(1) & (3).

13. ☒ It is certified that the estoppel provisions of 37 CFR 1.907 do not prohibit this reexamination. 37 CFR 1.915(b)(7)

14. ☒ a. It is certified that a copy of this request has been served in its entirety on the patent owner as provided in 37 CFR 1.33(c).
The name and address of the party served and the date of service are:
The Caldwell Firm, LLC
PO Box 59655, Dept. SVIPGP
Dallas, TX 75229

Date of Service: May 16, 2011; **or**

☐ b. A duplicate copy is enclosed because service on patent owner was not possible. An explanation of the efforts made to serve patent owner **is attached**. See MPEP 2620.

15. Third Party Requester Correspondence Address: Direct all communications about the reexamination to:

☒ The address associated with Customer Number: 26646

**OR**

☐ Firm or Individual Name

| | | |
|---|---|---|
| Address KENYON & KENYON LLP, One Broadway | | |
| City New York | State NY | Zip 10004 |
| Country US | | |
| Telephone 212.425.7200 | Email | |

16. ☒ The patent is currently the subject of the following concurrent proceeding(s):
- ☐ a. Copending reissue Application No.
- ☒ b. Copending reexamination Control No. 90/011,011
- ☐ c. Copending Interference No.
- ☐ d. Copending litigation styled:

**WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.**

| Authorized Signature | Date |
|---|---|
| /Clifford A. Ulrich/ | May 16, 2011 |

| Typed/Printed Name | Registration No., if applicable |
|---|---|
| Clifford A. Ulrich | 42,194 |

## Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

| | | |
|---|---|---|
| In Re Patent of | : | James E. SMITH et al. |
| Patent No. | : | 7,241,034 |
| Issued | : | July 10, 2007 |
| Title | : | AUTOMATIC DIRECTIONAL CONTROL SYSTEM FOR VEHICLE HEADLIGHTS |
| Application Serial No. | : | 10/285,312 |
| Filed | : | October 31, 2002 |
| Requester | : | Volkswagen Group of America, Inc. |

**VIA EFS-WEB**
Mail Stop *Inter Partes* Reexam
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

**REQUEST FOR *INTER PARTES* REEXAMINATION**
**OF U.S. PATENT NO. 7,241,034 PURSUANT TO 37 C.F.R. § 1.915**

SIR:

Volkswagen Group of America, Inc. ("VWGoA"), through its undersigned counsel, hereby respectfully requests *inter partes* reexamination of U.S. Patent No. 7,241,034 pursuant to 35 U.S.C. § 311 *et seq.* and the provisions of 37 C.F.R. § 1.902 *et seq.*

## TABLE OF CONTENTS

**EXHIBITS**

| | |
|---|---|
| Exhibit 1 | U.S. Patent No. 7,241,034 |
| Exhibit 2 | "Original Complaint for Patent Infringement," filed on March 8, 2010, *BALTHER TECHNOLOGIES, LLC, v. AM. HONDA MOTOR CO. INC., et al.*, Case No. 6:10-CV-78-LED (E.D. Tex.) |
| Exhibit 3 | "Plaintiff's Notice of Voluntary Dismissal," filed on May 17, 2010, *BALTHER TECHNOLOGIES, LLC, v. AM. HONDA MOTOR CO. INC., et al.*, Case No. 6:10-CV-78-LED (E.D. Tex.) |
| Exhibit 4 | "Order," dated May 17, 2010, *BALTHER TECHNOLOGIES, LLC, v. AM. HONDA MOTOR CO. INC., et al.*, Case No. 6:10-CV-78-LED (E.D. Tex.) |
| Exhibit 5 | Listing of Prior Art Patents and Printed Publications that Raise Substantial New Questions of Patentability |
| Exhibit 6 | United Kingdom Patent Application Publication No 2 309 773 to Uchida |
| Exhibit 7 | United Kingdom Patent Application Publication No. 2 309 774 to Takahashi |
| Exhibit 8 | U.S. Patent No. 5,182,460 to Hussman |
| Exhibit 9 | German Patent Application Publication No. 31 10 094 to Miskin et al. |
| Exhibit 10 | Certified English-Language Translation of German Patent Application Publication No. 31 10 094 to Miskin et al. |
| Exhibit 11 | German Patent Application Publication No. 31 29 891 to Leleve |
| Exhibit 12 | Certified English-Language Translation of German Patent Application Publication No. 31 29 891 to Leleve |
| Exhibit 13 | U.S. Patent No. 6,305,823 to Toda et al. |
| Exhibit 14 | U.S. Patent No. 6,193,398 to Okuchi et al. |
| Exhibit 15 | U.S. Patent No. 5,909,949 to Gotoh |
| Exhibit 16 | U.S. Patent No. 4,954,933 to Wassen et al. |
| Exhibit 17 | Certificate of Service |

## I. <u>IDENTIFICATION PURSUANT TO 37 C.F.R. § 1.915(b)(1)</u>

*Inter partes* reexamination of claims 1 to 5 of U.S. Patent No. 7,241,034 ("the '034 patent") is requested.

## II. <u>COPY OF '034 PATENT PURSUANT TO 37 C.F.R. § 1.915(b)(5)</u>

Pursuant to 37 C.F.R. § 1.915(b)(5), annexed hereto as Exhibit 1 is a copy of the entire '034 patent including the front face, drawings, specification and claims (in double column format) for which *inter partes* reexamination is requested.

To the best of VWGoA's knowledge, as of the filing date of this Request, no disclaimer, certificate of correction, or reexamination certificate has been issued in connection with the '034 patent.

## III. <u>CERTIFICATION PURSUANT TO 37 C.F.R. § 1.915(b)(7)</u>

Pursuant to 37 C.F.R. § 1.915(b)(7), VWGoA certifies that the estoppel provisions of 37 C.F.R. § 1.907 do not prohibit the *inter partes* reexamination.

## IV. <u>IDENTIFICATION OF REAL PARTY IN INTEREST PURSUANT TO 37 C.F.R. § 1.915(b)(8)</u>

The real party in interest is VOLKSWAGEN GROUP OF AMERICA, INC., which is a subsidiary of VOLKSWAGEN AG.

## V. <u>PROCEEDINGS RELATED TO '034 PATENT</u>

Although VWGoA is not obligated to inform the Office of proceedings related to the '034 patent, the Office is hereby informed of the following proceeding that relates to the '034 patent which is pending as of the filing date of this Request:

> *EX PARTE REEXAMINATION OF THE '034 PATENT*, Control Number 90/011,011 (Request for *Ex Parte* Reexamination filed July 10, 2010) ("the '034 *Ex Parte* Reexamination"). Pursuant to M.P.E.P. § 2282,[1] VWGoA is filing in the '034 *Ex Parte* Reexamination a "Notice of Concurrent Proceeding" to inform the Office of the filing of this Request.

The Office is hereby further informed of the following concluded proceeding that related to the '034:[2]

> *BALTHER TECHNOLOGIES, LLC, v. AM. HONDA MOTOR CO. INC., et al.*, Case No. 6:10-CV-78-LED (E.D. Tex. – Complaint Filed on March 8, 2010) ("the *BALTHER* case"). Plaintiff Balther Technologies, LLC ("Balther") asserted infringement of the '034 patent by the Requester. Requester was therefore a party to the *BALTHER* case. A copy of the "Original Complaint for Patent Infringement" filed on March 8, 2010 is annexed hereto as Exhibit 2. A copy of "Plaintiff's Notice of Voluntary Dismissal" filed on May 17, 2010 is annexed hereto as Exhibit 3. A copy of the "Order" dismissing the *BALTHER* case pursuant to Plaintiff's request dated May 18, 2010 is annexed hereto as Exhibit 4.

## VI. THE '034 PATENT AND ITS PROSECUTION

The '034 patent issued on July 10, 2007 from U.S. Patent Application Serial No. 10/285,312 ("the '312 application"), filed on October 31, 2002. The '034 patent states that it claims the benefit of U.S. Provisional Application No. 60/369,447, filed on April 2, 2002,

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1 "Ordinarily, no submissions of any kind by third parties filed after the date of the order are entered into the reexamination or patent file while the reexamination proceeding is pending. However, in order to ensure a complete file, with updated status information regarding prior or concurrent proceedings regarding the patent under reexamination, the Office will, at any time, accept from any parties, for entry into the reexamination file, copies of notices of suits and other proceedings involving the patent and copies of decisions or papers filed in the court from litigations or other proceedings involving the patent."

2 Despite its duty under 37 C.F.R. § 1.565(a) ("In an *ex parte* reexamination proceeding before the Office, the patent owner must inform the Office of any prior or concurrent proceedings in which the patent is or was involved such as . . . litigation and the results of such proceedings") and M.P.E.P. § 2282 ("It is important for the Office to be aware of any prior or concurrent proceedings in which a patent undergoing *ex parte* reexamination is or was involved, such as . . . litigations, and the results of such proceedings") to inform the Office of all prior and concurrent proceedings involving the '034 patent, as of the filing date of this Request, Balther has not informed of Office of the *BALTHER* case in connection with the '034 *Ex Parte* Reexamination.

U.S. Provisional Application No. 60/356,703, filed on February 13, 2002, and U.S. Provisional Application No. 60/335,409, filed on October 31, 2001.

### A. Prosecution of ’312 Application

As originally filed, the ’312 application included thirteen claims, of which application claim 1 was the only independent claim. Application claim 1 is reproduced below:

> 1. An automatic directional control system for a vehicle headlight comprising:
>
> a sensor that is adapted to generate a signal that is representative of a condition of the vehicle, said sensed condition includes one or more of road speed, steering angle, pitch, and suspension height of the vehicle;
>
> a controller that is responsive to said sensor signal for generating an output signal; and
>
> an actuator that is adapted to be connected to the headlight to effect movement thereof in accordance with said output signal.

An Office Action was issued on December 23, 2003, in which: (1) application claims 1 to 2, 4 to 8, and 10 to 13 were rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Patent No. 6,305,823 (“Toda et al.”); (2) application claims 1 to 2, 4 to 8, and 10 to 13 were rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Patent No. 6,193,398 (“Okuchi et al.”); and (3) application claims 1 to 3 and 9 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 5,909,949 (“Gotoh”).

In an Amendment submitted on March 23, 2004, application claim 6 was cancelled, and application claims 1 and 7 were amended as follows:

> 1. An automatic directional control system for a vehicle headlight comprising:
>
> a sensor that is adapted to generate a signal that is representative of a condition of the vehicle, said sensed condition includes one or more of road speed, steering angle, pitch, and suspension height of the vehicle;
>
> a controller that is responsive to said sensor signal for generating an output signal <u>only when said sensor signal changes by more than a predetermined amount</u>; and

an actuator that is adapted to be connected to the headlight to effect movement thereof in accordance with said output signal.

7. <u>An</u> ~~The~~ automatic directional control system ~~defined in Claim 1 wherein said~~ <u>for a vehicle headlight comprising</u>:

<u>a sensor that is adapted to generate a signal that is representative of a condition of the vehicle, said sensed condition includes one or more of road speed, steering angle, pitch, and suspension height of the vehicle</u>;

<u>a</u> controller <u>that</u> is responsive to a rate of change of said sensor signal for generating said output signal<u>; and</u>

<u>an actuator that is adapted to be connected to the headlight to effect movement thereof in accordance with said output signal</u>.

The "Remarks" section of the Amendment alleged that: (1) "None of the art of record is believed to show or suggest a controller that is responsive to the sensor signal for generating an output signal only when the sensor signal changes by more than a predetermined amount," as recited in amended claim 1, and (2) "None of the art of record is believed to show or suggest a controller that is responsive to a rate of change of the sensor signal for generating the output signal," as recited in amended claim 7. Amendment at page 5.

A Final Office Action was issued on June 15, 2004, in which all of the claims were again rejected. In particular, (1) application claims 1 to 2, 4 to 5, 7 to 8, and 10 to 13 were rejected under 35 U.S.C. § 102(e) as anticipated by Toda et al.; (2) application claims 1 to 2, 4 to 5, 7 to 8, and 10 to 13 were rejected under 35 U.S.C. § 102(e) as anticipated by Okuchi et al.; and (3) application claims 1 to 3 and 9 were rejected under 35 U.S.C. § 102(b) as anticipated by Gotoh. The Examiner further stated that the applicants' arguments had been considered but were not persuasive.

On September 15, 2004, the applicants filed a Request for Reconsideration along with a Notice of Appeal. On December 28, 2004, the Examiner issued an Advisory Action, which stated that the "request for reconsideration has been considered but does NOT place the application in condition for allowance because [t]he prior art of record including Toda et al[.] in particular reads on independent claims 1 and 7.

Concurrent with the filing of a Request for Continued Examination on February 17, 2005, the applicants again argued that the claims, as amended on March 23, 2004, were allowable. Again, the applicants argued in particular that (1) "None of the art of record is believed to show or suggest a controller that is responsive to the sensor signal for generating an output signal only when the sensor signal changes by more than a predetermined amount," as recited in amended claim 1, and (2) "None of the art of record is believed to show or suggest a controller that is responsive to a rate of change of the sensor signal for generating the output signal," as recited in amended claim 7. Request for Continued Examination, Remarks at pages 2 to 4 (emphasis in original).

Another Office Action was issued on April 14, 2005 again rejecting all of the pending claims on the same grounds as the June 15, 2004 Office Action, and also concluding that the arguments of the applicants were not persuasive. The applicants replied to the April 14, 2005 Office Action by submitting a Response on July 14, 2005, in which the applicants stated that the limitation, "wherein the controller generates an output signal only when the sensor signal changes by more than a predetermined amount" (emphasis in original), "is not merely a recitation of 'intended use' alleged by the Examiner, but rather an important aspect of the operation of the headlight automatic directional control system." Response at page 2.

The Examiner issued a Final Office Action on October 5, 2005, again rejecting the claims as anticipated by Toda et al., Okuchi et al., and Gotoh et al., and again finding the applicants arguments to be unpersuasive.

The applicants then filed a Notice of Appeal and a Pre-Appeal Brief Request for Review on January 5, 2006, again restating their position. On February 3, 2006, a Notice of Panel Decision from Pre-Appeal Brief Review was issued, which states that the application remains under appeal because there is at least one actual issue for appeal.

On August 9, 2006, the applicants filed a Request for Continued Examination with a Preliminary Amendment, adding new independent claim 14, and again arguing that independent claims 1 and 7 were patentable. Newly added independent claim 14 is reproduced below:

> 14. An automatic directional control system for a vehicle headlight comprising:
>
> a sensor that is adapted to generate a signal that is representative of a condition of the vehicle, said sensed condition includes one or more of road speed, steering angle, pitch, and suspension height of the vehicle;

> a controller that is responsive to said sensor signal for generating an output signal only when said sensor signal changes by more than a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition; and
>
> an actuator that is adapted to be connected to the headlight to effect movement thereof in accordance with said output signal.

According to the "Remarks" section of the Preliminary Amendment, (1) the cited references, *i.e.*, Toda et al., Okuchi et al., and Gotoh, fail to disclose the limitation of claim 1 that the controller is responsive to the sensor signal for generating an output signal only when the sensor signal changes by more than a predetermined amount; (2) the cited references, *i.e.*, Toda et al., Okuchi et al., and Gotoh, fail to disclose the limitation of claim 14 that the controller is responsive to the sensor signal for generating an output signal only when the sensor signal changes by more than a predetermined minimum threshold amount to prevent the actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition; and (3) the cited references, *i.e.*, Toda et al. and Okuchi et al., fail to disclose the limitation of claim 7 that the controller is responsive to a rate of change of the sensor signal for generating the output signal.

A further Office Action was issued on October 6, 2006 in which all of the claims were rejected. In particular, (1) application claims 1 to 2, 4 to 5, 7 to 8, and 10 to 14 were rejected under 35 U.S.C. § 102(e) as anticipated by Toda et al.; (2) application claims 1 to 2, 4 to 5, 7 to 8, and 10 to 14 were rejected under 35 U.S.C. § 102(e) as anticipated by Okuchi et al.; and (3) application claims 1 to 3 and 9 were rejected under 35 U.S.C. § 102(b) as anticipated by Gotoh. The Examiner further stated that the applicants' arguments had been considered but were not persuasive.

In a January 8, 2007 Response, the applicants again argued that (1) the cited references, *i.e.*, Toda et al., Okuchi et al., and Gotoh, fail to disclose the limitation of claim 1 that the controller is responsive to the sensor signal for generating an output signal only when the sensor signal changes by more than a predetermined amount; (2) the cited references, *i.e.*, Toda et al., Okuchi et al., and Gotoh, fail to disclose the limitation of claim 14 that the controller is responsive to the sensor signal for generating an output signal only when the sensor signal changes by more than a predetermined minimum threshold amount to prevent the actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition; and (3) the cited references, *i.e.*, Toda et al. and Okuchi et al., fail to disclose the limitation of claim 7 that the controller is responsive to a rate of change of the sensor signal for generating the output signal. The applicants further argued that claims 1 and 14 "define a system wherein the actuator does not change the headlight according to the output signal generated by the sensor unless the sensor signal changes by more than a predetermined amount" (emphasis in original).

On January 31, 2007, an Interview took place. In the Interview Summary, the Examiner summarized the substance of the Interview as follows:

> We discussed independent claims 1, 7, and 14. We agreed that claim 14 is allowable over the prior art of record because of the specific limitation of "**a predetermined minimum threshhold [*sic*] amount to prevent the actuator from being operated continiously [*sic*] or duly in response to relatively small variations in the sensed operating speed. [*sic*]**"

Interview Summary (emphasis added).

That same day, the applicants submitted an Amendment, cancelling claims 1 and 7 to 13, and amending dependent claims 2 to 5 to depend from independent claim 14.

A Notice of Allowance issued on April 19, 2007, in which application claims 2 to 5 and 14 were indicated to be allowed. The Examiner stated that the "applicant's amendment and accompanying remarks has persuaded the examiner to place the application in condition for allowance." Thus, it is clear that application claim 14 was allowed due to the inclusion of the limitation:

> a controller that is responsive to said sensor signal for generating an output signal only when said sensor signal changes by more than a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition.

Independent application claim 14 corresponds to claim 1 in the '034 patent, the sole independent claim of the '034 patent.

### B. Pending *Ex Parte* Reexamination of '034 Patent

On May 25, 2010, Balther Technologies, LLC ("Balther"), the stated owner of the '034 patent, filed an incomplete request for *ex parte* reexamination of the '034 patent, and on July 9, 2010, Balther filed a "Substitute Request for *Ex Parte* Reexamination of U.S. Patent No. 7,241,034" requesting reexamination of the '034 patent. According to the records of the Office, the filing date of the request for reexamination is July 10, 2010, the date the requisite fee was received, and Reexamination Control No. 90/011,011 has been assigned to the *ex* *parte* reexamination proceeding. In its request, Balther admitted that claims 1 and 3 of the '034 patent were anticipated by U.S. Patent No. 4,733,333 ("Shibata") under 35 U.S.C. § 102(b), as Shibata teaches all of the limitations of claims 1 and 3.

On August 12, 2010, an Order Granting Request for *Ex Parte* Reexamination issued granting reexamination with respect to claims 1 and 3. On January 12, 2011 an Office Action issued rejecting claims 1 and 3 under 35 U.S.C. § 102(b) as anticipated by Shibata.

In response to the Office Action, on January 18, 2011 Balther submitted an "Amendment A," and then, on February 16, 2011, Balther submitted a "Substitute Amendment A," proposing amendments to claims 1 to 5 and proposing the addition of new claims dependent claims 6 to 45. Substitute Amendment A proposed the following amendment to independent claim 1, the sole independent claim:

> 1. An automatic directional control system for a vehicle headlight, comprising:
>
> [a] two or more sensors that [is] are each adapted to generate a signal that is representative of a condition of [the] a vehicle, said sensed conditions including[es] [one] two or more of road speed, steering angle, pitch, and suspension height of the vehicle;
>
> a controller that is responsive to said two or more sensor signals for generating [an] at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent [said] at least one actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating conditions; and
>
> [an] said at least one actuator [that is] being adapted to be connected to the headlight to effect movement thereof in accordance with said at least one output signal.

In the Remarks section of Substitute Amendment A, Balther argued that Shibata fails to teach "**two or more sensors** that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including **two or more** of road speed, steering angle, pitch, and suspension height of the vehicle." Substitute Amendment A at page 9 (emphasis in original). Thus, it appears that Balther considers proposed amended claim 1 to be patentable because it requires two or more sensors to generate a signal.

## VII. CITATIONS OF PRIOR ART PATENTS AND PRINTED PUBLICATIONS THAT ARE PRESENTED TO PROVIDE SUBSTANTIAL NEW QUESTIONS OF PATENTABILITY PURSUANT TO 37 C.F.R. § 1.915(b)(2)

Substantial new questions of patentability affecting claims 1 to 5 of the '034 patent under 35 U.S.C. §§ 102 and 103 are raised by the prior art patents and printed publications cited below pursuant to 37 C.F.R. § 1.915(b)(2). Annexed hereto as Exhibit 5 is a listing of, *inter alia*, the prior art patents and printed publications that raise substantial new questions of patentability.

The following patents and publications constitute prior art against the '034 patent, under the subsections of 35 U.S.C. § 102 indicated below:

1. United Kingdom Patent Application Publication No 2 309 773 ("Uchida"), which published on June 8, 1997 and therefore constitutes prior art against the '034 patent under 35 U.S.C. § 102(b).

2. United Kingdom Patent Application Publication No. 2 309 774 ("Takahashi"), which published on June 8, 1997 and therefore constitutes prior art against the '034 patent under 35 U.S.C. § 102(b).

3. U.S. Patent No. 5,182,460 ("Hussman"), which issued on January 26, 1993 and therefore constitutes prior art against the '034 patent under 35 U.S.C. § 102(b).

4. German Patent Application Publication No. 31 10 094 ("Miskin et al."), which published on September 30, 1982 and therefore constitutes prior art against the '034 patent under 35 U.S.C. § 102(b).

5. German Patent Application Publication No. 31 29 891 ("Leleve"), which published on June 9, 1982 and therefore constitutes prior art against the '034 patent under 35 U.S.C. § 102(b).

6. U.S. Patent No. 6,305,823 ("Toda et al."), which was filed on October 14, 1999 and issued on October 23, 2001 and therefore constitutes prior art against the '034 patent under 35 U.S.C. § 102(e).

7. U.S. Patent No. 6,193,398 ("Okuchi et al."), which was filed on June 16, 1999 and issued on February 27, 2001 and therefore constitutes prior art against the '034 patent under 35 U.S.C. § 102(e).

8. U.S. Patent No. 5,909,949 ("Gotoh"), which issued on June 8, 1999 and therefore constitutes prior art against the '034 patent under 35 U.S.C. § 102(b).

9. U.S. Patent No. 4,954,933 ("Wassen et al."), which issued on September 4, 1990 and therefore constitutes prior art against the '034 patent under 35 U.S.C. § 102(b).

A copy of every prior art patent and printed publication relied upon or referred to herein is submitted herewith as required by 37 C.F.R. § 1.915(b)(4), as follows:

A. A copy of Uchida is annexed hereto as Exhibit 6.

B. A copy of Takahashi is annexed hereto as Exhibit 7.

C. A copy of Hussman is annexed hereto as Exhibit 8.

D. A copy of Miskin et al. is annexed hereto as Exhibit 9, and a certified English-language translation of Miskin et al. is annexed hereto as Exhibit 10.

E. A copy of Leleve is annexed hereto as Exhibit 11, and a certified English-language translation of Leleve is annexed hereto as Exhibit 12.

F. A copy of Toda et al. is annexed hereto as Exhibit 13.

G. A copy of Okuchi et al. is annexed hereto as Exhibit 14.

H. A copy of Gotoh is annexed hereto as Exhibit 15.

I. A copy of Wassen et al. is annexed hereto as Exhibit 16.

## VIII. STATEMENTS POINTING OUT EACH SUBSTANTIAL NEW QUESTION OF PATENTABILITY PURSUANT TO 37 C.F.R. § 1.915(b)(3)

In accordance with 37 C.F.R. § 1.915(b)(3), reexamination of claims 1 to 5 of the '034 patent is requested in view of the prior art patents and printed publications cited above in Section VII based on the following substantial new questions of patentability and proposed grounds of rejection:

1. Claims 1, 2, 4, and 5 Are Anticipated by Uchida Under 35 U.S.C. § 102(b)

2. Claims 1, 2, 4, and 5 Are Anticipated by Takahashi Under 35 U.S.C. § 102(b)

3. Claims 1, 2, 4, and 5 Are Anticipated by Hussman Under 35 U.S.C. § 102(b)

4. Claims 1 and 5 Are Anticipated by Miskin et al. Under 35 U.S.C. § 102(b)

5. Claims 1 and 5 Are Anticipated by Leleve Under 35 U.S.C. § 102(b)

6. Claims 1, 2, 4, and 5 Are Unpatentable Over the Combination of Toda et al. and Uchida Under 35 U.S.C. § 103(a)

7. Claims 1, 2, 4, and 5 Are Unpatentable Over the Combination of Toda et al. and Takahashi Under 35 U.S.C. § 103(a)

8. Claims 1, 2, 4, and 5 Are Unpatentable Over the Combination of Toda et al. and Hussman Under 35 U.S.C. § 103(a)

9. Claims 1, 2, 4, and 5 Are Unpatentable Over the Combination of Toda et al. and Miskin et al. Under 35 U.S.C. § 103(a)

10. Claims 1, 2, 4, and 5 Are Unpatentable Over the Combination of Toda et al. and Leleve Under 35 U.S.C. § 103(a)

11. Claims 1, 2, 4, and 5 Are Unpatentable Over the Combination of Okuchi et al. and Uchida Under 35 U.S.C. § 103(a)

12. Claims 1, 2, 4, and 5 Are Unpatentable Over the Combination of Okuchi et al. and Takahashi Under 35 U.S.C. § 103(a)

13. Claims 1, 2, 4, and 5 Are Unpatentable Over the Combination of Okuchi et al. and Hussman Under 35 U.S.C. § 103(a)

14. Claims 1, 2, 4, and 5 Are Unpatentable Over the Combination of Okuchi et al. and Miskin et al. Under 35 U.S.C. § 103(a)

15. Claims 1, 2, 4, and 5 Are Unpatentable Over the Combination of Okuchi et al. and Leleve Under 35 U.S.C. § 103(a)

16. Claims 1 to 5 Are Unpatentable Over the Combination of Gotoh and Uchida Under 35 U.S.C. § 103(a)

17. Claims 1 to 5 Are Unpatentable Over the Combination of Gotoh and Takahashi Under 35 U.S.C. § 103(a)

18. Claims 1 to 5 Are Unpatentable Over the Combination of Gotoh and Hussman Under 35 U.S.C. § 103(a)

19. Claims 1, 2, 3, and 5 Are Unpatentable Over the Combination of Gotoh and Miskin et al. Under 35 U.S.C. § 103(a)

20. Claims 1 to 5 Are Unpatentable Over the Combination of Gotoh and Leleve Under 35 U.S.C. § 103(a)

Requester proposes the following grounds of rejection against proposed amended claims 1 to 46 as presented by Balther in its Substitute Amendment A filed on February 16, 2011 in the *Ex Parte* Reexamination of the '034 patent:

21. Proposed Claims 1, 2, 4 to 6, 9 to 13, 20, 22, 24, 25, 37, 38, 41, 42, 44, and 45 Are Anticipated by Uchida Under 35 U.S.C. § 102(b)

22. Proposed Claims 1, 2, 4 to 6, 9 to 11, 17, 18, 20, 21, 22, 24, 25, 28, 33, 34, 37, 38, 41, 42, 44, and 45 Are Anticipated by Takahashi Under 35 U.S.C. § 102(b)

23. Proposed Claims 1, 2, 4 to 6, 9, 10, 37, 38, 41, 42, 44, and 45 Are Anticipated by Hussman Under 35 U.S.C. § 102(b)

24. Proposed Claims 1, 2, 4 to 6, 9 to 13, 17, 18, 20 to 22, 24, 25, 28, 29, 36 to 42, 44, and 45 Are Unpatentable Over the Combination of Toda et al. and Uchida Under 35 U.S.C. § 103(a)

25. Proposed Claims 1, 2, 4 to 6, 9 to 13, 17, 18, 20 to 22, 24, 25, 28, 29, 33, 34, 36 to 42, 44, and 45 Are Unpatentable Over the Combination of Toda et al. and Takahashi Under 35 U.S.C. § 103(a)

26. Proposed Claims 1, 2, 4 to 6, 9 to 13, 17, 18, 20 to 22, 24, 25, 28, 29, 36 to 42, 44, and 45 Are Unpatentable Over the Combination of Toda et al. and Hussman Under 35 U.S.C. § 103(a)

27. Proposed Claims 1, 2, 4 to 6, 9 to 13, 15 to 18, 20 to 22, 24, 25, 28, 29, 33, 35, 37 to 42, 44, and 45 Are Unpatentable Over the Combination of Okuchi et al. and Uchida Under 35 U.S.C. § 103(a)

28. Proposed Claims 1, 2, 4 to 6, 9 to 13, 15 to 18, 20 to 22, 24, 25, 28, 29, 33 to 35, 37 to 42, 44, and 45 Are Unpatentable Over the Combination of Okuchi et al. and Takahashi Under 35 U.S.C. § 103(a)

29. Proposed Claims 1, 2, 4 to 6, 9 to 13, 15 to 18, 20 to 22, 25, 28, 29, 33, 35, 37 to 42, 44, and 45 Are Unpatentable Over the Combination of Okuchi et al. and Hussman Under 35 U.S.C. § 103(a)

30. Proposed Claims 1 to 13, 20, 22, 24 to 26, 28, 29, 37, 38, and 41 to 45 Are Unpatentable Over the Combination of Gotoh and Uchida Under 35 U.S.C. § 103(a)

31. Proposed Claims 1 to 12, 14, 16 to 18, 20 to 22, 24 to 26, 28, 29, 33, 34, 37, 38, and 41 to 45 Are Unpatentable Over the Combination of Gotoh and Takahashi Under 35 U.S.C. § 103(a)

32. Proposed Claims 1 to 13, 24, 26, 28, 29, 37, 38, and 41 to 45 Are Unpatentable Over the Combination of Gotoh and Hussman Under 35 U.S.C. § 103(a)

33. Proposed Claims 17, 19, 21, 23, 26, and 30 to 32 Are Unpatentable in View of the Combination of Uchida and the Admitted Prior Art Described in the '034 Patent Specification Under 35 U.S.C. § 103(a)

34. Proposed Claims 19, 23, 26, and 30 to 32 Are Unpatentable in View of the Combination of Takahashi and the Admitted Prior Art Described in the '034 Patent Specification Under 35 U.S.C. § 103(a)

35. Proposed Claims 17 to 21, 23 to 26, and 30 to 32 Are Unpatentable in View of the Combination of Hussman and the Admitted Prior Art Described in the '034 Patent Specification Under 35 U.S.C. § 103(a)

36. Proposed Claim 27 Is Unpatentable Over the Combination of Uchida and Wassen et al. Under 35 U.S.C. § 103(a)

37. Proposed Claim 27 Is Unpatentable Over the Combination of Takahashi and Wassen et al. Under 35 U.S.C. § 103(a)

38. Proposed Claim 27 of Is Unpatentable Over the Combination of Hussman and Wassen et al. Under 35 U.S.C. § 103(a)

## IX. DETAILED EXPLANATIONS PURSUANT TO 37 C.F.R. § 1.915(b)(3)

The following statements are made, pursuant to 37 C.F.R. § 1.915(b)(3), pointing out each substantial new question of patentability, and each proposed ground of rejection, based on the prior art patents and printed publications cited above in Section VII and annexed hereto as Exhibits 6 to 16, in accordance with the "broadest reasonable interpretation" standard as set forth in M.P.E.P. § 2258(I)(G),[3] which also applies to *inter partes* reexamination proceedings (M.P.E.P. § 2658). As set forth in detail below, the foregoing prior art patents and printed publications would have been considered important by a reasonable Examiner in deciding whether to allow claims 1 to 5 of the '034 patent. Therefore, these prior art patents and printed publications raise substantial new questions of patentability. In addition, the prior art patents and printed publications cited above should be

[3] "During reexamination, claims are given their broadest reasonable interpretation consistent with the specification and limitations in the specification are not read into the claims."

considered to be important to a reasonable Examiner in determining whether claims 1 to 46, as proposed by Balther in the *Ex Parte* Reexamination of the '034 patent, are patentable.

The criteria for determining whether a substantial new question of patentability is present is set forth in M.P.E.P. § 2642(I), which states:

> [F]or a substantial new question of patentability to be present, it is only necessary that:
>
> (A) The prior art patents and/or printed publications raise a substantial question of patentability regarding at least one claim, i.e., the teaching of the prior art patents and printed publications is such that a reasonable examiner would consider the teaching to be **important** in deciding whether or not the claim is patentable; and
>
> (B) The same question of patentability as to the claim has not been decided by the Office in a previous examination or pending reexamination of the patent or in a final holding of invalidity by the Federal Courts in a decision on the merits involving the claim. (emphasis in original).

With respect to the original prosecution of the '034 patent, this Request presents substantial new questions of patentability. It should be noted that of the prior art documents that are relied upon in this request, only Toda et al., Okuchi et al., and Gotoh were considered by the Examiner during the prosecution of the '034 patent. While the Examiner relied on these references in anticipation rejections under 35 U.S.C. §§ 102(b) and (e), this Request presents substantial new questions of patentability and proposed obviousness rejections based on these references under 35 U.S.C. § 103(a). These questions of patentability and obviousness rejections were not decided during the original prosecution of the '034 patent. Thus, substantial new questions of patentability are presented herein with respect to Toda et al., Okuchi et al., and Gotoh. Furthermore, this Request cites prior art patents and printed publications that disclose the following limitation of claim 1 of the '034 patent, which apparently lead to its allowance:

> a controller that is responsive to said sensor signal for generating an output signal *only when said sensor signal changes by more than a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition.*

With respect to the '034 *Ex Parte* Reexamination, this Request also presents substantial new questions of patentability. As of the filing date of the Request, the only question of patentability that is being addressed in the '034 *Ex Parte* Reexamination is the question of anticipation of claims 1 and 3 under 35 U.S.C. § 102(b) by Shibata.

As indicated above, the '034 *Ex Parte* Reexamination was requested based on Balther's admission that Shibata anticipates claims 1 and 3 under 35 U.S.C. § 102(b), and the Office Action dated January 12, 2011 rejected claims 1 and 3 under 35 U.S.C. § 102(b) as anticipated by Shibata. As further indicated above, Balther responded to the Office Action by proposing amendments to claims 1 to 5 and proposing the addition of new dependent claims 6 to 45. According to Balther, "Shibata fails to teach '<u>**two or more sensors**</u> that are each adapted to generate a signal that is representative of a condition of the vehicle, said <u>sensed conditions including</u> <u>**two or more**</u> of road speed, steering angle, pitch, and suspension height of the vehicle.'" Substitute Amendment A at page 9 (emphasis in original). This Request cites prior art patents and printed publications that disclose the foregoing limitation of proposed amended claim 1.

Additionally, only claims 1 and 3 of the '034 patent are under reexamination in the '034 *Ex Parte* Reexamination. That is, claims 2, 4, and 5 are *not* being reexamined in the '034 *Ex Parte* Reexamination. This Request presents questions of patentability affecting claims 2, 4, and 5, and, as such, presents questions of patentability that are necessarily *different* from the only question of patentability that is being addressed in the '034 *Ex Parte* Reexamination.

Each of the questions of patentability presented herein are <u>***new***</u> questions of patentability, with respect to both the original prosecution of the '034 patent and the '034 *Ex Parte* Reexamination. Furthermore, as set forth below, the teachings of the prior art patents and printed publications cited herein are such that a reasonable Examiner would consider them important in deciding whether the issued claims of the '034 patent and the proposed claims in the '034 *Ex Parte* Reexamination are patentable. Accordingly, <u>***substantial***</u> new questions of patentability are raised in this Request.

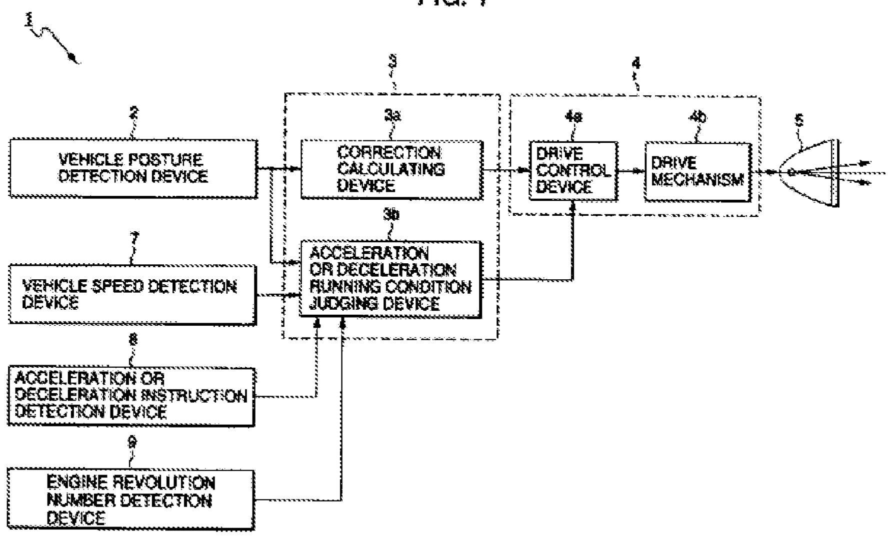
Pursuant to 37 C.F.R. § 1.915(b)(3), a detailed explanation of the pertinence and manner of applying the cited prior art patents and printed publications to every claim for which reexamination is requested is set forth below with reference to the appended charts.

### 1. Claims 1, 2, 4, and 5 of the '034 Patent Are Anticipated by Uchida Under 35 U.S.C. § 102(b)

Uchida anticipates claims 1, 2, 4, and 5 of the '034 patent under 35 U.S.C. § 102(b). Uchida was not cited during the prosecution of the '034 patent, and Uchida provides teachings that were not otherwise provided in any prior art that was relied upon during prosecution of the '034 patent.

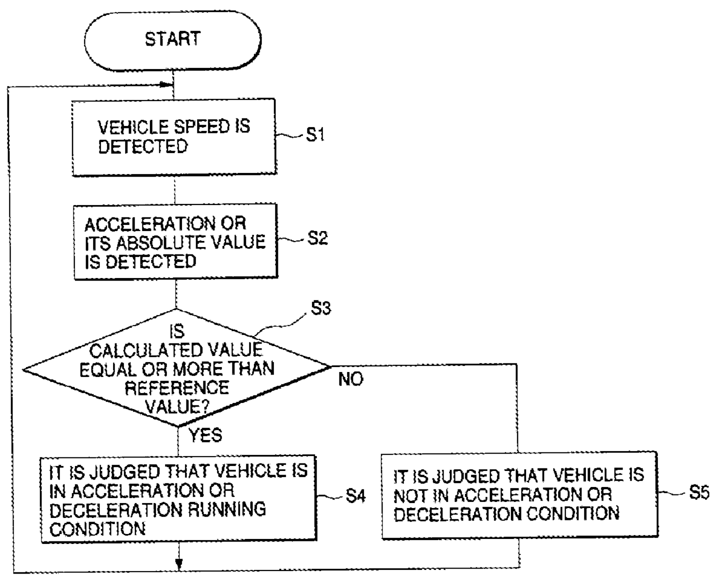
Uchida relates to a vehicle lamp illumination directional control device which detects the posture of a vehicle and adjusts the illumination direction of a vehicle lamp so that the illumination direction can always be kept in a predetermined direction. Page 1 at lines 3 to 7. Referring to Figure 1, the illumination direction of lights in a vehicle is controlled by detecting vehicle posture 2, vehicle speed 7, and vehicle acceleration or deceleration 8. The illumination direction is adjusted by control device 3, and drive device 4. Thus, as a vehicle posture changes when loads are applied to it, the inclination angle is measured and the direction of illumination of vehicle lamps are adjusted accordingly. Page 6, line 10 to page 7, line 4.

*FIG. 1*




Signals to the drive means are over-ridden when acceleration is not above a given threshold, such as when the vehicle is running over a rough road, to prevent excessive adjustment of the illumination direction. Specifically, referring to Figure 5, the vehicle is judged to be in acceleration or deceleration running condition or not in acceleration or deceleration condition by determining if a calculated value of acceleration is more or less than a reference value. Page 10, line 26 to page 11, line 6.

*FIG. 5*




When it is found that the vehicle is not in the acceleration or deceleration running condition, the control device 3 controls the illumination direction of the lamp by fixing the direction of illumination in a given direction, or by limiting the direction of the illumination light to a limited range. Page 4, lines 16 to 27.

Thus, Uchida discloses precisely the feature of claim 1 on which patentability of the issued claims was apparently based, *i.e.*, "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." *See e.g.*, figure 5; page 4, lines 16 to 27; page 10, line 26 to page 11, line 6. Accordingly, a substantial new question of patentability of claims 1, 2, 4, and 5 is raised by Uchida.

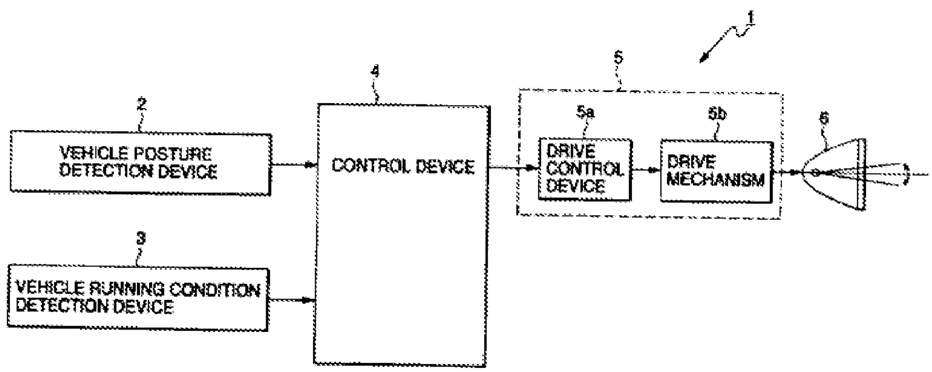
As set forth in the appended charts, Uchida discloses all of the limitations of claims 1, 2, 4, and 5 of the '034 patent and therefore anticipates claims 1, 2, 4, and 5 of the '034 patent. Accordingly, VWGoA proposes a ground of rejection of claims 1, 2, 4, and 5 of the '034 patent under 35 U.S.C. § 102(b) as anticipated by Uchida.

### 2. Claims 1, 2, 4, and 5 of the '034 Patent Are Anticipated by Takahashi Under 35 U.S.C. § 102(b)

Takahashi anticipates issued claims 1, 2, 4, and 5 of the '034 patent under 35 U.S.C. § 102(b). Takahashi was not cited during the prosecution of the '034 patent, and Takahashi provides teachings that were not otherwise provided in any prior art that was relied upon during prosecution of the '034 patent.

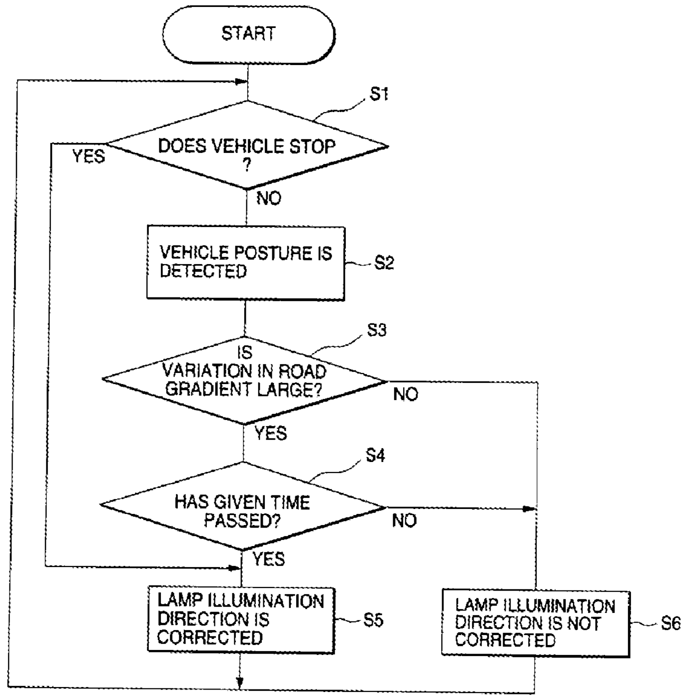
Takahashi relates to a vehicle lamp illumination direction control device which detects the posture of a vehicle and correctly adjusts the illumination direction of a vehicle lamp to maintain it in a predetermined direction. Page 1, lines 3 to 7. Referring to Figure 1, the illumination direction of lights in a vehicle is controlled by detecting vehicle posture 2, and vehicle running condition 3. The illumination direction is adjusted by control device 4, and drive device 5. Thus, as a vehicle posture changes when loads are applied to it, the inclination angle is measured and the direction of illumination of vehicle lamps are adjusted accordingly. Page 6, line 26 to page 7, line 4.

*FIG. 1*




A threshold value with respect to vehicle posture prevents the adjustment of the illumination direction when the vehicle makes sudden stops or starts. A threshold value with respect to time may be set in detection of the road gradient, and only when the amount of variations in the detection signal of the vehicle posture exceed a given reference value and such excessive state continues for a time longer than the set threshold time will the illumination direction be adjusted. Page 9, line 16 to page 10, line 3. Referring to Figure 7, in step S4 the determination of whether the variation in road gradient is more than a predetermined threshold is made. Based on this determination the lamp illumination is either corrected (S5) or not (S6). Page 10, line 20 to page 11, line 11.

FIG. 7



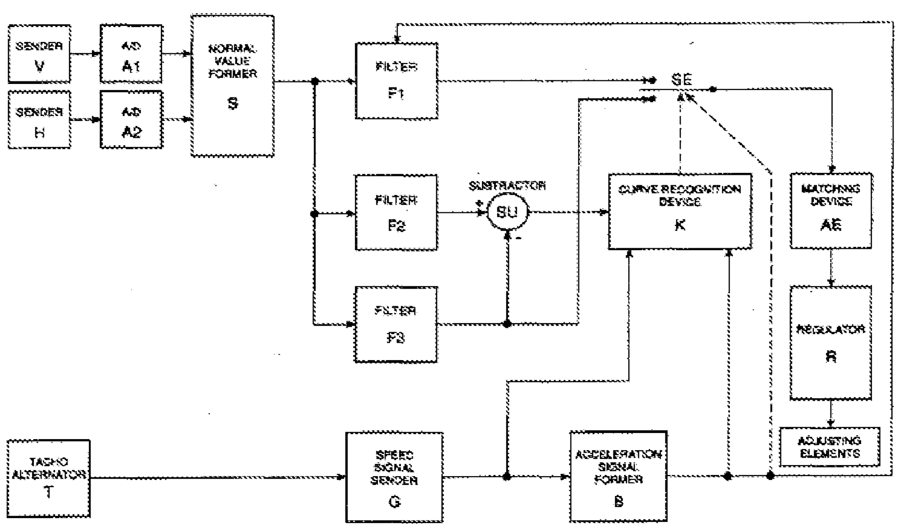

Thus, Takahashi discloses precisely the feature of claim 1 on which patentability of the issued claims was apparently based, *i.e.*, "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." *See e.g.*, figure 7; page 9, line 16 to page 10, line 3; page 10, line 20 to page 11, line 11. Accordingly, a substantial new question of patentability of claims 1, 2, 4, and 5 is raised by Takahashi.

As set forth in the appended charts, Takahashi discloses all of the limitations of claims 1, 2, 4, and 5 of the '034 patent and therefore anticipates claims 1, 2, 4, and 5 of the '034 patent. Accordingly, VWGoA proposes a ground of rejection of claims 1, 2, 4, and 5 of the '034 patent under 35 U.S.C. § 102(b) as anticipated by Takahashi.

### 3. Claims 1, 2, 4, and 5 of the '034 Patent Are <u>Anticipated by Hussman Under 35 U.S.C. § 102(b)</u>

Hussman anticipates issued claims 1, 2, 4, and 5 of the '034 patent under 35 U.S.C. § 102(b). Hussman was not cited during the prosecution of the '034 patent, and Hussman provides teachings that were not otherwise provided in any prior art that was relied upon during prosecution of the '034 patent.

Hussman relates to the regulation of the illumination direction of vehicle lamps based on the relative position of a vehicle body to the front and rear axles. Col. 1, lines 6 to 20. The change in the relative position of the vehicle body over time is detected and signaled by a resulting difference signal, a nominal-value signal. Abstract. This signal is filtered by three filters to determine the time for three average-value formations, each employing different time constants. Abstract. The first nominal-value signal is obtained by using a predetermined value. The second filtered nominal-value signal, obtained from using a smaller time constant, is then compared with the third filtered nominal-value signal, obtained from using a longer filtered time constant. Abstract. When a difference is detected between the second and third signal indicating changes in the inclination of the motor-vehicle body, and the vehicle speed is above a given threshold, the regulation of the illumination direction is switched from the first signal to the third signal, which was obtained using a larger time constant. Col. 3, lines 49 to 61; col. 6, lines 51 to 64. This causes the illumination direction to be adjusted less frequently, and prevents changing of illumination direction based on signals not attributable to longer term body position change. Col. 6, lines 51 to 64.




Thus, Hussman discloses precisely the feature of claim 1 on which patentability of the issued claims was apparently based, *i.e.*, "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." *See, e.g.*, col. 3, lines 49 to 61; col. 6, lines 51 to 64. Accordingly, a substantial new question of patentability of claims 1, 2, 4, and 5 is raised by Hussman.

As set forth in the appended charts, Hussman discloses all of the limitations of claims 1, 2, 4, and 5 of the ’034 patent and therefore anticipates claims 1, 2, 4, and 5 of the ’034 patent. Accordingly, VWGoA proposes a ground of rejection of claims 1, 2, 4, and 5 of the ’034 patent under 35 U.S.C. § 102(b) as anticipated by Hussman.

#### 4. Claims 1 and 5 of the ’034 Patent Are <u>Anticipated by Miskin et al. Under 35 U.S.C. § 102(b)</u>

Miskin et al. anticipates issued claims 1 and 5 of the ’034 patent under 35 U.S.C. § 102. Miskin et al. was not cited during the prosecution of the ’034 patent, and Miskin et al. provides teachings that were not otherwise provided in any prior art that was relied upon during prosecution of the ’034 patent.

Miskin et al. relates to a device for adjusting vehicle headlights automatically including four sensors, S1, S2, S3, and S4 that measure vehicle loading. Abstract; page 4. When the sensors detect a change in loading, they transmit signals through analog multiplexer 2 to the analog-digital converter 3 and are then input to microprocessor 4 as digital signals. Page 4. The microprocessor evaluates the signals by determining differential values and calculating the mean values from a series of measurements and compares these values to a predetermined threshold. Abstract.

Miskin et al. teaches that if the signals that lead to measured data are based on light loads caused by road bumps, the average differential value will be only a small deviation from the ideal headlight position value, and the predetermined threshold value will not be exceeded. Page 5. In this case, the headlights will not be adjusted. *Id.* In the case of a heavier load, the threshold value will be exceeded and the position of the headlights will be changed. *Id.*

Thus, Miskin et al. discloses precisely the feature of claim 1 on which patentability of the issued claims was apparently based, *i.e.*, “a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition.” *See e.g.*, Abstract; page 5. Accordingly, a substantial new question of patentability of claims 1 and 5 is raised by Miskin et al..

As set forth in the appended charts, Miskin et al. discloses all of the limitations of claims 1 and 5 of the ’034 patent and therefore anticipates claims 1 and 5 of the ’034 patent. Accordingly, VWGoA proposes a ground of rejection of claims 1 and 5 of the ’034 patent under 35 U.S.C. § 102(b) as anticipated by Miskin et al.

5. **Claims 1 and 5 of the '034 Patent Are <u>Anticipated by Leleve Under 35 U.S.C. § 102(b)</u>**

Leleve anticipates issued claims 1 and 5 of the '034 patent under 35 U.S.C. § 102. Leleve was not cited during the prosecution of the '034 patent, and Leleve provides teachings that were not otherwise provided in any prior art that was relied upon during prosecution of the '034 patent.

Leleve relates to a device for adjusting vehicle headlights as a function of the relative position of the vehicle wheels in relation to the vehicle body. Abstract. As illustrated in Figure 1, two sensors supply signals that correspond to the relative position of the vehicle. Sensor 1 is between the front axle and the body of the vehicle to detect the relative movement of the front of the vehicle, while sensor 2 is situated on the rear axle and performs the same function for the rear of the vehicle. Page 12. The signals from sensors 1 and 2 are sent to mixer stage 3, which generates a signal representative of the vibration or rocking motion of the vehicle. *Id.*

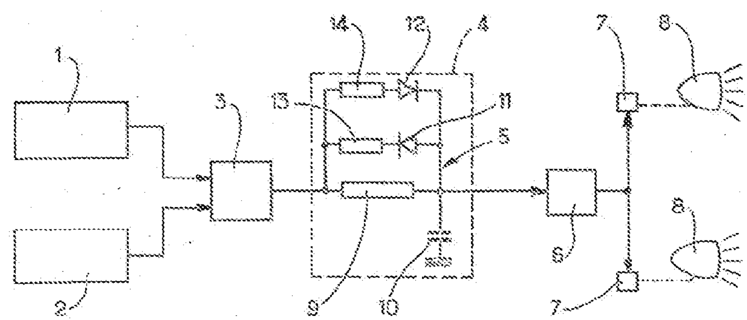


FIG. 1

The output of mixer stage 3 is connected to low pass filter 4, and the output of filter 4 is connected to control device 6, which actuates the mechanisms 7 causing headlights 8 to move. *Id.* Filter 4 is used to filter out frequencies above a certain threshold, for example, frequencies over 2 Hz, which can occur due to the pavement of the road and do not require adjustment. Pages 6 to 8. This feature prevents unwanted frequent adjusting of the headlights and also prolongs the service life of the system. Pages 6 to 7.

Thus, Leleve discloses precisely the feature of claim 1 on which patentability of the issued claims was apparently based, *i.e.*, "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." *See e.g.*, Abstract; page 5. Accordingly, a substantial new question of patentability of claims 1 and 5 is raised by Leleve.

As set forth in the appended charts, Leleve discloses all of the limitations of claims 1 and 5 of the '034 patent and therefore anticipates claims 1 and 5 of the '034 patent. Accordingly, VWGoA proposes a ground of rejection of claims 1 and 5 of the '034 patent under 35 U.S.C. § 102(b) as anticipated by Leleve.

#### 6. Claims 1, 2, 4, and 5 of the '034 Patent Are Unpatentable Over The Combination of Toda et al. and Uchida Under 35 U.S.C. § 103(a)

Claims 1, 2, 4, and 5 are unpatentable over the combination of Toda et al. and Uchida under 35 U.S.C. § 103(a). Although Toda et al. was relied on by the Examiner during the prosecution of the '034 patent, it was relied upon in an anticipation rejection under 35 U.S.C. § 102(e). The Examiner ultimately allowed application claim 14, which issued as claim 1 in the '034 patent, because of the inclusion of the limitation "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." As indicated above, Uchida was not cited during the prosecution of the '034 patent and discloses the foregoing limitation that the Examiner considered to be missing from Toda et al.

Toda et al. discloses an automatic leveling device for automotive vehicle headlamps. The system includes actuators to tilt the optical axes of the vehicle headlights, and a control unit which controls the driving of the actuators based on a detected pitch angle such that the optical axes of the headlamps stay in a certain inclined state with respect to the surface of the road. Col. 1, lines 52 to 63. The system further includes a vehicle speed detection means 12 and a pitch angle detection means 14. Abstract. Toda et al. further discloses that while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, and the acceleration is equal to or lower than a reference value, and these states continue for a predetermined amount of time. Col. 4, lines 1 to 25.

As discussed above, Uchida discloses that signals to the drive means are over-ridden when acceleration is not above a given threshold, such as when the vehicle is running over a rough road, to prevent excessive adjustment of the illumination direction. Specifically, referring to Figure 5, the vehicle is judged to be in acceleration or deceleration running condition or not in acceleration or deceleration condition by determining if a calculated value of acceleration is more or less than a reference value. Page 10, line 26 to page 11, line 6. Thus, Uchida discloses precisely the feature of claim 1 on which patentability of the issued claims was apparently based, *i.e.*, "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." *See e.g.*, figure 5; page 4, lines 16 to 27; page 10, line 26 to page 11, line 6.

A person of ordinary skill in the art at the time of the alleged inventions claimed in claims 1, 2, 4, and 5 of the '034 patent were made would have been motivated to combine the features provided by Toda et al. and the features of Uchida to "prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle" as described, for example, on page 4, lines 16 to 27 of Uchida. Moreover, combining the automatic leveling device described in Toda et al. and the vehicle lamp illumination directional control in Uchida is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Toda et al. and Uchida discloses all of the limitations of claims 1, 2, 4, and 5.

Based on the foregoing, a substantial new question of patentability of claims 1, 2, 4, and 5 of the '034 patent is raised by the combination of Toda et al. and Uchida. Accordingly, VWGoA proposes a ground of rejection of claims 1, 2, 4, and 5 of the '034 patent under 35 U.S.C. § 103(a) as obvious over the combination of Toda et al. and Uchida.

#### 7. Claims 1, 2, 4, and 5 of the '034 Patent Are Unpatentable Over the Combination of Toda et al. and Takahashi Under 35 U.S.C. § 103(a)

Claims 1, 2, 4, and 5 are unpatentable over the combination of Toda et al. and Takahashi under 35 U.S.C. § 103(a) As discussed above, Toda et al. was relied on by the Examiner during the prosecution of the '034 patent in rejecting the claims as anticipated under 35 U.S.C. § 102(e). The Examiner ultimately allowed application claim 14, which issued as claim 1 in the '034 patent, because of the inclusion of the limitation "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." As indicated above, Takahashi was not cited during the prosecution of the '034 patent and discloses the foregoing limitation that the Examiner considered to be missing from Toda et al.

Toda et al. discloses an automatic leveling device for automotive vehicle headlamps. The system includes actuators to tilt the optical axes of the vehicle headlights, and a control unit which controls the driving of the actuators based on a detected pitch angle such that the optical axes of the headlamps stay in a certain inclined state with respect to the surface of the road. Col. 1, lines 52 to 63. The system further includes a vehicle speed detection means 12 and a pitch angle detection means 14. Abstract. Toda et al. further discloses that while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, and the acceleration is equal to or lower than a reference value, and these states continue for a predetermined amount of time. Col. 4, lines 1 to 25.

As discussed above, Takahashi discloses that a threshold value with respect to vehicle posture prevents the adjustment of the illumination direction when the vehicle makes sudden stops or starts. A threshold value with respect to time may be set in detection of the road gradient, and only when the amount of variations in the detection signal of the vehicle posture exceed a given reference value and such excessive state continues for a time longer than the set threshold time will the illumination direction be adjusted. Page 9, line 16 to page 10, line 3. Referring to Figure 7, in step S4 the determination of whether the variation in road gradient is more than a predetermined threshold is made. Based on this determination the lamp illumination is either corrected (S5) or not (S6). Page 10, line 20 to page 11, line 11. Thus, Takahashi discloses precisely the feature of claim 1 on which patentability of the issued claims was apparently based, *i.e.*, "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." *See e.g.*, figure 7; page 9, line 16 to page 10, line 3; page 10, line 20 to page 11, line 11.

A person of ordinary skill in the art at the time of the alleged inventions claimed in claims 1, 2, 4, and 5 of the '034 patent were made would have been motivated to combine the features provided by Toda et al. and the features of Takahashi to "improve . . . visibility . . . and guarantee the safety of running of the vehicle" as described, for example, on page 3, lines 8 to 15 of Takahashi. Moreover, combining the automatic leveling device described in Toda et al. and the vehicle lamp illumination directional control in Takahashi is merely: (a) a combination of prior art elements according to known methods to yield predictable results;

(b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Toda et al. and Takahashi discloses all of the limitations of claims 1, 2, 4, and 5.

Based on the foregoing, a substantial new question of patentability of claims 1, 2, 4, and 5 of the '034 patent is raised by the combination of Toda et al. and Takahashi. Accordingly, VWGoA proposes a ground of rejection of claims 1, 2, 4, and 5 of the '034 patent under 35 U.S.C. § 103(a) as obvious over the combination of Toda et al. and Takahashi.

#### 8. Claims 1, 2, 4, and 5 of the '034 Patent Are Unpatentable Over the Combination of Toda et al. and Hussman Under 35 U.S.C. § 103(a)

Claims 1, 2, 4, and 5 are unpatentable over the combination of Toda et al. and Hussman under 35 U.S.C. § 103(a). As discussed above, Toda et al. was relied on by the Examiner during the prosecution of the '034 patent in rejecting the claims as anticipated under 35 U.S.C. § 102(e). The Examiner ultimately allowed application claim 14, which issued as claim 1 in the '034 patent, because of the inclusion of the limitation "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." As indicated above, Hussman was not cited during the prosecution of the '034 patent and discloses the foregoing limitation that the Examiner considered to be missing from Toda et al.

Toda et al. discloses an automatic leveling device for automotive vehicle headlamps. The system includes actuators to tilt the optical axes of the vehicle headlights, and a control unit which controls the driving of the actuators based on a detected pitch angle such that the optical axes of the headlamps stay in a certain inclined state with respect to the surface of the road. Col. 1, lines 52 to 63. The system further includes a vehicle speed detection means 12 and a pitch angle detection means 14. Abstract. Toda et al. further discloses that while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, and the acceleration is equal to or lower than a reference value, and these states continue for a predetermined amount of time. Col. 4, lines 1 to 25.

As discussed above, Hussman discloses that when difference between the second and third signal is detected indicating changes in the inclination of the motor-vehicle body, and the vehicle speed is above a given threshold, the regulation of the illumination direction is switched from the first signal to the third signal, which was obtained using a larger time constant. Col. 3, lines 49 to 61; col. 6, lines 51 to 64. This causes the illumination direction to be adjusted less frequently, and prevents changing of illumination direction based on signals not attributable to longer term body position change. Col. 6, lines 51 to 64.

Thus, Hussman discloses precisely the feature of claim 1 on which patentability of the issued claims was apparently based, *i.e.*, "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." *See, e.g.*, col. 3, lines 49 to 61; col. 6, lines 51 to 64.

A person of ordinary skill in the art at the time of the alleged inventions claimed in claims 1, 2, 4, and 5 of the '034 patent were made would have been motivated to combine the features provided by Toda et al. and the features of Hussman to "avoid[] false adjustments caused by" "inclination changes of the motor-vehicle body which are not attributable to changes in load or in road surface unevenness" as described, for example, at col. 1, line 65 to col. 2, line 4 of Hussman. Moreover, combining the automatic leveling device described in Toda et al. and the vehicle lamp illumination directional control in Hussman is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Toda et al. and Hussman discloses all of the limitations of claims 1, 2, 4, and 5.

Based on the foregoing, a substantial new question of patentability of claims 1, 2, 4, and 5 of the '034 patent is raised by the combination of Toda et al. and Hussman. Accordingly, VWGoA proposes a ground of rejection of claims 1, 2, 4, and 5 of the '034 patent under 35 U.S.C. § 103(a) as obvious over the combination of Toda et al. and Hussman.

### 9. Claims 1, 2, 4, and 5 of the '034 Patent Are Unpatentable Over the Combination of Toda et al. and Miskin et al. Under 35 U.S.C. § 103(a)

Claims 1, 2, 4, and 5 are unpatentable over the combination of Toda et al. and Miskin et al. under 35 U.S.C. § 103(a). As discussed above, Toda et al. was relied on by the Examiner during the prosecution of the '034 patent in rejecting the claims as anticipated under 35 U.S.C. § 102(e). The Examiner ultimately allowed application claim 14, which issued as claim 1 in the '034 patent, because of the inclusion of the limitation "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." As indicated above, Miskin et al. was not cited during the prosecution of the '034 patent and discloses the foregoing limitation that the Examiner considered to be missing from Toda et al.

Toda et al. discloses an automatic leveling device for automotive vehicle headlamps. The system includes actuators to tilt the optical axes of the vehicle headlights, and a control unit which controls the driving of the actuators based on a detected pitch angle such that the optical axes of the headlamps stay in a certain inclined state with respect to the surface of the road. Col. 1, lines 52 to 63. The system further includes a vehicle speed detection means 12 and a pitch angle detection means 14. Abstract. Toda et al. further discloses that while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, and the acceleration is equal to or lower than a reference value, and these states continue for a predetermined amount of time. Col. 4, lines 1 to 25.

Miskin et al. teaches that if the signals that lead to measured data are based on light loads caused by road bumps, the average differential value will be only a small deviation from the ideal headlight position value, and the predetermined threshold value will not be exceeded. Page 5. In this case, the headlights will not be adjusted. *Id.* In the case of a heavier load, the threshold value will be exceeded and the position of the headlights will be changed. *Id.*

Thus, Miskin et al. discloses precisely the feature of claim 1 on which patentability of the issued claims was apparently based, *i.e.*, "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." *See e.g.*, Abstract; page 5.

A person of ordinary skill in the art at the time of the alleged inventions claimed in claims 1, 2, 4, and 5 of the ’034 patent were made would have been motivated to combine the features provided by Toda et al. and the features of Miskin et al. to provide for “the correct illumination of the road regardless of the load of the vehicle that changes its position compared to its unloaded state” and so that “blinding of oncoming vehicles is avoided” as described, for example, on page 3 of Miskin et al. Moreover, combining the automatic leveling device described in Toda et al. and the vehicle lamp illumination directional control in Miskin et al. is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Toda et al. and Miskin et al. discloses all of the limitations of claims 1, 2, 4, and 5.

Based on the foregoing, a substantial new question of patentability of claims 1, 2, 4, and 5 of the ’034 patent is raised by the combination of Toda et al. and Miskin et al. Accordingly, VWGoA proposes a ground of rejection of claims 1, 2, 4, and 5 of the ’034 patent under 35 U.S.C. § 103(a) as obvious over the combination of Toda et al. and Miskin et al.

#### 10. Claims 1, 2, 4, and 5 of the ’034 Patent Are Unpatentable Over <u>The Combination of Toda et al. and Leleve Under 35 U.S.C. § 103(a)</u>

Claims 1, 2, 4, and 5 are unpatentable over the combination of Toda et al. and Leleve et al. under 35 U.S.C. § 103(a). As discussed above, Toda et al. was relied on by the Examiner during the prosecution of the ’034 patent in rejecting the claims as anticipated under 35 U.S.C. § 102(e). The Examiner ultimately allowed application claim 14, which issued as claim 1 in the ’034 patent, because of the inclusion of the limitation “a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition.” As indicated above, Leleve was not cited during the prosecution of the ’034 patent and discloses the foregoing limitation that the Examiner considered to be missing from Toda et al.

Toda et al. discloses an automatic leveling device for automotive vehicle headlamps. The system includes actuators to tilt the optical axes of the vehicle headlights, and a control unit which controls the driving of the actuators based on a detected pitch angle such that the optical axes of the headlamps stay in a certain inclined state with respect to the surface of the road. Col. 1, lines 52 to 63. The system further includes a vehicle speed detection means 12 and a pitch angle detection means 14. Abstract. Toda et al. further discloses that while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, and the acceleration is equal to or lower than a reference value, and these states continue for a predetermined amount of time. Col. 4, lines 1 to 25.

Leleve teaches that if the signals that lead to the measured vibration of the vehicle are caused by road bumps, the frequency will be above a certain level, and the frequency threshold will be exceeded. Pages 6 to 8. In this case, the headlights will not be adjusted. *Id.* In the case of lower frequencies, the signal will pass through the filter causing the headlights to be adjusted. Page 12.

Thus, Leleve discloses precisely the feature of claim 1 on which patentability of the issued claims was apparently based, *i.e.*, "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." *See e.g.*, pages 6 to 8.

A person of ordinary skill in the art at the time of the alleged inventions claimed in claims 1, 2, 4, and 5 of the '034 patent were made would have been motivated to combine the features provided by Toda et al. and the features of Leleve to provide for a device that can "differentiate between phenomena that require correction, and those for which a correction is undesired" and can prevent a phase shift that would cause the headlights "to be directed upward at the same moment that the front part of the vehicle body is executing an upward movement" as described, for example, on page 7 of Leleve. Moreover, combining the automatic leveling device described in Toda et al. and the vehicle lamp illumination directional control in Leleve is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Toda et al. and Leleve discloses all of the limitations of claims 1, 2, 4, and 5.

Based on the foregoing, a substantial new question of patentability of claims 1, 2, 4, and 5 of the ’034 patent is raised by the combination of Toda et al. and Leleve. Accordingly, VWGoA proposes a ground of rejection of claims 1, 2, 4, and 5 of the ’034 patent under 35 U.S.C. § 103(a) as obvious over the combination of Toda et al. and Leleve.

#### 11. Claims 1, 2, 4, and 5 of the ’034 Patent Are Unpatentable Over the Combination of Okuchi et al. and Uchida Under 35 U.S.C. § 103(a)

Claims 1, 2, 4, and 5 are unpatentable over the combination of Okuchi et al. and Uchida under 35 U.S.C. § 103(a). As discussed above, Okuchi et al. was relied on by the Examiner during the prosecution of the ’034 patent in rejecting the claims as anticipated under 35 U.S.C. § 102(e). The Examiner ultimately allowed application claim 14, which issued as claim 1 in the ’034 patent, because of the inclusion of the limitation “a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition.” As indicated above, Uchida was not cited during the prosecution of the ’034 patent and discloses the foregoing limitation that the Examiner considered to be missing from Okuchi et al.

Okuchi et al. discloses a vehicle headlight optical axis direction adjusting system for adjusting the direction of illumination of a vehicle headlight. In Okuchi et al. the vehicle pitch angle is calculated from vehicle height sensors 11F, 11R, HF and HR on the front and rear portions of a vehicle. Col. 4, line 58 to col. 5, line 8. These signals are supplied to Electronic Control Unit 20, which outputs signals to actuators to adjust the optical axis direction of the headlights as needed. Col. 5, lines 11 to 20. Referring to Figure 3, Okuchi further discloses measuring vehicle speed and acceleration and adjusting the filtering of the change in pitch signals in accordance with the running state of the vehicle. Col. 5, line 52 to col. 6, line 39. For example, when the vehicle speed is lower than a speed threshold, the control mode “stop mode” is implemented, and no filtering of the pitch signal is performed so that the actuator is allowed to respond quickly to changes in pitch angle. Col. 5, line 66 to col. 6, line 5. In contrast, when vehicle speed is higher than the threshold, but vehicle acceleration is lower than a threshold, the control mode “constant speed” mode is implemented, and high filtering of the pitch signal is performed as it is largely assumed that the pitch angle does not largely change. Col. 6, lines 29 to 38.

As discussed above, Uchida discloses that signals to the drive means are over-ridden when acceleration is not above a given threshold, such as when the vehicle is running over a rough road, to prevent excessive adjustment of the illumination direction. Specifically, referring to Figure 5, the vehicle is judged to be in acceleration or deceleration running condition or not in acceleration or deceleration condition by determining if a calculated value of acceleration is more or less than a reference value. Page 10, line 26 to page 11, line 6. Thus, Uchida discloses precisely the feature of claim 1 on which patentability of the issued claims was apparently based, *i.e.*, "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating threshold." *See e.g.*, figure 5; page 4, lines 16 to 27; page 10, line 26 to page 11, line 6.

A person of ordinary skill in the art at the time of the alleged inventions claimed in claims 1, 2, 4, and 5 of the '034 patent were made would have been motivated to combine the features provided by Okuchi et al. and the features of Uchida to "prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle" as described, for example, on page 4, lines 16 to 27 of Uchida. Moreover, combining the automatic headlight optical axis adjusting system described in Okuchi et al. and the vehicle lamp illumination directional control in Uchida is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Okuchi et al. and Uchida discloses all of the limitations of claims 1, 2, 4, and 5.

Based on the foregoing, a substantial new question of patentability of claims 1, 2, 4, and 5 of the '034 patent is raised by the combination of Okuchi et al. and Uchida. Accordingly, VWGoA proposes a ground of rejection of claims 1, 2, 4, and 5 of the '034 patent under 35 U.S.C. § 103(a) as obvious over the combination of Okuchi et al. and Uchida.

**12. Claims 1, 2, 4, and 5 of the '034 Patent Are Unpatentable Over the Combination of Okuchi et al. and Takahashi Under 35 U.S.C. § 103(a)**

Claims 1, 2, 4, and 5 are unpatentable over the combination of Okuchi et al. and Takahashi under 35 U.S.C. § 103(a). As discussed above, Okuchi et al. was relied on by the Examiner during the prosecution of the '034 patent in rejecting the claims as anticipated under 35 U.S.C. § 102(e). The Examiner ultimately allowed application claim 14, which issued as claim 1 in the '034 patent, because of the inclusion of the limitation "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." As indicated above, Takahashi was not cited during the prosecution of the '034 patent and discloses the foregoing limitation that the Examiner considered to be missing from Okuchi et al.

Okuchi et al. discloses a vehicle headlight optical axis direction adjusting system for adjusting the direction of illumination of a vehicle headlight. In Okuchi et al. the vehicle pitch angle is calculated from vehicle height sensors 11F, 11R, HF and HR on the front and rear portions of a vehicle. Col. 4, line 58 to col. 5, line 8. These signals are supplied to Electronic Control Unit 20, which outputs signals to actuators to adjust the optical axis direction of the headlights as needed. Col. 5, lines 11 to 20. Referring to Figure 3, Okuchi further discloses measuring vehicle speed and acceleration and adjusting the filtering of the change in pitch signals in accordance with the running state of the vehicle. Col. 5, line 52 to col. 6, line 39. For example, when the vehicle speed is lower than a speed threshold, the control mode "stop mode" is implemented, and no filtering of the pitch signal is performed so that the actuator is allowed to respond quickly to changes in pitch angle. Col. 5, line 66 to col. 6, line 5. In contrast, when vehicle speed is higher than the threshold, but vehicle acceleration is lower than a threshold, the control mode "constant speed" mode is implemented, and high filtering of the pitch signal is performed as it is largely assumed that the pitch angle does not largely change. Col. 6, lines 29 to 38.

As discussed above, Takahashi discloses that a threshold value with respect to vehicle posture prevents the adjustment of the illumination direction when the vehicle makes sudden stops or starts. A threshold value with respect to time may be set in detection of the road gradient, and only when the amount of variations in the detection signal of the vehicle posture exceed a given reference value and such excessive state continues for a time longer than the set threshold time will the illumination direction be adjusted. Page 9, line 16 to page 10, line

3. Referring to Figure 7, in step S4 the determination of whether the variation in road gradient is more than a predetermined threshold is made. Based on this determination the lamp illumination is either corrected (S5) or not (S6). Page 10, line 20 to page 11, line 11. Thus, Takahashi discloses precisely the feature of claim 1 on which patentability of the issued claims was apparently based, *i.e.*, "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." *See e.g.*, figure 7; page 9, line 16 to page 10, line 3; page 10, line 20 to page 11, line 11.

A person of ordinary skill in the art at the time of the alleged inventions claimed in claims 1, 2, 4, and 5 of the '034 patent were made would have been motivated to combine the features provided by Okuchi et al. and the features of Takahashi to "improve . . . visibility . . . and guarantee the safety of running of the vehicle" as described, for example, on page 3, lines 8 to 15 of Takahashi. Moreover, combining the automatic headlight optical axis adjusting system described in Okuchi et al. and the vehicle lamp illumination directional control in Takahashi is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Okuchi et al. and Takahashi discloses all of the limitations of claims 1, 2, 4, and 5.

Based on the foregoing, a substantial new question of patentability of claims 1, 2, 4, and 5 of the '034 patent is raised by the combination of Okuchi et al. and Takahashi. Accordingly, VWGoA proposes a ground of rejection of claims 1, 2, 4, and 5 of the '034 patent under 35 U.S.C. § 103(a) as obvious over the combination of Okuchi et al. and Takahashi.

### 13. Claims 1, 2, 4, and 5 of the '034 Patent Are Unpatentable Over the Combination of Okuchi et al. and Hussman Under 35 U.S.C. § 103(a)

Claims 1, 2, 4, and 5 are unpatentable over the combination of Okuchi et al. and Hussman under 35 U.S.C. § 103(a). As discussed above, Okuchi et al. was relied on by the

Examiner during the prosecution of the '034 patent in rejecting the claims as anticipated under 35 U.S.C. § 102(e). The Examiner ultimately allowed application claim 14, which issued as claim 1 in the '034 patent, because of the inclusion of the limitation "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." As indicated above, Hussman was not cited during the prosecution of the '034 patent and discloses the foregoing limitation that the Examiner considered to be missing from Okuchi et al.

Okuchi et al. discloses a vehicle headlight optical axis direction adjusting system for adjusting the direction of illumination of a vehicle headlight. In Okuchi et al. the vehicle pitch angle is calculated from vehicle height sensors 11F, 11R, HF and HR on the front and rear portions of a vehicle. Col. 4, line 58 to col. 5, line 8. These signals are supplied to Electronic Control Unit 20, which outputs signals to actuators to adjust the optical axis direction of the headlights as needed. Col. 5, lines 11 to 20. Referring to Figure 3, Okuchi further discloses measuring vehicle speed and acceleration and adjusting the filtering of the change in pitch signals in accordance with the running state of the vehicle. Col. 5, line 52 to col. 6, line 39. For example, when the vehicle speed is lower than a speed threshold, the control mode "stop mode" is implemented, and no filtering of the pitch signal is performed so that the actuator is allowed to respond quickly to changes in pitch angle. Col. 5, line 66 to col. 6, line 5. In contrast, when vehicle speed is higher than the threshold, but vehicle acceleration is lower than a threshold, the control mode "constant speed" mode is implemented, and high filtering of the pitch signal is performed as it is largely assumed that the pitch angle does not largely change. Col. 6, lines 29 to 38.

As discussed above, Hussman discloses that when difference between the second and third signal is detected indicating changes in the inclination of the motor-vehicle body, and the vehicle speed is above a given threshold, the regulation of the illumination direction is switched from the first signal to the third signal, which was obtained using a larger time constant. Col. 3, lines 49 to 61; col. 6, lines 51 to 64. This causes the illumination direction to be adjusted less frequently, and prevents changing of illumination direction based on signals not attributable to longer term body position change. Col. 6, lines 51 to 64.

Thus, Hussman discloses precisely the feature of claim 1 on which patentability of the issued claims was apparently based, *i.e.*, "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." *See, e.g.*, col. 3, lines 49 to 61; col. 6, lines 51 to 64.

A person of ordinary skill in the art at the time of the alleged inventions claimed in claims 1, 2, 4, and 5 of the '034 patent were made would have been motivated to combine the features provided by Okuchi et al. and the features of Hussman to "avoid[] false adjustments caused by" "inclination changes of the motor-vehicle body which are not attributable to changes in load or in road surface unevenness" as described, for example, at col. 1, line 65 to col. 2, line 4 of Hussman. Moreover, combining the automatic headlight optical axis adjusting system described in Okuchi et al. and the vehicle lamp illumination directional control in Hussman is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Okuchi et al. and Hussman discloses all of the limitations of claims 1, 2, 4, and 5.

Based on the foregoing, a substantial new question of patentability of claims 1, 2, 4, and 5 of the '034 patent is raised by the combination of Okuchi et al. and Hussman. Accordingly, VWGoA proposes a ground of rejection of claims 1, 2, 4, and 5 of the '034 patent under 35 U.S.C. § 103(a) as obvious over the combination of Okuchi et al. and Hussman.

**14. Claims 1, 2, 4, and 5 of the '034 Patent Are Unpatentable Over the Combination of <u>Okuchi et al. and Miskin et al. Under 35 U.S.C. § 103(a)</u>**

Claims 1, 2, 4, and 5 are unpatentable over the combination of Okuchi et al. and Miskin et al. under 35 U.S.C. § 103(a). As discussed above, Okuchi et al. was relied on by the Examiner during the prosecution of the '034 patent in rejecting the claims as anticipated under 35 U.S.C. § 102(e). The Examiner ultimately allowed application claim 14, which issued as claim 1 in the '034 patent, because of the inclusion of the limitation "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." As indicated above, Miskin et al. was not cited during the prosecution of the '034 patent and discloses the foregoing limitation that the Examiner considered to be missing from Okuchi et al.

Okuchi et al. discloses a vehicle headlight optical axis direction adjusting system for adjusting the direction of illumination of a vehicle headlight. In Okuchi et al. the vehicle pitch angle is calculated from vehicle height sensors 11F, 11R, HF and HR on the front and rear portions of a vehicle. Col. 4, line 58 to col. 5, line 8. These signals are supplied to Electronic Control Unit 20, which outputs signals to actuators to adjust the optical axis direction of the headlights as needed. Col. 5, lines 11 to 20. Referring to Figure 3, Okuchi further discloses measuring vehicle speed and acceleration and adjusting the filtering of the change in pitch signals in accordance with the running state of the vehicle. Col. 5, line 52 to col. 6, line 39. For example, when the vehicle speed is lower than a speed threshold, the control mode "stop mode" is implemented, and no filtering of the pitch signal is performed so that the actuator is allowed to respond quickly to changes in pitch angle. Col. 5, line 66 to col. 6, line 5. In contrast, when vehicle speed is higher than the threshold, but vehicle acceleration is lower than a threshold, the control mode "constant speed" mode is implemented, and high filtering of the pitch signal is performed as it is largely assumed that the pitch angle does not largely change. Col. 6, lines 29 to 38.

As discussed above, Miskin et al. teaches that if the signals that lead to measured data are based on light loads caused by road bumps, the average differential value will be only a small deviation from the ideal headlight position value, and the predetermined threshold value will not be exceeded. Page 5. In this case, the headlights will not be adjusted. *Id.* In the case of a heavier load, the threshold value will be exceeded and the position of the headlights will be changed. *Id.*

Thus, Miskin et al. discloses precisely the feature of claim 1 on which patentability of the issued claims was apparently based, *i.e.*, "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." *See e.g.*, Abstract; page 5.

A person of ordinary skill in the art at the time of the alleged inventions claimed in claims 1, 2, 4, and 5 of the '034 patent were made would have been motivated to combine the features provided by Okuchi et al. and the features of Miskin et al. to provide for "the correct illumination of the road regardless of the load of the vehicle that changes its position compared to its unloaded state" and so that "blinding of oncoming vehicles is avoided" as described, for example, on page 3 of Miskin et al. Moreover, combining the automatic headlight optical axis adjusting system described in Okuchi et al. and the vehicle lamp illumination directional control in Miskin et al. is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Okuchi et al. and Miskin et al. discloses all of the limitations of claims 1, 2, 4, and 5.

Based on the foregoing, a substantial new question of patentability of claims 1, 2, 4, and 5 of the '034 patent is raised by the combination of Okuchi et al. and Miskin et al. Accordingly, VWGoA proposes a ground of rejection of claims 1, 2, 4, and 5 of the '034 patent under 35 U.S.C. § 103(a) as obvious over the combination of Okuchi et al. and Miskin et al.

### 15. Claims 1, 2, 4, and 5 of the '034 Patent Are Unpatentable Over the Combination of Okuchi et al. and Leleve Under 35 U.S.C. § 103(a)

Claims 1, 2, 4, and 5 are unpatentable over the combination of Okuchi et al. and Leleve under 35 U.S.C. § 103(a). As discussed above, Okuchi et al. was relied on by the Examiner during the prosecution of the '034 patent in rejecting the claims as anticipated under 35 U.S.C. § 102(e). The Examiner ultimately allowed application claim 14, which issued as claim 1 in the '034 patent, because of the inclusion of the limitation "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." As indicated above, Leleve was not cited during the prosecution of the '034 patent and discloses the foregoing limitation that the Examiner considered to be missing from Okuchi et al.

Okuchi et al. discloses a vehicle headlight optical axis direction adjusting system for adjusting the direction of illumination of a vehicle headlight. In Okuchi et al. the vehicle pitch angle is calculated from vehicle height sensors 11F, 11R, HF and HR on the front and rear portions of a vehicle. Col. 4, line 58 to col. 5, line 8. These signals are supplied to Electronic Control Unit 20, which outputs signals to actuators to adjust the optical axis direction of the headlights as needed. Col. 5, lines 11 to 20. Referring to Figure 3, Okuchi further discloses measuring vehicle speed and acceleration and adjusting the filtering of the change in pitch signals in accordance with the running state of the vehicle. Col. 5, line 52 to col. 6, line 39. For example, when the vehicle speed is lower than a speed threshold, the control mode "stop mode" is implemented, and no filtering of the pitch signal is performed so that the actuator is allowed to respond quickly to changes in pitch angle. Col. 5, line 66 to col. 6, line 5. In contrast, when vehicle speed is higher than the threshold, but vehicle acceleration is lower than a threshold, the control mode "constant speed" mode is implemented, and high filtering of the pitch signal is performed as it is largely assumed that the pitch angle does not largely change. Col. 6, lines 29 to 38.

As discussed above, Leleve teaches that if the signals that lead to the measured vibration of the vehicle are caused by road bumps, the frequency will be above a certain level, and the frequency threshold will be exceeded. Pages 6 to 8. In this case, the headlights will not be adjusted. *Id.* In the case of lower frequencies, the signal will pass through the filter causing the headlights to be adjusted. Page 12.

Thus, Leleve discloses precisely the feature of claim 1 on which patentability of the issued claims was apparently based, *i.e.*, "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." *See e.g.*, pages 6 to 8.

A person of ordinary skill in the art at the time of the alleged inventions claimed in claims 1, 2, 4, and 5 of the '034 patent were made would have been motivated to combine the features provided by Okuchi et al. and the features of Leleve to provide for a device that can "differentiate between phenomena that require correction, and those for which a correction is undesired" and can prevent a phase shift that would cause the headlights "to be directed upward at the same moment that the front part of the vehicle body is executing an upward movement" as described, for example, on page 7 of Leleve. Moreover, combining the automatic headlight optical axis adjusting system described in Okuchi et al. and the vehicle lamp illumination directional control in Leleve is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Okuchi et al. and Leleve discloses all of the limitations of claims 1, 2, 4, and 5.

Based on the foregoing, a substantial new question of patentability of claims 1, 2, 4, and 5 of the '034 patent is raised by the combination of Okuchi et al. and Leleve. Accordingly, VWGoA proposes a ground of rejection of claims 1, 2, 4, and 5 of the '034 patent under 35 U.S.C. § 103(a) as obvious over the combination of Okuchi et al. and Leleve.

### 16. Claims 1 to 5 of the '034 Patent Are Unpatentable Over the Combination of Gotoh and Uchida Under 35 U.S.C. § 103(a)

Claims 1 to 5 are unpatentable over the combination of Gotoh and Uchida under 35 U.S.C. § 103(a). As discussed above, Gotoh was relied on by the Examiner during the prosecution of the '034 patent in rejecting the claims as anticipated under 35 U.S.C. § 102(b). The Examiner ultimately allowed application claim 14, which issued as claim 1 in the '034 patent, because of the inclusion of the limitation "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." As indicated above, Uchida was not cited during the prosecution of the '034 patent and discloses the foregoing limitation that the Examiner considered to be missing from Gotoh.

Gotoh discloses a device for changing the illumination direction of a vehicle headlights in the right and left directions. Referring to figure 3, a steering angle sensor 21, a vehicle speed sensor 22, and a yaw rate sensor 23, signal the steering angle, vehicle speed, and yaw rate, respectively to the Light Distribution Control ECU 10. Col. 4, line 61 to col. 5, line 5.

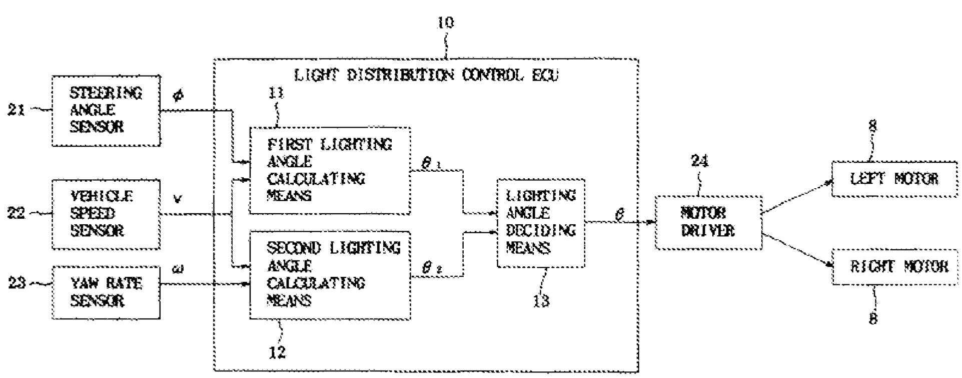



FIG. 3

The ECU 10 calculates a first lighting angle based on the steering angle as detected by the steering angle sensor and a speed correction coefficient based on the measured vehicle speed. Col. 5, lines 1 to 15. A second lighting angle based on the turning movement as based on the detections of the yaw rate and vehicle speed sensors. Col. 5, lines 16 to 24. The final lighting angle is decided based on whether the first lighting angle and the second lighting angle are pointed in the same right or left direction. Col. 5, lines 57 to 62.

As discussed above, Uchida discloses that signals to the drive means are over-ridden when acceleration is not above a given threshold, such as when the vehicle is running over a rough road, to prevent excessive adjustment of the illumination direction. Specifically, referring to Figure 5, the vehicle is judged to be in acceleration or deceleration running condition or not in acceleration or deceleration condition by determining if a calculated value of acceleration is more or less than a reference value. Page 10, line 26 to page 11, line 6. Thus, Uchida discloses precisely the feature of claim 1 on which patentability of the issued claims was apparently based, *i.e.*, "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." *See e.g.*, figure 5; page 4, lines 16 to 27; page 10, line 26 to page 11, line 6.

A person of ordinary skill in the art at the time of the alleged inventions claimed in claims 1 to 5 of the '034 patent were made would have been motivated to combine the features provided by Gotoh and the features of Uchida to "prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle" as described, for example, on page 4, lines 16 to 27 of Uchida. Moreover, combining the device for changing the illumination direction of a vehicle headlights in the right and left directions described in Gotoh and the vehicle lamp illumination directional control in Uchida is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Gotoh and Uchida discloses all of the limitations of claims 1 to 5.

Based on the foregoing, a substantial new question of patentability of claims 1 to 5 of the '034 patent is raised by the combination of Gotoh and Uchida. Accordingly, VWGoA proposes a ground of rejection of claims 1 to 5 of the '034 patent under 35 U.S.C. § 103(a) as obvious over the combination of Gotoh and Uchida.

### 17. Claims 1 to 5 of the '034 Patent Are Unpatentable Over the Combination of Gotoh and Takahashi Under 35 U.S.C. § 103(a)

Claims 1, 2, 3, 4, and 5 are unpatentable over the combination of Gotoh and Takahashi under 35 U.S.C. § 103(a). As discussed above, Gotoh was relied on by the Examiner during the prosecution of the '034 patent in rejecting the claims as anticipated under 35 U.S.C. § 102(b). The Examiner ultimately allowed application claim 14, which issued as claim 1 in the '034 patent, because of the inclusion of the limitation "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." As indicated above, Takahashi was not cited during the prosecution of the '034 patent and discloses the foregoing limitation that the Examiner considered to be missing from Gotoh.

As discussed above, Gotoh discloses a device for changing the illumination direction of a vehicle headlights in the right and left directions. Referring to figure 3, a steering angle sensor 21, a vehicle speed sensor 22, and a yaw rate sensor 23, signal the steering angle, vehicle speed, and yaw rate, respectively to the Light Distribution Control ECU 10. Col. 4, line 61 to col. 5, line 5. The ECU 10 calculates a first lighting angle based on the steering angle as detected by the steering angle sensor and a speed correction coefficient based on the measured vehicle speed. Col. 5, lines 1 to 15. A second lighting angle based on the turning movement as based on the detections of the yaw rate and vehicle speed sensors. Col. 5, lines 16 to 24. The final lighting angle is decided based on whether the first lighting angle and the second lighting angle are pointed in the same right or left direction. Col. 5, lines 57 to 62.

As discussed above, Takahashi discloses that a threshold value with respect to vehicle posture prevents the adjustment of the illumination direction when the vehicle makes sudden stops or starts. A threshold value with respect to time may be set in detection of the road gradient, and only when the amount of variations in the detection signal of the vehicle posture exceed a given reference value and such excessive state continues for a time longer than the set threshold time will the illumination direction be adjusted. Page 9, line 16 to page 10, line

3. Referring to Figure 7, in step S4 the determination of whether the variation in road gradient is more than a predetermined threshold is made. Based on this determination the lamp illumination is either corrected (S5) or not (S6). Page 10, line 20 to page 11, line 11. Thus, Takahashi discloses precisely the feature of claim 1 on which patentability of the issued claims was apparently based, *i.e.*, "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." *See e.g.*, figure 7; page 9, line 16 to page 10, line 3; page 10, line 20 to page 11, line 11.

A person of ordinary skill in the art at the time of the alleged inventions claimed in claims 1 to 5 of the '034 patent were made would have been motivated to combine the features provided by Gotoh and the features of Takahashi to "improve . . . visibility . . . and guarantee the safety of running of the vehicle" as described, for example, on page 3, lines 8 to 15 of Takahashi. Moreover, combining the device for changing the illumination direction of a vehicle headlights in the right and left directions described in Gotoh and the vehicle lamp illumination directional control in Takahashi is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Gotoh and Takahashi discloses all of the limitations of claims 1 to 5.

Based on the foregoing, a substantial new question of patentability of claims 1 to 5 of the '034 patent is raised by the combination of Gotoh and Takahashi. Accordingly, VWGoA proposes a ground of rejection of claims 1 to 5 of the '034 patent under 35 U.S.C. § 103(a) as obvious over the combination of Gotoh and Takahashi.

### 18. Claims 1 to 5 of the '034 Patent Are Unpatentable Over the Combination of Gotoh and Hussman Under 35 U.S.C. § 103(a)

Claims 1, 2, 3, 4, and 5 are unpatentable over the combination of Gotoh and Hussman under 35 U.S.C. § 103(a). As discussed above, Gotoh was relied on by the Examiner during the prosecution of the '034 patent in rejecting the claims as anticipated under 35 U.S.C. § 102(b). The Examiner ultimately allowed application claim 14, which issued as claim 1 in the '034 patent, because of the inclusion of the limitation "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." As indicated above, Hussman was not cited during the prosecution of the '034 patent and discloses the foregoing limitation that the Examiner considered to be missing from Gotoh.

As discussed above, Gotoh discloses a device for changing the illumination direction of a vehicle headlights in the right and left directions. Referring to figure 3, a steering angle sensor 21, a vehicle speed sensor 22, and a yaw rate sensor 23, signal the steering angle, vehicle speed, and yaw rate, respectively to the Light Distribution Control ECU 10. Col. 4, line 61 to col. 5, line 5. The ECU 10 calculates a first lighting angle based on the steering angle as detected by the steering angle sensor and a speed correction coefficient based on the measured vehicle speed. Col. 5, lines 1 to 15. A second lighting angle based on the turning movement as based on the detections of the yaw rate and vehicle speed sensors. Col. 5, lines 16 to 24. The final lighting angle is decided based on whether the first lighting angle and the second lighting angle are pointed in the same right or left direction. Col. 5, lines 57 to 62.

As discussed above, Hussman discloses that when difference between the second and third signal is detected indicating changes in the inclination of the motor-vehicle body, and the vehicle speed is above a given threshold, the regulation of the illumination direction is switched from the first signal to the third signal, which was obtained using a larger time constant. Col. 3, lines 49 to 61; col. 6, lines 51 to 64. This causes the illumination direction to be adjusted less frequently, and prevents changing of illumination direction based on signals not attributable to longer term body position change. Col. 6, lines 51 to 64.

Thus, Hussman discloses precisely the feature of claim 1 on which patentability of the issued claims was apparently based, *i.e.*, "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." *See, e.g.*, col. 3, lines 49 to 61; col. 6, lines 51 to 64.

A person of ordinary skill in the art at the time of the alleged inventions claimed in claims 1 to 5 of the '034 patent were made would have been motivated to combine the features provided by Gotoh and the features of Hussman to "avoid[] false adjustments caused by" "inclination changes of the motor-vehicle body which are not attributable to changes in load or in road surface unevenness" as described, for example, at col. 1, line 65 to col. 2, line 4 of Hussman. Moreover, combining the device for changing the illumination direction of a vehicle headlights in the right and left directions described in Gotoh and the vehicle lamp illumination directional control in Hussman is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Gotoh and Hussman discloses all of the limitations of claims 1 to 5.

Based on the foregoing, a substantial new question of patentability of claims 1 to 5 of the '034 patent is raised by the combination of Gotoh and Hussman. Accordingly, VWGoA proposes a ground of rejection of claims 1 to 5 of the '034 patent under 35 U.S.C. § 103(a) as obvious over the combination of Gotoh and Hussman.

### 19. Claims 1, 2, 3, and 5 of the '034 Patent Are Unpatentable Over the Combination of Gotoh and Miskin et al. Under 35 U.S.C. § 103(a)

Claims 1, 2, 3, and 5 are unpatentable over the combination of Gotoh and Miskin under 35 U.S.C. § 103(a). As discussed above, Gotoh was relied on by the Examiner during the prosecution of the '034 patent in rejecting the claims as anticipated under 35 U.S.C. § 102(b). The Examiner ultimately allowed application claim 14, which issued as claim 1 in the '034 patent, because of the inclusion of the limitation "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." As indicated above, Miskin et al. was not cited during the prosecution of the '034 patent and discloses the foregoing limitation that the Examiner considered to be missing from Gotoh.

As discussed above, Gotoh discloses a device for changing the illumination direction of a vehicle headlights in the right and left directions. Referring to figure 3, a steering angle sensor 21, a vehicle speed sensor 22, and a yaw rate sensor 23, signal the steering angle, vehicle speed, and yaw rate, respectively to the Light Distribution Control ECU 10. Col. 4, line 61 to col. 5, line 5. The ECU 10 calculates a first lighting angle based on the steering angle as detected by the steering angle sensor and a speed correction coefficient based on the measured vehicle speed. Col. 5, lines 1 to 15. A second lighting angle based on the turning movement as based on the detections of the yaw rate and vehicle speed sensors. Col. 5, lines

16 to 24. The final lighting angle is decided based on whether the first lighting angle and the second lighting angle are pointed in the same right or left direction. Col. 5, lines 57 to 62.

As discussed above, Miskin et al. teaches that if the signals that lead to measured data are based on light loads caused by road bumps, the average differential value will be only a small deviation from the ideal headlight position value, and the predetermined threshold value will not be exceeded. Page 5. In this case, the headlights will not be adjusted. *Id.* In the case of a heavier load, the threshold value will be exceeded and the position of the headlights will be changed. *Id.*

Thus, Miskin et al. discloses precisely the feature of claim 1 on which patentability of the issued claims was apparently based, *i.e.*, "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." *See e.g.*, Abstract; page 5.

A person of ordinary skill in the art at the time of the alleged inventions claimed in claims 1, 2, 3, and 5 of the '034 patent were made would have been motivated to combine the features provided by Gotoh and the features of Miskin et al. to provide for "the correct illumination of the road regardless of the load of the vehicle that changes its position compared to its unloaded state" and so that "blinding of oncoming vehicles is avoided" as described, for example, on page 3 of Miskin et al. Moreover, combining the device for changing the illumination direction of a vehicle headlights in the right and left directions described in Gotoh and the vehicle lamp illumination directional control in Miskin et al. is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Gotoh and Miskin et al. discloses all of the limitations of claims 1, 2, 3, and 5.

Based on the foregoing, a substantial new question of patentability of claims 1, 2, 3, and 5 of the '034 patent is raised by the combination of Gotoh and Miskin et al. Accordingly, VWGoA proposes a ground of rejection of claims 1, 2, 3, and 5 of the '034 patent under 35 U.S.C. § 103(a) as obvious over the combination of Gotoh and Miskin et al.

**20. Claims 1 to 5 of the '034 Patent Are Unpatentable Over the Combination of Gotoh and Leleve Under 35 U.S.C. § 103(a)**

Claims 1 to 5 are unpatentable over the combination of Gotoh and Leleve under 35 U.S.C. § 103(a). As discussed above, Gotoh was relied on by the Examiner during the prosecution of the '034 patent in rejecting the claims as anticipated under 35 U.S.C. § 102(b). The Examiner ultimately allowed application claim 14, which issued as claim 1 in the '034 patent, because of the inclusion of the limitation "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." As indicated above, Leleve was not cited during the prosecution of the '034 patent and discloses the foregoing limitation that the Examiner considered to be missing from Gotoh.

As discussed above, Gotoh discloses a device for changing the illumination direction of a vehicle headlights in the right and left directions. Referring to figure 3, a steering angle sensor 21, a vehicle speed sensor 22, and a yaw rate sensor 23, signal the steering angle, vehicle speed, and yaw rate, respectively to the Light Distribution Control ECU 10. Col. 4, line 61 to col. 5, line 5. The ECU 10 calculates a first lighting angle based on the steering angle as detected by the steering angle sensor and a speed correction coefficient based on the measured vehicle speed. Col. 5, lines 1 to 15. A second lighting angle based on the turning movement as based on the detections of the yaw rate and vehicle speed sensors. Col. 5, lines 16 to 24. The final lighting angle is decided based on whether the first lighting angle and the second lighting angle are pointed in the same right or left direction. Col. 5, lines 57 to 62.

As discussed above, Leleve teaches that if the signals that lead to the measured vibration of the vehicle are caused by road bumps, the frequency will be above a certain level, and the frequency threshold will be exceeded. Pages 6 to 8. In this case, the headlights will not be adjusted. *Id.* In the case of lower frequencies, the signal will pass through the filter causing the headlights to be adjusted. Page 12.

Thus, Leleve discloses precisely the feature of claim 1 on which patentability of the issued claims was apparently based, *i.e.*, "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." *See e.g.*, pages 6 to 8.

A person of ordinary skill in the art at the time of the alleged inventions claimed in claims 1 to 5 of the '034 patent were made would have been motivated to combine the features provided by Gotoh and the features of Leleve to provide for a device that can "differentiate between phenomena that require correction, and those for which a correction is undesired" and can prevent a phase shift that would cause the headlights "to be directed upward at the same moment that the front part of the vehicle body is executing an upward movement" as described, for example, on page 7 of Leleve. Moreover, combining the device for changing the illumination direction of a vehicle headlights in the right and left directions described in Gotoh and the vehicle lamp illumination directional control in Leleve is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Gotoh and Leleve discloses all of the limitations of claims 1 to 5.

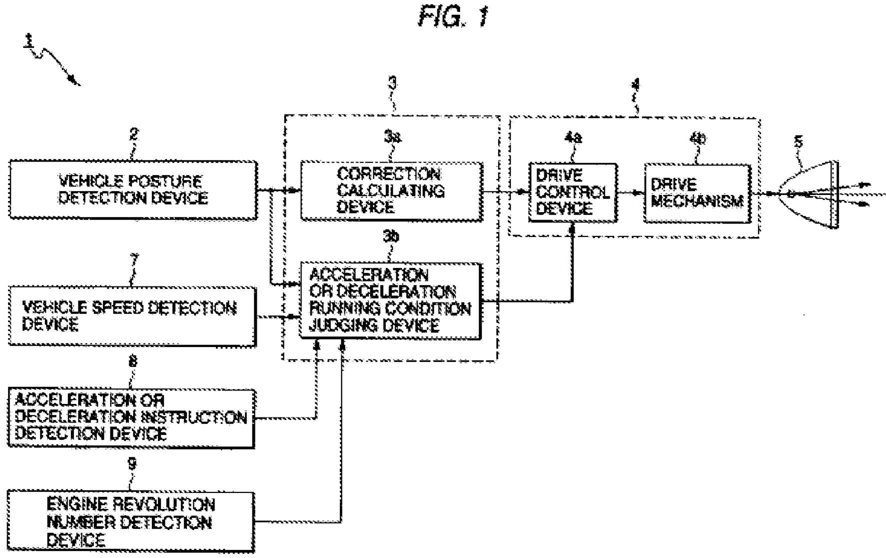
Based on the foregoing, a substantial new question of patentability of claims 1 to 5 of the '034 patent is raised by the combination of Gotoh and Leleve. Accordingly, VWGoA proposes a ground of rejection of claims 1 to 5 of the '034 patent under 35 U.S.C. § 103(a) as obvious over the combination of Gotoh and Leleve.

### 21. Proposed Claims 1, 2, 4 to 6, 9 to 13, 20, 22, 24, 25, 37, 38, 41, 42, 44, and 45 of the '034 *Ex Parte* Reexamination <u>Are Anticipated by Uchida Under 35 U.S.C. § 102(b)</u>

Uchida anticipates proposed claims 1, 2, 4 to 6, 9 to 13, 20, 22, 24, 25, 37, 38, 41, 42, 44, and 45 of the '034 *Ex Parte* Reexamination under 35 U.S.C. § 102(b). Uchida was not cited during the prosecution of the '034 patent, and, as of the filing date of this Request, has not been cited during the '034 *Ex Parte* Reexamination. Uchida provides teachings that were not otherwise provided in any prior art that was relied upon during prosecution of the '034 patent, and have not been otherwise provided in any prior art relied upon in the '034 *Ex Parte* Reexamination.

Uchida relates to a vehicle lamp illumination directional control device which detects both the posture and speed of a vehicle and adjusts the illumination direction of a vehicle lamp so that the illumination direction can always be kept in a predetermined direction. Page 1 at lines 3 to 7. Referring to Figure 1, the illumination direction of lights in a vehicle is controlled by detecting vehicle posture 2, vehicle speed 7, and vehicle acceleration or deceleration 8. The illumination direction is adjusted by control device 3, and drive device 4. Thus, as a vehicle posture changes when loads are applied to it, the inclination angle is measured and the direction of illumination of vehicle lamps are adjusted accordingly. Page 6, line 10 to page 7, line 4.

*FIG. 1*




Signals to the drive means are over-ridden when acceleration is not above a given threshold, such as when the vehicle is running over a rough road, to prevent excessive adjustment of the illumination direction. Specifically, referring to Figure 5, the vehicle is judged to be in acceleration or deceleration running condition or not in acceleration or deceleration condition by determining if a calculated value of acceleration is more or less than a reference value. Page 10, line 26 to page 11, line 6. When it is found that the vehicle is not in the acceleration or deceleration running condition, the control device 3 controls the illumination direction of the lamp by fixing the direction of illumination in a given direction, or by limiting the direction of the illumination light to a limited range. Page 4, lines 16 to 27.

Thus, by disclosing detection of vehicle posture, speed, and acceleration, Uchida discloses precisely the feature of proposed claim 1 that applicants argue the reference cited in the '034 *Ex Parte* Reexamination fails to teach, *i.e.*, "**two or more sensors** that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including **two or more** of road speed, steering angle, pitch, and suspension height of the vehicle." (emphasis in original) *See e.g.*, figure 1; page 6, lines 9 to 15; page 9, lines 28 to 33. Accordingly, a substantial new question of patentability of proposed claims 1, 2, 4 to 6, 9 to 13, 20, 22, 24, 25, 37, 38, 41, 42, 44, and 45 of the '034 *Ex Parte* Reexamination is raised by Uchida.

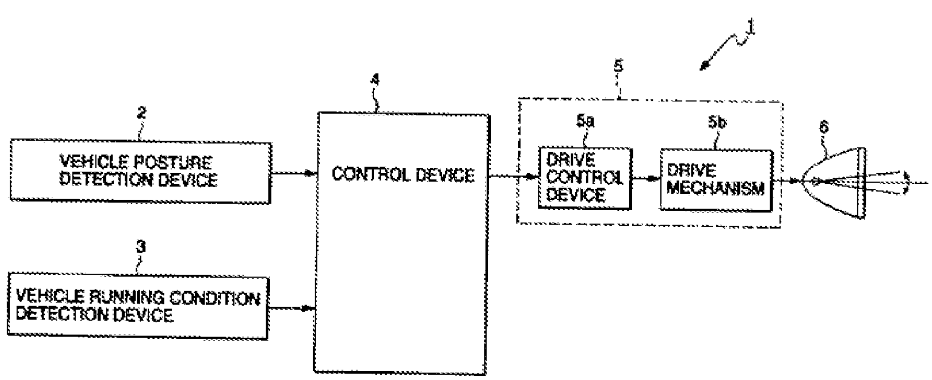
As set forth in the appended charts, Uchida discloses all of the limitations of proposed claims 1, 2, 4 to 6, 9 to 13, 20, 22, 24, 25, 37, 38, 41, 42, 44, and 45 of the '034 *Ex Parte* Reexamination and therefore anticipates proposed claims 1, 2, 4 to 6, 9 to 13, 20, 22, 24, 25, 37, 38, 41, 42, 44, and 45 of the '034 *Ex Parte* Reexamination. Accordingly, VWGoA proposes a ground of rejection of proposed claims 1, 2, 4 to 6, 9 to 13, 20, 22, 24, 25, 37, 38, 41, 42, 44, and 45 of the '034 *Ex Parte* Reexamination under 35 U.S.C. § 102(b) as anticipated by Uchida.

**22. Proposed Claims 1, 2, 4 to 6, 9 to 11, 17, 18, 20 to 22, 24, 25, 28, 33, 34, 37, 38, 41, 42, 44, and 45 of the '034 *Ex Parte* Reexamination Are Anticipated by Takahashi Under 35 U.S.C. § 102(b)**

Takahashi anticipates proposed claims 1, 2, 4 to 6, 9 to 11, 17, 18, 20 to 22, 24, 25, 28, 33, 34, 37, 38, 41, 42, 44, and 45 of the '034 *Ex Parte* Reexamination under 35 U.S.C. § 102(b). Takahashi was not cited during the prosecution of the '034 patent, and, as of the filing date of this Request, has not been cited during the '034 *Ex Parte* Reexamination. Takahashi provides teachings that were not otherwise provided in any prior art that was relied upon during prosecution of the '034 patent, and have not been otherwise provided in any prior art relied upon in the '034 *Ex Parte* Reexamination.

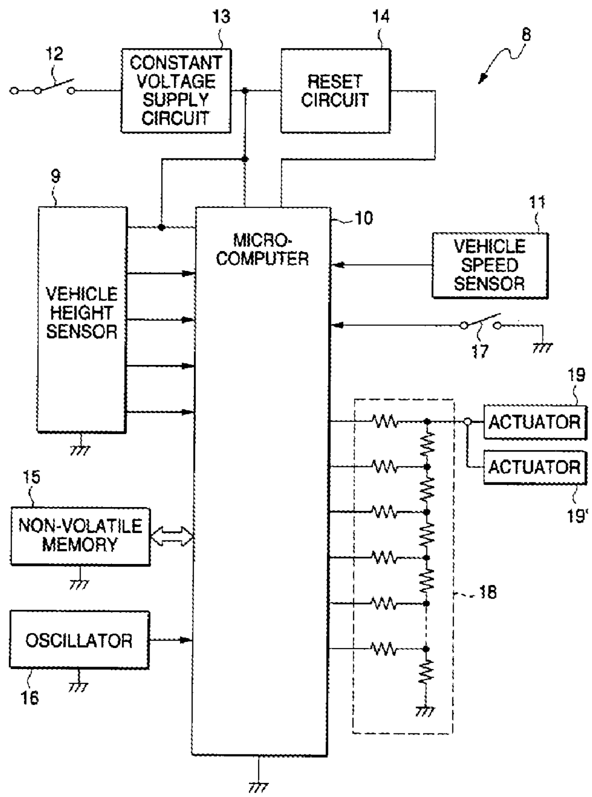
Takahashi relates to a vehicle lamp illumination direction control device which detects the posture of a vehicle and correctly adjusts the illumination direction of a vehicle lamp to maintain it in a predetermined direction. Page 1, lines 3 to 7. Referring to Figure 1, the illumination direction of lights in a vehicle is controlled by detecting vehicle posture 2, and vehicle running condition 3.

*FIG. 1*



Referring to figure 9, vehicle posture detect member 2 is composed of four height sensors 9. Figure 9; page 15, lines 24 to 30. Vehicle speed sensor 11 corresponds to the running condition detection device 3. Figure 9; page 15, line 24 to page 16, line 1.

*FIG. 9*




The illumination direction is adjusted by control device 4, and drive device 5. Thus, as a vehicle posture changes when loads are applied to it, the inclination angle is measured and the direction of illumination of vehicle lamps are adjusted accordingly. Page 6, line 26 to page 7, line 4.

A threshold value with respect to vehicle posture prevents the adjustment of the illumination direction when the vehicle makes sudden stops or starts. A threshold value with respect to time may be set in detection of the road gradient, and only when the amount of variations in the detection signal of the vehicle posture exceed a given reference value and such excessive state continues for a time longer than the set threshold time will the illumination direction be adjusted. Page 9, line 16 to page 10, line 3. Referring to Figure 7, in step S4 the determination of whether the variation in road gradient is more than a predetermined threshold is made. Based on this determination the lamp illumination is either corrected (S5) or not (S6). Page 10, line 20 to page 11, line 11.

Thus, by disclosing vehicle height sensors and speed sensors, Takahashi discloses precisely the feature of proposed claim 1 that applicants argue the reference cited in the '034 *Ex Parte* Reexamination fails to teach, *i.e.*, "**two or more sensors** that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including **two or more** of road speed, steering angle, pitch, and suspension height of the vehicle." (emphasis in original) *See e.g.*, figure 9; page 15, line 24 to page 16, line 1. Accordingly, a substantial new question of patentability of proposed claims 1, 2, 4 to 6, 9 to 11, 17, 18, 20 to 22, 24, 25, 28, 33, 34, 37, 38, 41, 42, 44, and 45 of the '034 *Ex Parte* Reexamination is raised by Takahashi.

As set forth in the appended charts, Takahashi discloses all of the limitations of proposed claims 1, 2, 4 to 6, 9 to 11, 17, 18, 20 to 22, 24, 25, 28, 33, 34, 37, 38, 41, 42, 44, and 45 of the '034 *Ex Parte* Reexamination and therefore anticipates proposed claims 1, 2, 4 to 6, 9 to 11, 17, 18, 20 to 22, 24, 25, 28, 33, 34, 37, 38, 41, 42, 44, and 45 of the '034 *Ex Parte* Reexamination. Accordingly, VWGoA proposes a ground of rejection of proposed claims 1, 2, 4 to 6, 9 to 11, 17, 18, 20 to 22, 24, 25, 28, 33, 34, 37, 38, 41, 42, 44, and 45 of the '034 *Ex Parte* Reexamination under 35 U.S.C. § 102(b) as anticipated by Takahashi.

### 23. Proposed Claims 1, 2, 4 to 6, 9, 10, 37, 38, 41, 42, 44, and 45 of the '034 *Ex Parte* Reexamination Are Anticipated by Hussman Under 35 U.S.C. § 102(b)

Hussman anticipates proposed claims 1, 2, 4 to 6, 9, 10, 37, 38, 41, 42, 44, and 45 of the '034 *Ex Parte* Reexamination under 35 U.S.C. § 102. Hussman was not cited during the prosecution of the '034 patent, and, as of the filing date of this Request, has not been cited during the '034 *Ex Parte* Reexamination. Hussman provides teachings that were not otherwise provided in any prior art that was relied upon during prosecution of the '034 patent, and have not been otherwise provided in any prior art relied upon in the '034 *Ex Parte* Reexamination.

Hussman relates to the regulation of the illumination direction of vehicle lamps based on the relative position of a vehicle body to the front and rear axles. Col. 1, lines 6 to 20. A front axle sensor sender V measures a relative position of a motor vehicle body to the front axle, and a rear axle sensor sender H measures a relative position of a motor vehicle body to the rear axle. Col. 2, lines 40 to 48. The change in the relative position of the vehicle body between front axle sender V and rear axle sender H is used to obtain a nominal-value signal.

Col. 2, lines 48 to 53. This signal is filtered by three filters to determine the time for three average-value formations, each employing different time constants. Abstract. The first nominal-value signal is obtained by using a predetermined value. The second filtered nominal-value signal, obtained from using a smaller time constant, is then compared with the third filtered nominal-value signal, obtained from using a longer filtered time constant. Abstract. When a difference is detected between the second and third signal indicating changes in the inclination of the motor-vehicle body, and the vehicle speed is above a given threshold, the regulation of the illumination direction is switched from the first signal to the third signal, which was obtained using a larger time constant. Col. 3, lines 49 to 61; col. 6, lines 51 to 64. This causes the illumination direction to be adjusted less frequently, and prevents changing of illumination direction based on signals not attributable to longer term body position change. Col. 6, lines 51 to 64.

With two sensors, V and H, signaling the suspension height of the vehicle, Hussman discloses precisely the feature of proposed claim 1 that applicants argue the reference cited in the ’034 *Ex Parte* Reexamination fails to teach, *i.e.*, “**two or more sensors** that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including **two or more** of road speed, steering angle, pitch, and suspension height of the vehicle.” (emphasis in original) *See e.g.*, col. 2, lines 48 to 53. Accordingly, a substantial new question of patentability of proposed claims 1, 2, 4 to 6, 9, 10, 37, 38, 41, 42, 44, and 45 of the ’034 *Ex Parte* Reexamination is raised by Hussman.

As set forth in the appended charts, Hussman discloses all of the limitations of proposed claims 1, 2, 4 to 6, 9, 10, 37, 38, 41, 42, 44, and 45 of the ’034 *Ex Parte* Reexamination and therefore anticipates proposed claims 1, 2, 4 to 6, 9, 10, 37, 38, 41, 42, 44, and 45 of the ’034 *Ex Parte* Reexamination. Accordingly, VWGoA proposes a ground of rejection of claims 1, 2, 4 to 6, 9, 10, 37, 38, 41, 42, 44, and 45 of the ’034 *Ex Parte* Reexamination under 35 U.S.C. § 102(b) as anticipated by Hussman.

### 24. Proposed Claims 1, 2, 4 to 6, 9 to 13, 17, 18, 20 to 22, 24, 25, 28, 29, 36 to 42, 44, and 45 of the ’034 *Ex Parte* Reexamination Are Unpatentable Over the Combination of Toda et al. and Uchida Under 35 U.S.C. § 103(a)

Proposed claims 1, 2, 4 to 6, 9 to 13, 17, 18, 20 to 22, 24, 25, 28, 29, 36 to 42, 44, and 45 of the ’034 *Ex Parte* Reexamination are unpatentable over the combination of Toda et al. and Uchida under 35 U.S.C. § 103(a). As discussed above, Toda et al. was relied on by the Examiner during the prosecution of the ’034 patent in rejecting the claims as anticipated under 35 U.S.C. § 102(e). As of the filing date of this Request, Toda et al. has not been relied on during the '034 *Ex Parte* Reexamination of the '034 patent. During the original prosecution of the '034 patent, the Examiner ultimately allowed application claim 14, which issued as claim 1 in the '034 patent, because of the inclusion of the limitation "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." As indicated above, Uchida was not cited during the prosecution of the '034 patent and discloses the foregoing limitation that the Examiner in the original prosecution of the '034 patent considered to be missing from Toda et al. Moreover, Toda et al. and Uchida disclose the limitation of proposed amended claim 1 that Balther apparently considers to be absent from the prior art cited in the '034 *Ex Parte* Reexamination, *i.e.*, "two or more sensors that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including two or more of road speed, steering angle, pitch, and suspension height of the vehicle.

Toda et al. discloses an automatic leveling device for automotive vehicle headlamps. The system includes actuators to tilt the optical axes of the vehicle headlights, and a control unit which controls the driving of the actuators based on a detected pitch angle such that the optical axes of the headlamps stay in a certain inclined state with respect to the surface of the road. Col. 1, lines 52 to 63. The system further includes a vehicle speed detection means 12 and a pitch angle detection means 14. Abstract. Toda et al. further discloses that while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, and the acceleration is equal to or lower than a reference value, and these states continue for a predetermined amount of time. Col. 4, lines 1 to 25. Thus, by disclosing detection of vehicle pitch angle and speed, Toda discloses precisely the feature of proposed claim 1 that applicants argue the reference cited in the '034 *Ex Parte* Reexamination fails to teach, *i.e.*, "**<u>two or more sensors</u>** that are each adapted to generate a signal that is representative of a condition of the vehicle, said <u>sensed conditions including</u> **<u>two or more</u>** of road speed, steering angle, pitch, and suspension height of the vehicle." Abstract; col. 1, lines 52 to 63.

As discussed above, Uchida relates to a vehicle lamp illumination directional control device which detects both the posture and speed of a vehicle and adjusts the illumination direction of a vehicle lamp so that the illumination direction can always be kept in a predetermined direction. Page 1 at lines 3 to 7. Referring to Figure 1, the illumination direction of lights in a vehicle is controlled by detecting vehicle posture 2, vehicle speed 7, and vehicle acceleration or deceleration 8. Uchida discloses that signals to the drive means are over-ridden when acceleration is not above a given threshold, such as when the vehicle is running over a rough road, to prevent excessive adjustment of the illumination direction. Specifically, referring to Figure 5, the vehicle is judged to be in acceleration or deceleration running condition or not in acceleration or deceleration condition by determining if a calculated value of acceleration is more or less than a reference value. Page 10, line 26 to page 11, line 6. Thus, by disclosing detection of vehicle posture, speed, and acceleration, Uchida discloses precisely the feature of proposed claim 1 that applicants argue the reference cited in the '034 *Ex Parte* Reexamination fails to teach, *i.e.*, "**two or more sensors** that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including **two or more** of road speed, steering angle, pitch, and suspension height of the vehicle." (emphasis in original) *See e.g.*, figure 1; page 6, lines 9 to 15; page 9, lines 28 to 33.

A person of ordinary skill in the art at the time of the alleged inventions claimed in proposed claims 1, 2, 4 to 6, 9 to 13, 17, 18, 20 to 22, 24, 25, 28, 29, 36 to 42, 44, and 45 of the '034 *Ex Parte* Reexamination were made would have been motivated to combine the features provided by Toda et al. and the features of Uchida to "prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle" as described, for example, on page 4, lines 16 to 27 of Uchida. Moreover, combining the automatic leveling device described in Toda et al. and the vehicle lamp illumination directional control in Uchida is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Toda et al. and Uchida discloses all of the limitations of proposed claims 1, 2, 4 to 6, 9 to 13, 17, 18, 20 to 22, 24, 25, 28, 29, 36 to 42, 44, and 45.

Based on the foregoing, a substantial new question of patentability of proposed claims 1, 2, 4 to 6, 9 to 13, 17, 18, 20 to 22, 24, 25, 28, 29, 36 to 42, 44, and 45 of the '034 *Ex Parte* Reexamination is raised by the combination of Toda et al. and Uchida. Accordingly, VWGoA proposes a ground of rejection of proposed claims 1, 2, 4 to 6, 9 to 13, 17, 18, 20 to 22, 24, 25, 28, 29, 36 to 42, 44, and 45 of the '034 *Ex Parte* Reexamination under 35 U.S.C. § 103(a) as obvious over the combination of Toda et al. and Uchida.

**25. Proposed Claims 1, 2, 4 to 6, 9 to 13, 17, 18, 20 to 22, 24, 25, 28, 29, 33, 34, 36 to 42, 44, and 45 of the '034 *Ex Parte* Reexamination Are Unpatentable Over the Combination of Toda et al. and Takahashi Under 35 U.S.C. § 103(a)**

Proposed claims 1, 2, 4 to 6, 9 to 13, 17, 18, 20 to 22, 24, 25, 28, 29, 33, 34, 36 to 42, 44, and 45 of the '034 *Ex Parte* Reexamination are unpatentable over the combination of Toda et al. and Takahashi under 35 U.S.C. § 103(a). As discussed above, Toda et al. was relied on by the Examiner during the prosecution of the '034 patent in rejecting the claims as anticipated under 35 U.S.C. § 102(e). As of the filing date of this Request, Toda et al. has not been relied on during the '034 *Ex Parte* Reexamination of the '034 patent. During the original prosecution of the '034 patent, the Examiner ultimately allowed application claim 14, which issued as claim 1 in the '034 patent, because of the inclusion of the limitation "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." As indicated above, Takahashi was not cited during the prosecution of the '034 patent and discloses the foregoing limitation that the Examiner in the original prosecution of the '034 patent considered to be missing from Toda et al. Moreover, Toda et al. and Takahashi disclose the limitation of proposed amended claim 1 that Balther apparently considers to be absent from the prior art cited in the '034 *Ex Parte* Reexamination, *i.e.*, "two or more sensors that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including two or more of road speed, steering angle, pitch, and suspension height of the vehicle.

Toda et al. discloses an automatic leveling device for automotive vehicle headlamps. The system includes actuators to tilt the optical axes of the vehicle headlights, and a control unit which controls the driving of the actuators based on a detected pitch angle such that the optical axes of the headlamps stay in a certain inclined state with respect to the surface of the road. Col. 1, lines 52 to 63. The system further includes a vehicle speed detection means 12 and a pitch angle detection means 14. Abstract. Toda et al. further discloses that while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, and the acceleration is equal to or lower than a reference value, and these states continue for a predetermined amount of time. Col. 4, lines 1 to 25. Thus, by disclosing detection of vehicle pitch angle and speed, Toda discloses precisely the feature of proposed claim 1 that applicants argue the reference cited in the '034 *Ex Parte* Reexamination fails to teach, *i.e.*, "**two or more sensors** that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including **two or more** of road speed, steering angle, pitch, and suspension height of the vehicle." Abstract; col. 1, lines 52 to 63.

As discussed above, Takahashi relates to a vehicle lamp illumination direction control device which detects the posture of a vehicle and correctly adjusts the illumination direction of a vehicle lamp to maintain it in a predetermined direction. Page 1, lines 3 to 7. Referring to Figure 1, the illumination direction of lights in a vehicle is controlled by detecting vehicle posture 2, and vehicle running condition 3. Referring to figure 9, vehicle posture detect member 2 is composed of four height sensors 9. Figure 9; page 15, lines 24 to 30. Vehicle speed sensor 11 corresponds to the running condition detection device 3. Figure 9; page 15, line 24 to page 16, line 1. The illumination direction is adjusted by control device 4, and drive device 5. Thus, as a vehicle posture changes when loads are applied to it, the inclination angle is measured and the direction of illumination of vehicle lamps are adjusted accordingly. Page 6, line 26 to page 7, line 4.

A threshold value with respect to vehicle posture prevents the adjustment of the illumination direction when the vehicle makes sudden stops or starts. A threshold value with respect to time may be set in detection of the road gradient, and only when the amount of variations in the detection signal of the vehicle posture exceed a given reference value and such excessive state continues for a time longer than the set threshold time will the illumination direction be adjusted. Page 9, line 16 to page 10, line 3.

Thus, by disclosing vehicle height sensors and speed sensors, Takahashi discloses precisely the feature of proposed claim 1 that Balther argues the reference cited in the '034 *Ex Parte* Reexamination fails to teach, *i.e.*, "**two or more sensors** that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including **two or more** of road speed, steering angle, pitch, and suspension height of the vehicle." (emphasis in original) *See e.g.*, figure 9; page 15, line 24 to page 16, line 1.

A person of ordinary skill in the art at the time of the alleged inventions claimed in proposed claims 1, 2, 4 to 6, 9 to 13, 17, 18, 20 to 22, 24, 25, 28, 29, 33, 34, 36 to 42, 44, and 45 of the ’034 *Ex Parte* Reexamination were made would have been motivated to combine the features provided by Toda et al. and the features of Takahashi to “improve . . . visibility . . . and guarantee the safety of running of the vehicle” as described, for example, on page 3, lines 8 to 15 of Takahashi. Moreover, combining the automatic leveling device described in Toda et al. and the vehicle lamp illumination directional control in Takahashi is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Toda et al. and Takahashi discloses all of the limitations of proposed claims 1, 2, 4 to 6, 9 to 13, 17, 18, 20 to 22, 24, 25, 28, 29, 33, 34, 36 to 42, 44, and 45.

Based on the foregoing, a substantial new question of patentability of proposed claims 1, 2, 4 to 6, 9 to 13, 17, 18, 20 to 22, 24, 25, 28, 29, 33, 34, 36 to 42, 44, and 45 of the ’034 *Ex Parte* Reexamination is raised by the combination of Toda et al. and Takahashi. Accordingly, VWGoA proposes a ground of rejection of proposed claims 1, 2, 4 to 6, 9 to 13, 17, 18, 20 to 22, 24, 25, 28, 29, 33, 34, 36 to 42, 44, and 45 of the ’034 *Ex Parte* Reexamination under 35 U.S.C. § 103(a) as obvious over the combination of Toda et al. and Takahashi.

### 26. Proposed Claims 1, 2, 4 to 6, 9 to 13, 17, 18, 20 to 22, 24, 25, 28, 29, 36 to 42, 44, and 45 of the ’034 *Ex Parte* Reexamination Are Unpatentable Over the Combination Of Toda et al. and Hussman Under 35 U.S.C. § 103(a)

Proposed claims 1, 2, 4 to 6, 9 to 13, 17, 18, 20 to 22, 24, 25, 28, 29, 36 to 42, 44, and 45 of the ’034 *Ex Parte* Reexamination are unpatentable over the combination of Toda et al. and Hussman under 35 U.S.C. § 103(a). As discussed above, Toda et al. was relied on by the Examiner during the prosecution of the ’034 patent in rejecting the claims as anticipated under 35 U.S.C. § 102(e). As of the filing date of this Request, Toda et al. has not been relied on during the ’034 *Ex Parte* Reexamination of the ’034 patent. During the original prosecution of the '034 patent, the Examiner ultimately allowed application claim 14, which issued as claim 1 in the '034 patent, because of the inclusion of the limitation "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." As indicated above, Hussman was not cited during the prosecution of the '034 patent and discloses the foregoing limitation that the Examiner in the original prosecution of the '034 patent considered to be missing from Toda et al. Moreover, Toda et al. and Hussman disclose the limitation of proposed amended claim 1 that Balther apparently considers to be absent from the prior art cited in the '034 *Ex Parte* Reexamination, *i.e.*, "two or more sensors that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including two or more of road speed, steering angle, pitch, and suspension height of the vehicle.

Toda et al. discloses an automatic leveling device for automotive vehicle headlamps. The system includes actuators to tilt the optical axes of the vehicle headlights, and a control unit which controls the driving of the actuators based on a detected pitch angle such that the optical axes of the headlamps stay in a certain inclined state with respect to the surface of the road. Col. 1, lines 52 to 63. The system further includes a vehicle speed detection means 12 and a pitch angle detection means 14. Abstract. Toda et al. further discloses that while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, and the acceleration is equal to or lower than a reference value, and these states continue for a predetermined amount of time. Col. 4, lines 1 to 25. Thus, by disclosing detection of vehicle pitch angle and speed, Toda discloses precisely the feature of proposed claim 1 that applicants argue the reference cited in the '034 *Ex Parte* Reexamination fails to teach, *i.e.*, "**<u>two or more sensors</u>** that are each adapted to generate a signal that is representative of a condition of the vehicle, said <u>sensed conditions including</u> **<u>two or more</u>** of road speed, steering angle, pitch, and suspension height of the vehicle." Abstract; col. 1, lines 52 to 63.

As discussed above, Hussman relates to the regulation of the illumination direction of vehicle lamps based on the relative position of a vehicle body to the front and rear axles. Col. 1, lines 6 to 20. A front axle sensor sender V measures a relative position of a motor vehicle body to the front axle, and a rear axle sensor sender H measures a relative position of a motor vehicle body to the rear axle. Col. 2, lines 40 to 48. The change in the relative position of the vehicle body between front axle sender V and rear axle sender H is used to obtain a nominal-value signal. Col. 2, lines 48 to 53. This signal is filtered by three filters to determine the time for three average-value formations, each employing different time constants. Abstract. The first nominal-value signal is obtained by using a predetermined value. The second filtered nominal-value signal, obtained from using a smaller time constant, is then compared with the third filtered nominal-value signal, obtained from using a longer filtered time constant. Abstract. When a difference is detected between the second and third signal indicating changes in the inclination of the motor-vehicle body, and the vehicle speed is above a given threshold, the regulation of the illumination direction is switched from the first signal to the third signal, which was obtained using a larger time constant. Col. 3, lines 49 to 61; col. 6, lines 51 to 64. This causes the illumination direction to be adjusted less frequently, and prevents changing of illumination direction based on signals not attributable to longer term body position change. Col. 6, lines 51 to 64.

With two sensors, V and H, signaling the suspension height of the vehicle, Hussman discloses precisely the feature of proposed claim 1 that applicants argue the reference cited in the '034 *Ex Parte* Reexamination fails to teach, *i.e.*, "**two or more sensors** that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including **two or more** of road speed, steering angle, pitch, and suspension height of the vehicle." (emphasis in original) *See e.g.*, col. 2, lines 48 to 53.

A person of ordinary skill in the art at the time of the alleged inventions claimed in proposed claims 1, 2, 4 to 6, 9 to 13, 17, 18, 20 to 22, 24, 25, 28, 29, 36 to 42, 44, and 45 of the '034 *Ex Parte* Reexamination were made would have been motivated to combine the features provided by Toda et al. and the features of Hussman to "avoid[] false adjustments caused by" "inclination changes of the motor-vehicle body which are not attributable to changes in load or in road surface unevenness" as described, for example, at col. 1, line 65 to col. 2, line 4 of Hussman. Moreover, combining the automatic leveling device described in Toda et al. and the vehicle lamp illumination directional control in Hussman is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Toda et al. and Hussman discloses all of the limitations of proposed claims 1, 2, 4 to 6, 9 to 13, 17, 18, 20 to 22, 24, 25, 28, 29, 36 to 42, 44, and 45.

Based on the foregoing, a substantial new question of patentability of proposed claims 1, 2, 4 to 6, 9 to 13, 17, 18, 20 to 22, 24, 25, 28, 29, 36 to 42, 44, and 45 of the '034 *Ex Parte* Reexamination is raised by the combination of Toda et al. and Hussman. Accordingly, VWGoA proposes a ground of rejection of proposed claims 1, 2, 4 to 6, 9 to 13, 17, 18, 20 to 22, 24, 25, 28, 29, 36 to 42, 44, and 45 of the '034 *Ex Parte* Reexamination under 35 U.S.C. § 103(a) as obvious over the combination of Toda et al. and Hussman.

**27. Proposed Claims 1, 2, 4 to 6, 9 to 13, 15 to 18, 20 to 22, 24, 25, 28, 29, 33, 35, 37 to 42, 44, and 45 of the '034 Ex Parte Reexamination Are Unpatentable Over the Combination of Okuchi et al. and Uchida Under 35 U.S.C. § 103(a)**

Proposed claims 1, 2, 4 to 6, 9 to 13, 15 to 18, 20 to 22, 24, 25, 28, 29, 33, 35, 37 to 42, 44, and 45 of the '034 *Ex Parte* Reexamination are unpatentable over the combination of Okuchi et al. and Uchida under 35 U.S.C. § 103(a). As discussed above, Okuchi et al. was relied on by the Examiner during the prosecution of the '034 patent in rejecting the claims as anticipated under 35 U.S.C. § 102(e). As of the filing date of this Request, Okuchi et al. has not been relied on during the '034 *Ex Parte* Reexamination of the '034 patent. During the original prosecution of the '034 patent, the Examiner ultimately allowed application claim 14, which issued as claim 1 in the '034 patent, because of the inclusion of the limitation "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." As indicated above, Uchida was not cited during the prosecution of the '034 patent and discloses the foregoing limitation that the Examiner in the original prosecution of the '034 patent considered to be missing from Okuchi et al. Moreover, Okuchi et al. and Uchida disclose the limitation of proposed amended claim 1 that Balther apparently considers to be absent from the prior art cited in the '034 *Ex Parte* Reexamination, *i.e.*, "two or more sensors that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including two or more of road speed, steering angle, pitch, and suspension height of the vehicle.

Okuchi et al. discloses a vehicle headlight optical axis direction adjusting system for adjusting the direction of illumination of a vehicle headlight. In Okuchi et al. the vehicle pitch angle is calculated from vehicle height sensors 11F, 11R, HF and HR on the front and rear portions of a vehicle. Col. 4, line 58 to col. 5, line 8. These signals are supplied to Electronic Control Unit 20, which outputs signals to actuators to adjust the optical axis direction of the headlights as needed. Col. 5, lines 11 to 20. Referring to Figure 3, Okuchi et al. further discloses detecting vehicle speed and acceleration and adjusting the filtering of the change in pitch signals in accordance with the running state of the vehicle. Col. 5, line 52 to col. 6, line 39. For example, when the vehicle speed is lower than a speed threshold, the control mode "stop mode" is implemented, and no filtering of the pitch signal is performed so that the actuator is allowed to respond quickly to changes in pitch angle. Col. 5, line 66 to col. 6, line 5. In contrast, when vehicle speed is higher than the threshold, but vehicle acceleration is lower than a threshold, the control mode "constant speed" mode is implemented, and high filtering of the pitch signal is performed as it is largely assumed that the pitch angle does not largely change. Col. 6, lines 29 to 38. Thus, by disclosing sensors for suspension height, speed, and acceleration of a vehicle, Okuchi et al. discloses precisely the feature of proposed claim 1 that applicants argue the reference cited in the '034 *Ex Parte* Reexamination fails to teach, *i.e.*, "**<u>two or more sensors</u>** that are each adapted to generate a signal that is representative of a condition of the vehicle, said <u>sensed conditions including</u> **<u>two or more</u>** of road speed, steering angle, pitch, and suspension height of the vehicle." Col. 4, line 58 to col. 5, line 8; col. 5, line 52 to col. 6, line 39.

As discussed above, Uchida relates to a vehicle lamp illumination directional control device which detects both the posture and speed of a vehicle and adjusts the illumination direction of a vehicle lamp so that the illumination direction can always be kept in a predetermined direction. Page 1 at lines 3 to 7. Referring to Figure 1, the illumination direction of lights in a vehicle is controlled by detecting vehicle posture 2, vehicle speed 7, and vehicle acceleration or deceleration 8. Uchida discloses that signals to the drive means are over-ridden when acceleration is not above a given threshold, such as when the vehicle is running over a rough road, to prevent excessive adjustment of the illumination direction. Specifically, referring to Figure 5, the vehicle is judged to be in acceleration or deceleration running condition or not in acceleration or deceleration condition by determining if a calculated value of acceleration is more or less than a reference value. Page 10, line 26 to page 11, line 6. Thus, by disclosing detection of vehicle posture, speed, and acceleration, Uchida discloses precisely the feature of proposed claim 1 that applicants argue the reference cited in the '034 *Ex Parte* Reexamination fails to teach, *i.e.*, "**<u>two or more sensors</u>** that are each adapted to generate a signal that is representative of a condition of the vehicle, said <u>sensed conditions including</u> **<u>two or more</u>** of road speed, steering angle, pitch, and suspension height of the vehicle." (emphasis in original) *See e.g.*, figure 1; page 6, lines 9 to 15; page 9, lines 28 to 33.

A person of ordinary skill in the art at the time of the alleged inventions claimed in proposed claims 1, 2, 4 to 6, 9 to 13, 15 to 18, 20 to 22, 24, 25, 28, 29, 33, 35, 37 to 42, 44, and 45 of the '034 *Ex Parte* Reexamination were made would have been motivated to combine the features provided by Okuchi et al. and the features of Uchida to "prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle" as described, for example, on page 4, lines 16 to 27 of Uchida. Moreover, combining the automatic leveling device described in Okuchi et al. and the vehicle lamp illumination directional control in Uchida is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Okuchi et al. and Uchida discloses all of the limitations of proposed claims 1, 2, 4 to 6, 9 to 13, 15 to 18, 20 to 22, 24, 25, 28, 29, 33, 35, 37 to 42, 44, and 45.

Based on the foregoing, a substantial new question of patentability of proposed claims 1, 2, 4 to 6, 9 to 13, 15 to 18, 20 to 22, 24, 25, 28, 29, 33, 35, 37 to 42, 44, and 45 of the '034 *Ex Parte* Reexamination is raised by the combination of Okuchi et al. and Uchida. Accordingly, VWGoA proposes a ground of rejection of proposed claims 1, 2, 4 to 6, 9 to 13, 15 to 18, 20 to 22, 24, 25, 28, 29, 33, 35, 37 to 42, 44, and 45 of the '034 *Ex Parte* Reexamination under 35 U.S.C. § 103(a) as obvious over the combination of Okuchi et al. and Uchida.

### 28. Proposed Claims 1, 2, 4 to 6, 9 to 13, 15 to 18, 20 to 22, 24, 25, 28, 29, 33 to 35, 37 to 42, 44, and 45 of the '034 *Ex Parte* Reexamination Are Unpatentable Over the Combination Of Okuchi et al. and Takahashi Under 35 U.S.C. § 103(a)

Proposed claims 1, 2, 4 to 6, 9 to 13, 15 to 18, 20 to 22, 24, 25, 28, 29, 33, 34, 35, 37 to 42, 44, and 45 of the '034 *Ex Parte* Reexamination are unpatentable over the combination of Okuchi et al. and Takahashi under 35 U.S.C. § 103(a). As discussed above, Okuchi et al. was relied on by the Examiner during the prosecution of the '034 patent in rejecting the claims as anticipated under 35 U.S.C. § 102(e). As of the filing date of this Request, Okuchi et al. has not been relied on during the '034 *Ex Parte* Reexamination of the '034 patent. During the original prosecution of the '034 patent, the Examiner ultimately allowed application claim 14, which issued as claim 1 in the '034 patent, because of the inclusion of the limitation "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." As indicated above, Takahashi was not cited during the prosecution of the '034 patent and discloses the foregoing limitation that the Examiner in the original prosecution of the '034 patent considered to be missing from Okuchi et al. Moreover, Okuchi et al. and Takahashi disclose the limitation of proposed amended claim 1 that Balther apparently considers to be absent from the prior art cited in the '034 *Ex Parte* Reexamination, *i.e.*, "two or more sensors that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including two or more of road speed, steering angle, pitch, and suspension height of the vehicle.

Okuchi et al. discloses a vehicle headlight optical axis direction adjusting system for adjusting the direction of illumination of a vehicle headlight. In Okuchi et al. the vehicle pitch angle is calculated from vehicle height sensors 11F, 11R, HF and HR on the front and rear portions of a vehicle. Col. 4, line 58 to col. 5, line 8. These signals are supplied to Electronic Control Unit 20, which outputs signals to actuators to adjust the optical axis direction of the headlights as needed. Col. 5, lines 11 to 20. Referring to Figure 3, Okuchi et al. further discloses detecting vehicle speed and acceleration and adjusting the filtering of the change in pitch signals in accordance with the running state of the vehicle. Col. 5, line 52 to col. 6, line 39. For example, when the vehicle speed is lower than a speed threshold, the control mode "stop mode" is implemented, and no filtering of the pitch signal is performed so that the actuator is allowed to respond quickly to changes in pitch angle. Col. 5, line 66 to col. 6, line 5. In contrast, when vehicle speed is higher than the threshold, but vehicle acceleration is lower than a threshold, the control mode "constant speed" mode is implemented, and high filtering of the pitch signal is performed as it is largely assumed that the pitch angle does not largely change. Col. 6, lines 29 to 38. Thus, by disclosing sensors for suspension height, speed, and acceleration of a vehicle, Okuchi et al. discloses precisely the feature of proposed claim 1 that applicants argue the reference cited in the '034 *Ex Parte* Reexamination fails to teach, *i.e.*, "**<u>two or more sensors</u>** that are each adapted to generate a signal that is representative of a condition of the vehicle, said <u>sensed conditions including</u> **<u>two or more</u>** of road speed, steering angle, pitch, and suspension height of the vehicle." Col. 4, line 58 to col. 5, line 8; col. 5, line 52 to col. 6, line 39.

As discussed above, Takahashi relates to a vehicle lamp illumination direction control device which detects the posture of a vehicle and correctly adjusts the illumination direction of a vehicle lamp to maintain it in a predetermined direction. Page 1, lines 3 to 7. Referring to Figure 1, the illumination direction of lights in a vehicle is controlled by detecting vehicle posture 2, and vehicle running condition 3. Referring to figure 9, vehicle posture detect member 2 is composed of four height sensors 9. Figure 9; page 15, lines 24 to 30. Vehicle speed sensor 11 corresponds to the running condition detection device 3. Figure 9; page 15, line 24 to page 16, line 1. The illumination direction is adjusted by control device 4, and drive device 5. Thus, as a vehicle posture changes when loads are applied to it, the inclination angle is measured and the direction of illumination of vehicle lamps are adjusted accordingly. Page 6, line 26 to page 7, line 4.

A threshold value with respect to vehicle posture prevents the adjustment of the illumination direction when the vehicle makes sudden stops or starts. A threshold value with respect to time may be set in detection of the road gradient, and only when the amount of variations in the detection signal of the vehicle posture exceed a given reference value and such excessive state continues for a time longer than the set threshold time will the illumination direction be adjusted. Page 9, line 16 to page 10, line 3.

Thus, by disclosing vehicle height sensors and speed sensors, Takahashi discloses precisely the feature of proposed claim 1 that applicants argue the reference cited in the '034 *Ex Parte* Reexamination fails to teach, *i.e.*, "**<u>two or more sensors</u>** that are each adapted to generate a signal that is representative of a condition of the vehicle, said <u>sensed conditions including</u> **<u>two or more</u>** of road speed, steering angle, pitch, and suspension height of the vehicle." (emphasis in original) *See e.g.*, figure 9; page 15, line 24 to page 16, line 1.

A person of ordinary skill in the art at the time of the alleged inventions claimed in proposed claims 1, 2, 4 to 6, 9 to 13, 15 to 18, 20 to 22, 24, 25, 28, 29, 33, 34, 35, 37 to 42, 44, and 45 of the '034 *Ex Parte* Reexamination were made would have been motivated to combine the features provided by Okuchi et al. and the features of Takahashi to "improve . . . visibility . . . and guarantee the safety of running of the vehicle" as described, for example, on page 3, lines 8 to 15 of Takahashi. Moreover, combining the automatic leveling device described in Okuchi et al. and the vehicle lamp illumination directional control in Takahashi is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Okuchi et al. and Takahashi discloses all of the limitations of proposed claims 1, 2, 4 to 6, 9 to 13, 15 to 18, 20 to 22, 24, 25, 28, 29, 33, 34, 35, 37 to 42, 44, and 45.

Based on the foregoing, a substantial new question of patentability of proposed claims 1, 2, 4 to 6, 9 to 13, 15 to 18, 20 to 22, 24, 25, 28, 29, 33, 34, 35, 37 to 42, 44, and 45 of the '034 *Ex Parte* Reexamination is raised by the combination of Okuchi et al. and Takahashi. Accordingly, VWGoA proposes a ground of rejection of proposed claims 1, 2, 4 to 6, 9 to 13, 15 to 18, 20 to 22, 24, 25, 28, 29, 33, 34, 35, 37 to 42, 44, and 45 of the '034 *Ex Parte* Reexamination under 35 U.S.C. § 103(a) as obvious over the combination of Okuchi et al. and Takahashi.

### 29. Proposed Claims 1, 2, 4 to 6, 9 to 13, 15 to 18, 20 to 22, 25, 28, 29, 33 to 35, 37 to 42, 44, and 45 of the '034 *Ex Parte* Reexamination Are Unpatentable Over the Combination Of Okuchi et al. and Hussman Under 35 U.S.C. § 103(a)

Proposed claims 1, 2, 4 to 6, 9 to 13, 15 to 18, 20 to 22, 25, 28, 29, 33 to 35, 37 to 42, 44, and 45 of the '034 *Ex Parte* Reexamination are unpatentable over the combination of Okuchi et al. and Hussman under 35 U.S.C. § 103(a). As discussed above, Okuchi et al. was relied on by the Examiner during the prosecution of the '034 patent in rejecting the claims as anticipated under 35 U.S.C. § 102(e). As of the filing date of this Request, Okuchi et al. has not been relied on during the '034 *Ex Parte* Reexamination of the '034 patent. During the original prosecution of the '034 patent, the Examiner ultimately allowed application claim 14, which issued as claim 1 in the '034 patent, because of the inclusion of the limitation "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." As indicated above, Hussman was not cited during the prosecution of the '034 patent and discloses the foregoing limitation that the Examiner in the original prosecution of the '034 patent considered to be missing from Okuchi et al. Moreover, Okuchi et al. and

Hussman disclose the limitation of proposed amended claim 1 that Balther apparently considers to be absent from the prior art cited in the '034 *Ex Parte* Reexamination, *i.e.*, "two or more sensors that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including two or more of road speed, steering angle, pitch, and suspension height of the vehicle.

Okuchi et al. discloses a vehicle headlight optical axis direction adjusting system for adjusting the direction of illumination of a vehicle headlight. In Okuchi et al. the vehicle pitch angle is calculated from vehicle height sensors 11F, 11R, HF and HR on the front and rear portions of a vehicle. Col. 4, line 58 to col. 5, line 8. These signals are supplied to Electronic Control Unit 20, which outputs signals to actuators to adjust the optical axis direction of the headlights as needed. Col. 5, lines 11 to 20. Referring to Figure 3, Okuchi et al. further discloses detecting vehicle speed and acceleration and adjusting the filtering of the change in pitch signals in accordance with the running state of the vehicle. Col. 5, line 52 to col. 6, line 39. For example, when the vehicle speed is lower than a speed threshold, the control mode "stop mode" is implemented, and no filtering of the pitch signal is performed so that the actuator is allowed to respond quickly to changes in pitch angle. Col. 5, line 66 to col. 6, line 5. In contrast, when vehicle speed is higher than the threshold, but vehicle acceleration is lower than a threshold, the control mode "constant speed" mode is implemented, and high filtering of the pitch signal is performed as it is largely assumed that the pitch angle does not largely change. Col. 6, lines 29 to 38. Thus, by disclosing sensors for suspension height, speed, and acceleration of a vehicle, Okuchi et al. discloses precisely the feature of proposed claim 1 that applicants argue the reference cited in the '034 *Ex Parte* Reexamination fails to teach, *i.e.*, "**two or more sensors** that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including **two or more** of road speed, steering angle, pitch, and suspension height of the vehicle." Col. 4, line 58 to col. 5, line 8; col. 5, line 52 to col. 6, line 39.

As discussed above, Hussman relates to the regulation of the illumination direction of vehicle lamps based on the relative position of a vehicle body to the front and rear axles. Col. 1, lines 6 to 20. A front axle sensor sender V measures a relative position of a motor vehicle body to the front axle, and a rear axle sensor sender H measures a relative position of a motor vehicle body to the rear axle. Col. 2, lines 40 to 48. The change in the relative position of the vehicle body between front axle sender V and rear axle sender H is used to obtain a nominal-value signal. Col. 2, lines 48 to 53. This signal is filtered by three filters to determine the time for three average-value formations, each employing different time constants. Abstract. The first nominal-value signal is obtained by using a predetermined value. The second filtered nominal-value signal, obtained from using a smaller time constant, is then compared with the third filtered nominal-value signal, obtained from using a longer filtered time constant. Abstract. When a difference is detected between the second and third signal indicating changes in the inclination of the motor-vehicle body, and the vehicle speed is above a given threshold, the regulation of the illumination direction is switched from the first signal to the third signal, which was obtained using a larger time constant. Col. 3, lines 49 to 61; col. 6, lines 51 to 64. This causes the illumination direction to be adjusted less frequently, and prevents changing of illumination direction based on signals not attributable to longer term body position change. Col. 6, lines 51 to 64.

With two sensors, V and H, signaling the suspension height of the vehicle, Hussman discloses precisely the feature of proposed claim 1 that applicants argue the reference cited in the '034 *Ex Parte* Reexamination fails to teach, *i.e.*, "**two or more sensors** that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including **two or more** of road speed, steering angle, pitch, and suspension height of the vehicle." (emphasis in original) *See e.g.*, col. 2, lines 48 to 53.

A person of ordinary skill in the art at the time of the alleged inventions claimed in proposed claims 1, 2, 4 to 6, 9 to 13, 15 to 18, 20 to 22, 25, 28, 29, 33 to 35, 37 to 42, 44, and 45 of the '034 *Ex Parte* Reexamination were made would have been motivated to combine the features provided by Okuchi et al. and the features of Hussman to "avoid[] false adjustments caused by" "inclination changes of the motor-vehicle body which are not attributable to changes in load or in road surface unevenness" as described, for example, at col. 1, line 65 to col. 2, line 4 of Hussman. Moreover, combining the automatic leveling device described in Okuchi et al. and the vehicle lamp illumination directional control in Hussman is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Okuchi et al. and Hussman discloses all of the limitations of proposed claims 1, 2, 4 to 6, 9 to 13, 15 to 18, 20 to 22, 25, 28, 29, 33 to 35, 37 to 42, 44, and 45.

Based on the foregoing, a substantial new question of patentability of proposed claims 1, 2, 4 to 6, 9 to 13, 15 to 18, 20 to 22, 25, 28, 29, 33 to 35, 37 to 42, 44, and 45 of the '034 *Ex Parte* Reexamination is raised by the combination of Okuchi et al. and Hussman. Accordingly, VWGoA proposes a ground of rejection of proposed claims 1, 2, 4 to 6, 9 to 13, 15 to 18, 20 to 22, 25, 28, 29, 33 to 35, 37 to 42, 44, and 45 of the '034 *Ex Parte* Reexamination under 35 U.S.C. § 103(a) as obvious over the combination of Okuchi et al. and Hussman.

### 30. Proposed Claims 1 to 14, 20, 22, 24 to 26, 28, 29, 37, 38, and 41 to 45 of the '034 *Ex Parte* Reexamination Are Unpatentable Over the Combination Of Gotoh and Uchida Under 35 U.S.C. § 103(a)

Proposed claims 1 to 14, 20, 22, 24 to 26, 28, 29, 37, 38, and 41 to 45 of the '034 *Ex Parte* Reexamination are unpatentable over the combination of Gotoh and Uchida under 35 U.S.C. § 103(a). As discussed above, Gotoh was relied on by the Examiner during the prosecution of the '034 patent in rejecting the claims as anticipated under 35 U.S.C. § 102(b). As of the filing date of this Request, Gotoh has not been relied on during the '034 *Ex Parte* Reexamination of the '034 patent. During the original prosecution of the '034 patent, the Examiner ultimately allowed application claim 14, which issued as claim 1 in the '034 patent, because of the inclusion of the limitation "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." As indicated above, Uchida was not cited during the prosecution of the '034 patent and discloses the foregoing limitation that the Examiner in the original prosecution of the '034 patent considered to be missing from Gotoh. Moreover, Gotoh and Uchida disclose the limitation of proposed amended claim 1 that Balther apparently considers to be absent from the prior art cited in the '034 *Ex Parte* Reexamination, *i.e.*, "two or more sensors that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including two or more of road speed, steering angle, pitch, and suspension height of the vehicle.

Gotoh discloses a device for changing the illumination direction of a vehicle headlights in the right and left directions. Referring to figure 3, a steering angle sensor 21, a vehicle speed sensor 22, and a yaw rate sensor 23, signal the steering angle, vehicle speed, and yaw rate, respectively to the Light Distribution Control ECU 10. Col. 4, line 61 to col. 5, line 5.

The ECU 10 calculates a first lighting angle based on the steering angle as detected by the steering angle sensor and a speed correction coefficient based on the measured vehicle speed. Col. 5, lines 1 to 15. A second lighting angle based on the turning movement as based on the detections of the yaw rate and vehicle speed sensors. Col. 5, lines 16 to 24. The final lighting angle is decided based on whether the first lighting angle and the second lighting angle are pointed in the same right or left direction. Col. 5, lines 57 to 62.

Thus, by disclosing sensors for steering angle, vehicle speed, and yaw rate, Gotoh discloses precisely the feature of proposed claim 1 that applicants argue the reference cited in the '034 *Ex Parte* Reexamination fails to teach, *i.e.*, "**two or more sensors** that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including **two or more** of road speed, steering angle, pitch, and suspension height of the vehicle." Col. 4, line 61 to col. 5, line 5.

As discussed above, Uchida relates to a vehicle lamp illumination directional control device which detects both the posture and speed of a vehicle and adjusts the illumination direction of a vehicle lamp so that the illumination direction can always be kept in a predetermined direction. Page 1 at lines 3 to 7. Referring to Figure 1, the illumination direction of lights in a vehicle is controlled by detecting vehicle posture 2, vehicle speed 7, and vehicle acceleration or deceleration 8. Uchida discloses that signals to the drive means are over-ridden when acceleration is not above a given threshold, such as when the vehicle is running over a rough road, to prevent excessive adjustment of the illumination direction. Specifically, referring to Figure 5, the vehicle is judged to be in acceleration or deceleration running condition or not in acceleration or deceleration condition by determining if a calculated value of acceleration is more or less than a reference value. Page 10, line 26 to page 11, line 6. Thus, by disclosing detection of vehicle posture, speed, and acceleration, Uchida discloses precisely the feature of proposed claim 1 that applicants argue the reference cited in the '034 *Ex Parte* Reexamination fails to teach, *i.e.*, "**two or more sensors** that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including **two or more** of road speed, steering angle, pitch, and suspension height of the vehicle." (emphasis in original) *See e.g.*, figure 1; page 6, lines 9 to 15; page 9, lines 28 to 33.

A person of ordinary skill in the art at the time of the alleged inventions claimed in proposed claims 1 to 14, 20, 22, 24 to 26, 28, 29, 37, 38, and 41 to 45 of the '034 *Ex Parte*

Reexamination were made would have been motivated to combine the features provided by Gotoh and the features of Uchida to "prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle" as described, for example, on page 4, lines 16 to 27 of Uchida. Moreover, combining the automatic leveling device described in Gotoh and the vehicle lamp illumination directional control in Uchida is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Gotoh and Uchida discloses all of the limitations of proposed claims 1 to 14, 20, 22, 24 to 26, 28, 29, 37, 38, and 41 to 45.

Based on the foregoing, a substantial new question of patentability of proposed claims 1 to 14, 20, 22, 24 to 26, 28, 29, 37, 38, and 41 to 45 of the '034 *Ex Parte* Reexamination is raised by the combination of Gotoh and Uchida. Accordingly, VWGoA proposes a ground of rejection of proposed claims 1 to 14, 20, 22, 24 to 26, 28, 29, 37, 38, and 41 to 45 of the '034 *Ex Parte* Reexamination under 35 U.S.C. § 103(a) as obvious over the combination of Gotoh and Uchida.

### 31. Proposed Claims 1 to 12, 14, 16 to 18, 20 to 22, 24 to 26, 28, 29, 33, 34, 37, 38, and 41 to 45 of the '034 *Ex Parte* Reexamination Are Unpatentable Over the Combination of Gotoh and Takahashi Under 35 U.S.C. § 103(a)

Proposed claims 1 to 12, 14, 16 to 18, 20 to 22, 24 to 26, 28, 29, 33, 34, 37, 38, and 41 to 45 of the '034 *Ex Parte* Reexamination are unpatentable over the combination of Gotoh and Takahashi under 35 U.S.C. § 103(a). As discussed above, Gotoh was relied on by the Examiner during the prosecution of the '034 patent in rejecting the claims as anticipated under 35 U.S.C. § 102(b). As of the filing date of this Request, Gotoh has not been relied on during the '034 *Ex Parte* Reexamination of the '034 patent. During the original prosecution of the '034 patent, the Examiner ultimately allowed application claim 14, which issued as claim 1 in the '034 patent, because of the inclusion of the limitation "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." As indicated above, Takahashi was not cited during the prosecution of the '034 patent and discloses the foregoing limitation that the Examiner in the original prosecution of the '034 patent considered to be missing from Gotoh. Moreover, Gotoh and Takahashi disclose the limitation of proposed amended claim 1 that Balther apparently considers to be absent from the prior art cited in the '034 *Ex Parte* Reexamination, *i.e.*, "two or more sensors that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including two or more of road speed, steering angle, pitch, and suspension height of the vehicle.

Gotoh discloses a device for changing the illumination direction of a vehicle headlights in the right and left directions. Referring to figure 3, a steering angle sensor 21, a vehicle speed sensor 22, and a yaw rate sensor 23, signal the steering angle, vehicle speed, and yaw rate, respectively to the Light Distribution Control ECU 10. Col. 4, line 61 to col. 5, line 5.

The ECU 10 calculates a first lighting angle based on the steering angle as detected by the steering angle sensor and a speed correction coefficient based on the measured vehicle speed. Col. 5, lines 1 to 15. A second lighting angle based on the turning movement as based on the detections of the yaw rate and vehicle speed sensors. Col. 5, lines 16 to 24. The final lighting angle is decided based on whether the first lighting angle and the second lighting angle are pointed in the same right or left direction. Col. 5, lines 57 to 62.

Thus, by disclosing sensors for steering angle, vehicle speed, and yaw rate, Gotoh discloses precisely the feature of proposed claim 1 that applicants argue the reference cited in the '034 *Ex Parte* Reexamination fails to teach, *i.e.*, "**<u>two or more sensors</u>** that are each adapted to generate a signal that is representative of a condition of the vehicle, said <u>sensed conditions including</u> **<u>two or more</u>** of road speed, steering angle, pitch, and suspension height of the vehicle." Col. 4, line 61 to col. 5, line 5.

As discussed above, Takahashi relates to a vehicle lamp illumination direction control device which detects the posture of a vehicle and correctly adjusts the illumination direction of a vehicle lamp to maintain it in a predetermined direction. Page 1, lines 3 to 7. Referring to Figure 1, the illumination direction of lights in a vehicle is controlled by detecting vehicle posture 2, and vehicle running condition 3. Referring to figure 9, vehicle posture detect member 2 is composed of four height sensors 9. Figure 9; page 15, lines 24 to 30. Vehicle speed sensor 11 corresponds to the running condition detection device 3. Figure 9; page 15, line 24 to page 16, line 1. The illumination direction is adjusted by control device 4, and drive device 5. Thus, as a vehicle posture changes when loads are applied to it, the inclination angle is measured and the direction of illumination of vehicle lamps are adjusted accordingly. Page 6, line 26 to page 7, line 4.

A threshold value with respect to vehicle posture prevents the adjustment of the illumination direction when the vehicle makes sudden stops or starts. A threshold value with respect to time may be set in detection of the road gradient, and only when the amount of variations in the detection signal of the vehicle posture exceed a given reference value and such excessive state continues for a time longer than the set threshold time will the illumination direction be adjusted. Page 9, line 16 to page 10, line 3.

Thus, by disclosing vehicle height sensors and speed sensors, Takahashi discloses precisely the feature of proposed claim 1 that applicants argue the reference cited in the '034 *Ex Parte* Reexamination fails to teach, *i.e.*, "**two or more sensors** that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including **two or more** of road speed, steering angle, pitch, and suspension height of the vehicle." (emphasis in original) *See e.g.*, figure 9; page 15, line 24 to page 16, line 1.

A person of ordinary skill in the art at the time of the alleged inventions claimed in proposed claims 1 to 12, 14, 16 to 18, 20 to 22, 24 to 26, 28, 29, 33, 34, 37, 38, and 41 to 45 of the '034 *Ex Parte* Reexamination were made would have been motivated to combine the features provided by Gotoh and the features of Takahashi to "improve . . . visibility . . . and guarantee the safety of running of the vehicle" as described, for example, on page 3, lines 8 to 15 of Takahashi. Moreover, combining the automatic leveling device described in Gotoh and the vehicle lamp illumination directional control in Takahashi is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Gotoh and Takahashi discloses all of the limitations of proposed claims 1 to 12, 14, 16 to 18, 20 to 22, 24 to 26, 28, 29, 33, 34, 37, 38, and 41 to 45.

Based on the foregoing, a substantial new question of patentability of proposed claims 1 to 12, 14, 16 to 18, 20 to 22, 24 to 26, 28, 29, 33, 34, 37, 38, and 41 to 45 of the '034 *Ex Parte* Reexamination is raised by the combination of Gotoh and Takahashi. Accordingly, VWGoA proposes a ground of rejection of proposed claims 1 to 12, 14, 16 to 18, 20 to 22, 24 to 26, 28, 29, 33, 34, 37, 38, and 41 to 45 of the '034 *Ex Parte* Reexamination under 35 U.S.C. § 103(a) as obvious over the combination of Gotoh and Takahashi.

### 32. Proposed Claims 1 to 13, 24, 26, 28, 29, 37, 38, and 41 to 45 of the '034 *Ex Parte* Reexamination Are Unpatentable Over the Combination of Gotoh and Hussman Under 35 U.S.C. § 103(a)

Proposed claims 1 to 13, 24, 26, 28, 29, 37, 38, and 41 to 45 of the '034 *Ex Parte* Reexamination are unpatentable over the combination of Gotoh and Hussman under 35 U.S.C. § 103(a). As discussed above, Gotoh was relied on by the Examiner during the prosecution of the '034 patent in rejecting the claims as anticipated under 35 U.S.C. § 102(b). As of the filing date of this Request, Gotoh has not been relied on during the '034 *Ex Parte* Reexamination of the '034 patent. During the original prosecution of the '034 patent, the Examiner ultimately allowed application claim 14, which issued as claim 1 in the '034 patent, because of the inclusion of the limitation "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating condition." As indicated above, Hussman was not cited during the prosecution of the '034 patent and discloses the foregoing limitation that the Examiner in the original prosecution of the '034 patent considered to be missing from Gotoh. Moreover, Gotoh and Hussman disclose the limitation of proposed amended claim 1 that Balther apparently considers to be absent from the prior art cited in the '034 *Ex Parte* Reexamination, *i.e.*, "two or more sensors that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including two or more of road speed, steering angle, pitch, and suspension height of the vehicle.

Gotoh discloses a device for changing the illumination direction of a vehicle headlights in the right and left directions. Referring to figure 3, a steering angle sensor 21, a vehicle speed sensor 22, and a yaw rate sensor 23, signal the steering angle, vehicle speed, and yaw rate, respectively to the Light Distribution Control ECU 10. Col. 4, line 61 to col. 5, line 5.

The ECU 10 calculates a first lighting angle based on the steering angle as detected by the steering angle sensor and a speed correction coefficient based on the measured vehicle speed. Col. 5, lines 1 to 15. A second lighting angle based on the turning movement as based on the detections of the yaw rate and vehicle speed sensors. Col. 5, lines 16 to 24. The final lighting angle is decided based on whether the first lighting angle and the second lighting angle are pointed in the same right or left direction. Col. 5, lines 57 to 62.

Thus, by disclosing sensors for steering angle, vehicle speed, and yaw rate, Gotoh discloses precisely the feature of proposed claim 1 that applicants argue the reference cited in the '034 *Ex Parte* Reexamination fails to teach, *i.e.*, "**two or more sensors** that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including **two or more** of road speed, steering angle, pitch, and suspension height of the vehicle." Col. 4, line 61 to col. 5, line 5.

As discussed above, Hussman relates to the regulation of the illumination direction of vehicle lamps based on the relative position of a vehicle body to the front and rear axles. Col. 1, lines 6 to 20. A front axle sensor sender V measures a relative position of a motor vehicle body to the front axle, and a rear axle sensor sender H measures a relative position of a motor vehicle body to the rear axle. Col. 2, lines 40 to 48. The change in the relative position of the vehicle body between front axle sender V and rear axle sender H is used to obtain a nominal-value signal. Col. 2, lines 48 to 53. This signal is filtered by three filters to determine the time for three average-value formations, each employing different time constants. Abstract. The first nominal-value signal is obtained by using a predetermined value. The second filtered nominal-value signal, obtained from using a smaller time constant, is then compared with the third filtered nominal-value signal, obtained from using a longer filtered time constant. Abstract. When a difference is detected between the second and third signal indicating changes in the inclination of the motor-vehicle body, and the vehicle speed is above a given threshold, the regulation of the illumination direction is switched from the first signal to the third signal, which was obtained using a larger time constant. Col. 3, lines 49 to 61; col. 6, lines 51 to 64. This causes the illumination direction to be adjusted less frequently, and prevents changing of illumination direction based on signals not attributable to longer term body position change. Col. 6, lines 51 to 64.

With two sensors, V and H, signaling the suspension height of the vehicle, Hussman discloses precisely the feature of proposed claim 1 that applicants argue the reference cited in the '034 *Ex Parte* Reexamination fails to teach, *i.e.*, "**two or more sensors** that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including **two or more** of road speed, steering angle, pitch, and suspension height of the vehicle." (emphasis in original) *See e.g.*, col. 2, lines 48 to 53.

A person of ordinary skill in the art at the time of the alleged inventions claimed in proposed claims 1 to 13, 24, 26, 28, 29, 37, 38, and 41 to 45 of the ’034 *Ex Parte* Reexamination were made would have been motivated to combine the features provided by Gotoh and the features of Hussman to “avoid[] false adjustments caused by” “inclination changes of the motor-vehicle body which are not attributable to changes in load or in road surface unevenness” as described, for example, at col. 1, line 65 to col. 2, line 4 of Hussman. Moreover, combining the automatic leveling device described in Gotoh and the vehicle lamp illumination directional control in Hussman is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Gotoh and Hussman discloses all of the limitations of proposed claims 1 to 13, 24, 26, 28, 29, 37, 38, and 41 to 45.

Based on the foregoing, a substantial new question of patentability of proposed claims 1 to 11, 24, 26, 28, 29, 37, 38, and 41 to 45 of the ’034 *Ex Parte* Reexamination is raised by the combination of Gotoh and Hussman. Accordingly, VWGoA proposes a ground of rejection of proposed claims 1 to 13, 24, 26, 28, 29, 37, 38, and 41 to 45 of the ’034 *Ex Parte* Reexamination under 35 U.S.C. § 103(a) as obvious over the combination of Gotoh and Hussman.

### 33. Proposed Claims 17, 19, 21, 23, 26, and 30 to 32 of the ’034 *Ex Parte* Reexamination Are Unpatentable in View of the Combination of Uchida and the Admitted Prior Art <u>Described in the ’034 Patent Specification Under 35 U.S.C. § 103(a)</u>

Proposed claims 17, 19, 21, 23, 26, and 30 to 32 of the ’034 *Ex Parte* Reexamination are unpatentable in view of the combination of Uchida and the admitted prior art described in the ’034 patent specification under 35 U.S.C. § 103(a). As indicated above, Uchida was not cited during the prosecution of the ’034 patent, and, as of the filing date of this Request, has not been cited during the ’034 *Ex Parte* Reexamination.

As discussed above, Uchida relates to a vehicle lamp illumination directional control device which detects both the posture and speed of a vehicle and adjusts the illumination direction of a vehicle lamp so that the illumination direction can always be kept in a predetermined direction. Page 1 at lines 3 to 7. Referring to Figure 1, the illumination direction of lights in a vehicle is controlled by detecting vehicle posture 2, vehicle speed 7, and vehicle acceleration or deceleration 8. Uchida discloses that signals to the drive means are over-ridden when acceleration is not above a given threshold, such as when the vehicle is running over a rough road, to prevent excessive adjustment of the illumination direction. Specifically, referring to Figure 5, the vehicle is judged to be in acceleration or deceleration running condition or not in acceleration or deceleration condition by determining if a calculated value of acceleration is more or less than a reference value. Page 10, line 26 to page 11, line 6. Thus, by disclosing detection of vehicle posture, speed, and acceleration, Uchida discloses precisely the feature of proposed claim 1 that applicants argue the reference cited in the '034 *Ex Parte* Reexamination fails to teach, *i.e.*, "**two or more sensors** that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including **two or more** of road speed, steering angle, pitch, and suspension height of the vehicle." (emphasis in original) *See e.g.*, figure 1; page 6, lines 9 to 15; page 9, lines 28 to 33.

The '034 patent specification admits that the features recited in proposed dependent claims 17, 19, 21, 23, 26, and 30 to 32 of the '034 *Ex Parte* Reexamination were in the prior art at the time the '034 patent was filed. For example, the '034 patent specification states that "it is known to provide a directional control system for vehicle headlights that is capable of automatically altering the directional aiming angles of the headlights to account for changes in the operating conditions of the vehicle," including moving the headlights in both the horizontal and vertical directions for aiming. Col. 1, lines 57 to 62. Further, actuators 12 and 13 to move the vehicle headlights are "conventional in the art," and the motors that embody the actuators, such as servo motors, step motors, electronically controlled mechanical actuators, and micro stepping motors are also described as "known in the art." Col. 3, lines 26 to 41. Further, the condition sensors 15 and 16 are described as "conventional in the art" and position feedback sensors 18 and 19 "can be embodied as any conventional sensor structures, such as Hall effect sensors" or can include "a conventional optical interrupter for each of the actuators 12 and 13." Col. 4, lines 24 to 36.

A person of ordinary skill in the art at the time of the alleged inventions claimed in proposed claims 17, 19, 21, 23, 26, and 30 to 32 of the '034 *Ex Parte* Reexamination were made would have been motivated to combine the features provided by Uchida and the admitted prior art features in the '034 patent specification to include conventional features such as allowing the headlights to move both horizontally and vertically, or various types of conventional actuators and condition sensors. Moreover, combining the vehicle lamp illumination directional control in Uchida is merely with the prior art features described in the '034 patent specification is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Uchida and the admitted prior art described in the '034 patent specification discloses all of the limitations of proposed claims 17, 19, 21, 23, 26, and 30 to 32.

Based on the foregoing, a substantial new question of patentability of proposed claims 17, 19, 21, 23, 26, and 30 to 32 of the '034 *Ex Parte* Reexamination is raised by the combination of Uchida and the admitted prior art described in the '034 patent specification. Accordingly, VWGoA proposes a ground of rejection of proposed claims 17, 19, 21, 23, 26, and 30 to 32 of the '034 *Ex Parte* Reexamination under 35 U.S.C. § 103(a) as obvious over the combination of Uchida and the admitted prior art.

### 34. Proposed Claims 19, 23, 26, and 30 to 32 of the '034 *Ex Parte* Reexamination Are Unpatentable in View of the Combination of Takahashi and the Admitted Prior Art Described in the '034 Patent Specification Under 35 U.S.C. § 103(a)

Proposed claims 19, 23, 26, and 30 to 32 of the '034 *Ex Parte* Reexamination are unpatentable in view of the combination of Takahashi and the admitted prior art described in the '034 patent specification under 35 U.S.C. § 103(a). As indicated above, Takahashi was not cited during the prosecution of the '034 patent, and, as of the filing date of this Request, has not been cited during the '034 *Ex Parte* Reexamination.

As discussed above, Takahashi relates to a vehicle lamp illumination direction control device which detects the posture of a vehicle and correctly adjusts the illumination direction of a vehicle lamp to maintain it in a predetermined direction. Page 1, lines 3 to 7. Referring to Figure 1, the illumination direction of lights in a vehicle is controlled by detecting vehicle posture 2, and vehicle running condition 3. Referring to figure 9, vehicle posture detect member 2 is composed of four height sensors 9. Figure 9; page 15, lines 24 to 30. Vehicle speed sensor 11 corresponds to the running condition detection device 3. Figure 9; page 15, line 24 to page 16, line 1. The illumination direction is adjusted by control device 4, and drive device 5. Thus, as a vehicle posture changes when loads are applied to it, the inclination angle is measured and the direction of illumination of vehicle lamps are adjusted accordingly. Page 6, line 26 to page 7, line 4.

A threshold value with respect to vehicle posture prevents the adjustment of the illumination direction when the vehicle makes sudden stops or starts. A threshold value with respect to time may be set in detection of the road gradient, and only when the amount of variations in the detection signal of the vehicle posture exceed a given reference value and such excessive state continues for a time longer than the set threshold time will the illumination direction be adjusted. Page 9, line 16 to page 10, line 3.

Thus, by disclosing vehicle height sensors and speed sensors, Takahashi discloses precisely the feature of proposed claim 1 that applicants argue the reference cited in the '034 *Ex Parte* Reexamination fails to teach, *i.e.*, "**two or more sensors** that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including **two or more** of road speed, steering angle, pitch, and suspension height of the vehicle." (emphasis in original) *See e.g.*, figure 9; page 15, line 24 to page 16, line 1.

The '034 patent specification admits that the features recited in proposed dependent claims 19, 23, 26, and 30 to 32 of the '034 *Ex Parte* Reexamination were in the prior art at the time the '034 patent was filed. For example, the '034 patent specification states that "it is known to provide a directional control system for vehicle headlights that is capable of automatically altering the directional aiming angles of the headlights to account for changes in the operating conditions of the vehicle," including moving the headlights in both the horizontal and vertical directions for aiming. Col. 1, lines 57 to 62. Further, actuators 12 and 13 to move the vehicle headlights are "conventional in the art," and the motors that embody the actuators, such as servo motors, step motors, electronically controlled mechanical actuators, and micro stepping motors are also described as "known in the art." Col. 3, lines 26 to 41. Further, the condition sensors 15 and 16 are described as "conventional in the art" and position feedback sensors 18 and 19 "can be embodied as any conventional sensor structures, such as Hall effect sensors" or can include "a conventional optical interrupter for each of the actuators 12 and 13." Col. 4, lines 24 to 36.

A person of ordinary skill in the art at the time of the alleged inventions claimed in proposed claims 19, 23, 26, and 30 to 32 of the '034 *Ex Parte* Reexamination were made would have been motivated to combine the features provided by Takahashi and the admitted prior art features in the ’034 patent specification to include conventional features such as allowing the headlights to move both horizontally and vertically, or various types of conventional actuators and condition sensors. Moreover, combining the vehicle lamp illumination directional control in Takahashi is merely with the prior art features described in the ’034 patent specification is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Takahashi and the admitted prior art described in the ’034 patent specification discloses all of the limitations of proposed claims 19, 23, 26, and 30 to 32.

Based on the foregoing, a substantial new question of patentability of proposed claims 19, 23, 26, and 30 to 32 of the ’034 *Ex Parte* Reexamination is raised by the combination of Takahashi and the admitted prior art described in the ’034 patent specification. Accordingly, VWGoA proposes a ground of rejection of proposed claims 19, 23, 26, and 30 to 32 of the ’034 *Ex Parte* Reexamination under 35 U.S.C. § 103(a) as obvious over the combination of Takahashi and the admitted prior art.

### 35. Proposed Claims 17 to 21, 23 to 26, and 30 to 32 of the ’034 *Ex Parte* Reexamination Are Unpatentable in View of the Combination of Hussman and the Admitted Prior Art Described in the ’034 Patent Specification Under 35 U.S.C. § 103(a)

Proposed claims 17 to 21, 23 to 26, and 30 to 32 of the ’034 *Ex Parte* Reexamination are unpatentable in view of the combination of Hussman and the admitted prior art described in the ’034 patent specification under 35 U.S.C. § 103(a). As indicated above, Hussman was not cited during the prosecution of the ’034 patent, and, as of the filing date of this Request, has not been cited during the ’034 *Ex Parte* Reexamination.

As discussed above, Hussman relates to the regulation of the illumination direction of vehicle lamps based on the relative position of a vehicle body to the front and rear axles. Col. 1, lines 6 to 20. A front axle sensor sender V measures a relative position of a motor vehicle body to the front axle, and a rear axle sensor sender H measures a relative position of a motor vehicle body to the rear axle. Col. 2, lines 40 to 48. The change in the relative position of the vehicle body between front axle sender V and rear axle sender H is used to obtain a nominal-value signal. Col. 2, lines 48 to 53. This signal is filtered by three filters to determine the time for three average-value formations, each employing different time constants. Abstract. The first nominal-value signal is obtained by using a predetermined value. The second filtered nominal-value signal, obtained from using a smaller time constant, is then compared with the third filtered nominal-value signal, obtained from using a longer filtered time constant. Abstract. When a difference is detected between the second and third signal indicating changes in the inclination of the motor-vehicle body, and the vehicle speed is above a given threshold, the regulation of the illumination direction is switched from the first signal to the third signal, which was obtained using a larger time constant. Col. 3, lines 49 to 61; col. 6, lines 51 to 64. This causes the illumination direction to be adjusted less frequently, and prevents changing of illumination direction based on signals not attributable to longer term body position change. Col. 6, lines 51 to 64.

With two sensors, V and H, signaling the suspension height of the vehicle, Hussman discloses precisely the feature of proposed claim 1 that applicants argue the reference cited in the '034 *Ex Parte* Reexamination fails to teach, *i.e.*, "**<u>two or more sensors</u>** that are each adapted to generate a signal that is representative of a condition of the vehicle, said <u>sensed conditions including</u> **<u>two or more</u>** of road speed, steering angle, pitch, and suspension height of the vehicle." (emphasis in original) *See e.g.*, col. 2, lines 48 to 53.

The '034 patent specification admits that the features recited in proposed dependent claims 17 to 21, 23 to 26, and 30 to 32 of the '034 *Ex Parte* Reexamination were in the prior art at the time the '034 patent was filed. For example, the '034 patent specification states that "it is known to provide a directional control system for vehicle headlights that is capable of automatically altering the directional aiming angles of the headlights to account for changes in the operating conditions of the vehicle," including moving the headlights in both the horizontal and vertical directions for aiming. Col. 1, lines 57 to 62. Further, actuators 12 and 13 to move the vehicle headlights are "conventional in the art," and the motors that embody the actuators, such as servo motors, step motors, electronically controlled mechanical actuators, and micro stepping motors are also described as "known in the art." Col. 3, lines 26 to 41. Further, the condition sensors 15 and 16 are described as "conventional in the art" and position feedback sensors 18 and 19 "can be embodied as any conventional sensor structures, such as Hall effect sensors" or can include "a conventional optical interrupter for each of the actuators 12 and 13." Col. 4, lines 24 to 36.

A person of ordinary skill in the art at the time of the alleged inventions claimed in proposed claims 17 to 21, 23 to 26, and 30 to 32 of the '034 *Ex Parte* Reexamination were made would have been motivated to combine the features provided by Hussman and the admitted prior art features in the '034 patent specification to include conventional features such as allowing the headlights to move both horizontally and vertically, or various types of conventional actuators and condition sensors. Moreover, combining the vehicle lamp illumination directional control in Hussman is merely with the prior art features described in the '034 patent specification is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Hussman and the admitted prior art described in the '034 patent specification discloses all of the limitations of proposed claims 17 to 21, 23 to 26, and 30 to 32.

Based on the foregoing, a substantial new question of patentability of proposed claims 17 to 21, 23 to 26, and 30 to 32 of the '034 *Ex Parte* Reexamination is raised by the combination of Hussman and the admitted prior art described in the '034 patent specification. Accordingly, VWGoA proposes a ground of rejection of proposed claims 17 to 21, 23 to 26, and 30 to 32 of the '034 *Ex Parte* Reexamination under 35 U.S.C. § 103(a) as obvious over the combination of Hussman and the admitted prior art.

### 36. Proposed Claim 27 of the '034 *Ex Parte* Reexamination Is Unpatentable Over the Combination of Uchida and Wassen et al. Under 35 U.S.C. § 103(a)

Proposed claim 27 of the '034 *Ex Parte* Reexamination is unpatentable over the combination of Uchida and Wassen et al. under 35 U.S.C. § 103(a). As indicated above, neither Uchida nor Wassen et al. was cited during the prosecution of the '034 patent, and, as of the filing date of this Request, neither Uchida nor Wassen et al. has been cited during the '034 *Ex Parte* Reexamination.

As discussed above, Uchida relates to a vehicle lamp illumination directional control device which detects both the posture and speed of a vehicle and adjusts the illumination direction of a vehicle lamp so that the illumination direction can always be kept in a predetermined direction. Page 1 at lines 3 to 7. Referring to Figure 1, the illumination direction of lights in a vehicle is controlled by detecting vehicle posture 2, vehicle speed 7, and vehicle acceleration or deceleration 8. Uchida discloses that signals to the drive means are over-ridden when acceleration is not above a given threshold, such as when the vehicle is running over a rough road, to prevent excessive adjustment of the illumination direction. Specifically, referring to Figure 5, the vehicle is judged to be in acceleration or deceleration running condition or not in acceleration or deceleration condition by determining if a calculated value of acceleration is more or less than a reference value. Page 10, line 26 to page 11, line 6. Thus, by disclosing detection of vehicle posture, speed, and acceleration, Uchida discloses precisely the feature of proposed claim 1 that applicants argue the reference cited in the '034 *Ex Parte* Reexamination fails to teach, *i.e.*, "**two or more sensors** that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including **two or more** of road speed, steering angle, pitch, and suspension height of the vehicle." (emphasis in original) *See e.g.*, figure 1; page 6, lines 9 to 15; page 9, lines 28 to 33.

Wassen et al. discloses manual adjustment of the beam emitted by a headlight when an actuator is associated with the adjustment device. Col. 3, lines 17 to 30.

A person of ordinary skill in the art at the time of the alleged invention claimed in proposed claim 27 of the '034 *Ex Parte* Reexamination was made would have been motivated to combine the features of Uchida with the features provided by Wassen et al. to provide a calibration mode that includes the capability of adjusting the illumination direction of a beam of light by manual operation of the at least one actuator. Moreover, combining the manual adjustment described in Wassen et al. and the vehicle lamp illumination directional control in Uchida is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended chart, the combination of Uchida and Wassen et al. discloses all of the limitations of proposed claim 27.

Based on the foregoing, a substantial new question of patentability of proposed claim 27 of the ’034 *Ex Parte* Reexamination is raised by the combination of Uchida and Wassen et al. Accordingly, VWGoA proposes a ground of rejection of proposed claim 27 of the ’034 *Ex Parte* Reexamination under 35 U.S.C. § 103(a) as obvious over the combination of Uchida and Wassen et al.

### 37. Proposed Claim 27 of the ’034 *Ex Parte* Reexamination Is Unpatentable Over the Combination of <u>Takahashi and Wassen et al. Under 35 U.S.C. § 103(a)</u>

Proposed claim 27 of the ’034 *Ex Parte* Reexamination is unpatentable over the combination of Takahashi and Wassen et al. under 35 U.S.C. § 103(a). As indicated above, neither Takahashi nor Wassen et al. was cited during the prosecution of the ’034 patent, and, as of the filing date of this Request, neither Takahashi nor Wassen et al. has been cited during the ’034 *Ex Parte* Reexamination.

As discussed above, Takahashi relates to a vehicle lamp illumination direction control device which detects the posture of a vehicle and correctly adjusts the illumination direction of a vehicle lamp to maintain it in a predetermined direction. Page 1, lines 3 to 7. Referring to Figure 1, the illumination direction of lights in a vehicle is controlled by detecting vehicle posture 2, and vehicle running condition 3. Referring to figure 9, vehicle posture detect member 2 is composed of four height sensors 9. Figure 9; page 15, lines 24 to 30. Vehicle speed sensor 11 corresponds to the running condition detection device 3. Figure 9; page 15, line 24 to page 16, line 1. The illumination direction is adjusted by control device 4, and drive device 5. Thus, as a vehicle posture changes when loads are applied to it, the inclination angle is measured and the direction of illumination of vehicle lamps are adjusted accordingly. Page 6, line 26 to page 7, line 4.

A threshold value with respect to vehicle posture prevents the adjustment of the illumination direction when the vehicle makes sudden stops or starts. A threshold value with respect to time may be set in detection of the road gradient, and only when the amount of variations in the detection signal of the vehicle posture exceed a given reference value and such excessive state continues for a time longer than the set threshold time will the illumination direction be adjusted. Page 9, line 16 to page 10, line 3.

Thus, by disclosing vehicle height sensors and speed sensors, Takahashi discloses precisely the feature of proposed claim 1 that applicants argue the reference cited in the ’034

*Ex Parte* Reexamination fails to teach, *i.e.*, "**two or more sensors** that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including **two or more** of road speed, steering angle, pitch, and suspension height of the vehicle." (emphasis in original) *See e.g.*, figure 9; page 15, line 24 to page 16, line 1.

Wassen et al. discloses manual adjustment of the beam emitted by a headlight when an actuator is associated with the adjustment device. Col. 3, lines 17 to 30.

A person of ordinary skill in the art at the time of the alleged invention claimed in proposed claim 27 of the '034 *Ex Parte* Reexamination was made would have been motivated to combine the features of Takahashi with the features provided by Wassen et al. to provide a calibration mode that includes the capability of adjusting the illumination direction of a beam of light by manual operation of the at least one actuator. Moreover, combining the manual adjustment described in Wassen et al. and the vehicle lamp illumination directional control in Takahashi is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended chart, the combination of Takahashi and Wassen et al. discloses all of the limitations of proposed claim 27.

Based on the foregoing, a substantial new question of patentability of proposed claim 27 of the '034 *Ex Parte* Reexamination is raised by the combination of Takahashi and Wassen et al. Accordingly, VWGoA proposes a ground of rejection of proposed claim 27 of the '034 *Ex Parte* Reexamination under 35 U.S.C. § 103(a) as obvious over the combination of Takahashi and Wassen et al.

### 38. Proposed Claim 27 of the '034 *Ex Parte* Reexamination Is Unpatentable Over the Combination of Hussman '460 and Wassen et al. Under 35 U.S.C. § 103(a)

Proposed claim 27 of the '034 *Ex Parte* Reexamination is unpatentable over the combination of Hussman and Wassen et al. under 35 U.S.C. § 103(a). As indicated above, neither Hussman nor Wassen et al. was cited during the prosecution of the '034 patent, and, as of the filing date of this Request, neither Hussman nor Wassen et al. has been cited during the '034 *Ex Parte* Reexamination.

As discussed above, Hussman relates to the regulation of the illumination direction of vehicle lamps based on the relative position of a vehicle body to the front and rear axles. Col. 1, lines 6 to 20. A front axle sensor sender V measures a relative position of a motor vehicle body to the front axle, and a rear axle sensor sender H measures a relative position of a motor vehicle body to the rear axle. Col. 2, lines 40 to 48. The change in the relative position of the vehicle body between front axle sender V and rear axle sender H is used to obtain a nominal-value signal. Col. 2, lines 48 to 53. This signal is filtered by three filters to determine the time for three average-value formations, each employing different time constants. Abstract. The first nominal-value signal is obtained by using a predetermined value. The second filtered nominal-value signal, obtained from using a smaller time constant, is then compared with the third filtered nominal-value signal, obtained from using a longer filtered time constant. Abstract. When a difference is detected between the second and third signal indicating changes in the inclination of the motor-vehicle body, and the vehicle speed is above a given threshold, the regulation of the illumination direction is switched from the first signal to the third signal, which was obtained using a larger time constant. Col. 3, lines 49 to 61; col. 6, lines 51 to 64. This causes the illumination direction to be adjusted less frequently, and prevents changing of illumination direction based on signals not attributable to longer term body position change. Col. 6, lines 51 to 64.

With two sensors, V and H, signaling the suspension height of the vehicle, Hussman discloses precisely the feature of proposed claim 1 that applicants argue the reference cited in the '034 *Ex Parte* Reexamination fails to teach, *i.e.*, "**two or more sensors** that are each adapted to generate a signal that is representative of a condition of the vehicle, said sensed conditions including **two or more** of road speed, steering angle, pitch, and suspension height of the vehicle." (emphasis in original) *See e.g.*, col. 2, lines 48 to 53.

Wassen et al. discloses manual adjustment of the beam emitted by a headlight when an actuator is associated with the adjustment device. Col. 3, lines 17 to 30.

A person of ordinary skill in the art at the time of the alleged invention claimed in proposed claim 27 of the '034 *Ex Parte* Reexamination was made would have been motivated to combine the features of Hussman with the features provided by Wassen et al. to provide a calibration mode that includes the capability of adjusting the illumination direction of a beam of light by manual operation of the at least one actuator. Moreover, combining the manual adjustment described in Wassen et al. and the vehicle lamp illumination directional control in

Hussman is merely: (a) a combination of prior art elements according to known methods to yield predictable results; (b) a simple substitution of one known element for another to obtain predictable results; (c) a use of known technique to improve similar devices in the same way; (d) application of a known technique to a known device ready for improvement to yield predictable results; (e) obvious to try; and/or (f) known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces since the variations are predictable to one of ordinary skill in the art.

As set forth in the appended charts, the combination of Hussman and Wassen et al. discloses all of the limitations of proposed claim 27.

Based on the foregoing, a substantial new question of patentability of proposed claim 27 of the '034 *Ex Parte* Reexamination is raised by the combination of Hussman and Wassen et al. Accordingly, VWGoA proposes a ground of rejection of proposed claim 27 of the '034 *Ex Parte* Reexamination under 35 U.S.C. § 103(a) as obvious over the combination of Hussman and Wassen et al.

## X. PROPOSED REJECTION OF PROPOSED CLAIMS 12 TO 16 UNDER 35 U.S.C. § 314(A)

Pursuant to 35 U.S.C. § 314(a), "no proposed amended or new claim enlarging the scope of the claims of the patent shall be permitted" in *inter partes* reexamination. Proposed claim 1 of the '034 *Ex Parte* Reexamination recites "two or more sensors that are each adapted to generate a signal that is representative of a condition of a vehicle, said sensed conditions including two or more of road speed, steering angle, pitch, and suspension height of the vehicle." Thus, proposed claim 1 requires sensors that generate a signal representative of two or more of the specific group of four specific recited conditions of road speed, steering angle, pitch, and suspension height of the vehicle.

Proposed claim 12 recites "The automatic directional control system defined in claim 1, wherein said sensed conditions further include one or more of a rate of change of road speed of the vehicle, a rate of change of steering angle of the vehicle, a rate of change of pitch of the vehicle, or a rate of change of suspension height of the vehicle." Thus, proposed claim 12 allows for sensors that generate a signal representative of four additional conditions, none of which were in the group required by claim 1. In other words, the group recited in proposed claim 12 is *broader* than the group recited in claim 1 of the '034 patent. Thus, proposed claim 12 is *broader* than claim 1 of the '034 patent. For example, a directional control system with sensors for rate of change of pitch and rate of change of road speed would satisfy the conditions of proposed claim 12, but **not** claim 1 of the '034 patent.

Proposed claim 12 therefore improperly enlarges the scope of the claims of the '034 patent. As such proposed claim 12, and proposed claims 13 to 16, which depend from proposed claim 12, are should be rejected under 35 U.S.C. § 314(a).

## XI. PROPOSED REJECTION OF PROPOSED CLAIMS 12 TO 16 UNDER 35 U.S.C. § 112, ¶ 4

Pursuant to 35 U.S.C. § 112, ¶ 4, "a claim in dependent form shall . . . specify a further limitation of the subject matter claimed." As set forth above, proposed claims 12 to 16 are *broader* than proposed claim 1, from which proposed claims 12 to 16 ultimately depend. As such, proposed claims 12 to 16 fail to "specify a further limitation of the subject matter claimed" and should therefore be rejected under 35 U.S.C. § 112, ¶ 4.

## XII. FEE PURSUANT TO 37 C.F.R. § 1.915(a)

The $8,800 fee under 37 C.F.R. § 1.915(a) and 37 C.F.R. § 1.20(c)(2) for requesting *inter partes* reexamination is being paid by credit card. The Director is nevertheless authorized to charge any fees that may be required in connection with the Request or these proceedings on behalf of Requester, Volkswagen Group of America, Inc., to the deposit account of Kenyon & Kenyon LLP, Deposit Account ***11-0600***.

## XIII. CERTIFICATION PURSUANT TO 37 C.F.R. § 1.915(b)(6)

According to 37 C.F.R. § 1.915(b)(6), a request for *inter partes* reexamination must include a certification that a copy of the request filed by a person other than the patent owner has been served in its entirety on the patent owner at the address as provided for in 37 C.F.R. § 1.33(c).

According to the Office's PAIR system, the correspondence address for the '034 patent is: **The Caldwell Firm, LLC, P.O. Box 59655, Dept. SVIPGP, Dallas, Texas 75229**.

Accordingly, a copy of this Request is being served in its entirety at the foregoing correspondence address as provided for in 37 C.F.R. § 1.33(c), in accordance with 37 C.F.R. § 1.915(b)(6). A certificate of service is annexed hereto as Exhibit 17, which sets forth that, pursuant to 37 C.F.R. § 1. 1.915(b)(6), a copy of this Request has been served in its entirety on "the patent owner at the address as provided for in [37 C.F.R.] § 1.33(c)" at the correspondence address listed above.

## XIV. CONCLUSION

For all of the reasons set forth above, reexamination of claims 1 to 5 of the '034 patent is requested.

Respectfully submitted,

Date: May 16, 2011

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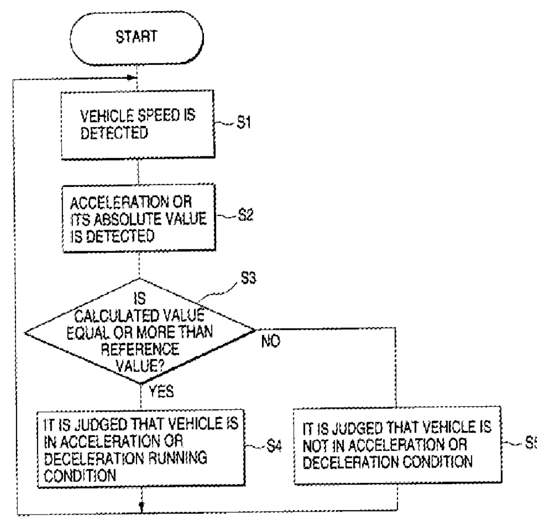
## 1. Claims 1, 2, 4, and 5 of U.S. Patent No. 7,231,034 are Anticipated by Uchida under 35 U.S.C. § 102(b)

| Limitation of '034 Patent Claim 1 | GB 2 309 773 (Uchida) |
|---|---|
| 1. An automatic directional control system for a vehicle headlight comprising: | E.g., page 1, line 3 to 7, "The present invention relates to a vehicle lamp illumination direction control device which detects the posture of a vehicle and correctly adjusts the illumination direction of a vehicle lamp so that the illumination direction can always be kept in a predetermined direction." |
| a sensor that is adapted to generate a signal that is representative of a condition of the vehicle, said sensed condition includes one or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., Page 1, lines 14 to 28, "The conventional device of this type includes a detection device which detects the inclination and height of the vehicle body variable according to the conditions of occupants (such as the number of occupants, the position arrangement of the occupants, and the like), the loaded conditions of loads on board the vehicle, the running conditions of the vehicle, and the like, calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detection device, and adjusts the illumination angle of the vehicle lamp with respect to the initially adjusted value of the vehicle lamp so that the illumination state of the vehicle lamp can always be kept in a desired state, thereby to control the illumination direction of the vehicle lamp for desired light distribution."<br><br>E.g., Page 8, lines 20 to page 9, line 1, "Here, as basic information used to judge whether the vehicle is in the acceleration or deceleration running condition or not, besides the information that is given by the vehicle posture detection device 2, as shown in Fig. 1, there is also available information which can be obtained by providing acceleration or deceleration instruction detection device 8 used to detect an acceleration or deceleration instruction or information relating to the present instruction according to the amount of pressing-down of a gas pedal, variations in the opening of a throttle valve or the like, or information which can be obtained by providing an engine revolution number detection device 9 used to detect the number of revolutions of an engine: that is, the information obtained by these detection devices may be transmitted to the acceleration or deceleration running condition judging device 3b." |

| Limitation of '034 Patent Claim 1 | GB 2 309 773 (Uchida) |
|---|---|
| | E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2."<br><br>See also Page 9, lines 24 to 28 and Page 12 line 27 to page 13, line 15. |
| a controller that is responsive to said sensor signal for generating an output signal | E.g., Page 4, lines 16 to 27 "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle." |
| only when said sensor signal changes by more than a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition; and | E.g., Page 4, lines 16 to 27 "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle."<br><br>E.g., Page 10, line 26 to page 11, line 6, "At first, in step S1, the vehicle |

<table>
<tr><th>Limitation of '034 Patent Claim 1</th><th>GB 2 309 773 (Uchida)</th></tr>
<tr><td></td><td>speed v(t) is detected and, after then, in step S2, the acceleration dv(t)/dt or the absolute value thereof is calculated. Next, in Step S3, it is checked whether the acceleration dv(t)/dt or the absolute value thereof is equal to or more than a reference value or not. If it is found that the acceleration dv(t)/dt or the absolute value thereof is less than the reference value, then the processing advances to step S5. In step S4, it is judged that the vehicle is in the acceleration or deceleration running condition and, after then, the processing goes back to Step S2. Also, in Step S5, it is judged that the vehicle is not in the acceleration or deceleration running condition and, after then, the processing returns back to the first step S1.<br><br>E.g., Figure 5:<br><br>FIG. 5<br>
</td></tr>
</table>

| Limitation of '034 Patent Claim 1 | GB 2 309 773 (Uchida) |
| --- | --- |
| an actuator that is adapted to be connected to the headlight to effect movement thereof in accordance with said output signal. | E.g., Page 16, line 28 to Page 17, line 6 "Also, if it is judged by the acceleration or deceleration running condition judging device 3b that the vehicle is not in the acceleration or deceleration running condition, then the illumination angle of the lamp 5 can be controlled by one of the following methods when the drive control device 4a receives an instruction from the acceleration or deceleration running condition judging device 3b: 1) a method for fixing the illumination angle; 2) a method for limiting the range of the illumination angle or forbidding part of the range of the illumination angle; and, 3) a method for changing the response speed or control speed of an actuator."<br><br>E.g., Page 7, lines 4 to 9 "In particular, the correction calculating device 3a is structured in the following manner: that is, in accordance with a detect signal from the vehicle posture detection device 2, it transmits a control signal to the drive device 4 so that the illumination direction of the lamp 5 can be always kept in a given direction." See also 7:9-32.<br><br>E.g., Page 8, lines 1 to 9 "When the judging device 3b judges that the vehicle is in an acceleration or deceleration running condition, in accordance with a control signal transmitted from the correction calculating device 3a to the drive control device 4a, the acceleration or deceleration running condition judging device 3b transmits to the drive control device 4a a signal which allows the illumination direction of the lamp 5 to be corrected in a predetermined direction." |

| Limitation of '034 Patent Claim 2 | GB 2 309 773 (Uchida) |
| --- | --- |
| 2. The automatic directional control system defined in claim 1 | See claim 1 chart, above at page 1. |
| wherein said sensor generates a signal that is representative of the road speed | E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration |

| Limitation of '034 Patent Claim 2 | GB 2 309 773 (Uchida) |
|---|---|
| of the vehicle. | or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2."<br><br>E.g., Page 9, lines 24 to 28 "Firstly, the method i) is a method which judges whether the vehicle is in the acceleration or deceleration running condition or not by detecting the running speed of the vehicle to calculate the change of the speed with time, that is, by calculating the acceleration of the vehicle." |

| Limitation of '034 Patent Claim 4 | GB 2 309 773 (Uchida) |
|---|---|
| 4. The automatic directional control system defined in claim 1 | See claim 1 chart, above at page 1. |
| wherein said sensor generates a signal that is representative of the pitch of the vehicle. | E.g., Page 12 line 27 to page 13, line 15 "Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Claim 5 | GB 2 309 773 (Uchida) |
|---|---|
| 5. The automatic directional control system defined in claim 1 | See claim 1 chart, above at page 1. |

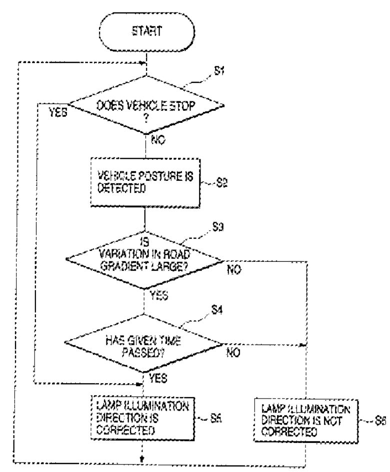
| Limitation of '034 Patent Claim 5 | GB 2 309 773 (Uchida) |
| --- | --- |
| wherein said sensor generates a signal that is representative of the suspension height of the vehicle. | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

## 2. Claims 1, 2, 4, and 5 of U.S. Patent No. 7,231,034 are Anticipated by Takahashi under 35 U.S.C. § 102(b)

| Limitation of '034 Patent Claim 1 | GB 2 309 774 (Takahashi) |
|---|---|
| 1. An automatic directional control system for a vehicle headlight comprising: | E.g., page 5, line 3 to 7, "The present invention relates to a vehicle lamp illumination direction control device which detects the posture of a vehicle and correctly adjust the illumination direction of a vehicle lamp so that it can be always kept in a predetermined direction." |
| a sensor that is adapted to generate a signal that is representative of a condition of the vehicle, said sensed condition includes one or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |
| a controller that is responsive to said sensor signal for generating an output signal | E.g., Page 10, line 20 to page 11, line 11, "In Step S4, it is checked whether a state in which the amount of variations of the detect signal supplied by the vehicle posture detection device 2 is equal to or more than a given reference value continues for a given period of time or longer or not. If it is found that such state continues, then the processing advances to Step S and, if not, then the processing goes to Step S6. Here, when a threshold value relating to the running distance of the vehicle is set instead of setting a threshold value relating to the above-mentioned continuing time, in Step S4, it may be checked whether a state in which the amount of variations in the detect signal supplied by the vehicle posture detection device 2 is equal to or more than a given reference value continues over a given running distance or not. In Step S5, in accordance with the information from the vehicle posture detection device 2, the control device 4 transmits to the drive control device 5a a control signal which causes the illumination direction of the lamp 6 to be kept |

| Limitation of '034 Patent Claim 1 | GB 2 309 774 (Takahashi) |
|---|---|
| | in a predetermined direction, and the illumination direction of the lamp 6 is corrected through the drive mechanism 5. After then, the processing goes back to the first step S1. Also, in Step 6, the correction of the illumination direction of the lamp 6 is not carried out but the processing returns to the first Step S1." |
| only when said sensor signal changes by more than a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition; and | E.g., page 8, lines 26 to 32 "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2."<br><br>E.g., page 9, line to page 10, line 3 "Also, in order to prevent the illumination direction of the lamp 6 from being corrected inadvertently when a sudden change in the posture of the vehicle occurs temporarily or due to the wrong operation of the lamp 6 caused by external disturbances, for example, when the vehicle makes a sudden start or a sudden stop, preferably, a threshold value with respect to time may be set in detection of the road gradient and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a threshold value with respect to the running distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a distance equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected. Also, the threshold values may be set in various manners, for example, they may be set as a constant value, or may be set as a variable which varies according to the speeds of the vehicle."<br><br>E.g., Page 10, line 20 to page 11, line 11, "In Step S4, it is checked whether a state in which the amount of variations of the detect signal supplied by the |

| Limitation of '034 Patent Claim 1 | GB 2 309 774 (Takahashi) |
|---|---|
| | vehicle posture detection device 2 is equal to or more than a given reference value continues for a given period of time or longer or not. If it is found that such state continues, then the processing advances to Step S and, if not, then the processing goes to Step S6. Here, when a threshold value relating to the running distance of the vehicle is set instead of setting a threshold value relating to the above-mentioned continuing time, in Step S4, it may be checked whether a state in which the amount of variations in the detect signal supplied by the vehicle posture detection device 2 is equal to or more than a given reference value continues over a given running distance or not. In Step S5, in accordance with the information from the vehicle posture detection device 2, the control device 4 transmits to the drive control device 5a a control signal which causes the illumination direction of the lamp 6 to be kept in a predetermined direction, and the illumination direction of the lamp 6 is corrected through the drive mechanism 5. After then, the processing goes back to the first step S1. Also, in Step 6, the correction of the illumination direction of the lamp 6 is not carried out but the processing returns to the first Step S1."<br><br>E.g., Figure 7: |

| Limitation of '034 Patent Claim 1 | GB 2 309 774 (Takahashi) |
|---|---|
| | FIG. 7   |
| an actuator that is adapted to be connected to the headlight to effect movement thereof in accordance with said output signal. | E.g., page 2, lines 14 to 17 "However, in the above-mentioned automatic adjustment device, since the lamp is driven with high frequency, an actuator used in a drive mechanism for driving the lamp is required to show high response property and high durability."<br><br>See also page 6, lines 26 to 32, page 7, lines 12 to 17, and page 11, lines 12 to 16. |

| Limitation of '034 Patent Claim 2 | GB 2 309 774 (Takahashi) |
|---|---|
| 2. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 7. |

| Limitation of '034 Patent Claim 2 | GB 2 309 774 (Takahashi) |
|---|---|
| wherein said sensor generates a signal that is representative of the road speed of the vehicle. | E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle." |

| Limitation of '034 Patent Claim 4 | GB 2 309 774 (Takahashi) |
|---|---|
| 4. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 7. |
| wherein said sensor generates a signal that is representative of the pitch of the vehicle. | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp." |

| Limitation of '034 Patent Claim 5 | GB 2 309 774 (Takahashi) |
|---|---|
| 5. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 7. |
| wherein said sensor generates a signal that is representative of the suspension height of the vehicle. | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is |

| Limitation of '034 Patent Claim 5 | GB 2 309 774 (Takahashi) |
| --- | --- |
| | obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br><br>E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |



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### 3. Claims 1, 2, 4, and 5 of U.S. Patent No. 7,231,034 are Anticipated by Hussman under 35 U.S.C. § 102(b)

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,182,460 (Hussman) |
| --- | --- |
| 1. An automatic directional control system for a vehicle headlight comprising: | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation." |
| a sensor that is adapted to generate a signal that is representative of a condition of the vehicle, said sensed condition includes one or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>See also col. 2, lines 40 to 48, and col. 3, lines 40 to 45. |
| a controller that is responsive to said sensor signal for generating an output signal | E.g., col. 3, lines 30 to 39, "The curve-recognition device K is electrically conductively coupled with the switchover device SE and thereby couples the third filter F3 electrically conductively with the regulator R if a difference signal other than zero is fed to it from the subtractor SU. When no difference signal from the subtractor SU is present, the curve-recognition device K switches the switchover device SE so that the first filter F1 is coupled to the regulator R." |
| only when said sensor signal changes by more than a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition; and | E.g., col. 4, lines 6 to 12, "At the coupling between the switchover device SE and the regulator R, a matching device AE is, here for example, arranged which, upon a switchover by the switchover device SE, adjusts the various nominal values to one another so that discontinuities or jumps in the |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|
| | adjustment and regulation of the illumination range are avoided."<br><br>E.g., col. 6, line 10 to 34, "In this connection, it is beneficial that upon the presence of a difference between the second, filtered, nominal-value signal to the third, filtered, nominal-value signal and upon termination of a difference is again switched from the third, filtered, nominal-value signal to the first, filtered, nominal-value signal because in this manner, in an uncomplicated and cost effective manner, upon the presence of an inclination change of the motor vehicle body which is not attributable to a change in loading or to road surface unevenness, the regulation of the illumination range of the motor vehicle, in dependence from the third, long, filter time constant results, whereby the third, filtered, nominal-value signal is independent, or substantially independent, from the disturbing, or distorting, short time inclination changes so that after inclination changes of the motor-vehicle body which, for example, are caused by driving about a curve, false adjustments of the illumination range are not caused which can lead to the blinding of oncoming traffic or to losses in illumination range, which eliminates a danger during operation of a motor vehicle." |
| an actuator that is adapted to be connected to the headlight to effect movement thereof in accordance with said output signal. | E.g., col. 3, lines 16 to 18, "The regulator R regulates the position of adjusting elements, which are shown here in block form and which change the positions of headlights." |

| Limitation of '034 Patent Claim 2 | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|
| 2. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 13. |
| wherein said sensor generates a signal that is representative of the road speed of the vehicle. | E.g., col. 3, lines 40 to 45, "The curve-recognition device K is electrically conductively coupled with a speed signal sensor, or sender, G and includes a speed threshold value device which itself affects the switchover such that the |

| Limitation of '034 Patent Claim 2 | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|
| | third filter F3 is only coupled to the regulator R if a minimum speed of the motor vehicle is exceeded." |

| Limitation of '034 Patent Claim 4 | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|
| 4. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 13. |
| wherein said sensor generates a signal that is representative of the pitch of the vehicle. | E.g. col. 1, lines 6 to 20, "This invention concerns a method to regulate an illuminating range of a motor vehicle in which signals are measured at a position on a front axle and at a position on a rear axle, which signals depend upon a relative position of a motor vehicle body, or chassis, to the front and rear axles, with a difference between these signals being formed as a difference signal, with the resulting difference signal, as a nominal-value signal, being filtered to a first mean, or average, value, with a time for the first average-value formation being determined by a first filter time constant, and with positions of adjusting elements being regulated when the first, filtered, nominal-value signal deviates from a predetermined, or set, value and an apparatus for regulating the illumination range of a motor vehicle." |

| Limitation of '034 Patent Claim 5 | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|
| 5. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 13. |
| wherein said sensor generates a signal that is representative of the suspension height of the vehicle. | E.g. col. 1, lines 6 to 20, "This invention concerns a method to regulate an illuminating range of a motor vehicle in which signals are measured at a position on a front axle and at a position on a rear axle, which signals depend upon a relative position of a motor vehicle body, or chassis, to the front and rear axles, with a difference between these signals being formed as a |

| Limitation of '034 Patent Claim 5 | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|
| | difference signal, with the resulting difference signal, as a nominal-value signal, being filtered to a first mean, or average, value, with a time for the first average-value formation being determined by a first filter time constant, and with positions of adjusting elements being regulated when the first, filtered, nominal-value signal deviates from a predetermined, or set, value and an apparatus for regulating the illumination range of a motor vehicle." |

## 4. Claims 1, and 5 of U.S. Patent No. 7,231,034 are Anticipated by Miskin et al. under 35 U.S.C. § 102(b)

| Limitation of '034 Patent Claim 1 | DE 31 10 094 (Miskin et al.) |
|---|---|
| 1. An automatic directional control system for a vehicle headlight comprising: | E.g., Abstract, "A device for automatic headlight adjustment in motor vehicles consists of four sensors which are arranged in pairs one behind the other in the direction of travel on those components of the motor vehicle which respond to loading." |
| a sensor that is adapted to generate a signal that is representative of a condition of the vehicle, said sensed condition includes one or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., Abstract, "A device for automatic headlight adjustment in motor vehicles consists of four sensors which are arranged in pairs one behind the other in the direction of travel on those components of the motor vehicle which respond to loading."<br><br>E.g., page 4, "The four sensors are arranged in pairs one behind the other S1, S2/S3, S4, following the driving direction, on those components of the motor vehicle that experience position change by loading, e.g. on wheel suspensions or shock absorbers." |
| a controller that is responsive to said sensor signal for generating an output signal | E.g., page 5, "If the signals that lead to measured data are based on light load such as those caused by road bumps, then it will result on average in a differential value that provides only a small deviation from the ideal headlight position value, thus the predetermined threshold value is not exceeded. For heavier loads, the threshold value is exceeded, the microprocessor 4 transmits signals via the digital/analog converter 6, 6' and the operational amplifier 7, 7' to the respective headlights adjustment devices, which then change the position of the headlights accordingly using conventional tools, such as, for example, spindles, which convert the rotary motion of the motor into linear movement of the headlights." |
| only when said sensor signal changes by more than a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition; and | E.g., page 5, "If the signals that lead to measured data are based on light load such as those caused by road bumps, then it will result on average in a differential value that provides only a small deviation from the ideal headlight position value, thus the predetermined threshold value is not |

| Limitation of '034 Patent Claim 1 | DE 31 10 094 (Miskin et al.) |
|---|---|
| | exceeded. For heavier loads, the threshold value is exceeded, the microprocessor 4 transmits signals via the digital/analog converter 6, 6' and the operational amplifier 7, 7' to the respective headlights adjustment devices, which then change the position of the headlights accordingly using conventional tools, such as, for example, spindles, which convert the rotary motion of the motor into linear movement of the headlights." |
| an actuator that is adapted to be connected to the headlight to effect movement thereof in accordance with said output signal. | E.g., page 5, "If the signals that lead to measured data are based on light load such as those caused by road bumps, then it will result on average in a differential value that provides only a small deviation from the ideal headlight position value, thus the predetermined threshold value is not exceeded. For heavier loads, the threshold value is exceeded, the microprocessor 4 transmits signals via the digital/analog converter 6, 6' and the operational amplifier 7, 7' to the respective headlights adjustment devices, which then change the position of the headlights accordingly using conventional tools, such as, for example, spindles, which convert the rotary motion of the motor into linear movement of the headlights." |

| Limitation of '034 Patent Claim 5 | DE 31 10 094 (Miskin et al.) |
|---|---|
| 5. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 17. |
| wherein said sensor generates a signal that is representative of the suspension height of the vehicle. | E.g., Abstract, "A device for automatic headlight adjustment in motor vehicles consists of four sensors which are arranged in pairs one behind the other in the direction of travel on those components of the motor vehicle which respond to loading."<br><br>E.g., page 4, "The four sensors are arranged in pairs one behind the other S1, S2/S3, S4, following the driving direction, on those components of the motor vehicle that experience position change by loading, e.g. on wheel suspensions |

| Limitation of '034 Patent Claim 5 | DE 31 10 094 (Miskin et al.) |
|---|---|
| | or shock absorbers." |

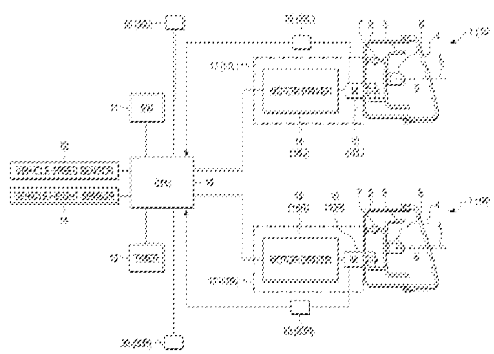
## 5. Claims 1, and 5 of U.S. Patent No. 7,231,034 are Anticipated by Leleve under 35 U.S.C. § 102(b)

| Limitation of '034 Patent Claim 1 | DE 31 29 891 (Leleve) |
|---|---|
| 1. An automatic directional control system for a vehicle headlight comprising: | E.g., page 7, "According to the invention, a device for the dynamic adjustment of the headlights of a vehicle is to be provided, which no longer has the aforementioned disadvantages and allows pleasant night-time driving under all driving conditions and regardless of the state of the road." |
| a sensor that is adapted to generate a signal that is representative of a condition of the vehicle, said sensed condition includes one or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., page 12, "The device shown in Fig. 1 has a first sensor 1 between the front axle and the body of the vehicle in order to detect a relative movement. A corresponding sensor 2 is situated on the rear axle." |
| a controller that is responsive to said sensor signal for generating an output signal | E.g., page 12, "The signals generated by sensors 1, 2 are processed in a mixer stage 3, where a signal is generated that represents the vibration or rocking motion of the vehicle in the course of its movement." |
| only when said sensor signal changes by more than a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition; and | E.g., page 8, "One first specific embodiment of the invention is characterized by the fact that the filter includes threshold value elements, via which at least one amplitude threshold is able to be defined, for which the filter predefines a limit frequency. This allows a precise adaptation of the features of the filter to the different interference phenomena requiring an adjustment of the headlight position."<br><br>See also pages 9 to 10, 13. |
| an actuator that is adapted to be connected to the headlight to effect movement thereof in accordance with said output signal. | E.g., page 12, "The output of filter 4 is connected to a control and amplifier device 6, which outputs a power signal to actuating organs 7, which causes headlights 8 to move." |

| **Limitation of '034 Patent Claim 5** | **DE 31 29 891 (Leleve)** |
|---|---|
| 5. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 20. |
| wherein said sensor generates a signal that is representative of the suspension height of the vehicle. | E.g., page 12, "The device shown in Fig. 1 has a first sensor 1 between the front axle and the body of the vehicle in order to detect a relative movement. A corresponding sensor 2 is situated on the rear axle." |

## 6. Claims 1, 2, 4, and 5 of U.S. Patent No. 7,231,034 Are Unpatentable Over the Combination of Toda et al. and Uchida Under 35 U.S.C. § 103(a)

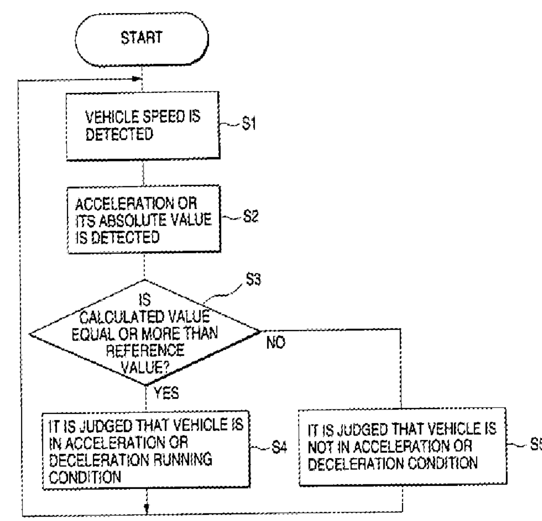
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 1. An automatic directional control system for a vehicle headlight comprising: | E.g., Abstract, "An automatic leveling device for automotive vehicle headlamps is described." | E.g., page 1, line 3 to 7, "The present invention relates to a vehicle lamp illumination direction control device which detects the posture of a vehicle and correctly adjusts the illumination direction of a vehicle lamp so that the illumination direction can always be kept in a predetermined direction." |
| a sensor that is adapted to generate a signal that is representative of a condition of the vehicle, said sensed condition includes one or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1: | E.g., Page 1, lines 14 to 28, "The conventional device of this type includes a detection device which detects the inclination and height of the vehicle body variable according to the conditions of occupants (such as the number of occupants, the position arrangement of the occupants, and the like), the loaded conditions of loads on board the vehicle, the running conditions of the vehicle, and the like, calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detection device, and adjusts the illumination angle of the vehicle lamp with respect to the initially adjusted value of the vehicle lamp so that the illumination state of the vehicle lamp can always be kept in a desired state, thereby to control the illumination direction of the vehicle lamp for desired light distribution."<br><br>E.g., Page 8, lines 20 to page 9, line 1, "Here, as basic information used to judge whether the vehicle is in the acceleration or deceleration running condition or not, besides the information that is given by the vehicle posture detection device 2, as shown in Fig. 1, there is |

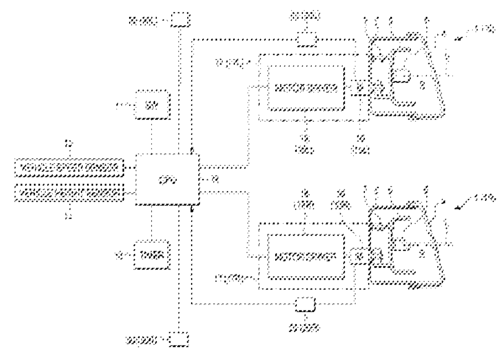
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | FIG. 1<br> | also available information which can be obtained by providing acceleration or deceleration instruction detection device 8 used to detect an acceleration or deceleration instruction or information relating to the present instruction according to the amount of pressing-down of a gas pedal, variations in the opening of a throttle valve or the like, or information which can be obtained by providing an engine revolution number detection device 9 used to detect the number of revolutions of an engine: that is, the information obtained by these detection devices may be transmitted to the acceleration or deceleration running condition judging device 3b."<br><br>E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2."<br><br>E.g., Page 9, lines 24 to 28 "Firstly, the method i) is a method which judges whether the vehicle is in the acceleration or deceleration running condition or not by detecting the running speed of the vehicle to calculate the change of the speed with time, that is, by calculating the acceleration of the vehicle."<br><br>E.g., Page 12 line 27 to page 13, line 15 "The |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | | remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |
| a controller that is responsive to said sensor signal for generating an output signal | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or | E.g., Page 4, lines 16 to 27 "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the |

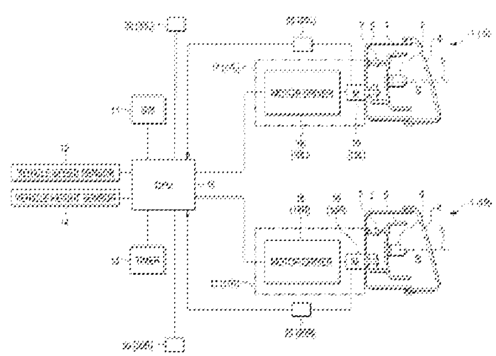
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 $m/s^2$ or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle." |
| only when said sensor signal changes by more than a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition; and | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or | E.g., Page 4, lines 16 to 27 "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the |

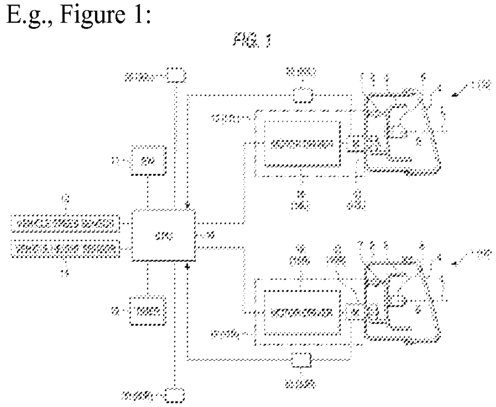
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 $m/s^2$ or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle."<br><br>E.g., Page 10, line 26 to page 11, line 6, "At first, in step S1, the vehicle speed v(t) is detected and, after then, in step S2, the acceleration dv(t)/dt or the absolute value thereof is calculated. Next, in Step S3, it is checked whether the acceleration dv(t)/dt or the absolute value thereof is equal to or more than a reference value or not. If it is found that the acceleration dv(t)/dt or the absolute value thereof is less than the reference value, then the processing advances to step S5. In step S4, it is judged that the vehicle is in the acceleration or deceleration running condition and, after then, the processing goes back to Step S2. Also, in Step S5, it is judged that the vehicle is not in the acceleration or deceleration running condition and, after then, the processing returns back to the first step S1.<br><br>E.g., Figure 5: |

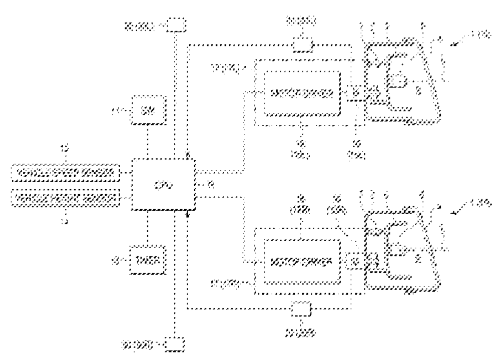
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | | FIG. 5<br><br> |
| an actuator that is adapted to be connected to the headlight to effect movement thereof in accordance with said output signal. | E.g., Page 16, line 28 to Page 17, line 6 "Also, if it is judged by the acceleration or deceleration running condition judging device 3b that the vehicle is not in the acceleration or deceleration running condition, then the illumination angle of the lamp 5 can be controlled by one of the following methods when the drive control device 4a receives an instruction from the acceleration or deceleration running condition judging device 3b: 1) a method for fixing the illumination angle; 2) a method for limiting the range of the illumination angle or forbidding | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1: |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| | part of the range of the illumination angle; and, 3) a method for changing the response speed or control speed of an actuator."<br><br>E.g., Page 7, lines 4 to 9 "In particular, the correction calculating device 3a is structured in the following manner: that is, in accordance with a detect signal from the vehicle posture detection device 2, it transmits a control signal to the drive device 4 so that the illumination direction of the lamp 5 can be always kept in a given direction." See also 7:9-32.<br><br>E.g., Page 8, lines 1 to 9 "When the judging device 3b judges that the vehicle is in an acceleration or deceleration running condition, in accordance with a control signal transmitted from the correction calculating device 3a to the drive control device 4a, the acceleration or deceleration running condition judging device 3b transmits to the drive control device 4a a signal which allows the illumination direction of the lamp 5 to be corrected in a predetermined direction." | FIG. 1<br> |

| Limitation of '034 Patent Claim 2 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| 2. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 22. | See claim 1 claim chart, above at page 22. |

<table>
<tr><th>Limitation of '034 Patent Claim 2</th><th>U.S. Patent No. 6,305,823 (Toda et al.)</th><th>GB 2 309 773 (Uchida)</th></tr>
<tr><td>wherein said sensor generates a signal that is representative of the road speed of the vehicle.</td><td>E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br>FIG. 1<br></td><td>E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2."<br><br>E.g., Page 9, lines 24 to 28 "Firstly, the method i) is a method which judges whether the vehicle is in the acceleration or deceleration running condition or not by detecting the running speed of the vehicle to calculate the change of the speed with time, that is, by calculating the acceleration of the vehicle."</td></tr>
</table>

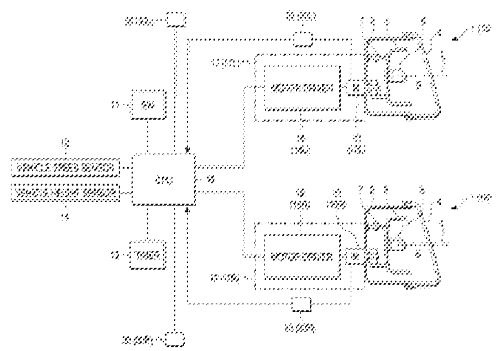
| Limitation of '034 Patent Claim 4 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 4. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 22. | See claim 1 claim chart, above at page 22. |
| wherein said sensor generates a signal that is representative of the pitch of the vehicle. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br> | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Claim 5 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 5. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 22. | See claim 1 claim chart, above at page 22. |
| wherein said sensor generates a signal that is representative of the suspension height of the vehicle. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the |

| Limitation of '034 Patent Claim 5 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | | running condition of the vehicle can be confirmed to a certain degree." |

## 7. Claims 1, 2, 4, and 5 of U.S. Patent No. 7,231,034 Are Unpatentable Over the Combination of Toda et al. and Takahashi Under 35 U.S.C. § 103(a)

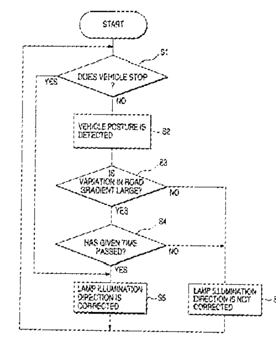
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 1. An automatic directional control system for a vehicle headlight comprising: | E.g., Abstract, "An automatic leveling device for automotive vehicle headlamps is described." | E.g., page 5, line 3 to 7, "The present invention relates to a vehicle lamp illumination direction control device which detects the posture of a vehicle and correctly adjust the illumination direction of a vehicle lamp so that it can be always kept in a predetermined direction." |
| a sensor that is adapted to generate a signal that is representative of a condition of the vehicle, said sensed condition includes one or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1: | E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle."<br><br>E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition |

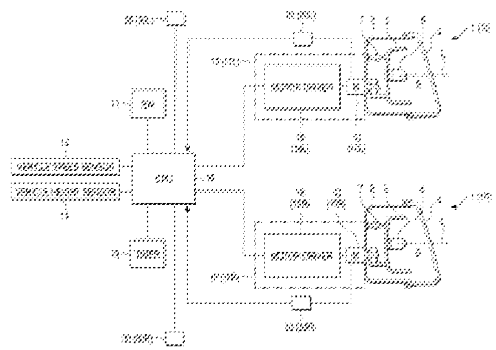
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | FIG. 1<br> | detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle.".<br><br>E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br><br>E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |
| a controller that is responsive to said sensor signal for generating an output signal | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 $m/s^2$ or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, | E.g., page 8, lines 26 to 32 "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2." |

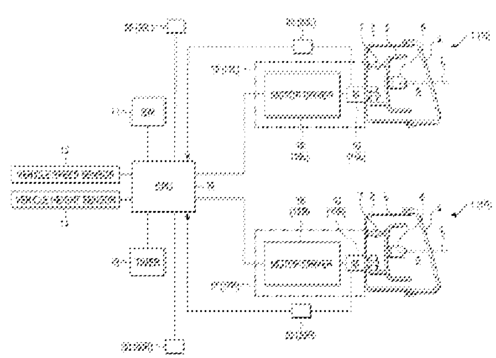
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | |
| only when said sensor signal changes by more than a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition; and | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 $m/s^2$ or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, | E.g., page 8, lines 26 to 32 "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2."<br><br>E.g., page 9, line to page 10, line 3 "Also, in order to prevent the illumination direction of the lamp 6 from being corrected inadvertently when a sudden change in the posture of the vehicle occurs temporarily or due to the wrong operation of the lamp 6 caused by external disturbances, for example, when the vehicle makes a sudden start or a sudden stop, preferably, a threshold value with respect to time may be set in detection of the road gradient and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a threshold value with respect to the running distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | reference value and such excessive state continues for a distance equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected. Also, the threshold values may be set in various manners, for example, they may be set as a constant value, or may be set as a variable which varies according to the speeds of the vehicle."<br><br>E.g., Page 10, line 20 to page 11, line 11, "In Step S4, it is checked whether a state in which the amount of variations of the detect signal supplied by the vehicle posture detection device 2 is equal to or more than a given reference value continues for a given period of time or longer or not. If it is found that such state continues, then the processing advances to Step S and, if not, then the processing goes to Step S6. Here, when a threshold value relating to the running distance of the vehicle is set instead of setting a threshold value relating to the above-mentioned continuing time, in Step S4, it may be checked whether a state in which the amount of variations in the detect signal supplied by the vehicle posture detection device 2 is equal to or more than a given reference value continues over a given running distance or not. In Step S5, in accordance with the information from the vehicle posture detection device 2, the control device 4 transmits to the drive control device 5a a control signal which causes the illumination direction of the lamp 6 to be kept in a predetermined direction, and the |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | illumination direction of the lamp 6 is corrected through the drive mechanism 5. After then, the processing goes back to the first step S1. Also, in Step 6, the correction of the illumination direction of the lamp 6 is not carried out but the processing returns to the first Step S1."<br><br>E.g., Figure 7:<br>FIG. 7<br> |
| an actuator that is adapted to be connected to the headlight to effect movement thereof in accordance with said output signal. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit." | E.g., page 2, lines 14 to 17 "However, in the above-mentioned automatic adjustment device, since the lamp is driven with high frequency, an actuator used in a drive mechanism for driving the lamp is required to show high response property and high durability."<br><br>E.g., page 6, lines 26 to 32 "When the control device 4 receives the detect signal of the vehicle running condition detection device 3 and finds from this detect signal that the vehicle is standing |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | E.g., Figure 1:<br>FIG. 1<br> | still, the control device 4, in accordance with information on the vehicle posture obtained from the vehicle posture detection device 2, transmits to the drive signal 5 a control signal for correction of the illumination direction of the lamp 6."<br><br>E.g., page 7, lines 12 to 17 "In view of this, the control device 4 is structured such that, based on the information from the vehicle posture detection device 2, it can detect the amount of variations in the gradient of the road and, therefore, when the road gradient varies suddenly, it can correct the illumination direction of the lamp 6."<br><br>E.g., page 11, lines 12 to 16 "The correction of the illumination direction of the lamp 6 in Step S5 is carried out by the drive device 5 based on the control signal transmitted from the control device 4 and, as a method for executing such correction, there are available two methods . . ." |

| Limitation of '034 Patent Claim 2 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 2. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 33. | See claim 1 claim chart, above at page 33. |
| wherein said sensor generates a signal that is representative of the road speed of the vehicle. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator | E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the |

| Limitation of '034 Patent Claim 2 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> | detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle." |

| Limitation of '034 Patent Claim 4 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 4. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 33. | See claim 1 claim chart, above at page 33. |
| wherein said sensor generates a signal that is representative of the pitch of the vehicle. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a |



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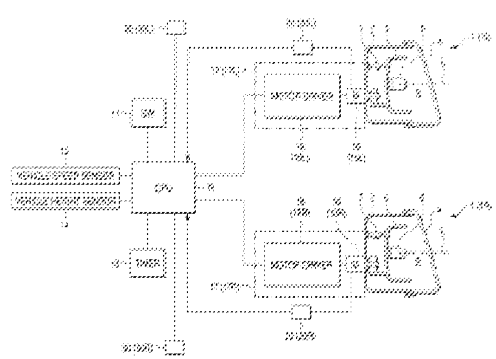
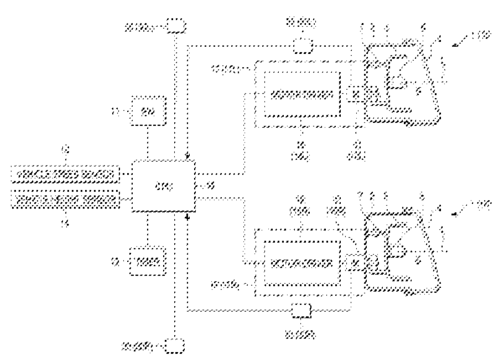
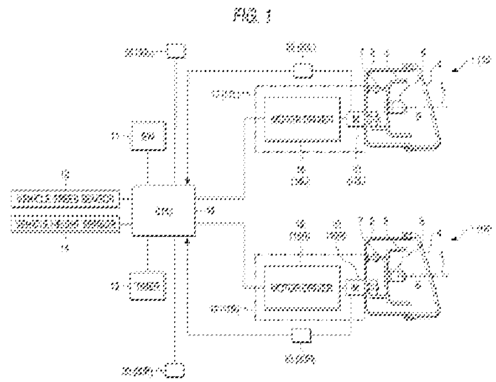
| Limitation of '034 Patent Claim 4 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> | device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp." |

| Limitation of '034 Patent Claim 5 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 5. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 33. | See claim 1 claim chart, above at page 33. |
| wherein said sensor generates a signal that is | E.g., col. 3, lines 11 to 18, "The headlamp | E.g., page 2, lines 6 to 13 "Therefore, there is |

| Limitation of '034 Patent Claim 5 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
| --- | --- | --- |
| representative of the suspension height of the vehicle. | automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> | conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br><br>E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |

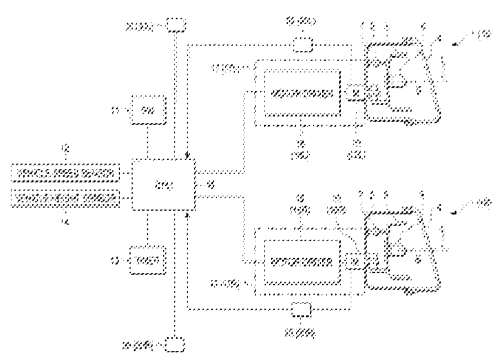
## 8. Claims 1, 2, 4, and 5 of U.S. Patent No. 7,231,034 Are Unpatentable Over the Combination of Toda et al. and Hussman Under 35 U.S.C. § 103(a)

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 1. An automatic directional control system for a vehicle headlight comprising: | E.g., Abstract, "An automatic leveling device for automotive vehicle headlamps is described." | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation." |
| a sensor that is adapted to generate a signal that is representative of a condition of the vehicle, said sensed condition includes one or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1: | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value |

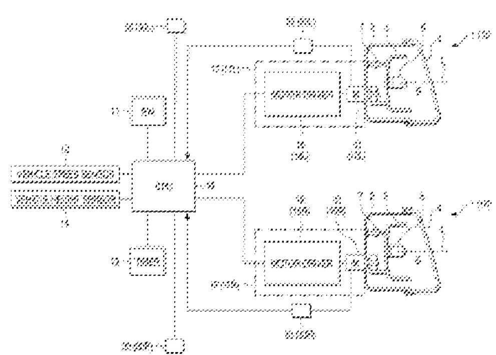
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| |  | former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles."<br><br>E.g., col. 3, lines 40 to 45, "The curve-recognition device K is electrically conductively coupled with a speed signal sensor, or sender, G and includes a speed threshold value device which itself affects the switchover such that the third filter F3 is only coupled to the regulator R if a minimum speed of the motor vehicle is exceeded." |
| a controller that is responsive to said sensor signal for generating an output signal | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is | E.g., col. 3, lines 30 to 39, "The curve-recognition device K is electrically conductively coupled with the switchover device SE and thereby couples the third filter F3 electrically conductively with the regulator R if a difference signal other than zero is fed to it from the subtractor SU. When no difference signal from the subtractor SU is present, the curve-recognition device K switches the switchover device SE so that the first filter F1 is coupled to the regulator R." |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | proper to limit the acceleration to 0.5 $m/s^2$ or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | |
| only when said sensor signal changes by more than a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition; and | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is | E.g., col. 3, lines 30 to 39, "The curve-recognition device K is electrically conductively coupled with the switchover device SE and thereby couples the third filter F3 electrically conductively with the regulator R if a difference signal other than zero is fed to it from the subtractor SU. When no difference signal from the subtractor SU is present, the curve-recognition device K switches the switchover device SE so that the first filter F1 is coupled to the regulator R."<br><br>E.g., col. 4, lines 6 to 12, "At the coupling between the switchover device SE and the regulator R, a matching device AE is, here for example, arranged which, upon a switchover by the switchover device SE, adjusts the various nominal values to one another so that |

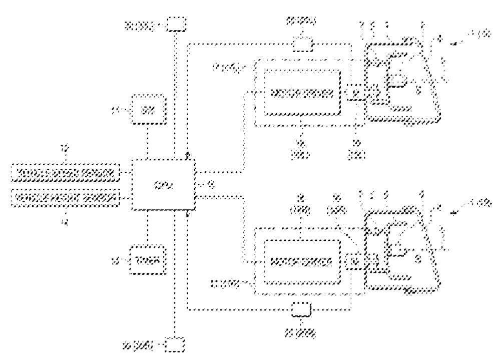
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | proper to limit the acceleration to 0.5 $m/s^2$ or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | discontinuities or jumps in the adjustment and regulation of the illumination range are avoided."<br><br>E.g., col. 6, line 10 to 34, "In this connection, it is beneficial that upon the presence of a difference between the second, filtered, nominal-value signal to the third, filtered, nominal-value signal and upon termination of a difference is again switched from the third, filtered, nominal-value signal to the first, filtered, nominal-value signal because in this manner, in an uncomplicated and cost effective manner, upon the presence of an inclination change of the motor vehicle body which is not attributable to a change in loading or to road surface unevenness, the regulation of the illumination range of the motor vehicle, in dependence from the third, long, filter time constant results, whereby the third, filtered, nominal-value signal is independent, or substantially independent, from the disturbing, or distorting, short time inclination changes so that after inclination changes of the motor-vehicle body which, for example, are caused by driving about a curve, false adjustments of the illumination range are not caused which can lead to the blinding of oncoming traffic or to losses in illumination range, which eliminates a danger during operation of a motor vehicle." |
| an actuator that is adapted to be connected to the headlight to effect movement thereof in accordance with said output signal. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes | E.g., col. 3, lines 16 to 18, "The regulator R regulates the position of adjusting elements, which are shown here in block form and which change |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> | the positions of headlights." |

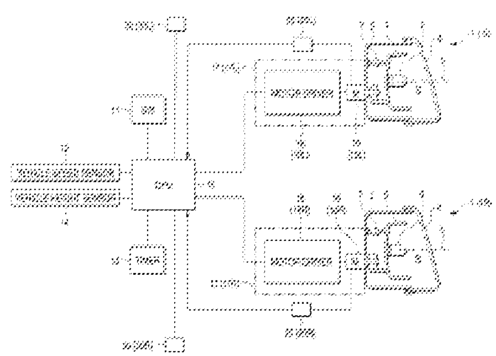
| Limitation of '034 Patent Claim 2 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 2. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 43. | See claim 1 claim chart, above at page 43. |
| wherein said sensor generates a signal that is | E.g., col. 3, lines 11 to 18, "The headlamp | E.g., col. 3, lines 40 to 45, "The curve-recognition |

| Limitation of '034 Patent Claim 2 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| representative of the road speed of the vehicle. | automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> | device K is electrically conductively coupled with a speed signal sensor, or sender, G and includes a speed threshold value device which itself affects the switchover such that the third filter F3 is only coupled to the regulator R if a minimum speed of the motor vehicle is exceeded." |

| Limitation of '034 Patent Claim 4 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 4. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 43. | See claim 1 claim chart, above at page 43. |

| Limitation of '034 Patent Claim 4 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
| --- | --- | --- |
| wherein said sensor generates a signal that is representative of the pitch of the vehicle. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> | E.g. col. 1, lines 6 to 20, "This invention concerns a method to regulate an illuminating range of a motor vehicle in which signals are measured at a position on a front axle and at a position on a rear axle, which signals depend upon a relative position of a motor vehicle body, or chassis, to the front and rear axles, with a difference between these signals being formed as a difference signal, with the resulting difference signal, as a nominal-value signal, being filtered to a first mean, or average, value, with a time for the first average-value formation being determined by a first filter time constant, and with positions of adjusting elements being regulated when the first, filtered, nominal-value signal deviates from a predetermined, or set, value and an apparatus for regulating the illumination range of a motor vehicle." |

| Limitation of '034 Patent Claim 5 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
| --- | --- | --- |
| 5. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 43. | See claim 1 claim chart, above at page 43. |

| Limitation of '034 Patent Claim 5 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| wherein said sensor generates a signal that is representative of the suspension height of the vehicle. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> | E.g. col. 1, lines 6 to 20, "This invention concerns a method to regulate an illuminating range of a motor vehicle in which signals are measured at a position on a front axle and at a position on a rear axle, which signals depend upon a relative position of a motor vehicle body, or chassis, to the front and rear axles, with a difference between these signals being formed as a difference signal, with the resulting difference signal, as a nominal-value signal, being filtered to a first mean, or average, value, with a time for the first average-value formation being determined by a first filter time constant, and with positions of adjusting elements being regulated when the first, filtered, nominal-value signal deviates from a predetermined, or set, value and an apparatus for regulating the illumination range of a motor vehicle." |

## 9. Claims 1, 2, 4, and 5 of U.S. Patent No. 7,231,034 Are Unpatentable Over the Combination of Toda et al. and Miskin et al. Under 35 U.S.C. § 103(a)

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| 1. An automatic directional control system for a vehicle headlight comprising: | E.g., Abstract, "An automatic leveling device for automotive vehicle headlamps is described." | E.g., Abstract, "A device for automatic headlight adjustment in motor vehicles consists of four sensors which are arranged in pairs one behind the other in the direction of travel on those components of the motor vehicle which respond to loading." |
| a sensor that is adapted to generate a signal that is representative of a condition of the vehicle, said sensed condition includes one or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1: | E.g., Abstract, "A device for automatic headlight adjustment in motor vehicles consists of four sensors which are arranged in pairs one behind the other in the direction of travel on those components of the motor vehicle which respond to loading."<br><br>E.g., page 4, "The four sensors are arranged in pairs one behind the other S1, S2/S3, S4, following the driving direction, on those components of the motor vehicle that experience position change by loading, e.g. on wheel suspensions or shock absorbers." |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | DE 31 10 094 (Miskin et al.) |
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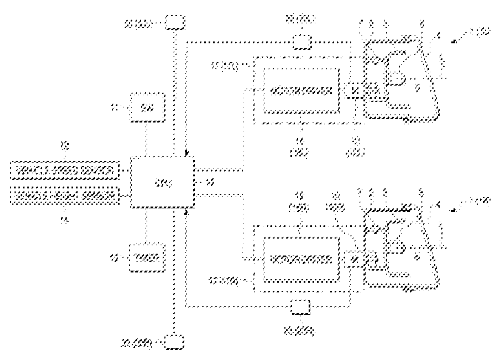
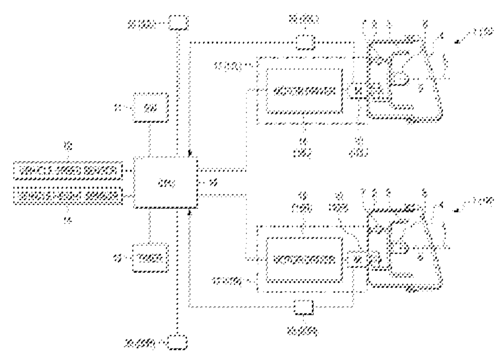
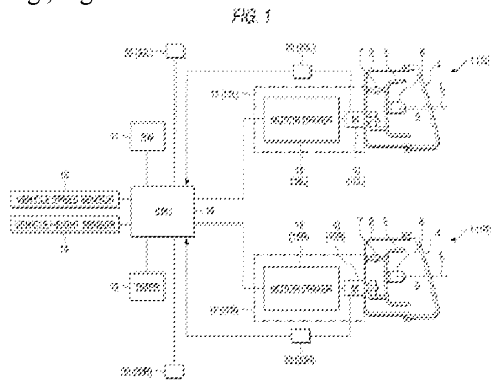
| | FIG. 1  | |
| a controller that is responsive to said sensor signal for generating an output signal | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 $m/s^2$ or | E.g., page 5, "If the signals that lead to measured data are based on light load such as those caused by road bumps, then it will result on average in a differential value that provides only a small deviation from the ideal headlight position value, thus the predetermined threshold value is not exceeded. For heavier loads, the threshold value is exceeded, the microprocessor 4 transmits signals via the digital/analog converter 6, 6' and the operational amplifier 7, 7' to the respective headlights adjustment devices, which then change the position of the headlights accordingly using conventional tools, such as, for example, spindles, which convert the rotary motion of the motor into linear movement of the headlights." |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| | lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | |
| only when said sensor signal changes by more than a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition; and | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 $m/s^2$ or | E.g., page 5, "If the signals that lead to measured data are based on light load such as those caused by road bumps, then it will result on average in a differential value that provides only a small deviation from the ideal headlight position value, thus the predetermined threshold value is not exceeded. For heavier loads, the threshold value is exceeded, the microprocessor 4 transmits signals via the digital/analog converter 6, 6' and the operational amplifier 7, 7' to the respective headlights adjustment devices, which then change the position of the headlights accordingly using conventional tools, such as, for example, spindles, which convert the rotary motion of the motor into linear movement of the headlights." |

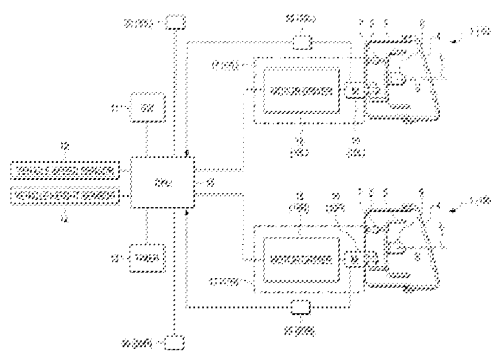
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| | lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | |
| an actuator that is adapted to be connected to the headlight to effect movement thereof in accordance with said output signal. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1: | E.g., page 5, "If the signals that lead to measured data are based on light load such as those caused by road bumps, then it will result on average in a differential value that provides only a small deviation from the ideal headlight position value, thus the predetermined threshold value is not exceeded. For heavier loads, the threshold value is exceeded, the microprocessor 4 transmits signals via the digital/analog converter 6, 6' and the operational amplifier 7, 7' to the respective headlights adjustment devices, which then change the position of the headlights accordingly using conventional tools, such as, for example, spindles, which convert the rotary motion of the motor into linear movement of the headlights." |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| | FIG. 1  | |

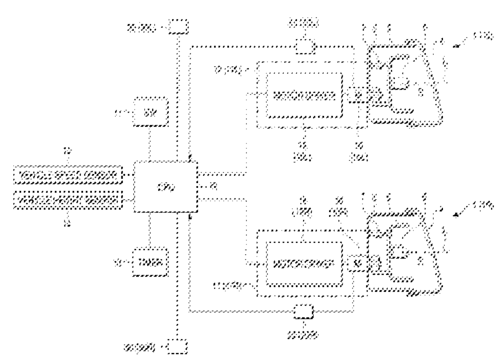
| Limitation of '034 Patent Claim 2 | U.S. Patent No. 6,305,823 (Toda et al.) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| 2. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 51. | See claim 1 claim chart, above at page 51. |
| wherein said sensor generates a signal that is representative of the road speed of the vehicle. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit." | |

| Limitation of '034 Patent Claim 2 | U.S. Patent No. 6,305,823 (Toda et al.) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| | E.g., Figure 1:  | |

| Limitation of '034 Patent Claim 4 | U.S. Patent No. 6,305,823 (Toda et al.) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| 4. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 51. | See claim 1 claim chart, above at page 51. |
| wherein said sensor generates a signal that is representative of the pitch of the vehicle. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control | |

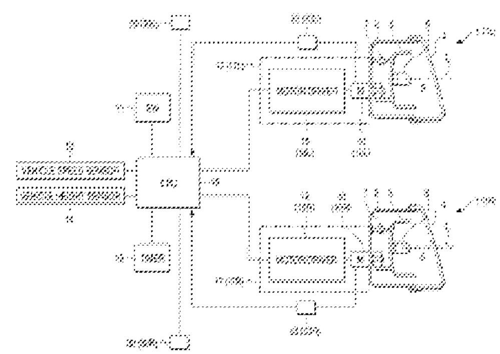
| Limitation of '034 Patent Claim 4 | U.S. Patent No. 6,305,823 (Toda et al.) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| | unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> | |

| Limitation of '034 Patent Claim 5 | U.S. Patent No. 6,305,823 (Toda et al.) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| 5. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 51. | See claim 1 claim chart, above at page 51. |
| wherein said sensor generates a signal that is representative of the suspension height of the vehicle. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height | E.g., Abstract, "A device for automatic headlight adjustment in motor vehicles consists of four sensors which are arranged in pairs one behind the other in the direction of travel on those components of the motor vehicle which respond to loading."<br><br>E.g., page 4, "The four sensors are arranged in |

| Limitation of '034 Patent Claim 5 | U.S. Patent No. 6,305,823 (Toda et al.) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| | sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> | pairs one behind the other S1, S2/S3, S4, following the driving direction, on those components of the motor vehicle that experience position change by loading, e.g. on wheel suspensions or shock absorbers." |

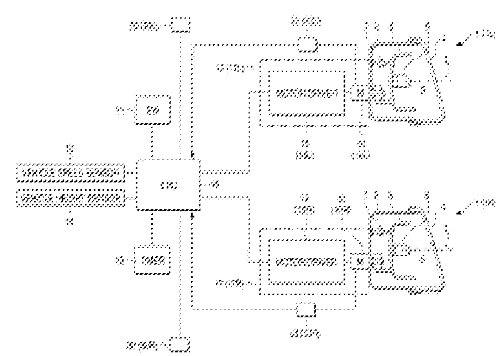
## 10. Claims 1, 2, 4, and 5 of U.S. Patent No. 7,231,034 Are Unpatentable Over the Combination of Toda et al. and Leleve Under 35 U.S.C. § 103(a)

| Limitation of '034 Patent Claim 1 | DE 31 29 891 (Leleve) | U.S. Patent No. 6,305,823 (Toda et al.) |
|---|---|---|
| 1. An automatic directional control system for a vehicle headlight comprising: | E.g., page 7, "According to the invention, a device for the dynamic adjustment of the headlights of a vehicle is to be provided, which no longer has the aforementioned disadvantages and allows pleasant night-time driving under all driving conditions and regardless of the state of the road." | E.g., Abstract, "An automatic leveling device for automotive vehicle headlamps is described." |
| a sensor that is adapted to generate a signal that is representative of a condition of the vehicle, said sensed condition includes one or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., page 12, "The device shown in Fig. 1 has a first sensor 1 between the front axle and the body of the vehicle in order to detect a relative movement. A corresponding sensor 2 is situated on the rear axle." | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1: |

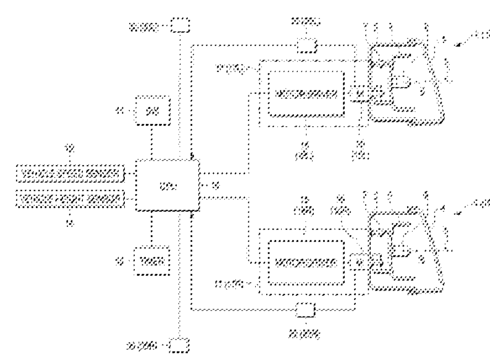
| Limitation of '034 Patent Claim 1 | DE 31 29 891 (Leleve) | U.S. Patent No. 6,305,823 (Toda et al.) |
|---|---|---|
| | | FIG. 1  |
| a controller that is responsive to said sensor signal for generating an output signal | E.g., page 12, "The signals generated by sensors 1, 2 are processed in a mixer stage 3, where a signal is generated that represents the vibration or rocking motion of the vehicle in the course of its movement." | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 $m/s^2$ or lower. Therefore, an abrupt detection of an |

| Limitation of '034 Patent Claim 1 | DE 31 29 891 (Leleve) | U.S. Patent No. 6,305,823 (Toda et al.) |
|---|---|---|
| | | abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." |
| only when said sensor signal changes by more than a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition; and | E.g., page 8, "One first specific embodiment of the invention is characterized by the fact that the filter includes threshold value elements, via which at least one amplitude threshold is able to be defined, for which the filter predefines a limit frequency. This allows a precise adaptation of the features of the filter to the different interference phenomena requiring an adjustment of the headlight position." | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 $m/s^2$ or lower. Therefore, an abrupt detection of an |

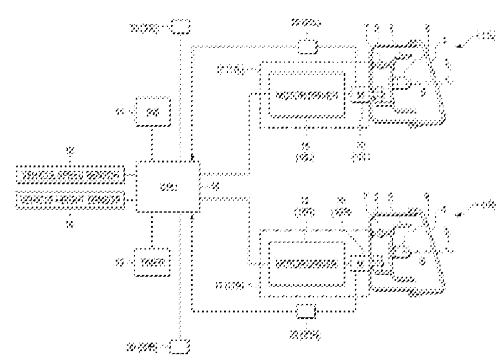
| Limitation of '034 Patent Claim 1 | DE 31 29 891 (Leleve) | U.S. Patent No. 6,305,823 (Toda et al.) |
|---|---|---|
| | | abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." |
| an actuator that is adapted to be connected to the headlight to effect movement thereof in accordance with said output signal. | E.g., page 12, "The output of filter 4 is connected to a control and amplifier device 6, which outputs a power signal to actuating organs 7, which causes headlights 8 to move." | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1: |

| Limitation of '034 Patent Claim 1 | DE 31 29 891 (Leleve) | U.S. Patent No. 6,305,823 (Toda et al.) |
|---|---|---|
| | | FIG. 1  |

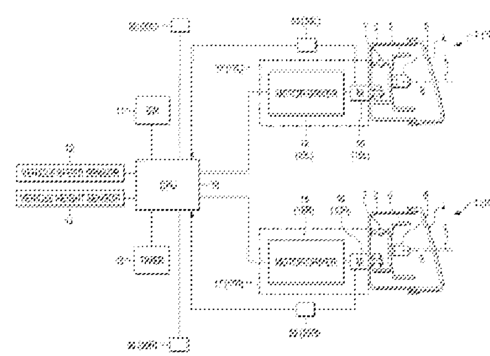
| Limitation of '034 Patent Claim 2 | DE 31 29 891 (Leleve) | U.S. Patent No. 6,305,823 (Toda et al.) |
|---|---|---|
| 2. The automatic directional control system defined in claim 1 | See claim 1 claim chart above at page 59. | See claim 1 claim chart above at page 59. |
| wherein said sensor generates a signal that is representative of the road speed of the vehicle. | | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit." |

| Limitation of '034 Patent Claim 2 | DE 31 29 891 (Leleve) | U.S. Patent No. 6,305,823 (Toda et al.) |
|---|---|---|
| | | E.g., Figure 1:<br>FIG. 1<br> |

| Limitation of '034 Patent Claim 4 | DE 31 29 891 (Leleve) | U.S. Patent No. 6,305,823 (Toda et al.) |
|---|---|---|
| 4. The automatic directional control system defined in claim 1 | See claim 1 claim chart above at page 59. | See claim 1 claim chart above at page 59. |
| wherein said sensor generates a signal that is representative of the pitch of the vehicle. | | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control |

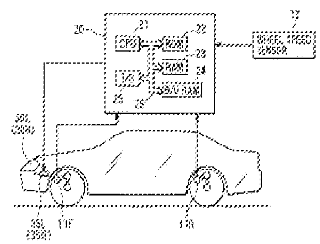
| Limitation of '034 Patent Claim 4 | DE 31 29 891 (Leleve) | U.S. Patent No. 6,305,823 (Toda et al.) |
| --- | --- | --- |
| | | unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> |

| Limitation of '034 Patent Claim 5 | DE 31 29 891 (Leleve) | U.S. Patent No. 6,305,823 (Toda et al.) |
| --- | --- | --- |
| 5. The automatic directional control system defined in claim 1 | See claim 1 claim chart above at page 59. | See claim 1 claim chart above at page 59. |
| wherein said sensor generates a signal that is representative of the suspension height of the vehicle. | E.g., page 12, "The device shown in Fig. 1 has a first sensor 1 between the front axle and the body of the vehicle in order to detect a relative movement. A corresponding sensor 2 is situated on the rear axle." | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch |

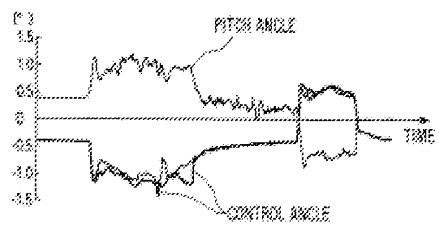
| Limitation of '034 Patent Claim 5 | DE 31 29 891 (Leleve) | U.S. Patent No. 6,305,823 (Toda et al.) |
| --- | --- | --- |
| | | angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> |

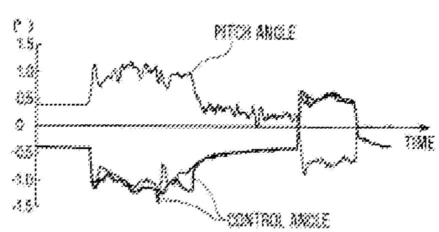
## 11. Claims 1, 2, 4, and 5 of U.S. Patent No. 7,231,034 Are Unpatentable Over the Combination of Okuchi et al. and Uchida Under 35 U.S.C. § 103(a)

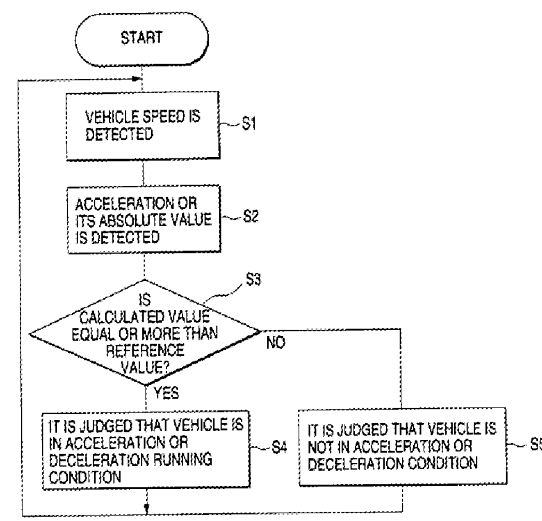
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 1. An automatic directional control system for a vehicle headlight comprising: | E.g., Abstract, "In a vehicle headlight optical axis automatic adjusting system, a pitch angle in the longitudinal direction of a vehicle is calculated from a signal of a height sensor." | E.g., page 1, line 3 to 7, "The present invention relates to a vehicle lamp illumination direction control device which detects the posture of a vehicle and correctly adjusts the illumination direction of a vehicle lamp so that the illumination direction can always be kept in a predetermined direction." |
| a sensor that is adapted to generate a signal that is representative of a condition of the vehicle, said sensed condition includes one or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the | E.g., Page 1, lines 14 to 28, "The conventional device of this type includes a detection device which detects the inclination and height of the vehicle body variable according to the conditions of occupants (such as the number of occupants, the position arrangement of the occupants, and the like), the loaded conditions of loads on board the vehicle, the running conditions of the vehicle, and the like, calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detection device, and adjusts the illumination angle of the vehicle lamp with respect to the initially adjusted value of the vehicle lamp so that the illumination state of the vehicle lamp can always be kept in a desired state, thereby to control the illumination direction of the vehicle lamp for desired light distribution."<br><br>E.g., Page 8, lines 20 to page 9, line 1, "Here, as basic information used to judge whether the vehicle is in the acceleration or deceleration running condition or not, besides the information that is given by the vehicle posture detection device 2, as shown in Fig. 1, there is |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG.1<br> | also available information which can be obtained by providing acceleration or deceleration instruction detection device 8 used to detect an acceleration or deceleration instruction or information relating to the present instruction according to the amount of pressing-down of a gas pedal, variations in the opening of a throttle valve or the like, or information which can be obtained by providing an engine revolution number detection device 9 used to detect the number of revolutions of an engine: that is, the information obtained by these detection devices may be transmitted to the acceleration or deceleration running condition judging device 3b."<br><br>E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2."<br><br>E.g., Page 9, lines 24 to 28 "Firstly, the method i) is a method which judges whether the vehicle is in the acceleration or deceleration running condition or not by detecting the running speed of the vehicle to calculate the change of the speed with time, that is, by calculating the acceleration of the vehicle."<br><br>E.g., Page 12 line 27 to page 13, line 15 "The |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | | remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |
| a controller that is responsive to said sensor signal for generating an output signal | E.g., col. 6, lines 6 to 14, "On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding | E.g., Page 4, lines 16 to 27 "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the |

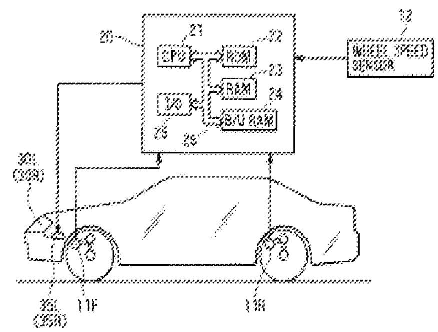
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle."<br><br>E.g., Fig. 7:<br><br>FIG. 7<br><br> | direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle." |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| only when said sensor signal changes by more than a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition; and | E.g., col. 6, lines 6 to 14, "On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle."<br><br>E.g., Fig. 7:<br>FIG. 7<br> | E.g., Page 4, lines 16 to 27 "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle."<br><br>E.g., Page 10, line 26 to page 11, line 6, "At first, in step S1, the vehicle speed v(t) is detected and, after then, in step S2, the acceleration dv(t)/dt or the absolute value thereof is calculated. Next, in Step S3, it is checked whether the acceleration dv(t)/dt or the absolute value thereof is equal to or more than a reference value or not. If it is found that the acceleration dv(t)/dt or the absolute value thereof is less than the reference value, then the processing advances to step S5. In step S4, it is judged that the vehicle is in the acceleration or deceleration running condition and, after then, the processing goes back to Step S2. Also, in Step S5, it is judged that the vehicle is not in the acceleration or deceleration running condition and, after then, the processing returns back to the first step S1.<br><br>E.g., Figure 5: |

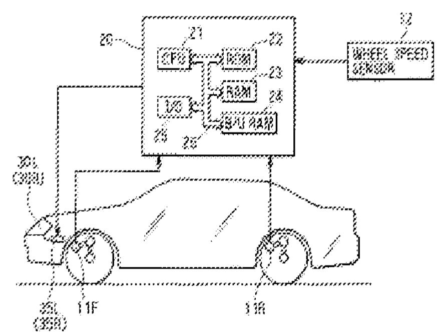
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| | | FIG. 5   |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| an actuator that is adapted to be connected to the headlight to effect movement thereof in accordance with said output signal. | E.g., col. 5, lines 16 to 20, "Output signals from the ECU 20 are supplied to actuators 35R and 35L of right and left headlights 30R and 30L of the vehicle, thereby adjusting the optical axis direction of the right and left headlights 30R and 30L as will be described hereinlater." | E.g., Page 16, line 28 to Page 17, line 6 "Also, if it is judged by the acceleration or deceleration running condition judging device 3b that the vehicle is not in the acceleration or deceleration running condition, then the illumination angle of the lamp 5 can be controlled by one of the following methods when the drive control device 4a receives an instruction from the acceleration or deceleration running condition judging device 3b: 1) a method for fixing the illumination angle; 2) a method for limiting the range of the illumination angle or forbidding part of the range of the illumination angle; and, 3) a method for changing the response speed or control speed of an actuator."<br><br>E.g., Page 7, lines 4 to 9 "In particular, the correction calculating device 3a is structured in the following manner: that is, in accordance with a detect signal from the vehicle posture detection device 2, it transmits a control signal to the drive device 4 so that the illumination direction of the lamp 5 can be always kept in a given direction." See also 7:9-32.<br><br>E.g., Page 8, lines 1 to 9 "When the judging device 3b judges that the vehicle is in an acceleration or deceleration running condition, in accordance with a control signal transmitted from the correction calculating device 3a to the drive control device 4a, the acceleration or deceleration running condition judging device 3b transmits to the drive control device 4a a signal which allows the illumination direction of the lamp 5 to be corrected in a predetermined direction." |

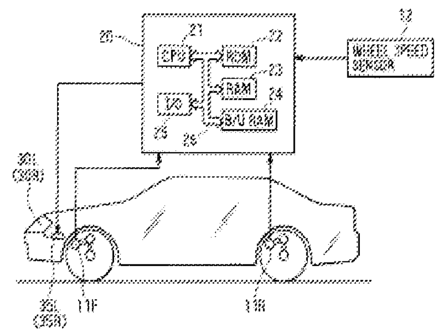
| Limitation of '034 Patent Claim 2 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 2. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 67. | See claim 1 claim chart, above at page 67. |
| wherein said sensor generates a signal that is representative of the road speed of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1: | E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2."<br><br>E.g., Page 9, lines 24 to 28 "Firstly, the method i) is a method which judges whether the vehicle is in the acceleration or deceleration running condition or not by detecting the running speed of the vehicle to calculate the change of the speed with time, that is, by calculating the acceleration of the vehicle." |

| Limitation of '034 Patent Claim 2 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | FIG. 1   | |

| Limitation of '034 Patent Claim 4 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 4. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 67. | See claim 1 claim chart, above at page 67. |
| wherein said sensor generates a signal that is representative of the pitch of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used |

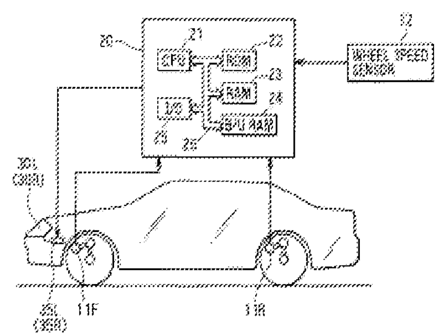
| Limitation of '034 Patent Claim 4 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br><br>FIG.1<br> | height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Claim 5 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 5. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 67. | See claim 1 claim chart, above at page 67. |
| wherein said sensor generates a signal that is representative of the suspension height of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1: | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

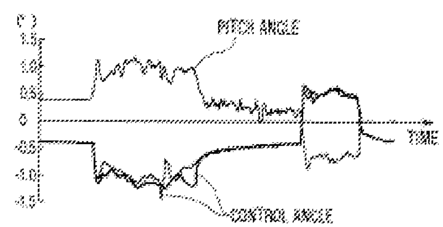
| Limitation of '034 Patent Claim 5 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | FIG. 1<br> | |

## 12. Claims 1, 2, 4, and 5 of U.S. Patent No. 7,231,034 Are Unpatentable Over the Combination of Okuchi et al. and Takahashi Under 35 U.S.C. § 103(a)

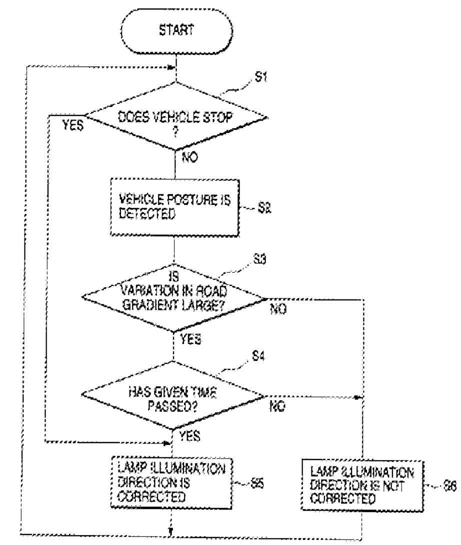
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 1. An automatic directional control system for a vehicle headlight comprising: | E.g., Abstract, "In a vehicle headlight optical axis automatic adjusting system, a pitch angle in the longitudinal direction of a vehicle is calculated from a signal of a height sensor." | E.g., page 5, line 3 to 7, "The present invention relates to a vehicle lamp illumination direction control device which detects the posture of a vehicle and correctly adjust the illumination direction of a vehicle lamp so that it can be always kept in a predetermined direction." |
| a sensor that is adapted to generate a signal that is representative of a condition of the vehicle, said sensed condition includes one or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20." | E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle."<br><br>E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
| --- | --- | --- |
| | E.g., Fig. 1:<br><br>FIG.1<br> | detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle.".<br><br>E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br><br>E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |
| a controller that is responsive to said sensor signal for generating an output signal | | E.g., page 8, lines 26 to 32 "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2." |
| only when said sensor signal changes by more than a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition; and | E.g., col. 6, lines 6 to 14, "On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle."<br><br>E.g., Fig. 7: | E.g., page 8, lines 26 to 32 "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2."<br><br>E.g., page 9, line to page 10, line 3 "Also, in order to prevent the illumination direction of the lamp 6 from being corrected inadvertently when a sudden change in the posture of the vehicle occurs temporarily or due to the wrong operation of the lamp 6 caused by external disturbances, for example, when the vehicle makes a sudden start or a sudden stop, preferably, a threshold value with respect to time may be set in detection of the road gradient and, only when the amount of variations |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | FIG. 7<br> | in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a threshold value with respect to the running distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a distance equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected. Also, the threshold values may be set in various manners, for example, they may be set as a constant value, or may be set as a variable which varies according to the speeds of the vehicle."<br><br>E.g., Page 10, line 20 to page 11, line 11, "In Step S4, it is checked whether a state in which the amount of variations of the detect signal supplied by the vehicle posture detection device 2 is equal to or more than a given reference value continues for a given period of time or longer or not. If it is found that such state continues, then the processing advances to Step S and, if not, then the processing goes to Step S6. Here, when a threshold value relating to the running distance of the vehicle is set instead of setting a threshold value relating to the above-mentioned continuing time, in Step S4, it may be checked whether a state in which the amount of variations in the detect |

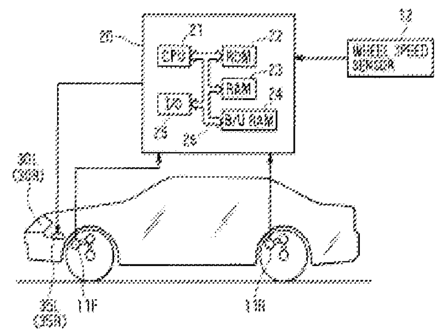
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | signal supplied by the vehicle posture detection device 2 is equal to or more than a given reference value continues over a given running distance or not. In Step S5, in accordance with the information from the vehicle posture detection device 2, the control device 4 transmits to the drive control device 5a a control signal which causes the illumination direction of the lamp 6 to be kept in a predetermined direction, and the illumination direction of the lamp 6 is corrected through the drive mechanism 5. After then, the processing goes back to the first step S1. Also, in Step 6, the correction of the illumination direction of the lamp 6 is not carried out but the processing returns to the first Step S1."<br><br>E.g., Figure 7: |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | FIG. 7<br> |
| an actuator that is adapted to be connected to the headlight to effect movement thereof in accordance with said output signal. | E.g., col. 5, lines 16 to 20, "Output signals from the ECU 20 are supplied to actuators 35R and 35L of right and left headlights 30R and 30L of the vehicle, thereby adjusting the optical axis direction of the right and left headlights 30R and 30L as will be described hereinlater." | E.g., page 2, lines 14 to 17 "However, in the above-mentioned automatic adjustment device, since the lamp is driven with high frequency, an actuator used in a drive mechanism for driving the lamp is required to show high response property and high durability."<br><br>E.g., page 6, lines 26 to 32 "When the control device 4 receives the detect signal of the vehicle running condition detection device 3 and finds from this detect signal that the vehicle is standing |

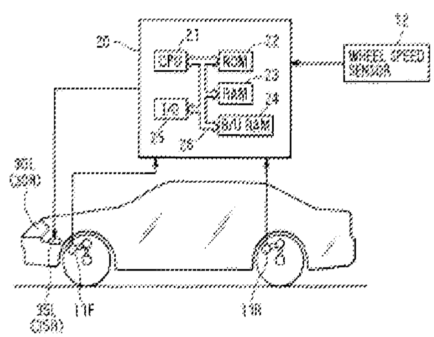
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | still, the control device 4, in accordance with information on the vehicle posture obtained from the vehicle posture detection device 2, transmits to the drive signal 5 a control signal for correction of the illumination direction of the lamp 6."<br><br>E.g., page 7, lines 12 to 17 "In view of this, the control device 4 is structured such that, based on the information from the vehicle posture detection device 2, it can detect the amount of variations in the gradient of the road and, therefore, when the road gradient varies suddenly, it can correct the illumination direction of the lamp 6."<br><br>E.g., page 11, lines 12 to 16 "The correction of the illumination direction of the lamp 6 in Step S5 is carried out by the drive device 5 based on the control signal transmitted from the control device 4 and, as a method for executing such correction, there are available two methods . . ." |

| Limitation of '034 Patent Claim 2 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 2. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 79. | See claim 1 claim chart, above at page 79. |
| wherein said sensor generates a signal that is representative of the road speed of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a | E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the |

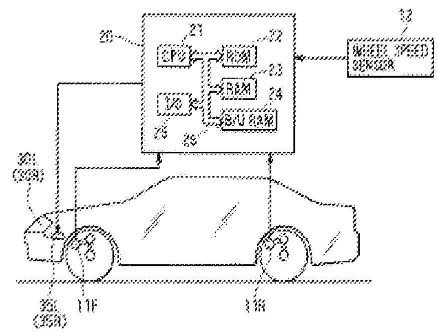
| Limitation of '034 Patent Claim 2 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1: | detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle." |

| Limitation of '034 Patent Claim 2 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | FIG. 1   | |

| Limitation of '034 Patent Claim 4 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 4. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 79. | See claim 1 claim chart, above at page 79. |
| wherein said sensor generates a signal that is representative of the pitch of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp." |

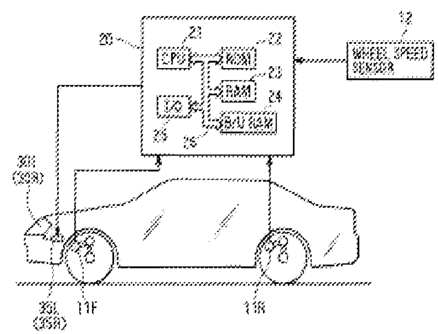
| Limitation of '034 Patent Claim 4 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG. 1<br> | |

| Limitation of '034 Patent Claim 5 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 5. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 79. | See claim 1 claim chart, above at page 79. |
| wherein said sensor generates a signal that is representative of the suspension height of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1: | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br><br>E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |

| Limitation of '034 Patent Claim 5 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
| --- | --- | --- |
|  | FIG. 1   |  |

## 13. Claims 1, 2, 4, and 5 of U.S. Patent No. 7,231,034 Are Unpatentable Over the Combination of Okuchi et al. and Hussman Under 35 U.S.C. § 103(a)

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 1. An automatic directional control system for a vehicle headlight comprising: | E.g., Abstract, "In a vehicle headlight optical axis automatic adjusting system, a pitch angle in the longitudinal direction of a vehicle is calculated from a signal of a height sensor." | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation." |
| a sensor that is adapted to generate a signal that is representative of a condition of the vehicle, said sensed condition includes one or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value |

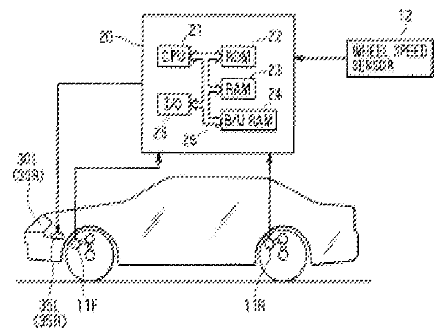
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG.1<br> | former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles."<br><br>E.g., col. 3, lines 40 to 45, "The curve-recognition device K is electrically conductively coupled with a speed signal sensor, or sender, G and includes a speed threshold value device which itself affects the switchover such that the third filter F3 is only coupled to the regulator R if a minimum speed of the motor vehicle is exceeded." |
| a controller that is responsive to said sensor signal for generating an output signal | E.g., Col. 4, lines 59 to 60, "The motor 8 is controlled for its driving by a light distribution control ECU 10." | E.g., col. 3, lines 30 to 39, "The curve-recognition device K is electrically conductively coupled with the switchover device SE and thereby couples the third filter F3 electrically conductively with the regulator R if a difference signal other than zero is fed to it from the subtractor SU. When no difference signal from the subtractor SU is present, the curve-recognition device K switches the switchover device SE so that the first filter F1 is coupled to the regulator R." |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| only when said sensor signal changes by more than a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition; and | E.g., col. 6, line 42 to col. 7, line 2, "Referring to FIG. 8, from changes of the steering angle φ and the yaw angular velocity ω of FIGS. 7A and 7B, the following is understood. When the vehicle goes around the rightward curve, the steering wheel is turned to the right to have a positive steering angle φ at first, and the vehicle body yaws somewhat after the change of steering angle φ so that the yaw angular velocity ω increases following increase of the steering angle.<br><br>In the meantime, the rear part of the vehicle is swung outside large, and therefore the driver turns the steering wheel to the left or in the opposite direction rapidly for counter-steering to recover direction of the vehicle. Namely, the steering angle φ changes from an upward incline to a downward incline in FIG. 7A. However, the yaw angular velocity ω is maintained due to inertia.<br><br>Further, when the direction of the vehicle comes to show some recovery, the driver again turns the steering wheel to the right for going around the rightward curve, but he comes to carry out the counter-steering again soon after. Thus, the steering angle φ swings rightward and leftward in large variations.<br><br>However, while the steering angle φ is swinging rightward and leftward as described above, the yaw angular velocity ω is maintained at a certain angular velocity stably in general, and at a time | E.g., col. 3, lines 30 to 39, "The curve-recognition device K is electrically conductively coupled with the switchover device SE and thereby couples the third filter F3 electrically conductively with the regulator R if a difference signal other than zero is fed to it from the subtractor SU. When no difference signal from the subtractor SU is present, the curve-recognition device K switches the switchover device SE so that the first filter F1 is coupled to the regulator R."<br><br>E.g., col. 4, lines 6 to 12, "At the coupling between the switchover device SE and the regulator R, a matching device AE is, here for example, arranged which, upon a switchover by the switchover device SE, adjusts the various nominal values to one another so that discontinuities or jumps in the adjustment and regulation of the illumination range are avoided."<br><br>E.g., col. 6, line 10 to 34, "In this connection, it is beneficial that upon the presence of a difference between the second, filtered, nominal-value signal to the third, filtered, nominal-value signal and upon termination of a difference is again switched from the third, filtered, nominal-value signal to the first, filtered, nominal-value signal because in this manner, in an uncomplicated and cost effective manner, upon the presence of an inclination change of the motor vehicle body which is not attributable to a change in loading or to road surface unevenness, the regulation of the |

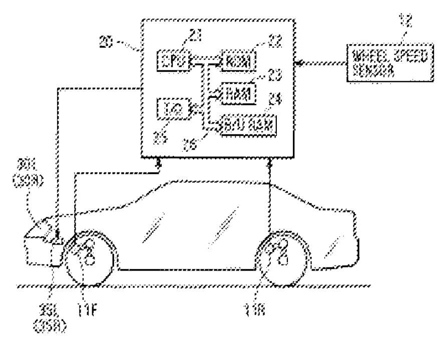
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | somewhat before the vehicle passes through the curve completely, the yaw angular velocity ω comes to coincide with the steering angle φ."<br><br>E.g., Col. 7, lines 34 to 39, "Since the actual light distribution control is performed on the basis of the above-mentioned final lighting angle θ, even if the steering wheel is operated rapidly for the counter-steering and the like, change of the lighting region is suppressed pertinently and the driver is given no sense of incongruity." | illumination range of the motor vehicle, in dependence from the third, long, filter time constant results, whereby the third, filtered, nominal-value signal is independent, or substantially independent, from the disturbing, or distorting, short time inclination changes so that after inclination changes of the motor-vehicle body which, for example, are caused by driving about a curve, false adjustments of the illumination range are not caused which can lead to the blinding of oncoming traffic or to losses in illumination range, which eliminates a danger during operation of a motor vehicle." |
| an actuator that is adapted to be connected to the headlight to effect movement thereof in accordance with said output signal. | E.g., col. 5, lines 16 to 20, "Output signals from the ECU 20 are supplied to actuators 35R and 35L of right and left headlights 30R and 30L of the vehicle, thereby adjusting the optical axis direction of the right and left headlights 30R and 30L as will be described hereinlater." | E.g., col. 3, lines 16 to 18, "The regulator R regulates the position of adjusting elements, which are shown here in block form and which change the positions of headlights." |

| Limitation of '034 Patent Claim 2 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 2. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 136. | See claim 1 claim chart, above at page 136. |
| wherein said sensor generates a signal that is representative of the road speed of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a | E.g., col. 3, lines 40 to 45, "The curve-recognition device K is electrically conductively coupled with a speed signal sensor, or sender, G and includes a speed threshold value device which itself affects |

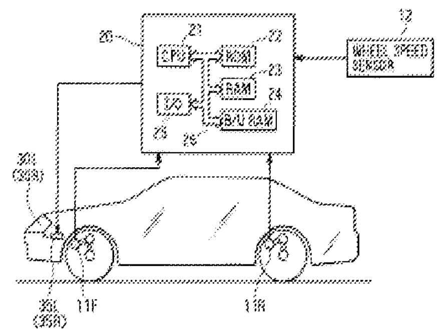
| Limitation of '034 Patent Claim 2 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1: | the switchover such that the third filter F3 is only coupled to the regulator R if a minimum speed of the motor vehicle is exceeded." |

| Limitation of '034 Patent Claim 2 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | FIG.1   | |

| Limitation of '034 Patent Claim 4 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 4. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 136. | See claim 1 claim chart, above at page 136. |
| wherein said sensor generates a signal that is representative of the pitch of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front | E.g. col. 1, lines 6 to 20, "This invention concerns a method to regulate an illuminating range of a motor vehicle in which signals are measured at a position on a front axle and at a position on a rear axle, which signals depend upon a relative position of a motor vehicle body, or chassis, to the front and rear axles, with a difference between these signals being formed as a difference signal, with the resulting difference signal, as a nominal-value signal, being filtered to a first mean, or average, |

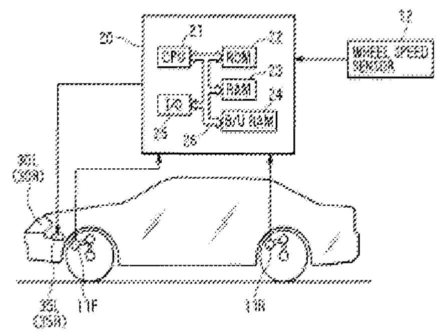
| Limitation of '034 Patent Claim 4 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG. 1<br> | value, with a time for the first average-value formation being determined by a first filter time constant, and with positions of adjusting elements being regulated when the first, filtered, nominal-value signal deviates from a predetermined, or set, value and an apparatus for regulating the illumination range of a motor vehicle." |

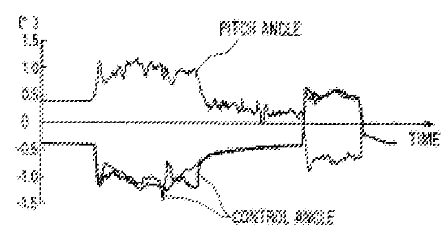
| Limitation of '034 Patent Claim 5 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 5. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 136. | See claim 1 claim chart, above at page 136. |
| wherein said sensor generates a signal that is representative of the suspension height of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1: | E.g. col. 1, lines 6 to 20, "This invention concerns a method to regulate an illuminating range of a motor vehicle in which signals are measured at a position on a front axle and at a position on a rear axle, which signals depend upon a relative position of a motor vehicle body, or chassis, to the front and rear axles, with a difference between these signals being formed as a difference signal, with the resulting difference signal, as a nominal-value signal, being filtered to a first mean, or average, value, with a time for the first average-value formation being determined by a first filter time constant, and with positions of adjusting elements being regulated when the first, filtered, nominal-value signal deviates from a predetermined, or set, value and an apparatus for regulating the illumination range of a motor vehicle." |

| Limitation of '034 Patent Claim 5 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | FIG.1   | |

## 14. Claims 1, 2, 4, and 5 of U.S. Patent No. 7,231,034 Are Unpatentable Over the Combination of Okuchi et al. and Miskin et al. Under 35 U.S.C. § 103(a)

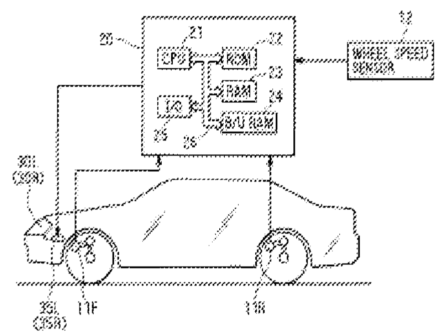
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| 1. An automatic directional control system for a vehicle headlight comprising: | E.g., Abstract, "In a vehicle headlight optical axis automatic adjusting system, a pitch angle in the longitudinal direction of a vehicle is calculated from a signal of a height sensor." | E.g., Abstract, "A device for automatic headlight adjustment in motor vehicles consists of four sensors which are arranged in pairs one behind the other in the direction of travel on those components of the motor vehicle which respond to loading." |
| a sensor that is adapted to generate a signal that is representative of a condition of the vehicle, said sensed condition includes one or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20." | E.g., Abstract, "A device for automatic headlight adjustment in motor vehicles consists of four sensors which are arranged in pairs one behind the other in the direction of travel on those components of the motor vehicle which respond to loading."<br><br>E.g., page 4, "The four sensors are arranged in pairs one behind the other S1, S2/S3, S4, following the driving direction, on those components of the motor vehicle that experience position change by loading, e.g. on wheel suspensions or shock absorbers." |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| | E.g., Fig. 1: FIG. 1   | |
| a controller that is responsive to said sensor signal for generating an output signal | | E.g., page 5, "If the signals that lead to measured data are based on light load such as those caused by road bumps, then it will result on average in a differential value that provides only a small deviation from the ideal headlight position value, thus the predetermined threshold value is not exceeded. For heavier loads, the threshold value is exceeded, the microprocessor 4 transmits signals via the digital/analog converter 6, 6' and the operational amplifier 7, 7' to the respective headlights adjustment devices, which then change the position of the headlights accordingly using conventional tools, such as, for example, spindles, which convert the rotary motion of the motor into linear movement of the headlights." |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| only when said sensor signal changes by more than a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition; and | E.g., col. 6, lines 6 to 14, "On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle."<br><br>E.g., Fig. 7:<br>FIG. 7<br> | E.g., page 5, "If the signals that lead to measured data are based on light load such as those caused by road bumps, then it will result on average in a differential value that provides only a small deviation from the ideal headlight position value, thus the predetermined threshold value is not exceeded. For heavier loads, the threshold value is exceeded, the microprocessor 4 transmits signals via the digital/analog converter 6, 6' and the operational amplifier 7, 7' to the respective headlights adjustment devices, which then change the position of the headlights accordingly using conventional tools, such as, for example, spindles, which convert the rotary motion of the motor into linear movement of the headlights." |
| an actuator that is adapted to be connected to the headlight to effect movement thereof in accordance with said output signal. | E.g., col. 5, lines 16 to 20, "Output signals from the ECU 20 are supplied to actuators 35R and 35L of right and left headlights 30R and 30L of the vehicle, thereby adjusting the optical axis direction of the right and left headlights 30R and 30L as will be described hereinlater." | E.g., page 5, "If the signals that lead to measured data are based on light load such as those caused by road bumps, then it will result on average in a differential value that provides only a small deviation from the ideal headlight position value, thus the predetermined threshold value is not exceeded. For heavier loads, the threshold value is exceeded, the microprocessor 4 transmits signals |

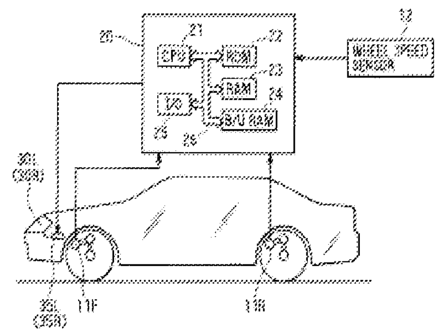
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| | | via the digital/analog converter 6, 6' and the operational amplifier 7, 7' to the respective headlights adjustment devices, which then change the position of the headlights accordingly using conventional tools, such as, for example, spindles, which convert the rotary motion of the motor into linear movement of the headlights." |

| Limitation of '034 Patent Claim 2 | U.S. Patent No. 6,193,398 (Okuchi et al.) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| 2. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 100. | See claim 1 claim chart, above at page 100. |
| wherein said sensor generates a signal that is representative of the road speed of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of | |

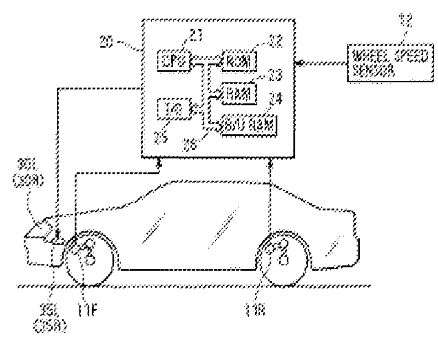
| Limitation of '034 Patent Claim 2 | U.S. Patent No. 6,193,398 (Okuchi et al.) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| | wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG. 1<br> | |

| Limitation of '034 Patent Claim 4 | U.S. Patent No. 6,193,398 (Okuchi et al.) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| 4. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 100. | See claim 1 claim chart, above at page 100. |
| wherein said sensor generates a signal that is representative of the pitch of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided | |

| Limitation of '034 Patent Claim 4 | U.S. Patent No. 6,193,398 (Okuchi et al.) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| | between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1: | |

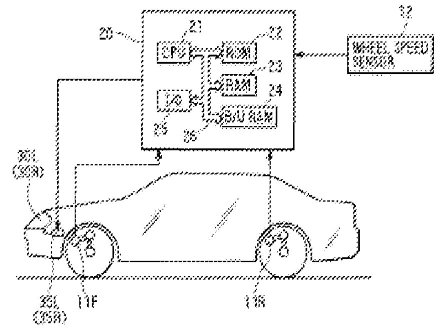
| Limitation of '034 Patent Claim 4 | U.S. Patent No. 6,193,398 (Okuchi et al.) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| | FIG. 1   | |

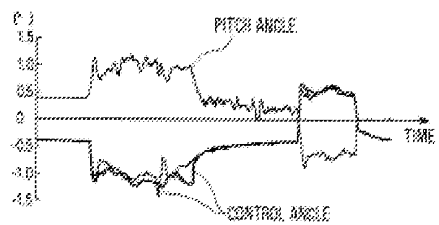
| Limitation of '034 Patent Claim 5 | U.S. Patent No. 6,193,398 (Okuchi et al.) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| 5. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 100. | See claim 1 claim chart, above at page 100. |
| wherein said sensor generates a signal that is representative of the suspension height of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front | E.g., Abstract, "A device for automatic headlight adjustment in motor vehicles consists of four sensors which are arranged in pairs one behind the other in the direction of travel on those components of the motor vehicle which respond to loading."<br><br>E.g., page 4, "The four sensors are arranged in pairs one behind the other S1, S2/S3, S4, following the driving direction, on those |

| Limitation of '034 Patent Claim 5 | U.S. Patent No. 6,193,398 (Okuchi et al.) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| | wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG. 1<br> | components of the motor vehicle that experience position change by loading, e.g. on wheel suspensions or shock absorbers." |

## 15. Claims 1, 2, 4, and 5 of U.S. Patent No. 7,231,034 Are Unpatentable Over the Combination of Okuchi et al. and Leleve Under 35 U.S.C. § 103(a)

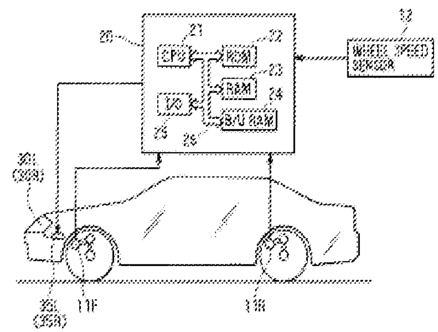
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | DE 31 29 891 (Leleve) |
|---|---|---|
| 1. An automatic directional control system for a vehicle headlight comprising: | E.g., Abstract, "In a vehicle headlight optical axis automatic adjusting system, a pitch angle in the longitudinal direction of a vehicle is calculated from a signal of a height sensor." | E.g., page 7, "According to the invention, a device for the dynamic adjustment of the headlights of a vehicle is to be provided, which no longer has the aforementioned disadvantages and allows pleasant night-time driving under all driving conditions and regardless of the state of the road." |
| a sensor that is adapted to generate a signal that is representative of a condition of the vehicle, said sensed condition includes one or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20." | E.g., page 12, "The device shown in Fig. 1 has a first sensor 1 between the front axle and the body of the vehicle in order to detect a relative movement. A corresponding sensor 2 is situated on the rear axle." |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | DE 31 29 891 (Leleve) |
|---|---|---|
| | E.g., Fig. 1: FIG. 1   | |
| a controller that is responsive to said sensor signal for generating an output signal | | E.g., page 12, "The signals generated by sensors 1, 2 are processed in a mixer stage 3, where a signal is generated that represents the vibration or rocking motion of the vehicle in the course of its movement." |
| only when said sensor signal changes by more than a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition; and | E.g., col. 6, lines 6 to 14, "On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so | E.g., page 8, "One first specific embodiment of the invention is characterized by the fact that the filter includes threshold value elements, via which at least one amplitude threshold is able to be defined, for which the filter predefines a limit frequency. This allows a precise adaptation of the features of the filter to the different interference phenomena requiring an adjustment of the headlight position." See also pages 9 to 10, 13. |

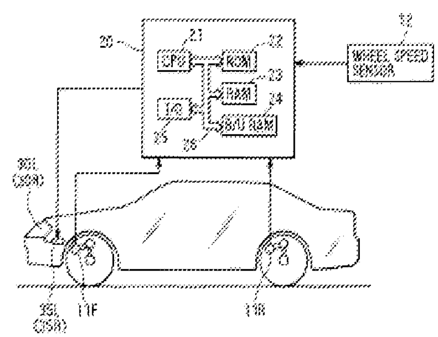
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | DE 31 29 891 (Leleve) |
|---|---|---|
| | that the actuator is allowed to respond quickly to the change in the pitch angle."<br><br>E.g., Fig. 7:<br>FIG. 7<br> | |
| an actuator that is adapted to be connected to the headlight to effect movement thereof in accordance with said output signal. | E.g., col. 5, lines 16 to 20, "Output signals from the ECU 20 are supplied to actuators 35R and 35L of right and left headlights 30R and 30L of the vehicle, thereby adjusting the optical axis direction of the right and left headlights 30R and 30L as will be described hereinlater." | E.g., page 12, "The output of filter 4 is connected to a control and amplifier device 6, which outputs a power signal to actuating organs 7, which causes headlights 8 to move." |

| Limitation of '034 Patent Claim 2 | U.S. Patent No. 6,193,398 (Okuchi et al.) | DE 31 29 891 (Leleve) |
|---|---|---|
| 2. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 108. | See claim 1 claim chart, above at page 108. |
| wherein said sensor generates a signal that is representative of the road speed of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided | |

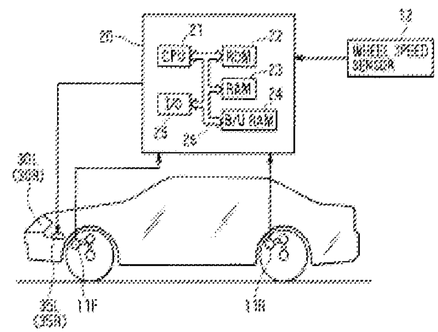
| Limitation of '034 Patent Claim 2 | U.S. Patent No. 6,193,398 (Okuchi et al.) | DE 31 29 891 (Leleve) |
|---|---|---|
| | between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1: | |

| Limitation of '034 Patent Claim 2 | U.S. Patent No. 6,193,398 (Okuchi et al.) | DE 31 29 891 (Leleve) |
|---|---|---|
| | FIG.1   | |

| Limitation of '034 Patent Claim 4 | U.S. Patent No. 6,193,398 (Okuchi et al.) | DE 31 29 891 (Leleve) |
|---|---|---|
| 4. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 108. | See claim 1 claim chart, above at page 108. |
| wherein said sensor generates a signal that is representative of the pitch of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front | |

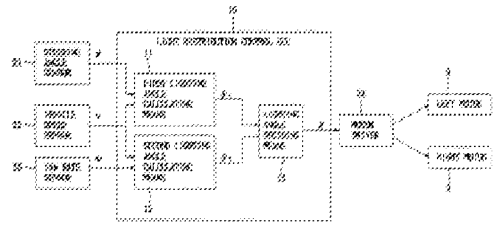
| Limitation of '034 Patent Claim 4 | U.S. Patent No. 6,193,398 (Okuchi et al.) | DE 31 29 891 (Leleve) |
|---|---|---|
| | wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG. 1<br> | |

| Limitation of '034 Patent Claim 5 | U.S. Patent No. 6,193,398 (Okuchi et al.) | DE 31 29 891 (Leleve) |
|---|---|---|
| 5. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 108. | See claim 1 claim chart, above at page 108. |
| wherein said sensor generates a signal that is representative of the suspension height of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1: | E.g., page 12, "The device shown in Fig. 1 has a first sensor 1 between the front axle and the body of the vehicle in order to detect a relative movement. A corresponding sensor 2 is situated on the rear axle." |

| Limitation of '034 Patent Claim 5 | U.S. Patent No. 6,193,398 (Okuchi et al.) | DE 31 29 891 (Leleve) |
|---|---|---|
| | FIG. 1   | |

## 16. Claims 1 to 5 of U.S. Patent No. 7,231,034 Are Unpatentable Over the Combination of Gotoh and Uchida Under 35 U.S.C. § 103(a)

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| 1. An automatic directional control system for a vehicle headlight comprising: | E.g., Abstract, "A head lamp device for a vehicle capable of changing a lighting region in front of the vehicle in right and left directions, in which change of the lighting region is suppressed so as not to give the driver a sense of incongruity when a steering wheel is operated in one direction and then rapidly in the other as in case of counter-steering." | E.g., page 1, line 3 to 7, "The present invention relates to a vehicle lamp illumination direction control device which detects the posture of a vehicle and correctly adjusts the illumination direction of a vehicle lamp so that the illumination direction can always be kept in a predetermined direction." |
| a sensor that is adapted to generate a signal that is representative of a condition of the vehicle, said sensed condition includes one or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3 | E.g., Page 1, lines 14 to 28, "The conventional device of this type includes a detection device which detects the inclination and height of the vehicle body variable according to the conditions of occupants (such as the number of occupants, the position arrangement of the occupants, and the like), the loaded conditions of loads on board the vehicle, the running conditions of the vehicle, and the like, calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detection device, and adjusts the illumination angle of the vehicle lamp with respect to the initially adjusted value of the vehicle lamp so that the illumination state of the vehicle lamp can always be kept in a desired state, thereby to control the illumination direction of the vehicle lamp for desired light distribution."<br><br>E.g., Page 8, lines 20 to page 9, line 1, "Here, as basic information used to judge whether the vehicle is in the acceleration or deceleration running condition or not, |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| | <br>FIG. 3 | besides the information that is given by the vehicle posture detection device 2, as shown in Fig. 1, there is also available information which can be obtained by providing acceleration or deceleration instruction detection device 8 used to detect an acceleration or deceleration instruction or information relating to the present instruction according to the amount of pressing-down of a gas pedal, variations in the opening of a throttle valve or the like, or information which can be obtained by providing an engine revolution number detection device 9 used to detect the number of revolutions of an engine: that is, the information obtained by these detection devices may be transmitted to the acceleration or deceleration running condition judging device 3b."<br><br>E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2."<br><br>E.g., Page 9, lines 24 to 28 "Firstly, the method i) is a method which judges whether the vehicle is in the acceleration or deceleration running condition or not by detecting the running speed of the vehicle to calculate the change of the speed with time, that is, by calculating the acceleration of the vehicle." |



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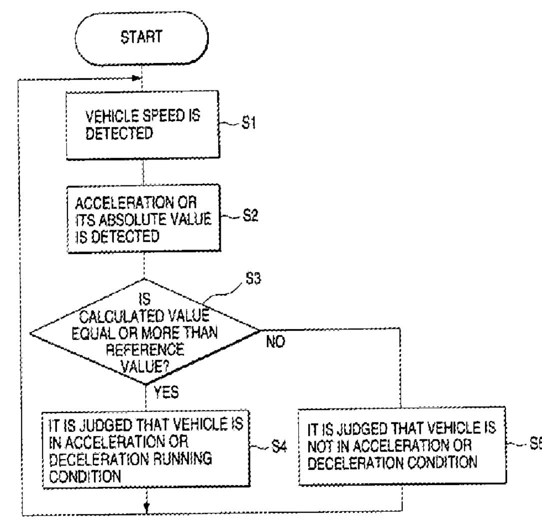
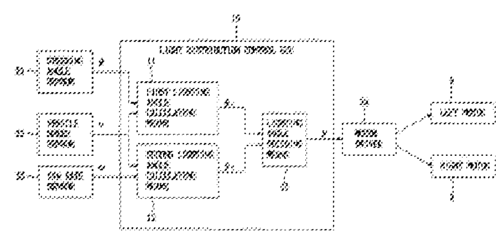
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| | | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |
| a controller that is responsive to said sensor signal for generating an output signal | E.g., Col. 4, lines 59 to 60, "The motor 8 is controlled for its driving by a light distribution control ECU 10." | E.g., Page 4, lines 16 to 27 "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the |

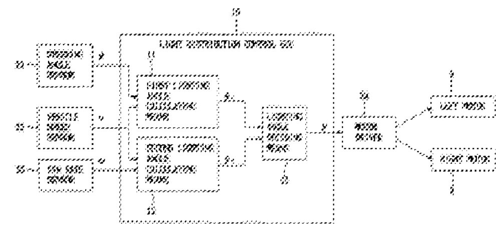
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| | | lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle." |
| only when said sensor signal changes by more than a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition; and | E.g., col. 6, line 42 to col. 7, line 2, "Referring to FIG. 8, from changes of the steering angle φ and the yaw angular velocity ω of FIGS. 7A and 7B, the following is understood. When the vehicle goes around the rightward curve, the steering wheel is turned to the right to have a positive steering angle φ at first, and the vehicle body yaws somewhat after the change of steering angle φ so that the yaw angular velocity ω increases following increase of the steering angle.<br><br>In the meantime, the rear part of the vehicle is swung outside large, and therefore the driver turns the steering wheel to the left or in the opposite direction rapidly for counter-steering to recover direction of the vehicle. Namely, the steering angle φ changes from an upward incline to a downward incline in FIG. 7A. However, the yaw angular velocity ω is maintained due to inertia. | E.g., Page 4, lines 16 to 27 "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle."<br><br>E.g., Page 10, line 26 to page 11, line 6, "At first, in step S1, the vehicle speed v(t) is detected and, after then, in step S2, the acceleration dv(t)/dt or the absolute value thereof is calculated. Next, in Step S3, it is checked whether the acceleration dv(t)/dt or the absolute value thereof is equal to or more than a reference value or not. If it is found that the acceleration dv(t)/dt or the absolute value thereof is less |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| | Further, when the direction of the vehicle comes to show some recovery, the driver again turns the steering wheel to the right for going around the rightward curve, but he comes to carry out the counter-steering again soon after. Thus, the steering angle φ swings rightward and leftward in large variations.<br><br>However, while the steering angle φ is swinging rightward and leftward as described above, the yaw angular velocity ω is maintained at a certain angular velocity stably in general, and at a time somewhat before the vehicle passes through the curve completely, the yaw angular velocity ω comes to coincide with the steering angle φ."<br><br>E.g., Col. 7, lines 34 to 39, "Since the actual light distribution control is performed on the basis of the above-mentioned final lighting angle θ, even if the steering wheel is operated rapidly for the counter-steering and the like, change of the lighting region is suppressed pertinently and the driver is given no sense of incongruity." | than the reference value, then the processing advances to step S5. In step S4, it is judged that the vehicle is in the acceleration or deceleration running condition and, after then, the processing goes back to Step S2. Also, in Step S5, it is judged that the vehicle is not in the acceleration or deceleration running condition and, after then, the processing returns back to the first step S1.<br><br>E.g., Figure 5:<br>FIG. 5<br> |
| an actuator that is adapted to be connected to the headlight to effect movement thereof in accordance with said output signal. | | E.g., Page 16, line 28 to Page 17, line 6 "Also, if it is judged by the acceleration or deceleration running condition judging device 3b that the vehicle is not in |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| | | the acceleration or deceleration running condition, then the illumination angle of the lamp 5 can be controlled by one of the following methods when the drive control device 4a receives an instruction from the acceleration or deceleration running condition judging device 3b: 1) a method for fixing the illumination angle; 2) a method for limiting the range of the illumination angle or forbidding part of the range of the illumination angle; and, 3) a method for changing the response speed or control speed of an actuator."<br><br>E.g., Page 7, lines 4 to 9 "In particular, the correction calculating device 3a is structured in the following manner: that is, in accordance with a detect signal from the vehicle posture detection device 2, it transmits a control signal to the drive device 4 so that the illumination direction of the lamp 5 can be always kept in a given direction." See also 7:9-32.<br><br>E.g., Page 8, lines 1 to 9 "When the judging device 3b judges that the vehicle is in an acceleration or deceleration running condition, in accordance with a control signal transmitted from the correction calculating device 3a to the drive control device 4a, the acceleration or deceleration running condition judging device 3b transmits to the drive control device 4a a signal which allows the illumination direction of the lamp 5 to be corrected in a predetermined direction." |

| Limitation of '034 Patent Claim 2 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| 2. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 116. | See claim 1 claim chart, above at page 116. |
| wherein said sensor generates a signal that is representative of the road speed of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3<br><br>FIG. 3 | E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2."<br><br>E.g., Page 9, lines 24 to 28 "Firstly, the method i) is a method which judges whether the vehicle is in the acceleration or deceleration running condition or not by detecting the running speed of the vehicle to calculate the change of the speed with time, that is, by calculating the acceleration of the vehicle." |

| Limitation of '034 Patent Claim 3 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| 3. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 116. | See claim 1 claim chart, above at page 116. |
| wherein said sensor generates a signal that is | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block | |

| Limitation of '034 Patent Claim 3 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| representative of the steering angle of the vehicle. | diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3<br><br>FIG. 3 | |

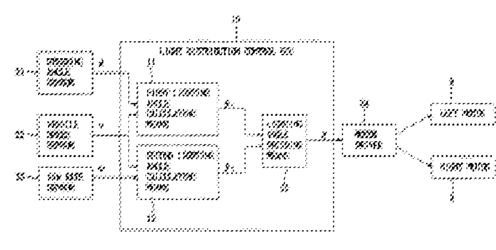
| Limitation of '034 Patent Claim 4 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| 4. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 116. | See claim 1 claim chart, above at page 116. |
| wherein said sensor generates a signal that is representative of the pitch of the vehicle. | | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. |

| Limitation of '034 Patent Claim 4 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| | | Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Claim 5 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| 5. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 116. | See claim 1 claim chart, above at page 116. |

| Limitation of '034 Patent Claim 5 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| wherein said sensor generates a signal that is representative of the suspension height of the vehicle. | | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

## 17. Claims 1 to 5 of U.S. Patent No. 7,231,034 Are Unpatentable Over the Combination of Gotoh and Takahashi Under 35 U.S.C. § 103(a)

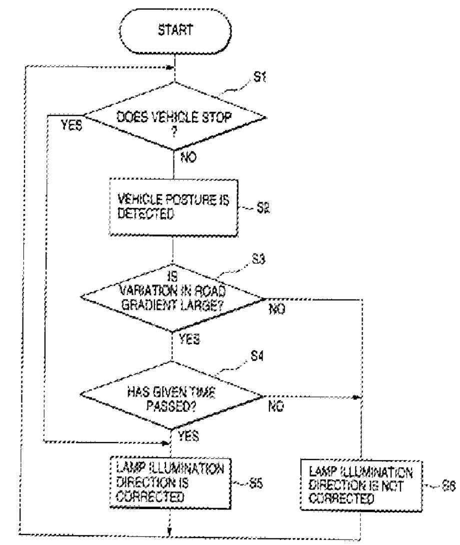
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 1. An automatic directional control system for a vehicle headlight comprising: | E.g., Abstract, "A head lamp device for a vehicle capable of changing a lighting region in front of the vehicle in right and left directions, in which change of the lighting region is suppressed so as not to give the driver a sense of incongruity when a steering wheel is operated in one direction and then rapidly in the other as in case of counter-steering." | E.g., page 5, line 3 to 7, "The present invention relates to a vehicle lamp illumination direction control device which detects the posture of a vehicle and correctly adjust the illumination direction of a vehicle lamp so that it can be always kept in a predetermined direction." |
| a sensor that is adapted to generate a signal that is representative of a condition of the vehicle, said sensed condition includes one or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3<br><br>FIG. 3 | E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle."<br><br>E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | stopping or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle.".<br><br>E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br><br>E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |
| a controller that is responsive to said sensor signal for generating an output signal | E.g., Col. 4, lines 59 to 60, "The motor 8 is controlled for its driving by a light distribution control ECU 10." | E.g., page 8, lines 26 to 32 "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2." |
| only when said sensor signal changes by more than a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition; and | E.g., col. 6, line 42 to col. 7, line 2, "Referring to FIG. 8, from changes of the steering angle φ and the yaw angular velocity ω of FIGS. 7A and 7B, the following is understood. When the vehicle goes around the rightward curve, the steering wheel is turned to the right to have a positive steering angle φ at first, and the vehicle body yaws somewhat after the change of steering angle φ so that the yaw angular velocity ω increases following increase of the steering angle.<br><br>In the meantime, the rear part of the vehicle is swung outside large, and therefore the driver turns the steering wheel to the left or in the opposite direction rapidly for counter-steering to recover direction of the vehicle. Namely, the steering angle φ changes from an upward incline to a | E.g., page 8, lines 26 to 32 "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2."<br><br>E.g., page 9, line to page 10, line 3 "Also, in order to prevent the illumination direction of the lamp 6 from being corrected inadvertently when a sudden change in the posture of the vehicle occurs temporarily or due to the wrong operation of the lamp 6 caused by external disturbances, for example, when the vehicle makes a sudden start or a sudden stop, preferably, a threshold value with |

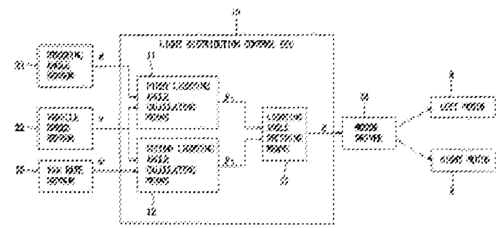
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | downward incline in FIG. 7A. However, the yaw angular velocity ω is maintained due to inertia.<br><br>Further, when the direction of the vehicle comes to show some recovery, the driver again turns the steering wheel to the right for going around the rightward curve, but he comes to carry out the counter-steering again soon after. Thus, the steering angle φ swings rightward and leftward in large variations.<br><br>However, while the steering angle φ is swinging rightward and leftward as described above, the yaw angular velocity ω is maintained at a certain angular velocity stably in general, and at a time somewhat before the vehicle passes through the curve completely, the yaw angular velocity ω comes to coincide with the steering angle φ."<br><br>E.g., Col. 7, lines 34 to 39, "Since the actual light distribution control is performed on the basis of the above-mentioned final lighting angle θ, even if the steering wheel is operated rapidly for the counter-steering and the like, change of the lighting region is suppressed pertinently and the driver is given no sense of incongruity." | respect to time may be set in detection of the road gradient and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a threshold value with respect to the running distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a distance equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected. Also, the threshold values may be set in various manners, for example, they may be set as a constant value, or may be set as a variable which varies according to the speeds of the vehicle."<br><br>E.g., Page 10, line 20 to page 11, line 11, "In Step S4, it is checked whether a state in which the amount of variations of the detect signal supplied by the vehicle posture detection device 2 is equal to or more than a given reference value continues for a given period of time or longer or not. If it is found that such state continues, then the processing advances to Step S and, if not, then the processing goes to Step S6. Here, when a threshold value relating to the running distance of the vehicle is set instead of setting a threshold value relating to the above-mentioned continuing |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | time, in Step S4, it may be checked whether a state in which the amount of variations in the detect signal supplied by the vehicle posture detection device 2 is equal to or more than a given reference value continues over a given running distance or not. In Step S5, in accordance with the information from the vehicle posture detection device 2, the control device 4 transmits to the drive control device 5a a control signal which causes the illumination direction of the lamp 6 to be kept in a predetermined direction, and the illumination direction of the lamp 6 is corrected through the drive mechanism 5. After then, the processing goes back to the first step S1. Also, in Step 6, the correction of the illumination direction of the lamp 6 is not carried out but the processing returns to the first Step S1."<br><br>E.g., Figure 7: |

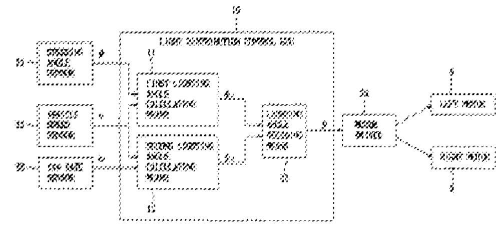
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | FIG. 7   |
| an actuator that is adapted to be connected to the headlight to effect movement thereof in accordance with said output signal. | | E.g., page 2, lines 14 to 17 "However, in the above-mentioned automatic adjustment device, since the lamp is driven with high frequency, an actuator used in a drive mechanism for driving the lamp is required to show high response property and high durability."<br><br>E.g., page 6, lines 26 to 32 "When the control device 4 receives the detect signal of the vehicle running condition detection device 3 and finds from this detect signal that the vehicle is standing |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | still, the control device 4, in accordance with information on the vehicle posture obtained from the vehicle posture detection device 2, transmits to the drive signal 5 a control signal for correction of the illumination direction of the lamp 6."<br><br>E.g., page 7, lines 12 to 17 "In view of this, the control device 4 is structured such that, based on the information from the vehicle posture detection device 2, it can detect the amount of variations in the gradient of the road and, therefore, when the road gradient varies suddenly, it can correct the illumination direction of the lamp 6."<br><br>E.g., page 11, lines 12 to 16 "The correction of the illumination direction of the lamp 6 in Step S5 is carried out by the drive device 5 based on the control signal transmitted from the control device 4 and, as a method for executing such correction, there are available two methods . . ." |

| Limitation of '034 Patent Claim 2 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 2. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 126. | See claim 1 claim chart, above at page 126. |
| wherein said sensor generates a signal that is representative of the road speed of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting | E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the |

| Limitation of '034 Patent Claim 2 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3<br><br>FIG. 3 | detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle." |

| Limitation of '034 Patent Claim 3 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 3. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 126. | See claim 1 claim chart, above at page 126. |
| wherein said sensor generates a signal that is representative of the steering angle of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw | |

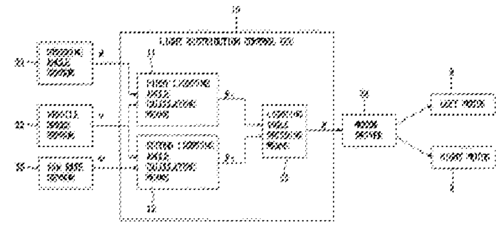
| Limitation of '034 Patent Claim 3 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | angular velocity (yaw rate) ω."<br><br>E.g., Figure 3<br><br><br>FIG. 3 | |

| Limitation of '034 Patent Claim 4 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 4. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 126. | See claim 1 claim chart, above at page 126. |
| wherein said sensor generates a signal that is representative of the pitch of the vehicle. | | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp." |

| Limitation of '034 Patent Claim 5 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 5. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 126. | See claim 1 claim chart, above at page 126. |
| wherein said sensor generates a signal that is representative of the suspension height of the vehicle. | | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br><br>E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |

## 18. Claims 1 to 5 of U.S. Patent No. 7,231,034 Are Unpatentable Over the Combination of Gotoh and Hussman Under 35 U.S.C. § 103(a)

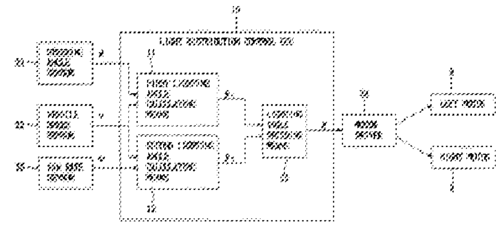
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 1. An automatic directional control system for a vehicle headlight comprising: | E.g., Abstract, "A head lamp device for a vehicle capable of changing a lighting region in front of the vehicle in right and left directions, in which change of the lighting region is suppressed so as not to give the driver a sense of incongruity when a steering wheel is operated in one direction and then rapidly in the other as in case of counter-steering." | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation." |
| a sensor that is adapted to generate a signal that is representative of a condition of the vehicle, said sensed condition includes one or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3 | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| |  FIG. 5 | former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles."<br><br>E.g., col. 3, lines 40 to 45, "The curve-recognition device K is electrically conductively coupled with a speed signal sensor, or sender, G and includes a speed threshold value device which itself affects the switchover such that the third filter F3 is only coupled to the regulator R if a minimum speed of the motor vehicle is exceeded." |
| a controller that is responsive to said sensor signal for generating an output signal | E.g., Col. 4, lines 59 to 60, "The motor 8 is controlled for its driving by a light distribution control ECU 10." | E.g., col. 3, lines 30 to 39, "The curve-recognition device K is electrically conductively coupled with the switchover device SE and thereby couples the third filter F3 electrically conductively with the regulator R if a difference signal other than zero is fed to it from the subtractor SU. When no difference signal from the subtractor SU is present, the curve-recognition device K switches the switchover device SE so that the first filter F1 is coupled to the regulator R." |
| only when said sensor signal changes by more than a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition; and | E.g., col. 6, line 42 to col. 7, line 2, "Referring to FIG. 8, from changes of the steering angle φ and the yaw angular velocity ω of FIGS. 7A and 7B, the following is understood. When the vehicle goes around the rightward curve, the steering wheel is turned to the right to have a positive | E.g., col. 3, lines 30 to 39, "The curve-recognition device K is electrically conductively coupled with the switchover device SE and thereby couples the third filter F3 electrically conductively with the regulator R if a difference signal other than zero is fed to it from the subtractor SU. When no |

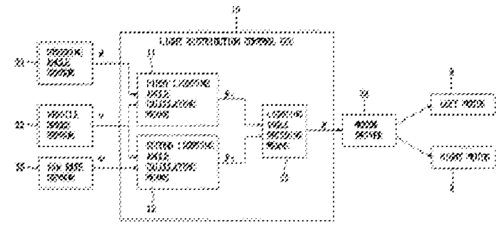
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
| --- | --- | --- |
| | steering angle φ at first, and the vehicle body yaws somewhat after the change of steering angle φ so that the yaw angular velocity ω increases following increase of the steering angle.<br><br>In the meantime, the rear part of the vehicle is swung outside large, and therefore the driver turns the steering wheel to the left or in the opposite direction rapidly for counter-steering to recover direction of the vehicle. Namely, the steering angle φ changes from an upward incline to a downward incline in FIG. 7A. However, the yaw angular velocity ω is maintained due to inertia.<br><br>Further, when the direction of the vehicle comes to show some recovery, the driver again turns the steering wheel to the right for going around the rightward curve, but he comes to carry out the counter-steering again soon after. Thus, the steering angle φ swings rightward and leftward in large variations.<br><br>However, while the steering angle φ is swinging rightward and leftward as described above, the yaw angular velocity ω is maintained at a certain angular velocity stably in general, and at a time somewhat before the vehicle passes through the curve completely, the yaw angular velocity ω comes to coincide with the steering angle φ."<br><br>E.g., Col. 7, lines 34 to 39, "Since the actual light distribution control is performed on the basis of | difference signal from the subtractor SU is present, the curve-recognition device K switches the switchover device SE so that the first filter F1 is coupled to the regulator R."<br><br>E.g., col. 4, lines 6 to 12, "At the coupling between the switchover device SE and the regulator R, a matching device AE is, here for example, arranged which, upon a switchover by the switchover device SE, adjusts the various nominal values to one another so that discontinuities or jumps in the adjustment and regulation of the illumination range are avoided."<br><br>E.g., col. 6, line 10 to 34, "In this connection, it is beneficial that upon the presence of a difference between the second, filtered, nominal-value signal to the third, filtered, nominal-value signal and upon termination of a difference is again switched from the third, filtered, nominal-value signal to the first, filtered, nominal-value signal because in this manner, in an uncomplicated and cost effective manner, upon the presence of an inclination change of the motor vehicle body which is not attributable to a change in loading or to road surface unevenness, the regulation of the illumination range of the motor vehicle, in dependence from the third, long, filter time constant results, whereby the third, filtered, nominal-value signal is independent, or substantially independent, from the disturbing, or distorting, short time inclination changes so that |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | the above-mentioned final lighting angle θ, even if the steering wheel is operated rapidly for the counter-steering and the like, change of the lighting region is suppressed pertinently and the driver is given no sense of incongruity." | after inclination changes of the motor-vehicle body which, for example, are caused by driving about a curve, false adjustments of the illumination range are not caused which can lead to the blinding of oncoming traffic or to losses in illumination range, which eliminates a danger during operation of a motor vehicle." |
| an actuator that is adapted to be connected to the headlight to effect movement thereof in accordance with said output signal. | | E.g., col. 3, lines 16 to 18, "The regulator R regulates the position of adjusting elements, which are shown here in block form and which change the positions of headlights." |

| Limitation of '034 Patent Claim 2 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 2. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 136. | See claim 1 claim chart, above at page 136. |
| wherein said sensor generates a signal that is representative of the road speed of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3 | E.g., col. 3, lines 40 to 45, "The curve-recognition device K is electrically conductively coupled with a speed signal sensor, or sender, G and includes a speed threshold value device which itself affects the switchover such that the third filter F3 is only coupled to the regulator R if a minimum speed of the motor vehicle is exceeded." |

| Limitation of '034 Patent Claim 2 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| |  FIG. 3 | |

| Limitation of '034 Patent Claim 3 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 3. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 136. | See claim 1 claim chart, above at page 136. |
| wherein said sensor generates a signal that is representative of the steering angle of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3 | |

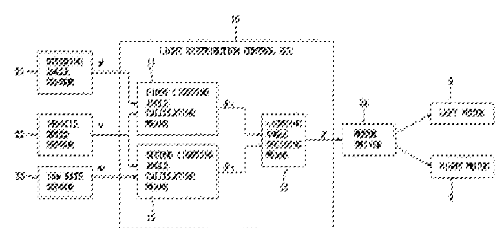
| Limitation of '034 Patent Claim 3 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| |  FIG. 3 | |

| Limitation of '034 Patent Claim 4 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 4. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 136. | See claim 1 claim chart, above at page 136. |
| wherein said sensor generates a signal that is representative of the pitch of the vehicle. | | E.g. col. 1, lines 6 to 20, "This invention concerns a method to regulate an illuminating range of a motor vehicle in which signals are measured at a position on a front axle and at a position on a rear axle, which signals depend upon a relative position of a motor vehicle body, or chassis, to the front and rear axles, with a difference between these signals being formed as a difference signal, with the resulting difference signal, as a nominal-value signal, being filtered to a first mean, or average, value, with a time for the first average-value formation being determined by a first filter time constant, and with positions of adjusting elements being regulated when the first, filtered, nominal-value signal deviates from a |

| Limitation of '034 Patent Claim 4 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | | predetermined, or set, value and an apparatus for regulating the illumination range of a motor vehicle." |

| Limitation of '034 Patent Claim 5 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 5. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 136. | See claim 1 claim chart, above at page 136. |
| wherein said sensor generates a signal that is representative of the suspension height of the vehicle. | | E.g. col. 1, lines 6 to 20, "This invention concerns a method to regulate an illuminating range of a motor vehicle in which signals are measured at a position on a front axle and at a position on a rear axle, which signals depend upon a relative position of a motor vehicle body, or chassis, to the front and rear axles, with a difference between these signals being formed as a difference signal, with the resulting difference signal, as a nominal-value signal, being filtered to a first mean, or average, value, with a time for the first average-value formation being determined by a first filter time constant, and with positions of adjusting elements being regulated when the first, filtered, nominal-value signal deviates from a predetermined, or set, value and an apparatus for regulating the illumination range of a motor vehicle." |

## 19. Claims 1, 2, 3, and 5 of U.S. Patent No. 7,231,034 Are Unpatentable Over the Combination of Gotoh and Miskin et al. Under 35 U.S.C. § 103(a)

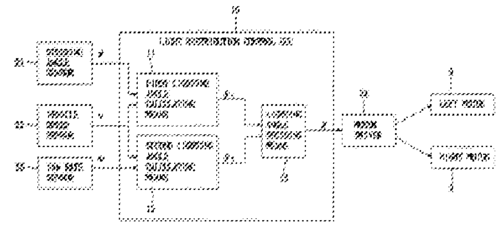
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| 1. An automatic directional control system for a vehicle headlight comprising: | E.g., Abstract, "A head lamp device for a vehicle capable of changing a lighting region in front of the vehicle in right and left directions, in which change of the lighting region is suppressed so as not to give the driver a sense of incongruity when a steering wheel is operated in one direction and then rapidly in the other as in case of counter-steering." | E.g., Abstract, "A device for automatic headlight adjustment in motor vehicles consists of four sensors which are arranged in pairs one behind the other in the direction of travel on those components of the motor vehicle which respond to loading." |
| a sensor that is adapted to generate a signal that is representative of a condition of the vehicle, said sensed condition includes one or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3<br><br>FIG. 3 | E.g., Abstract, "A device for automatic headlight adjustment in motor vehicles consists of four sensors which are arranged in pairs one behind the other in the direction of travel on those components of the motor vehicle which respond to loading."<br><br>E.g., page 4, "The four sensors are arranged in pairs one behind the other S1, S2/S3, S4, following the driving direction, on those components of the motor vehicle that experience position change by loading, e.g. on wheel suspensions or shock absorbers." |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| a controller that is responsive to said sensor signal for generating an output signal | E.g., Col. 4, lines 59 to 60, "The motor 8 is controlled for its driving by a light distribution control ECU 10." | E.g., page 5, "If the signals that lead to measured data are based on light load such as those caused by road bumps, then it will result on average in a differential value that provides only a small deviation from the ideal headlight position value, thus the predetermined threshold value is not exceeded. For heavier loads, the threshold value is exceeded, the microprocessor 4 transmits signals via the digital/analog converter 6, 6' and the operational amplifier 7, 7' to the respective headlights adjustment devices, which then change the position of the headlights accordingly using conventional tools, such as, for example, spindles, which convert the rotary motion of the motor into linear movement of the headlights." |
| only when said sensor signal changes by more than a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition; and | E.g., col. 6, line 42 to col. 7, line 2, "Referring to FIG. 8, from changes of the steering angle φ and the yaw angular velocity ω of FIGS. 7A and 7B, the following is understood. When the vehicle goes around the rightward curve, the steering wheel is turned to the right to have a positive steering angle φ at first, and the vehicle body yaws somewhat after the change of steering angle φ so that the yaw angular velocity ω increases following increase of the steering angle.<br><br>In the meantime, the rear part of the vehicle is swung outside large, and therefore the driver turns the steering wheel to the left or in the opposite direction rapidly for counter-steering to recover direction of the vehicle. Namely, the steering | E.g., page 5, "If the signals that lead to measured data are based on light load such as those caused by road bumps, then it will result on average in a differential value that provides only a small deviation from the ideal headlight position value, thus the predetermined threshold value is not exceeded. For heavier loads, the threshold value is exceeded, the microprocessor 4 transmits signals via the digital/analog converter 6, 6' and the operational amplifier 7, 7' to the respective headlights adjustment devices, which then change the position of the headlights accordingly using conventional tools, such as, for example, spindles, which convert the rotary motion of the motor into linear movement of the headlights." |

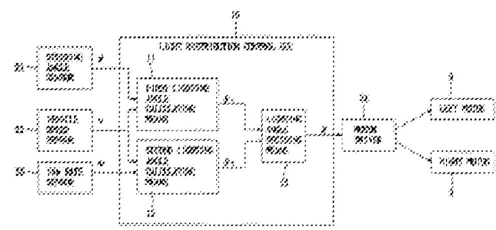
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | DE 31 10 094 (Miskin et al.) |
| --- | --- | --- |
| | angle $\varphi$ changes from an upward incline to a downward incline in FIG. 7A. However, the yaw angular velocity $\omega$ is maintained due to inertia.<br><br>Further, when the direction of the vehicle comes to show some recovery, the driver again turns the steering wheel to the right for going around the rightward curve, but he comes to carry out the counter-steering again soon after. Thus, the steering angle $\varphi$ swings rightward and leftward in large variations.<br><br>However, while the steering angle $\varphi$ is swinging rightward and leftward as described above, the yaw angular velocity $\omega$ is maintained at a certain angular velocity stably in general, and at a time somewhat before the vehicle passes through the curve completely, the yaw angular velocity $\omega$ comes to coincide with the steering angle $\varphi$."<br><br>E.g., Col. 7, lines 34 to 39, "Since the actual light distribution control is performed on the basis of the above-mentioned final lighting angle $\theta$, even if the steering wheel is operated rapidly for the counter-steering and the like, change of the lighting region is suppressed pertinently and the driver is given no sense of incongruity." | |
| an actuator that is adapted to be connected to the headlight to effect movement thereof in accordance with said output signal. | | E.g., page 5, "If the signals that lead to measured data are based on light load such as those caused by road bumps, then it will result on average in a differential value that provides only a small |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| | | deviation from the ideal headlight position value, thus the predetermined threshold value is not exceeded. For heavier loads, the threshold value is exceeded, the microprocessor 4 transmits signals via the digital/analog converter 6, 6' and the operational amplifier 7, 7' to the respective headlights adjustment devices, which then change the position of the headlights accordingly using conventional tools, such as, for example, spindles, which convert the rotary motion of the motor into linear movement of the headlights." |

| Limitation of '034 Patent Claim 2 | U.S. Patent No. 5,909,949 (Gotoh) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| 2. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 143. | See claim 1 claim chart, above at page 143. |
| wherein said sensor generates a signal that is representative of the road speed of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3 | |

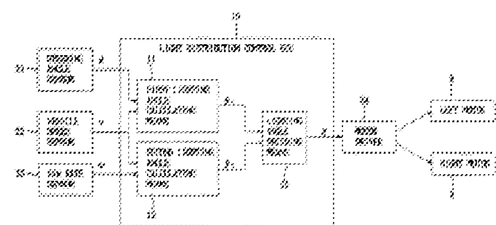
| Limitation of '034 Patent Claim 2 | U.S. Patent No. 5,909,949 (Gotoh) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| |  FIG. 3 | |

| Limitation of '034 Patent Claim 3 | U.S. Patent No. 5,909,949 (Gotoh) | DE 31 10 094 (Miskin et al.) |
|---|---|---|
| 3. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 143. | See claim 1 claim chart, above at page 143. |
| wherein said sensor generates a signal that is representative of the steering angle of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3 | |

| Limitation of '034 Patent Claim 3 | U.S. Patent No. 5,909,949 (Gotoh) | DE 31 10 094 (Miskin et al.) |
| --- | --- | --- |
| |  FIG. 3 | |

| Limitation of '034 Patent Claim 5 | U.S. Patent No. 5,909,949 (Gotoh) | DE 31 10 094 (Miskin et al.) |
| --- | --- | --- |
| 5. The automatic directional control system defined in claim 1 | See claim 1 claim chart, above at page 143. | See claim 1 claim chart, above at page 143. |
| wherein said sensor generates a signal that is representative of the suspension height of the vehicle. | | E.g., Abstract, "A device for automatic headlight adjustment in motor vehicles consists of four sensors which are arranged in pairs one behind the other in the direction of travel on those components of the motor vehicle which respond to loading."<br>E.g., page 4, "The four sensors are arranged in pairs one behind the other S1, S2/S3, S4, following the driving direction, on those components of the motor vehicle that experience position change by loading, e.g. on wheel suspensions or shock absorbers." |

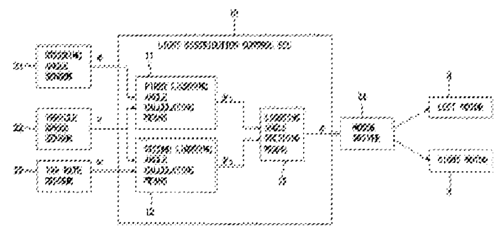
## 20. Claims 1 to 5 of U.S. Patent No. 7,231,034 Are Unpatentable Over the Combination of Gotoh and Leleve Under 35 U.S.C. § 103(a)

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | DE 31 29 891 (Leleve) |
|---|---|---|
| 1. An automatic directional control system for a vehicle headlight comprising: | E.g., Abstract, "A head lamp device for a vehicle capable of changing a lighting region in front of the vehicle in right and left directions, in which change of the lighting region is suppressed so as not to give the driver a sense of incongruity when a steering wheel is operated in one direction and then rapidly in the other as in case of counter-steering." | E.g., page 7, "According to the invention, a device for the dynamic adjustment of the headlights of a vehicle is to be provided, which no longer has the aforementioned disadvantages and allows pleasant night-time driving under all driving conditions and regardless of the state of the road." |
| a sensor that is adapted to generate a signal that is representative of a condition of the vehicle, said sensed condition includes one or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3<br><br>FIG. 3 | E.g., page 12, "The device shown in Fig. 1 has a first sensor 1 between the front axle and the body of the vehicle in order to detect a relative movement. A corresponding sensor 2 is situated on the rear axle." |

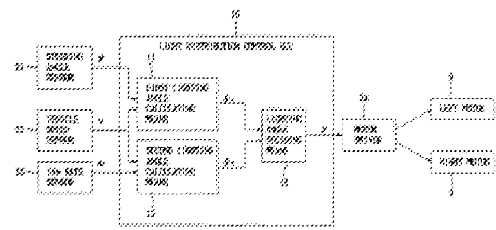
| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | DE 31 29 891 (Leleve) |
|---|---|---|
| a controller that is responsive to said sensor signal for generating an output signal | E.g., Col. 4, lines 59 to 60, "The motor 8 is controlled for its driving by a light distribution control ECU 10." | E.g., page 12, "The signals generated by sensors 1, 2 are processed in a mixer stage 3, where a signal is generated that represents the vibration or rocking motion of the vehicle in the course of its movement." |
| only when said sensor signal changes by more than a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition; and | E.g., col. 6, line 42 to col. 7, line 2, "Referring to FIG. 8, from changes of the steering angle φ and the yaw angular velocity ω of FIGS. 7A and 7B, the following is understood. When the vehicle goes around the rightward curve, the steering wheel is turned to the right to have a positive steering angle φ at first, and the vehicle body yaws somewhat after the change of steering angle φ so that the yaw angular velocity ω increases following increase of the steering angle.<br><br>In the meantime, the rear part of the vehicle is swung outside large, and therefore the driver turns the steering wheel to the left or in the opposite direction rapidly for counter-steering to recover direction of the vehicle. Namely, the steering angle φ changes from an upward incline to a downward incline in FIG. 7A. However, the yaw angular velocity ω is maintained due to inertia.<br><br>Further, when the direction of the vehicle comes to show some recovery, the driver again turns the steering wheel to the right for going around the rightward curve, but he comes to carry out the counter-steering again soon after. Thus, the steering angle φ swings rightward and leftward in | E.g., page 8, "One first specific embodiment of the invention is characterized by the fact that the filter includes threshold value elements, via which at least one amplitude threshold is able to be defined, for which the filter predefines a limit frequency. This allows a precise adaptation of the features of the filter to the different interference phenomena requiring an adjustment of the headlight position."<br><br>See also pages 9 to 10, 13. |

| Limitation of '034 Patent Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | DE 31 29 891 (Leleve) |
| --- | --- | --- |
| | large variations.<br><br>However, while the steering angle φ is swinging rightward and leftward as described above, the yaw angular velocity ω is maintained at a certain angular velocity stably in general, and at a time somewhat before the vehicle passes through the curve completely, the yaw angular velocity ω comes to coincide with the steering angle φ."<br><br>E.g., Col. 7, lines 34 to 39, "Since the actual light distribution control is performed on the basis of the above-mentioned final lighting angle θ, even if the steering wheel is operated rapidly for the counter-steering and the like, change of the lighting region is suppressed pertinently and the driver is given no sense of incongruity." | |
| an actuator that is adapted to be connected to the headlight to effect movement thereof in accordance with said output signal. | | E.g., page 12, "The output of filter 4 is connected to a control and amplifier device 6, which outputs a power signal to actuating organs 7, which causes headlights 8 to move." |

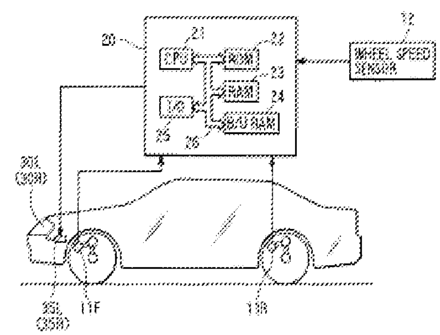
| Limitation of '034 Patent Claim 2 | U.S. Patent No. 5,909,949 (Gotoh) | DE 31 29 891 (Leleve) |
| --- | --- | --- |
| 2. The automatic directional control system defined in claim 1 | See claim 1 claim chart above at page 149. | See claim 1 claim chart above at page 149. |
| wherein said sensor generates a signal that is representative of the road speed of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing | |

| Limitation of '034 Patent Claim 2 | U.S. Patent No. 5,909,949 (Gotoh) | DE 31 29 891 (Leleve) |
|---|---|---|
| | the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3<br><br>FIG. 3 | |

| Limitation of '034 Patent Claim 3 | U.S. Patent No. 5,909,949 (Gotoh) | DE 31 29 891 (Leleve) |
|---|---|---|
| 3. The automatic directional control system defined in claim 1 | See claim 1 claim chart above at page 149. | See claim 1 claim chart above at page 149. |
| wherein said sensor generates a signal that is representative of the steering angle of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle | |

| Limitation of '034 Patent Claim 3 | U.S. Patent No. 5,909,949 (Gotoh) | DE 31 29 891 (Leleve) |
|---|---|---|
| | speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3<br><br>FIG. 3 | |

| Limitation of '034 Patent Claim 4 | DE 31 29 891 (Leleve) | U.S. Patent No. 5,909,949 (Gotoh) |
|---|---|---|
| 4. The automatic directional control system defined in claim 1 | See claim 1 claim chart above at page 149. | See claim 1 claim chart above at page 149. |
| wherein said sensor generates a signal that is representative of the pitch of the vehicle. | | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front |

| Limitation of '034 Patent Claim 4 | DE 31 29 891 (Leleve) | U.S. Patent No. 5,909,949 (Gotoh) |
|---|---|---|
| | | wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br><br>FIG.1<br> |

| **Limitation of '034 Patent Claim 5** | **DE 31 29 891 (Leleve)** | **U.S. Patent No. 5,909,949 (Gotoh)** |
|---|---|---|
| 5. The automatic directional control system defined in claim 1 | See claim 1 claim chart above at page 149. | See claim 1 claim chart above at page 149. |
| wherein said sensor generates a signal that is representative of the suspension height of the vehicle. | E.g., page 12, "The device shown in Fig. 1 has a first sensor 1 between the front axle and the body of the vehicle in order to detect a relative movement. A corresponding sensor 2 is situated on the rear axle." | |

## 21. Proposed Claims 1, 2, 4 to 6, 9 to 13, 20, 22, 24, 25, 37, 38, 41, 42, 44, and 45 Are Anticipated by Uchida Under 35 U.S.C. § 102(b)

| Limitation of '034 Patent Proposed Claim 1 | GB 2 309 773 (Uchida) |
|---|---|
| 1. An automatic directional control system for a vehicle headlight, comprising: | E.g., page 1, lines 3 to 7, "The present invention relates to a vehicle lamp illumination direction control device which detects the posture of a vehicle and correctly adjusts the illumination direction of a vehicle lamp so that the illumination direction can be always kept in a predetermined direction." |
| two or more sensors that are each adapted to generate a signal that is representative of a condition of a vehicle, said sensed conditions including two or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2."<br><br>E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2."<br><br>E.g., Page 9, lines 24 to 28 "Firstly, the method i) is a method which judges whether the vehicle is in the acceleration or deceleration running condition or not by detecting the running speed of the vehicle to calculate the change of the speed with time, that is, by calculating the acceleration of the vehicle."<br><br>E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the |

| Limitation of '034 Patent Proposed Claim 1 | GB 2 309 773 (Uchida) |
| --- | --- |
| | vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree."<br><br>E.g., page 15, line 30 to page 16, line 2 "As has been described above, according to the respective methods, it is possible to judge whether the vehicle is running in the acceleration condition or in the deceleration condition. Also, these methods can be applied in various manners, for example, the respective methods can be used individually, or some of them may be combined together for the enhanced accuracy of the judgment." |
| a controller that is responsive to said two or more sensor signals for generating at least one output signal | E.g., page 4, lines 16 to 27 "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle." |

| Limitation of '034 Patent Proposed Claim 1 | GB 2 309 773 (Uchida) |
|---|---|
| only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating conditions; and | E.g., page 4, lines 16 to 27 "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle." |
| said at least one actuator being adapted to be connected to the headlight to effect movement thereof in accordance with said at least one output signal. | E.g., page 16, line 28 to page 17, line 6 "Also, if it is judged by the acceleration or deceleration running condition judging device 3b that the vehicle is not in the acceleration or deceleration running condition, then the illumination angle of the lamp 5 can be controlled by one of the following methods when the drive control device 4a receives an instruction from the acceleration or deceleration running condition judging device 3b: 1) a method for fixing the illumination angle; 2) a method for limiting the range of the illumination angle or forbidding part of the range of the illumination angle; and, 3) a method for changing the response speed or control speed of an actuator."<br><br>E.g., page 7, lines 4 to 9, "In particular, the correction calculating device 3a is structured in the following manner: that is, in accordance with a detect signal from the vehicle posture detection device 2, it transmits a control signal to the drive device 4 so that the illumination direction of the lamp 5 can be always kept in a given direction." See also 7:9-32.<br><br>E.g., page 8, lines 1 to 9, "When the judging device 3b judges that the vehicle is in an acceleration or deceleration running condition, in accordance with a control signal transmitted from the correction calculating device 3a to the drive control device 4a, the acceleration or deceleration running condition judging device 3b transmits to the drive control device 4a a signal which |

| **Limitation of '034 Patent Proposed Claim 1** | **GB 2 309 773 (Uchida)** |
|---|---|
| | allows the illumination direction of the lamp 5 to be corrected in a predetermined direction." |

| **Limitation of '034 Patent Proposed Claim 2** | **GB 2 309 773 (Uchida)** |
|---|---|
| 2. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 156. |
| wherein at least one of said two or more sensors generates a signal that is representative of the road speed of the vehicle. | E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2."<br><br>E.g., Page 9, lines 24 to 28 "Firstly, the method i) is a method which judges whether the vehicle is in the acceleration or deceleration running condition or not by detecting the running speed of the vehicle to calculate the change of the speed with time, that is, by calculating the acceleration of the vehicle." |

| **Limitation of '034 Patent Proposed Claim 4** | **GB 2 309 773 (Uchida)** |
|---|---|
| 4. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 156. |
| wherein at least one of said two or more sensors generates a signal that is representative of the pitch of the vehicle. | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the |

| Limitation of '034 Patent Proposed Claim 4 | GB 2 309 773 (Uchida) |
|---|---|
| | vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Proposed Claim 5 | GB 2 309 773 (Uchida) |
|---|---|
| 5. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 156. |
| wherein at least one of said two or more sensors generates a signal that is representative of the suspension height of the vehicle. | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by |

| Limitation of '034 Patent Proposed Claim 5 | GB 2 309 773 (Uchida) |
|---|---|
| | comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Proposed Claim 6 | GB 2 309 773 (Uchida) |
|---|---|
| 6. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 156. |
| wherein said two or more sensors include a first sensor and a second sensor. | E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2."<br><br>E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is |

| Limitation of '034 Patent Proposed Claim 6 | GB 2 309 773 (Uchida) |
|---|---|
| | obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

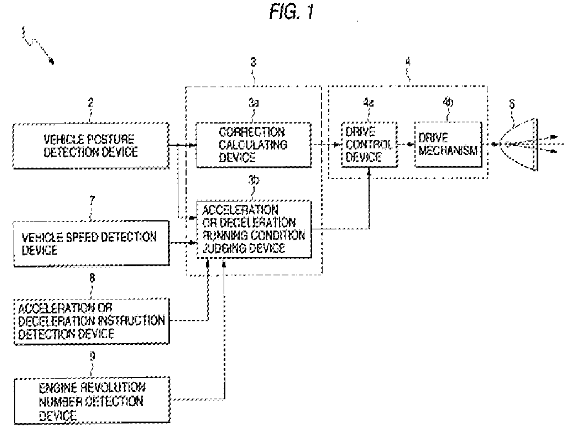
| Limitation of '034 Patent Proposed Claim 9 | GB 2 309 773 (Uchida) |
|---|---|
| 9. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 161. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the suspension height of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle. | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions |

| Limitation of '034 Patent Proposed Claim 9 | GB 2 309 773 (Uchida) |
| --- | --- |
| | thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Proposed Claim 10 | GB 2 309 773 (Uchida) |
| --- | --- |
| 10. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 161. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the road speed of the vehicle. | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| **Limitation of '034 Patent Proposed Claim 10** | **GB 2 309 773 (Uchida)** |
| --- | --- |
| | E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2."<br><br>E.g., Page 9, lines 24 to 28 "Firstly, the method i) is a method which judges whether the vehicle is in the acceleration or deceleration running condition or not by detecting the running speed of the vehicle to calculate the change of the speed with time, that is, by calculating the acceleration of the vehicle." |

| **Limitation of '034 Patent Proposed Claim 11** | **GB 2 309 773 (Uchida)** |
| --- | --- |
| 11. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 161. |
| wherein said first sensor is physically separate from said second sensor. | E.g., page 6, line 30 to page 7, line 3, "In order for the vehicle posture detection device and the acceleration or deceleration running condition judging device to transmit signals to one another, they must be separate: "The outputs of the vehicle posture detection device 2 are transmitted to the correction calculating device 3a and acceleration or deceleration running condition judging device 3b which cooperate together in forming the control device 3, and these outputs are used as control signals to be applied to the drive device 4 and are then used as instructions for correcting the illumination of lamp 5."<br><br>E.g., Fig. 1: |

| Limitation of '034 Patent Proposed Claim 11 | GB 2 309 773 (Uchida) |
|---|---|
| | FIG. 1   |

| Limitation of '034 Patent Proposed Claim 12 | GB 2 309 773 (Uchida) |
|---|---|
| 12. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 156. |
| wherein said sensed conditions further include one or more of a rate of change of road speed of the vehicle, a rate of change of steering angle of the vehicle, a rate of change of pitch of the vehicle, or a rate of change of suspension height of the vehicle. | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by |

| Limitation of '034 Patent Proposed Claim 12 | GB 2 309 773 (Uchida) |
|---|---|
| | comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Proposed Claim 20 | GB 2 309 773 (Uchida) |
|---|---|
| 20. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 156. |
| wherein the at least one actuator includes an electronically controlled mechanical actuator. | E.g., page 19, lines 6 to 22 "For example, when the actuator incorporates therein a DC (direct current) motor, a difference between the control target position (or angle) of the actuator and the current position (or angle) thereof is detected, and a pulse signal having a duty cycle corresponding to the detected position difference is supplied to the DC motor to thereby control the position of the actuator, as shown in Fig. 11, if the characteristic of the duty cycle DT with respect to the position difference δxx is changed from the state of a relatively faster response speed shown by a broken line 10 to the state of a slow response speed shown by a solid line 11, with respect to the same position difference δxx=δxxa, the duty cycle DT in the other running conditions of the vehicle than the acceleration or deceleration running condition thereof is smaller than the duty cycle in the acceleration or deceleration running condition of the vehicle, so that the drive control on the lamp 5 by the actuator is slowed down." |

| Limitation of '034 Patent Proposed Claim 22 | GB 2 309 773 A (Uchida) |
| --- | --- |
| 22. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 156. |
| wherein the at least one actuator includes a servo motor. | E.g., page 19, lines 6 to 22 "For example, when the actuator incorporates therein a DC (direct current) motor, a difference between the control target position (or angle) of the actuator and the current position (or angle) thereof is detected, and a pulse signal having a duty cycle corresponding to the detected position difference is supplied to the DC motor to thereby control the position of the actuator, as shown in Fig. 11, if the characteristic of the duty cycle DT with respect to the position difference δxx is changed from the state of a relatively faster response speed shown by a broken line 10 to the state of a slow response speed shown by a solid line 11, with respect to the same position difference δxx=δxxa, the duty cycle DT in the other running conditions of the vehicle than the acceleration or deceleration running condition thereof is smaller than the duty cycle in the acceleration or deceleration running condition of the vehicle, so that the drive control on the lamp 5 by the actuator is slowed down." |

| Limitation of '034 Patent Proposed Claim 24 | GB 2 309 773 (Uchida) |
| --- | --- |
| 24. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 156. |
| wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted relative to the vehicle. | E.g., page 16, lines 6 to 15 "The simplest method for changing the illumination pattern of the lamp 5 in a vertical plane is a method which changes the illumination angle of the lamp 5 with respect to a horizontal plane by rotating the entire lamp 5 about the rotary shaft thereof. For example, the right and left side surfaces of the lamp 5 are supported in a freely rotatable manner and the rotary shaft of the lamp 5 is rotated directly by a drive source such as a motor or the like, or, there is available a drive mechanism in which a member fixed to the lamp 5 or formed integrally with the lamp 5 is rotated by the drive device 4." |

| Limitation of '034 Patent Proposed Claim 25 | GB 2 309 773 (Uchida) |
|---|---|
| 25. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 156. |
| wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted up and down relative to a horizontal reference position. | E.g., page 16, lines 6 to 15 "The simplest method for changing the illumination pattern of the lamp 5 in a vertical plane is a method which changes the illumination angle of the lamp 5 with respect to a horizontal plane by rotating the entire lamp 5 about the rotary shaft thereof. For example, the right and left side surfaces of the lamp 5 are supported in a freely rotatable manner and the rotary shaft of the lamp 5 is rotated directly by a drive source such as a motor or the like, or, there is available a drive mechanism in which a member fixed to the lamp 5 or formed integrally with the lamp 5 is rotated by the drive device 4." |

| Limitation of '034 Patent Proposed Claim 37 | GB 2 309 773 (Uchida) |
|---|---|
| 37. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 156. |
| wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by sensing a front and a rear suspension height of the vehicle. | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running |

| Limitation of '034 Patent Proposed Claim 37 | GB 2 309 773 (Uchida) |
|---|---|
| | condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Proposed Claim 38 | GB 2 309 773 (Uchida) |
|---|---|
| 38. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 156. |
| wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by a pitch level sensor. | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed |

| **Limitation of '034 Patent Proposed Claim 38** | **GB 2 309 773 (Uchida)** |
| --- | --- |
| | to a certain degree." |

| **Limitation of '034 Patent Proposed Claim 41** | **GB 2 309 773 A (Uchida)** |
| --- | --- |
| 41. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 156. |
| wherein the automatic directional control system is configured such that the predetermined minimum threshold amount functions as a filter to minimize undesirable operation of the at least one actuator. | E.g., page 4, lines 16 to 27, "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle." |

| **Limitation of '034 Patent Proposed Claim 42** | **GB 2 309 773 (Uchida)** |
| --- | --- |
| 42. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 156. |
| wherein said sensed conditions include three or more of road speed, steering angle, pitch, and suspension height of the vehicle. | E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2." |

| Limitation of '034 Patent Proposed Claim 42 | GB 2 309 773 (Uchida) |
| --- | --- |
| | E.g., Page 9, lines 24 to 28 "Firstly, the method i) is a method which judges whether the vehicle is in the acceleration or deceleration running condition or not by detecting the running speed of the vehicle to calculate the change of the speed with time, that is, by calculating the acceleration of the vehicle."<br><br>E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree."<br><br>E.g., page 15, line 30 to page 16, line 2 "As has been described above, according to the respective methods, it is possible to judge whether the vehicle is running in the acceleration condition or in the deceleration condition. Also, these methods can be applied in various manners, for example, the respective methods can be used individually, or some of them may be combined together for the enhanced accuracy of the judgment." |

| **Limitation of '034 Patent Proposed Claim 44** | **GB 2 309 773 (Uchida)** |
| --- | --- |
| 44. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 156. |
| wherein said controller is configured to be responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated continuously in response to relatively small variations in the sensed operating conditions. | E.g., page 4, lines 16 to 27 "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle." |

| **Limitation of '034 Patent Proposed Claim 45** | **GB 2 309 773 (Uchida)** |
| --- | --- |
| 45. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 156. |
| wherein controller is configured to be responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated unduly frequently in response to relatively small variations in the sensed operating conditions. | E.g., page 4, lines 16 to 27 "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle." |

## 22. Proposed Claims 1, 2, 4 to 6, 9 to 11, 17, 18, 20, 21, 22, 24, 25, 28, 33, 34, 37, 38, 41, 42, 44, and 45 Are Anticipated by Takahashi Under 35 U.S.C. § 102(b)

| Limitation of '034 Patent Proposed Claim 1 | GB 2 309 774 (Takahashi) |
|---|---|
| 1. An automatic directional control system for a vehicle headlight, comprising: | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp." |
| two or more sensors that are each adapted to generate a signal that is representative of a condition of a vehicle, said sensed conditions including two or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle."<br><br>E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle."<br><br>E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping |

| Limitation of '034 Patent Proposed Claim 1 | GB 2 309 774 (Takahashi) |
|---|---|
| | or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle."<br><br>E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br><br>E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |
| a controller that is responsive to said two or more sensor signals for generating at least one output signal | E.g., page 8, lines 26 to 32 "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2." |
| only when said at least one of the two or more sensor signals changes by | E.g., page 9, lines 16 to 34 "Also, in order to prevent the illumination |

| Limitation of '034 Patent Proposed Claim 1 | GB 2 309 774 (Takahashi) |
|---|---|
| more than a predetermined minimum threshold amount to prevent at least one actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating conditions; and | direction of the lamp 6 from being corrected inadvertently when a sudden change in the posture of the vehicle occurs temporarily or due to the wrong operation of the lamp 6 caused by external disturbances, for example, when the vehicle makes a sudden start or a sudden stop, preferably, a threshold value with respect to time may be set in detection of the road gradient and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a threshold value with respect to the running distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a distance equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected." |
| said at least one actuator being adapted to be connected to the headlight to effect movement thereof in accordance with said at least one output signal. | E.g., page 2, lines 14 to 17 "However, in the above-mentioned automatic adjustment device, since the lamp is driven with high frequency, an actuator used in a drive mechanism for driving the lamp is required to show high response property and high durability."<br><br>E.g., page 6, lines 26 to 32 "When the control device 4 receives the detect signal of the vehicle running condition detection device 3 and finds from this detect signal that the vehicle is standing still, the control device 4, in accordance with information on the vehicle posture obtained from the vehicle posture detection device 2, transmits to the drive signal 5 a control signal for correction of the illumination direction of the lamp 6."<br><br>E.g., page 7, lines 12 to 17 "In view of this, the control device 4 is structured such that, based on the information from the vehicle posture detection device 2, it can detect the amount of variations in the gradient of the road and, therefore, when the road gradient varies suddenly, it can correct the illumination direction of the lamp 6." |

| Limitation of '034 Patent Proposed Claim 1 | GB 2 309 774 (Takahashi) |
|---|---|
| | E.g., page 11, lines 12 to 16, "The correction of the illumination direction of the lamp 6 in Step S5 is carried out by the drive device 5 based on the control signal transmitted from the control device 4 and, as a method for executing such correction, there are available two methods as follows: 1) a method for inclining the entire lamp, and, 2) a method for moving the component (such as a lens, a reflector, a shade or the like) of the optical system of the lamp." |

| Limitation of '034 Patent Proposed Claim 2 | GB 2 309 774 (Takahashi) |
|---|---|
| 2. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 173. |
| wherein at least one of said two or more sensors generates a signal that is representative of the road speed of the vehicle. | E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle." |

| Limitation of '034 Patent Proposed Claim 4 | GB 2 309 774 (Takahashi) |
|---|---|
| 4. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 173. |
| wherein at least one of said two or more sensors generates a signal that is representative of the pitch of the vehicle. | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is |

| **Limitation of '034 Patent Proposed Claim 4** | **GB 2 309 774 (Takahashi)** |
| --- | --- |
| | obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp." |

| **Limitation of '034 Patent Proposed Claim 5** | **GB 2 309 774 (Takahashi)** |
| --- | --- |
| 5. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 173. |
| wherein at least one of said two or more sensors generates a signal that is representative of the suspension height of the vehicle. | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br><br>E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |

| **Limitation of '034 Patent Proposed Claim 6** | **GB 2 309 774 (Takahashi)** |
| --- | --- |
| 6. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 173. |

| Limitation of '034 Patent Proposed Claim 6 | GB 2 309 774 (Takahashi) |
|---|---|
| wherein said two or more sensors include a first sensor and a second sensor. | E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle."<br><br>E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle." |

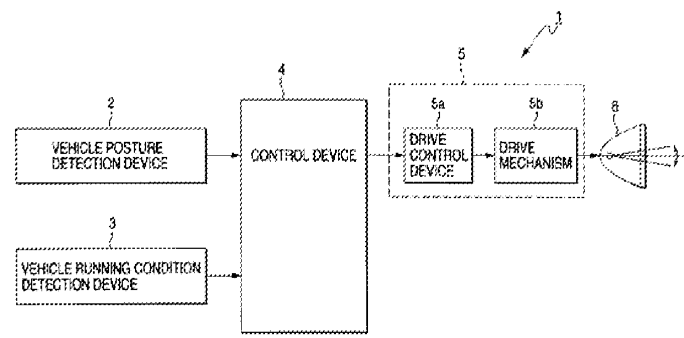
| Limitation of '034 Patent Proposed Claim 9 | GB 2 309 774 (Takahashi) |
|---|---|
| 9. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 177. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the suspension height of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle. | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp." |

| Limitation of '034 Patent Proposed Claim 9 | GB 2 309 774 (Takahashi) |
|---|---|
| | E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle."<br><br>E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp." |

| Limitation of '034 Patent Proposed Claim 10 | GB 2 309 774 (Takahashi) |
|---|---|
| 10. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 177. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the road speed of the vehicle. | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br>E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 |

| Limitation of '034 Patent Proposed Claim 10 | GB 2 309 774 (Takahashi) |
|---|---|
| | is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle." |

| Limitation of '034 Patent Proposed Claim 11 | GB 2 309 774 (Takahashi) |
|---|---|
| 11. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 177. |
| wherein said first sensor is physically separate from said second sensor. | See, e.g., Fig. 1, ref. 2, 3 (Separate detection devices). See also 5:25-27 ("an illumination direction control device 1 is composed of vehicle posture detection device 2, vehicle running condition detection device 3, control device 4, drive device 5 . . ., and lamp 6.") |

| Limitation of '034 Patent Proposed Claim 11 | GB 2 309 774 (Takahashi) |
|---|---|
| | FIG. 1   |

| Limitation of '034 Patent Proposed Claim 17 | GB 2 309 774 (Takahashi) |
|---|---|
| 17. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 173. |
| wherein the automatic directional control system is configured to include at least two actuators. | E.g., page 16, line 31 to page 17, line 1 "A rudder resistance network 18, which corresponds to the above-mentioned drive control device 5a, is used to convert the output signal of the microcomputer 10 into an analog signal and transmits it to actuators 19 and 19' which are disposed downstream thereof." |

| Limitation of '034 Patent Proposed Claim 18 | GB 2 309 774 (Takahashi) |
|---|---|
| 18. The automatic directional control system defined in claim 17, | See claim 17 claim chart, above at page 181. |
| wherein the at least two actuators include a first actuator that is adapted to be connected to the headlight to effect movement thereof in a vertical direction. | E.g., page 11, lines 21 to 32 "In particular, the method 1) is the simplest method that can change the illumination pattern of the lamp 6 within a vertical plane, in which the entire lamp is rotated about the rotary shaft thereof to thereby change the illumination angle of the lamp 6 with respect to a horizontal plane including the optical axis of the lamp. For example, in the method 1), there can be used a drive mechanism in which the right and left side surfaces of the lamp 6 are supported rotatably, and the rotary shaft of the lamp 6 is rotated directly by a drive source such as a motor or the like, or a member fixed to or formed integrally with the lamp 6 is rotated by the drive device 5." |

| Limitation of '034 Patent Proposed Claim 20 | GB 2 309 774 (Takahashi) |
|---|---|
| 20. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 173. |
| wherein the at least one actuator includes an electronically controlled mechanical actuator. | E.g., page 16, line 31 to page 17, line 1 "A rudder resistance network 18, which corresponds to the above-mentioned drive control device 5a, is used to convert the output signal of the microcomputer 10 into an analog signal and transmits it to actuators 19 and 19' which are disposed downstream thereof."<br>E.g., page 11, line 32 to page 12, line 3 "As an example of such lamp, there is available a lamp including a mechanism which can use the rotational force of the motor as the rotational force of the lam through a transmission mechanism using a worm and worm wheel (for example, see Japanese Patent Publication No. Hei. 63-166672)." |

| **Limitation of '034 Patent Proposed Claim 21** | **GB 2 309 774 (Takahashi)** |
| --- | --- |
| 21. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 173. |
| wherein the at least one actuator includes a step motor. | E.g., page 18, lines 5 to 8 "Besides this, according to the invention, the lamp or the component thereof can be driven or controlled by use of a stepping motor to thereby correct the illumination direction of the lamp." |

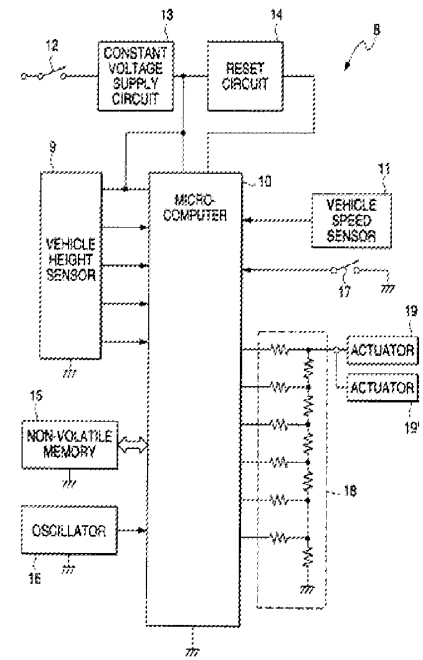
| **Limitation of '034 Patent Proposed Claim 22** | **GB 2 309 774 (Takahashi)** |
| --- | --- |
| 22. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 173. |
| wherein the at least one actuator includes a servo motor. | E.g., page 16, line 31 to page 17, line 1 "A rudder resistance network 18, which corresponds to the above-mentioned drive control device 5a, is used to convert the output signal of the microcomputer 10 into an analog signal and transmits it to actuators 19 and 19' which are disposed downstream thereof." E.g., page 11, line 32 to page 12, line 3 "As an example of such lamp, there is available a lamp including a mechanism which can use the rotational force of the motor as the rotational force of the lam through a transmission mechanism using a worm and worm wheel (for example, see Japanese Patent Publication No. Hei. 63-166672)." |

| **Limitation of '034 Patent Proposed Claim 24** | **GB 2 309 774 (Takahashi)** |
| --- | --- |
| 24. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 173. |
| wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted relative to the vehicle. | E.g., page 11, lines 21 to 32 "In particular, the method 1) is the simplest method that can change the illumination pattern of the lamp 6 within a vertical plane, in which the entire lamp is rotated about the rotary shaft thereof to thereby change the illumination angle of the lamp 6 with respect to |

| Limitation of '034 Patent Proposed Claim 24 | GB 2 309 774 (Takahashi) |
|---|---|
| | a horizontal plane including the optical axis of the lamp. For example, in the method 1), there can be used a drive mechanism in which the right and left side surfaces of the lamp 6 are supported rotatably, and the rotary shaft of the lamp 6 is rotated directly by a drive source such as a motor or the like, or a member fixed to or formed integrally with the lamp 6 is rotated by the drive device 5." |

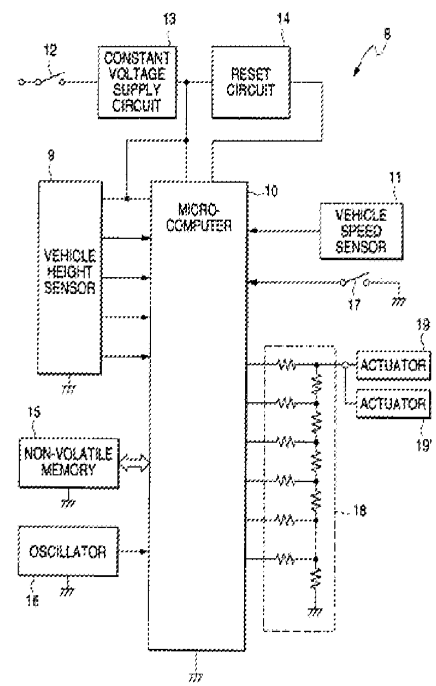
| Limitation of '034 Patent Proposed Claim 25 | GB 2 309 774 (Takahashi) |
|---|---|
| 25. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 173. |
| wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted up and down relative to a horizontal reference position. | E.g., page 11, lines 21 to 32 "In particular, the method 1) is the simplest method that can change the illumination pattern of the lamp 6 within a vertical plane, in which the entire lamp is rotated about the rotary shaft thereof to thereby change the illumination angle of the lamp 6 with respect to a horizontal plane including the optical axis of the lamp. For example, in the method 1), there can be used a drive mechanism in which the right and left side surfaces of the lamp 6 are supported rotatably, and the rotary shaft of the lamp 6 is rotated directly by a drive source such as a motor or the like, or a member fixed to or formed integrally with the lamp 6 is rotated by the drive device 5." |

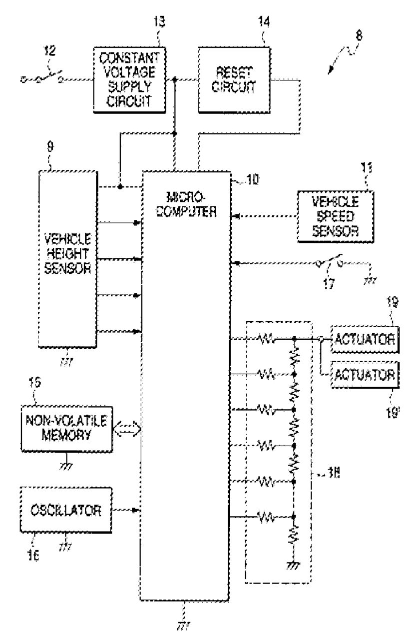
| Limitation of '034 Patent Proposed Claim 28 | GB 2 309 774 (Takahashi) |
|---|---|
| 28. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 173. |
| wherein the automatic directional control system is configured such that the controller includes a microprocessor. | E.g., page 16, lines 1 to 4 "When a turn-on switch 12 for the lamp 6 is put into operation, a supply voltage from a constant voltage supply circuit 13 and |

| Limitation of '034 Patent Proposed Claim 28 | GB 2 309 774 (Takahashi) |
|---|---|
| | a reset signal from a reset circuit 14 are supplied to the microcomputer 10." See also Fig. 9, ref. 10. FIG. 9  |



| Limitation of '034 Patent Proposed Claim 33 | GB 2 309 774 (Takahashi) |
|---|---|
| 33. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 173. |

| Limitation of '034 Patent Proposed Claim 33 | GB 2 309 774 (Takahashi) |
| --- | --- |
| wherein the automatic directional control system further includes memory. | E.g., page 16, lines 5 to 9 "Also, a non-volatile memory 15 (such as an electrically erasable EEPROM, or the like) for storing control programs and data values therein) [sic] and an oscillator 16 used to generate a clock signal are additionally attached to the microcomputer 10." See also Fig. 9, ref. 15.<br>FIG. 9<br> |

| Limitation of '034 Patent Proposed Claim 34 | GB 2 309 774 (Takahashi) |
|---|---|
| 34. The automatic directional control system defined in claim 33, | See claim 33 claim chart, above at page 185. |
| wherein the memory includes non-volatile memory. | E.g., page 16, lines 5 to 9 "Also, a non-volatile memory 15 (such as an electrically erasable EEPROM, or the like) for storing control programs and data values therein) [sic] and an oscillator 16 used to generate a clock signal are additionally attached to the microcomputer 10." See also Fig. 9, ref. 15.<br>FIG. 9<br> |

| Limitation of '034 Patent Proposed Claim 37 | GB 2 309 774 (Takahashi) |
| --- | --- |
| 37. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 173. |
| wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by sensing a front and a rear suspension height of the vehicle. | E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |

| Limitation of '034 Patent Proposed Claim 38 | GB 2 309 774 (Takahashi) |
| --- | --- |
| 38. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 173. |
| wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by a pitch level sensor. | E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |

| Limitation of '034 Patent Proposed Claim 41 | GB 2 309 774 (Takahashi) |
|---|---|
| 41. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 173. |
| wherein the automatic directional control system is configured such that the predetermined minimum threshold amount functions as a filter to minimize undesirable operation of the at least one actuator. | E.g., page 8, lines 26 to 32 "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2."<br><br>E.g., page 9, lines 16 to 34 "Also, in order to prevent the illumination direction of the lamp 6 from being corrected inadvertently when a sudden change in the posture of the vehicle occurs temporarily or due to the wrong operation of the lamp 6 caused by external disturbances, for example, when the vehicle makes a sudden start or a sudden stop, preferably, a threshold value with respect to time may be set in detection of the road gradient and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a threshold value with respect to the running distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a distance equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected." |

| Limitation of '034 Patent Proposed Claim 42 | GB 2 309 774 (Takahashi) |
|---|---|
| 42. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 173. |
| wherein said sensed conditions include three or more of road speed, steering angle, pitch, and suspension height of the vehicle. | E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping |

| Limitation of '034 Patent Proposed Claim 42 | GB 2 309 774 (Takahashi) |
|---|---|
| | or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle."<br><br>E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br><br>E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |

| Limitation of '034 Patent Proposed Claim 44 | GB 2 309 774 (Takahashi) |
|---|---|
| 44. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 173. |
| wherein said controller is configured to be responsive to said two or more | E.g., page 8, lines 26 to 32 "Therefore, when the amount of variations with |

| **Limitation of '034 Patent Proposed Claim 44** | **GB 2 309 774 (Takahashi)** |
| --- | --- |
| sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated continuously in response to relatively small variations in the sensed operating conditions. | time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2."<br><br>E.g., page 9, lines 16 to 34 "Also, in order to prevent the illumination direction of the lamp 6 from being corrected inadvertently when a sudden change in the posture of the vehicle occurs temporarily or due to the wrong operation of the lamp 6 caused by external disturbances, for example, when the vehicle makes a sudden start or a sudden stop, preferably, a threshold value with respect to time may be set in detection of the road gradient and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a threshold value with respect to the running distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a distance equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected." |

| **Limitation of '034 Patent Proposed Claim 45** | **GB 2 309 774 (Takahashi)** |
| --- | --- |
| 45. The automatic directional control system defined in claim l, | See claim 1 claim chart, above at page 173. |
| wherein controller is configured to be responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated unduly frequently in response to relatively small variations in the | E.g., page 8, lines 26 to 32 "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2." |

| Limitation of '034 Patent Proposed Claim 45 | GB 2 309 774 (Takahashi) |
|---|---|
| sensed operating conditions. | E.g., page 9, lines 16 to 34 "Also, in order to prevent the illumination direction of the lamp 6 from being corrected inadvertently when a sudden change in the posture of the vehicle occurs temporarily or due to the wrong operation of the lamp 6 caused by external disturbances, for example, when the vehicle makes a sudden start or a sudden stop, preferably, a threshold value with respect to time may be set in detection of the road gradient and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a threshold value with respect to the running distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a distance equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected." |

## 23. Proposed Claims 1, 2, 4 to 6, 9, 10, 37, 38, 41, 42, 44, and 45 Are Anticipated by Hussman Under 35 U.S.C. § 102(b)

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|
| 1. An automatic directional control system for a vehicle headlight, comprising: | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation." |
| two or more sensors that are each adapted to generate a signal that is representative of a condition of a vehicle, said sensed conditions including two or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles."<br><br>E.g., col. 3, lines 40 to 45, "The curve-recognition device K is electrically conductively coupled with a speed signal sensor, or sender, G and includes a speed threshold value device which itself affects the switchover such that the third filter F3 is only coupled to the regulator R if a minimum speed of the motor vehicle is exceeded." |

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|
| a controller that is responsive to said two or more sensor signals for generating at least one output signal | E.g., col. 3, lines 30 to 39, "The curve-recognition device K is electrically conductively coupled with the switchover device SE and thereby couples the third filter F3 electrically conductively with the regulator R if a difference signal other than zero is fed to it from the subtractor SU. When no difference signal from the subtractor SU is present, the curve-recognition device K switches the switchover device SE so that the first filter F1 is coupled to the regulator R."<br><br>E.g., col. 4, lines 6 to 12, "At the coupling between the switchover device SE and the regulator R, a matching device AE is, here for example, arranged which, upon a switchover by the switchover device SE, adjusts the various nominal values to one another so that discontinuities or jumps in the adjustment and regulation of the illumination range are avoided." |
| only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating conditions; and | E.g., col. 6, line 10 to 34, "In this connection, it is beneficial that upon the presence of a difference between the second, filtered, nominal-value signal to the third, filtered, nominal-value signal and upon termination of a difference is again switched from the third, filtered, nominal-value signal to the first, filtered, nominal-value signal because in this manner, in an uncomplicated and cost effective manner, upon the presence of an inclination change of the motor vehicle body which is not attributable to a change in loading or to road surface unevenness, the regulation of the illumination range of the motor vehicle, in dependence from the third, long, filter time constant results, whereby the third, filtered, nominal-value signal is independent, or substantially independent, from the disturbing, or distorting, short time inclination changes so that after inclination changes of the motor-vehicle body which, for example, are caused by driving about a curve, false adjustments of the illumination range are not caused which can lead to the blinding of oncoming traffic or to losses in illumination range, which eliminates a danger during operation of a motor vehicle." |
| said at least one actuator being adapted to be connected to the headlight to | E.g., col. 3, lines 16 to 18, "The regulator R regulates the position of |

| **Limitation of '034 Patent Proposed Claim 1** | **U.S. Patent No. 5,182,460 (Hussman)** |
| --- | --- |
| effect movement thereof in accordance with said at least one output signal. | adjusting elements, which are shown here in block form and which change the positions of headlights." |

| **Limitation of '034 Patent Proposed Claim 2** | **U.S. Patent No. 5,182,460 (Hussman)** |
| --- | --- |
| 2. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 193. |
| wherein at least one of said two or more sensors generates a signal that is representative of the road speed of the vehicle. | E.g., col. 3, lines 40 to 45, "The curve-recognition device K is electrically conductively coupled with a speed signal sensor, or sender, G and includes a speed threshold value device which itself affects the switchover such that the third filter F3 is only coupled to the regulator R if a minimum speed of the motor vehicle is exceeded." |

| **Limitation of '034 Patent Proposed Claim 4** | **U.S. Patent No. 5,182,460 (Hussman)** |
| --- | --- |
| 4. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 193. |
| wherein at least one of said two or more sensors generates a signal that is representative of the pitch of the vehicle. | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal- |

| Limitation of '034 Patent Proposed Claim 4 | U.S. Patent No. 5,182,460 (Hussman) |
| --- | --- |
| | value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles." |

| Limitation of '034 Patent Proposed Claim 5 | U.S. Patent No. 5,182,460 (Hussman) |
| --- | --- |
| 5. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 193. |
| wherein at least one of said two or more sensors generates a signal that is representative of the suspension height of the vehicle. | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles." |

| Limitation of '034 Patent Proposed Claim 6 | U.S. Patent No. 5,182,460 (Hussman) |
| --- | --- |
| 6. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 193. |

| Limitation of '034 Patent Proposed Claim 6 | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|
| wherein said two or more sensors include a first sensor and a second sensor. | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles."<br><br>E.g., col. 3, lines 40 to 45, "The curve-recognition device K is electrically conductively coupled with a speed signal sensor, or sender, G and includes a speed threshold value device which itself affects the switchover such that the third filter F3 is only coupled to the regulator R if a minimum speed of the motor vehicle is exceeded." |

| Limitation of '034 Patent Proposed Claim 9 | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|
| 9. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 196. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the suspension height of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle. | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a |

| Limitation of '034 Patent Proposed Claim 9 | U.S. Patent No. 5,182,460 (Hussman) |
| --- | --- |
| | difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles." |

| Limitation of '034 Patent Proposed Claim 10 | U.S. Patent No. 5,182,460 (Hussman) |
| --- | --- |
| 10. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 196. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the road speed of the vehicle. | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor |

| Limitation of '034 Patent Proposed Claim 10 | U.S. Patent No. 5,182,460 (Hussman) |
| --- | --- |
| | vehicle body to the front and rear axles."<br><br>E.g., col. 3, lines 40 to 45, "The curve-recognition device K is electrically conductively coupled with a speed signal sensor, or sender, G and includes a speed threshold value device which itself affects the switchover such that the third filter F3 is only coupled to the regulator R if a minimum speed of the motor vehicle is exceeded." |

| Limitation of '034 Patent Proposed Claim 37 | U.S. Patent No. 5,182,460 (Hussman) |
| --- | --- |
| 37. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 193. |
| wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by sensing a front and a rear suspension height of the vehicle. | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles." |

| Limitation of '034 Patent Proposed Claim 38 | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|
| 38. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 193. |
| wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by a pitch level sensor. | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles." |

| Limitation of '034 Patent Proposed Claim 41 | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|
| 41. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 193. |
| wherein the automatic directional control system is configured such that the predetermined minimum threshold amount functions as a filter to minimize undesirable operation of the at least one actuator. | E.g., col. 4, lines 6 to 12, "At the coupling between the switchover device SE and the regulator R, a matching device AE is, here for example, arranged which, upon a switchover by the switchover device SE, adjusts the various nominal values to one another so that discontinuities or jumps in the adjustment and regulation of the illumination range are avoided." |

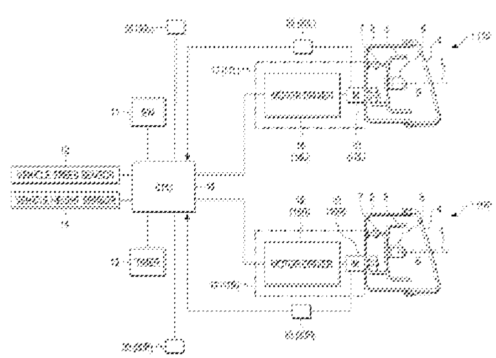
| **Limitation of '034 Patent Proposed Claim 42** | **U.S. Patent No. 5,182,460 (Hussman)** |
|---|---|
| 42. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 193. |
| wherein said sensed conditions include three or more of road speed, steering angle, pitch, and suspension height of the vehicle. | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles." |

| **Limitation of '034 Patent Proposed Claim 44** | **U.S. Patent No. 5,182,460 (Hussman)** |
|---|---|
| 44. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 193. |
| wherein said controller is configured to be responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated continuously in response to relatively small variations in the sensed operating conditions. | E.g., col. 4, lines 6 to 12, "At the coupling between the switchover device SE and the regulator R, a matching device AE is, here for example, arranged which, upon a switchover by the switchover device SE, adjusts the various nominal values to one another so that discontinuities or jumps in the adjustment and regulation of the illumination range are avoided." |

| Limitation of '034 Patent Proposed Claim 45 | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|
| 45. The automatic directional control system defined in claim l, | See claim 1 claim chart, above at page 193. |
| wherein controller is configured to be responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated unduly frequently in response to relatively small variations in the sensed operating conditions. | E.g., col. 4, lines 6 to 12, "At the coupling between the switchover device SE and the regulator R, a matching device AE is, here for example, arranged which, upon a switchover by the switchover device SE, adjusts the various nominal values to one another so that discontinuities or jumps in the adjustment and regulation of the illumination range are avoided." |

## 24. Proposed Claims 1, 2, 4 to 6, 9 to 13, 17, 18, 20, 21, 22, 24, 25, 28, 29, 36 to 42, 44, and 45 Are Unpatentable Over the Combination of Toda et al. and Uchida Under 35 U.S.C. § 103(a)

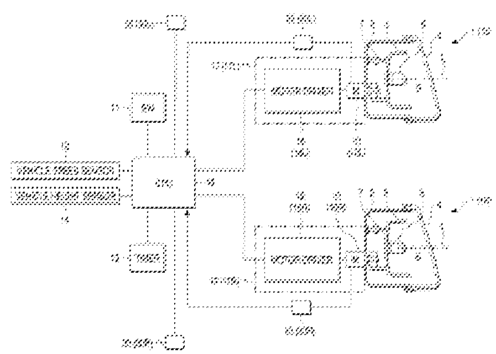
| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 1. An automatic directional control system for a vehicle headlight, comprising: | E.g., Abstract, "An automatic leveling device for automotive vehicle headlamps is described." | E.g., page 1, lines 3 to 7, "The present invention relates to a vehicle lamp illumination direction control device which detects the posture of a vehicle and correctly adjusts the illumination direction of a vehicle lamp so that the illumination direction can be always kept in a predetermined direction." |
| two or more sensors that are each adapted to generate a signal that is representative of a condition of a vehicle, said sensed conditions including two or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1: | E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2."<br><br>E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2." |

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | FIG. 1  | E.g., Page 9, lines 24 to 28 "Firstly, the method i) is a method which judges whether the vehicle is in the acceleration or deceleration running condition or not by detecting the running speed of the vehicle to calculate the change of the speed with time, that is, by calculating the acceleration of the vehicle."<br><br>E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the |

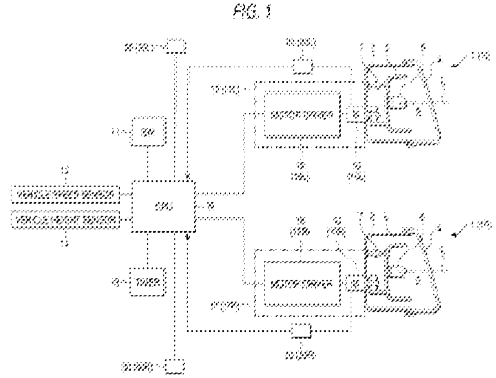
| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | | inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree."<br><br>E.g., page 15, line 30 to page 16, line 2 "As has been described above, according to the respective methods, it is possible to judge whether the vehicle is running in the acceleration condition or in the deceleration condition. Also, these methods can be applied in various manners, for example, the respective methods can be used individually, or some of them may be combined together for the enhanced accuracy of the judgment." |
| a controller that is responsive to said two or more sensor signals for generating at least one output signal | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, | E.g., page 4, lines 16 to 27 "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle." |

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | |
| only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating conditions; and | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, | E.g., page 4, lines 16 to 27 "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle." |

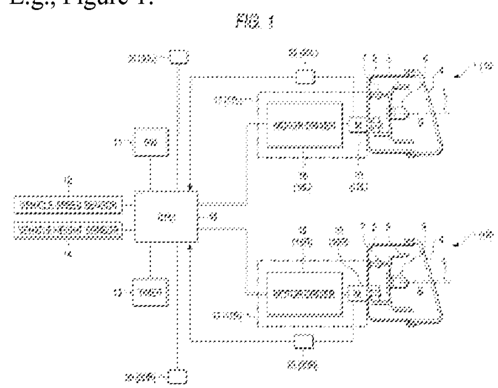
| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | |
| said at least one actuator being adapted to be connected to the headlight to effect movement thereof in accordance with said at least one output signal. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1: | E.g., page 16, line 28 to page 17, line 6 "Also, if it is judged by the acceleration or deceleration running condition judging device 3b that the vehicle is not in the acceleration or deceleration running condition, then the illumination angle of the lamp 5 can be controlled by one of the following methods when the drive control device 4a receives an instruction from the acceleration or deceleration running condition judging device 3b: 1) a method for fixing the illumination angle; 2) a method for limiting the range of the illumination angle or forbidding part of the range of the illumination angle; and, 3) a method for changing the response speed or control speed of an actuator." |

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | FIG. 1  | E.g., page 7, lines 4 to 9, "In particular, the correction calculating device 3a is structured in the following manner: that is, in accordance with a detect signal from the vehicle posture detection device 2, it transmits a control signal to the drive device 4 so that the illumination direction of the lamp 5 can be always kept in a given direction." See also 7:9-32.<br><br>E.g., page 8, lines 1 to 9, "When the judging device 3b judges that the vehicle is in an acceleration or deceleration running condition, in accordance with a control signal transmitted from the correction calculating device 3a to the drive control device 4a, the acceleration or deceleration running condition judging device 3b transmits to the drive control device 4a a signal which allows the illumination direction of the lamp 5 to be corrected in a predetermined direction." |

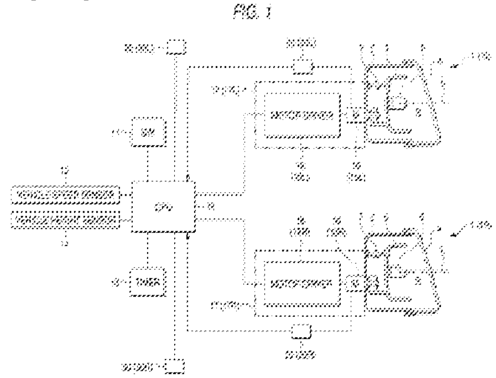
| Limitation of '034 Patent Proposed Claim 2 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 2. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 203. | See claim 1 claim chart, above at page 203. |
| wherein at least one of said two or more sensors generates a signal that is representative of the road speed of the vehicle. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator | E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a |

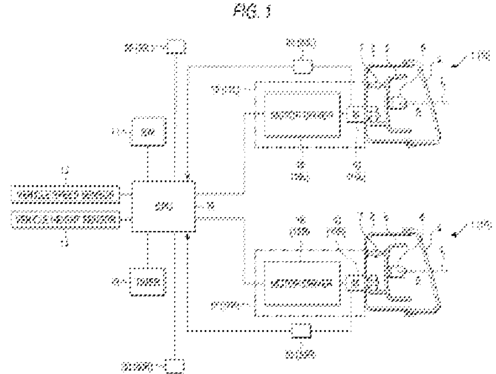
| Limitation of '034 Patent Proposed Claim 2 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> | method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2."<br><br>E.g., Page 9, lines 24 to 28 "Firstly, the method i) is a method which judges whether the vehicle is in the acceleration or deceleration running condition or not by detecting the running speed of the vehicle to calculate the change of the speed with time, that is, by calculating the acceleration of the vehicle." |

| Limitation of '034 Patent Proposed Claim 4 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 4. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 203. | See claim 1 claim chart, above at page 203. |
| wherein at least one of said two or more sensors generates a signal that is representative of the pitch of the vehicle. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition |

| Limitation of '034 Patent Proposed Claim 4 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br> | of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

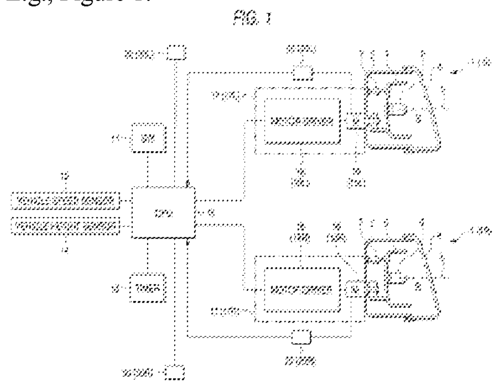
| Limitation of '034 Patent Proposed Claim 5 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 5. The automatic directional control system | See claim 1 claim chart, above at page 203. | See claim 1 claim chart, above at page 203. |

| Limitation of '034 Patent Proposed Claim 5 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| defined in claim 1, | | |
| wherein at least one of said two or more sensors generates a signal that is representative of the suspension height of the vehicle. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

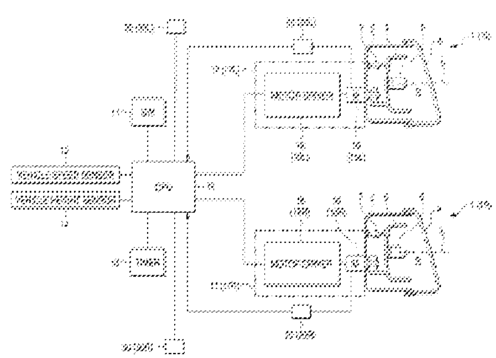
| Limitation of '034 Patent Proposed Claim 6 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 6. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 203. | See claim 1 claim chart, above at page 203. |
| wherein said two or more sensors include a first sensor and a second sensor. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> | E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2."<br><br>E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is |

| Limitation of '034 Patent Proposed Claim 6 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| | | possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Proposed Claim 9 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| 9. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 212. | See claim 6 claim chart, above at page 212. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the suspension height of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit." | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the |

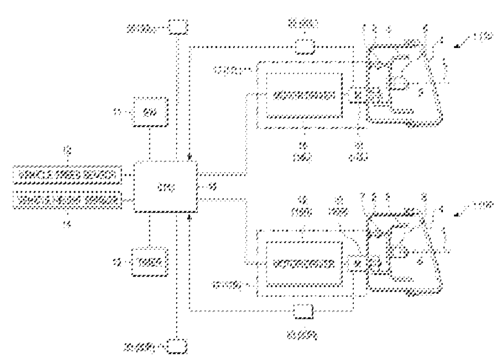
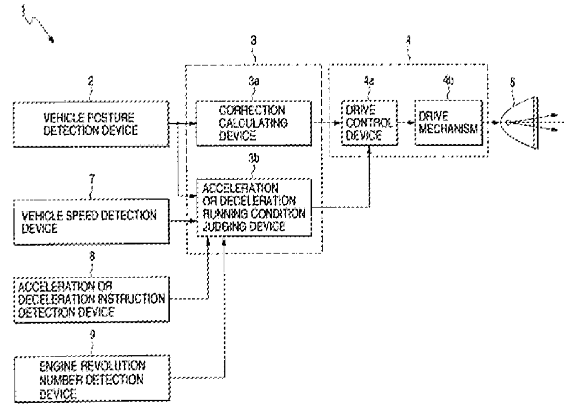
| Limitation of '034 Patent Proposed Claim 9 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | E.g., Figure 1:  | information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Proposed Claim 10 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 10. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 212. | See claim 6 claim chart, above at page 212. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the road speed of the vehicle. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the |

| Limitation of '034 Patent Proposed Claim 10 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> | vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree."<br><br>E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture |

| Limitation of '034 Patent Proposed Claim 10 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | | detection device 2."<br><br>E.g., Page 9, lines 24 to 28 "Firstly, the method i) is a method which judges whether the vehicle is in the acceleration or deceleration running condition or not by detecting the running speed of the vehicle to calculate the change of the speed with time, that is, by calculating the acceleration of the vehicle." |

| Limitation of '034 Patent Proposed Claim 11 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 11. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 212. | See claim 6 claim chart, above at page 212. |
| wherein said first sensor is physically separate from said second sensor. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1: | E.g., page 6, line 30 to page 7, line 3, "In order for the vehicle posture detection device and the acceleration or deceleration running condition judging device to transmit signals to one another, they must be separate: "The outputs of the vehicle posture detection device 2 are transmitted to the correction calculating device 3a and acceleration or deceleration running condition judging device 3b which cooperate together in forming the control device 3, and these outputs are used as control signals to be applied to the drive device 4 and are then used as instructions for correcting the illumination of lamp 5."<br><br>E.g., Fig. 1: |

| Limitation of '034 Patent Proposed Claim 11 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | FIG. 1  | FIG. 1  |

| Limitation of '034 Patent Proposed Claim 12 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 12. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 203. | See claim 1 claim chart, above at page 203. |
| wherein said sensed conditions further include one or more of a rate of change of road speed of the vehicle, a rate of change of steering angle of the vehicle, a rate of change of pitch of the vehicle, or a rate of change of suspension height of the vehicle. | E.g., col. 5, lines 31 to 38, "If YES (the vehicle speed exceeds 30 km/h), in step 124, it is determined whether or not the acceleration is lower than the reference value when the vehicle is at halt. In step 124, if YES (lower than 0.5 m/s2), then in step 126 it is determined whether or not a state continues for a predetermined time period (three seconds) or longer in which the vehicle speed exceeds 30 km/h and the acceleration is | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the |

| Limitation of '034 Patent Proposed Claim 12 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| | lower than 0.5 m/s2" | height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Proposed Claim 13 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| 13. The automatic directional control system defined in claim 12, | See claim 12 claim chart, above at page 217. | See claim 12 claim chart, above at page 217. |
| wherein at least one of said two or more sensors generate a signal that is representative of the rate of change of road speed of the vehicle. | E.g., col. 5, lines 31 to 38, "If YES (the vehicle speed exceeds 30 km/h), in step 124, it is determined whether or not the acceleration is lower than the reference value when the vehicle is | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is |

| Limitation of '034 Patent Proposed Claim 13 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| | at halt. In step 124, if YES (lower than 0.5 m/s2), then in step 126 it is determined whether or not a state continues for a predetermined time period (three seconds) or longer in which the vehicle speed exceeds 30 km/h and the acceleration is lower than 0.5 m/s2" | obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Proposed Claim 17 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| 17. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 203. | See claim 1 claim chart, above at page 203. |

| Limitation of '034 Patent Proposed Claim 17 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| wherein the automatic directional control system is configured to include at least two actuators. | E.g., col. 2, line 65 to col. 3, line 10, "In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and right headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 10R) which includes an actuator main body and a motor driver 18 (18L, 18R)." | |

| Limitation of '034 Patent Proposed Claim 18 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 18. The automatic directional control system defined in claim 17, | See claim 17 claim chart, above at page 219. | See claim 17 claim chart, above at page 219. |
| wherein the at least two actuators include a first actuator that is adapted to be connected to the headlight to effect movement thereof in a vertical direction. | E.g., col. 2, line 65 to col. 3, line 10, "In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and right headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb | E.g., page 7, lines 4 to 9 "In particular, the correction calculating device 3a is structured in the following manner: that is, in accordance with a detect signal from the vehicle posture detection device 2, it transmits a control signal to the drive device 4 so that the illumination direction of the lamp 5 can be always kept in a given direction." |

| Limitation of '034 Patent Proposed Claim 18 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| | 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 10R) which includes an actuator main body and a motor driver 18 (18L, 18R)." | E.g., page 8, lines 1 to 9 "When the judging device 3b judges that the vehicle is in an acceleration or deceleration running condition, in accordance with a control signal transmitted from the correction calculating device 3a to the drive control device 4a, the acceleration or deceleration running condition judging device 3b transmits to the drive control device 4a a signal which allows the illumination direction of the lamp 5 to be corrected in a predetermined direction."<br><br>E.g., page 3, lines 19 to 22 "There is provided a vehicle lamp illumination direction control device for changing the direction of the illumination light of a lamp according to the vertical inclination of a vehicle in the advancing direction thereof." |

| Limitation of '034 Patent Proposed Claim 20 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| 20. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 203. | See claim 1 claim chart, above at page 203. |
| wherein the at least one actuator includes an electronically controlled mechanical actuator. | E.g., col. 2, line 65 to col. 3, line 10, "In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and right headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb | E.g., page 19, lines 6 to 22 "For example, when the actuator incorporates therein a DC (direct current) motor, a difference between the control target position (or angle) of the actuator and the current position (or angle) thereof is detected, and a pulse signal having a duty cycle corresponding to the detected position difference is supplied to |

| Limitation of '034 Patent Proposed Claim 20 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 10R) which includes an actuator main body and a motor driver 18 (18L, 18R)."<br>E.g., col. 3, lines 18 to 24, "The CPU 16 calculates vehicle speed depending on data from sensors 12 and calculates vehicle height depending on data from sensors 14, judges whether the headlamps are switched on or off, and output to motor drivers 18 (18L, 18R) a control signal for driving the motors 10 (10L, 10R) a magnitude corresponding to operating pitch angle data. A timer 13 is also connected to the CPU 16." | the DC motor to thereby control the position of the actuator, as shown in Fig. 11, if the characteristic of the duty cycle DT with respect to the position difference δxx is changed from the state of a relatively faster response speed shown by a broken line 10 to the state of a slow response speed shown by a solid line 11, with respect to the same position difference δxx=δxxa, the duty cycle DT in the other running conditions of the vehicle than the acceleration or deceleration running condition thereof is smaller than the duty cycle in the acceleration or deceleration running condition of the vehicle, so that the drive control on the lamp 5 by the actuator is slowed down." |

| Limitation of '034 Patent Proposed Claim 21 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 21. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 203. | See claim 1 claim chart, above at page 203. |
| wherein the at least one actuator includes a step motor. | E.g., col. 2, line 65 to col. 3, line 10, "In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and right headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp | |

| Limitation of '034 Patent Proposed Claim 21 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 10R) which includes an actuator main body and a motor driver 18 (18L, 18R)." | |

| Limitation of '034 Patent Proposed Claim 22 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 22. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 203. | See claim 1 claim chart, above at page 203. |
| wherein the at least one actuator includes a servo motor. | E.g., col. 2, line 65 to col. 3, line 10, "In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and right headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt | E.g., page 19, lines 6 to 22 "For example, when the actuator incorporates therein a DC (direct current) motor, a difference between the control target position (or angle) of the actuator and the current position (or angle) thereof is detected, and a pulse signal having a duty cycle corresponding to the detected position difference is supplied to the DC motor to thereby control the position of the actuator, as shown in Fig. 11, if the characteristic of the duty cycle DT with respect to the position difference δxx is changed from the state of a relatively faster response speed shown by a broken |

| Limitation of '034 Patent Proposed Claim 22 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 10R) which includes an actuator main body and a motor driver 18 (18L, 18R)."<br><br>E.g., col. 3, lines 18 to 24, "The CPU 16 calculates vehicle speed depending on data from sensors 12 and calculates vehicle height depending on data from sensors 14, judges whether the headlamps are switched on or off, and output to motor drivers 18 (18L, 18R) a control signal for driving the motors 10 (10L, 10R) a magnitude corresponding to operating pitch angle data. A timer 13 is also connected to the CPU 16." | line 10 to the state of a slow response speed shown by a solid line 11, with respect to the same position difference δxx=δxxa, the duty cycle DT in the other running conditions of the vehicle than the acceleration or deceleration running condition thereof is smaller than the duty cycle in the acceleration or deceleration running condition of the vehicle, so that the drive control on the lamp 5 by the actuator is slowed down." |

| Limitation of '034 Patent Proposed Claim 24 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 24. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 203. | See claim 1 claim chart, above at page 203. |
| wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted relative to the vehicle. | E.g., col. 2, line 65 to col. 3, line 10, "In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and right headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a | E.g., page 16, lines 6 to 15 "The simplest method for changing the illumination pattern of the lamp 5 in a vertical plane is a method which changes the illumination angle of the lamp 5 with respect to a horizontal plane by rotating the entire lamp 5 about the rotary shaft thereof. For example, the right and left side surfaces of the lamp 5 are supported in a freely rotatable manner and the rotary shaft of the lamp 5 is rotated directly by a |

| Limitation of '034 Patent Proposed Claim 24 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 10R) which includes an actuator main body and a motor driver 18 (18L, 18R)." | drive source such as a motor or the like, or, there is available a drive mechanism in which a member fixed to the lamp 5 or formed integrally with the lamp 5 is rotated by the drive device 4." |

| Limitation of '034 Patent Proposed Claim 25 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 25. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 203. | See claim 1 claim chart, above at page 203. |
| wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted up and down relative to a horizontal reference position. | E.g., col. 2, line 65 to col. 3, line 10, "In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and right headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 10R) which includes an actuator main body and a motor driver 18 (18L, | E.g., page 16, lines 6 to 15 "The simplest method for changing the illumination pattern of the lamp 5 in a vertical plane is a method which changes the illumination angle of the lamp 5 with respect to a horizontal plane by rotating the entire lamp 5 about the rotary shaft thereof. For example, the right and left side surfaces of the lamp 5 are supported in a freely rotatable manner and the rotary shaft of the lamp 5 is rotated directly by a drive source such as a motor or the like, or, there is available a drive mechanism in which a member fixed to the lamp 5 or formed integrally with the lamp 5 is rotated by the drive device 4." |

| Limitation of '034 Patent Proposed Claim 25 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | 18R)." | |

| Limitation of '034 Patent Proposed Claim 28 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 28. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 203. | See claim 1 claim chart, above at page 203. |
| wherein the automatic directional control system is configured such that the controller includes a microprocessor. | E.g., col. 3, lines 18 to 24, "The CPU 16 calculates vehicle speed depending on data from sensors 12 and calculates vehicle height depending on data from sensors 14, judges whether the headlamps are switched on or off, and output to motor drivers 18 (18L, 18R) a control signal for driving the motors 10 (10L, 10R) a magnitude corresponding to operating pitch angle data. A timer 13 is also connected to the CPU 16." | |

| Limitation of '034 Patent Proposed Claim 29 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 29. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 203. | See claim 1 claim chart, above at page 203. |
| wherein the automatic directional control system is configured such that the controller includes a programmable electronic controller. | E.g., col. 3, lines 18 to 24, "The CPU 16 calculates vehicle speed depending on data from sensors 12 and calculates vehicle height depending on data from sensors 14, judges whether the headlamps are switched on or off, and output to motor drivers 18 (18L, 18R) a control signal for driving the motors | |

| Limitation of '034 Patent Proposed Claim 29 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| | 10 (10L, 10R) a magnitude corresponding to operating pitch angle data. A timer 13 is also connected to the CPU 16." | |

| Limitation of '034 Patent Proposed Claim 36 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| 36. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 203. | See claim 1 claim chart, above at page 203. |
| wherein the automatic directional control system is configured to position the headlight at or near a calibration position when an electrical system of the vehicle is turned on. | E.g., col. 3, lines 62 to 65, "When the vehicle is stationary, since the proper pitch angle of the vehicle can be detected in principle, the driving of the motors 10 (10L, 10R) is first controlled based on the vehicle pitch angle obtained when the vehicle is at halt." | |

| Limitation of '034 Patent Proposed Claim 37 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| 37. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 203. | See claim 1 claim chart, above at page 203. |
| wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by sensing a front and a rear suspension height of the vehicle. | E.g., col. 3, lines 48 to 53, "When a two-sensor system is used in which vehicle height sensors are provided on both the front and rear wheels, the vehicle pitch angle is obtained from displacement distances of the vehicle height at the front and rear of the vehicle and a wheel base of the vehicle, or a distance between front and rear axles of the | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the |

| Limitation of '034 Patent Proposed Claim 37 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | vehicle." | vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Proposed Claim 38 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 38. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 203. | See claim 1 claim chart, above at page 203. |
| wherein the automatic directional control system is configured such that the pitch of the vehicle is | E.g., col. 3, lines 48 to 53, "When a two-sensor system is used in which vehicle height sensors are | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge |

| Limitation of '034 Patent Proposed Claim 38 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| capable of being determined by a pitch level sensor. | provided on both the front and rear wheels, the vehicle pitch angle is obtained from displacement distances of the vehicle height at the front and rear of the vehicle and a wheel base of the vehicle, or a distance between front and rear axles of the vehicle." | the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Proposed Claim 39 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 39. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 203. | See claim 1 claim chart, above at page 203. |
| wherein the automatic directional control system is configured such that the controller is programmed to be responsive to changes in the suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle. | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 | |

| Limitation of '034 Patent Proposed Claim 39 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | |

| Limitation of '034 Patent Proposed Claim 40 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 40. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 203. | See claim 1 claim chart, above at page 203. |
| wherein the automatic directional control system is configured such that the controller is programmed to be responsive to changes in the suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle, thereby ignoring frequency changes in the suspension height of the vehicle that are a result of bumps in a road. | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the | |

| Limitation of '034 Patent Proposed Claim 40 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | |

| Limitation of '034 Patent Proposed Claim 41 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 41. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 203. | See claim 1 claim chart, above at page 203. |
| wherein the automatic directional control system is configured such that the predetermined minimum threshold amount functions as a filter to minimize undesirable operation of the at least one actuator. | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, | E.g., page 4, lines 16 to 27, "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle." |

| Limitation of '034 Patent Proposed Claim 41 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | |

| Limitation of '034 Patent Proposed Claim 42 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 42. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 203. | See claim 1 claim chart, above at page 203. |
| wherein said sensed conditions include three or more of road speed, steering angle, pitch, and suspension height of the vehicle. | | E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; |

| Limitation of '034 Patent Proposed Claim 42 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | | and iv) a method using the vehicle posture detection device 2."<br><br>E.g., Page 9, lines 24 to 28 "Firstly, the method i) is a method which judges whether the vehicle is in the acceleration or deceleration running condition or not by detecting the running speed of the vehicle to calculate the change of the speed with time, that is, by calculating the acceleration of the vehicle."<br><br>E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for |

| Limitation of '034 Patent Proposed Claim 42 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | | example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree."<br><br>E.g., page 15, line 30 to page 16, line 2 "As has been described above, according to the respective methods, it is possible to judge whether the vehicle is running in the acceleration condition or in the deceleration condition. Also, these methods can be applied in various manners, for example, the respective methods can be used individually, or some of them may be combined together for the enhanced accuracy of the judgment." |

| Limitation of '034 Patent Proposed Claim 44 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 44. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 203. | See claim 1 claim chart, above at page 203. |
| wherein said controller is configured to be responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a | E.g., page 4, lines 16 to 27 "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a |

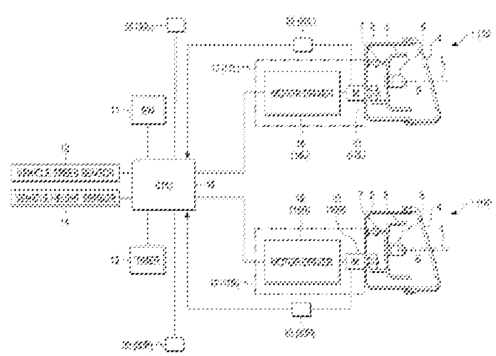
| Limitation of '034 Patent Proposed Claim 44 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| from being operated continuously in response to relatively small variations in the sensed operating conditions. | reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | given direction, or by limiting the direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle." |

| Limitation of '034 Patent Proposed Claim 45 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| 45. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 203. | See claim 1 claim chart, above at page 203. |

| Limitation of '034 Patent Proposed Claim 45 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| wherein controller is configured to be responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated unduly frequently in response to relatively small variations in the sensed operating conditions. | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | E.g., page 4, lines 16 to 27 "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle." |

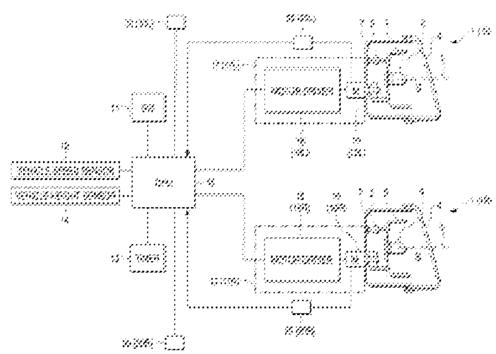
## 25. Proposed Claims 1, 2, 4 to 6, 9 to 13, 17, 18, 20, 21, 22, 24, 25, 28, 29, 33, 34, 36 to 42, 44, and 45 Are Unpatentable Over the Combination of Toda et al. and Takahashi Under 35 U.S.C. §103(a)

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 1. An automatic directional control system for a vehicle headlight, comprising: | E.g., Abstract, "An automatic leveling device for automotive vehicle headlamps is described." | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp." |
| two or more sensors that are each adapted to generate a signal that is representative of a condition of a vehicle, said sensed conditions including two or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1: | E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle."<br>E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the |

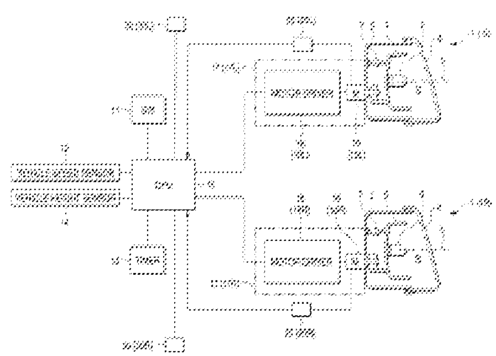
| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | FIG. 1  | information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br><br>E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |
| a controller that is responsive to said two or more sensor signals for generating at least one output signal | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For | E.g., page 9, lines 16 to 34 "Also, in order to prevent the illumination direction of the lamp 6 from being corrected inadvertently when a sudden change in the posture of the vehicle occurs temporarily or due to the wrong operation of the lamp 6 caused by external disturbances, for example, when the vehicle makes a sudden start or a sudden stop, preferably, a threshold value with respect to time may be set in detection of the road gradient and, only when the amount of variations in the detect signal of the vehicle posture detection |

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a threshold value with respect to the running distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a distance equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected." |
| only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating conditions; and | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For | E.g., page 8, lines 26 to 32 "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2."<br><br>E.g., page 9, lines 16 to 34 "Also, in order to prevent the illumination direction of the lamp 6 |

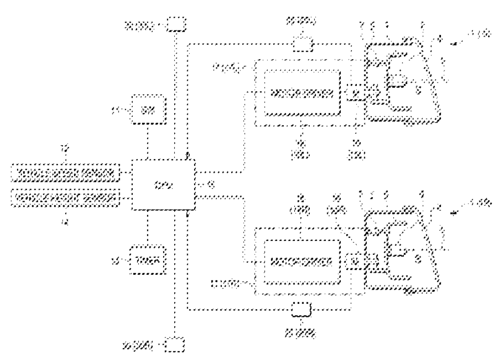
| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | from being corrected inadvertently when a sudden change in the posture of the vehicle occurs temporarily or due to the wrong operation of the lamp 6 caused by external disturbances, for example, when the vehicle makes a sudden start or a sudden stop, preferably, a threshold value with respect to time may be set in detection of the road gradient and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a threshold value with respect to the running distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a distance equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected." |
| said at least one actuator being adapted to be connected to the headlight to effect movement thereof in accordance with said at least one output signal. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control | E.g., page 2, lines 14 to 17 "However, in the above-mentioned automatic adjustment device, since the lamp is driven with high frequency, an actuator used in a drive mechanism for driving the lamp is required to show high response property and high durability."<br><br>E.g., page 6, lines 26 to 32 "When the control device 4 receives the detect signal of the vehicle running condition detection device 3 and finds |

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> | from this detect signal that the vehicle is standing still, the control device 4, in accordance with information on the vehicle posture obtained from the vehicle posture detection device 2, transmits to the drive signal 5 a control signal for correction of the illumination direction of the lamp 6."<br><br>E.g., page 7, lines 12 to 17 "In view of this, the control device 4 is structured such that, based on the information from the vehicle posture detection device 2, it can detect the amount of variations in the gradient of the road and, therefore, when the road gradient varies suddenly, it can correct the illumination direction of the lamp 6."<br><br>E.g., page 11, lines 12 to 16, "The correction of the illumination direction of the lamp 6 in Step S5 is carried out by the drive device 5 based on the control signal transmitted from the control device 4 and, as a method for executing such correction, there are available two methods as follows: 1) a method for inclining the entire lamp, and, 2) a method for moving the component (such as a lens, a reflector, a shade or the like) of the optical system of the lamp." |

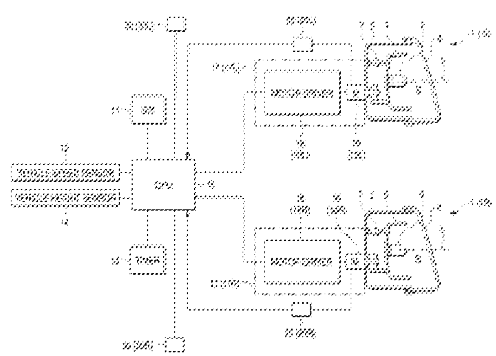
| Limitation of '034 Patent Proposed Claim 2 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 2. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 238. | See claim 1 claim chart, above at page 238. |

| Limitation of '034 Patent Proposed Claim 2 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| wherein at least one of said two or more sensors generates a signal that is representative of the road speed of the vehicle. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> | E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle." |

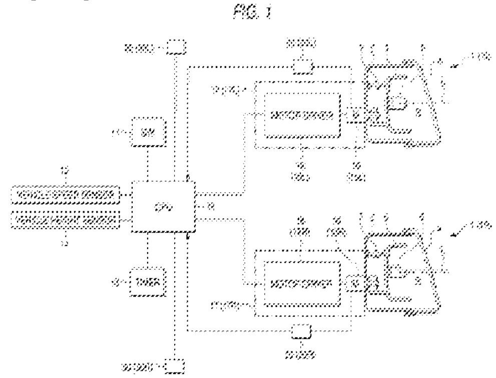
| Limitation of '034 Patent Proposed Claim 4 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 4. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 238. | See claim 1 claim chart, above at page 238. |

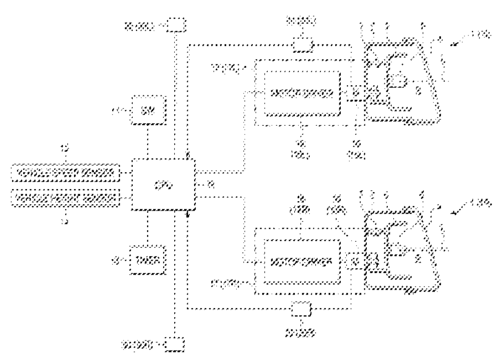
| Limitation of '034 Patent Proposed Claim 4 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| wherein at least one of said two or more sensors generates a signal that is representative of the pitch of the vehicle. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp." |

| Limitation of '034 Patent Proposed Claim 5 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 5. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 238. | See claim 1 claim chart, above at page 238. |

| Limitation of '034 Patent Proposed Claim 5 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| wherein at least one of said two or more sensors generates a signal that is representative of the suspension height of the vehicle. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br><br>E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |

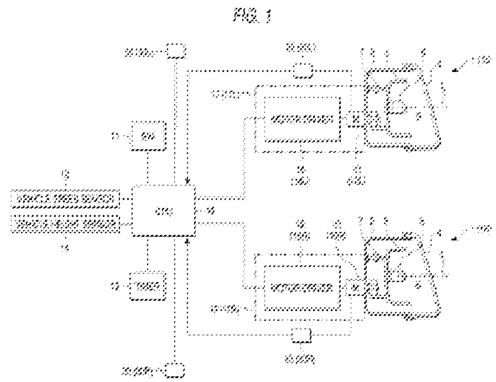
| Limitation of '034 Patent Proposed Claim 6 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 6. The automatic directional control system | See claim 1 claim chart, above at page 238. | See claim 1 claim chart, above at page 238. |

| Limitation of '034 Patent Proposed Claim 6 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| defined in claim 1, | | |
| wherein said two or more sensors include a first sensor and a second sensor. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> | E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle."<br><br>E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle." |

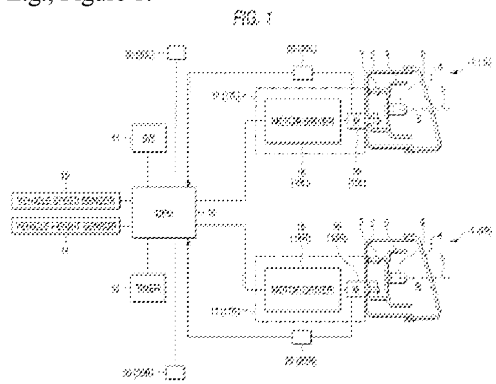
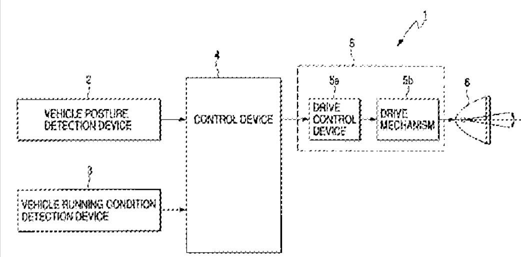
| Limitation of '034 Patent Proposed Claim 9 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 9. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 245. | See claim 6 claim chart, above at page 245. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the suspension height of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br><br>E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |

| Limitation of '034 Patent Proposed Claim 9 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp." |

| Limitation of '034 Patent Proposed Claim 10 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 10. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 245. | See claim 6 claim chart, above at page 245. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the road speed of the vehicle. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1: | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br><br>E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition |

| Limitation of '034 Patent Proposed Claim 10 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| |  | detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle." |

| Limitation of '034 Patent Proposed Claim 11 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 11. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 245. | See claim 6 claim chart, above at page 245. |
| wherein said first sensor is physically separate from said second sensor. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit." | See, e.g., Fig. 1, ref. 2, 3 (Separate detection devices). See also 5:25-27 ("an illumination direction control device 1 is composed of vehicle posture detection device 2, vehicle running condition detection device 3, control device 4, drive device 5 . . ., and lamp 6.") |

| Limitation of '034 Patent Proposed Claim 11 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | E.g., Figure 1:  | FIG. 1  |

| Limitation of '034 Patent Proposed Claim 12 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 12. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 238. | See claim 1 claim chart, above at page 238. |
| wherein said sensed conditions further include one or more of a rate of change of road speed of the vehicle, a rate of change of steering angle of the vehicle, a rate of change of pitch of the vehicle, or a rate of change of suspension height of the vehicle. | E.g., col. 5, lines 31 to 38, "If YES (the vehicle speed exceeds 30 km/h), in step 124, it is determined whether or not the acceleration is lower than the reference value when the vehicle is at halt. In step 124, if YES (lower than 0.5 m/s2), then in step 126 it is determined whether or not a state continues for a predetermined time period (three seconds) or longer in which the vehicle speed exceeds 30 km/h and the acceleration is lower than 0.5 m/s2" | E.g., page 7, lines 29 to 34, to page 8, line 21 "In particular, Fig. 3 shows schematically the amount of variations in the output level V when the vehicle runs first along an uphill slope and thereafter runs along a road having a small gradient. In this case, when the vehicle runs over the uphill slope the output level V falls down suddenly."<br><br>E.g., page 8, lines 19 to 25, "These figures show clearly that the magnitude of the amount of |

| Limitation of '034 Patent Proposed Claim 12 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | variations in the road gradients is reflected on the amount of variations in the outputs of the height sensor when the vehicle runs from the road having a small gradient to the road having a large gradient or when the vehicle runs from the road having a large gradient to the road having a small gradient." |

| Limitation of '034 Patent Proposed Claim 13 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 13. The automatic directional control system defined in claim 12, | See claim 12 claim chart, above at page 250. | See claim 12 claim chart, above at page 250. |
| wherein at least one of said two or more sensors generate a signal that is representative of the rate of change of road speed of the vehicle. | E.g., col. 5, lines 31 to 38, "If YES (the vehicle speed exceeds 30 km/h), in step 124, it is determined whether or not the acceleration is lower than the reference value when the vehicle is at halt. In step 124, if YES (lower than 0.5 m/s2), then in step 126 it is determined whether or not a state continues for a predetermined time period (three seconds) or longer in which the vehicle speed exceeds 30 km/h and the acceleration is lower than 0.5 m/s2" | |

| Limitation of '034 Patent Proposed Claim 17 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 17. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 238. | See claim 1 claim chart, above at page 238. |

| Limitation of '034 Patent Proposed Claim 17 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| wherein the automatic directional control system is configured to include at least two actuators. | E.g., col. 2, line 65 to col. 3, line 10, "In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and right headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 10R) which includes an actuator main body and a motor driver 18 (18L, 18R)." | E.g., page 16, line 31 to page 17, line 1 "A rudder resistance network 18, which corresponds to the above-mentioned drive control device 5a, is used to convert the output signal of the microcomputer 10 into an analog signal and transmits it to actuators 19 and 19' which are disposed downstream thereof." |

| Limitation of '034 Patent Proposed Claim 18 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 18. The automatic directional control system defined in claim 17, | See claim 17 claim chart, above at page 251. | See claim 17 claim chart, above at page 251. |
| wherein the at least two actuators include a first actuator that is adapted to be connected to the headlight to effect movement thereof in a vertical direction. | E.g., col. 2, line 65 to col. 3, line 10, "In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and right headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb | E.g., page 11, lines 21 to 32 "In particular, the method 1) is the simplest method that can change the illumination pattern of the lamp 6 within a vertical plane, in which the entire lamp is rotated about the rotary shaft thereof to thereby change the illumination angle of the lamp 6 with respect to a horizontal plane including the optical axis of the |

| Limitation of '034 Patent Proposed Claim 18 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 10R) which includes an actuator main body and a motor driver 18 (18L, 18R)." | lamp. For example, in the method 1), there can be used a drive mechanism in which the right and left side surfaces of the lamp 6 are supported rotatably, and the rotary shaft of the lamp 6 is rotated directly by a drive source such as a motor or the like, or a member fixed to or formed integrally with the lamp 6 is rotated by the drive device 5." |

| Limitation of '034 Patent Proposed Claim 20 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 20. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 238. | See claim 1 claim chart, above at page 238. |
| wherein the at least one actuator includes an electronically controlled mechanical actuator. | E.g., col. 2, line 65 to col. 3, line 10, "In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and right headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a | E.g., page 16, line 31 to page 17, line 1 "A rudder resistance network 18, which corresponds to the above-mentioned drive control device 5a, is used to convert the output signal of the microcomputer 10 into an analog signal and transmits it to actuators 19 and 19' which are disposed downstream thereof."<br><br>E.g., page 11, line 32 to page 12, line 3 "As an example of such lamp, there is available a lamp including a mechanism which can use the rotational force of the motor as the rotational force of the lam through a transmission mechanism using a worm and worm wheel (for example, see |

| Limitation of '034 Patent Proposed Claim 20 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | stepping motor 10 (10L, 10R) which includes an actuator main body and a motor driver 18 (18L, 18R)."<br><br>E.g., col. 3, lines 18 to 24, "The CPU 16 calculates vehicle speed depending on data from sensors 12 and calculates vehicle height depending on data from sensors 14, judges whether the headlamps are switched on or off, and output to motor drivers 18 (18L, 18R) a control signal for driving the motors 10 (10L, 10R) a magnitude corresponding to operating pitch angle data. A timer 13 is also connected to the CPU 16." | Japanese Patent Publication No. Hei. 63-166672)." |

| Limitation of '034 Patent Proposed Claim 21 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 21. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 238. | See claim 1 claim chart, above at page 238. |
| wherein the at least one actuator includes a step motor. | E.g., col. 2, line 65 to col. 3, line 10, "In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and right headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic | E.g., page 18, lines 5 to 8 "Besides this, according to the invention, the lamp or the component thereof can be driven or controlled by use of a stepping motor to thereby correct the illumination direction of the lamp." |

| Limitation of '034 Patent Proposed Claim 21 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 10R) which includes an actuator main body and a motor driver 18 (18L, 18R)." | |

| Limitation of '034 Patent Proposed Claim 22 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 22. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 238. | See claim 1 claim chart, above at page 238. |
| wherein the at least one actuator includes a servo motor. | E.g., col. 2, line 65 to col. 3, line 10, "In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and right headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 10R) which includes an actuator main body and a motor driver 18 (18L, 18R)." | E.g., page 16, line 31 to page 17, line 1 "A rudder resistance network 18, which corresponds to the above-mentioned drive control device 5a, is used to convert the output signal of the microcomputer 10 into an analog signal and transmits it to actuators 19 and 19' which are disposed downstream thereof."<br><br>E.g., page 11, line 32 to page 12, line 3 "As an example of such lamp, there is available a lamp including a mechanism which can use the rotational force of the motor as the rotational force of the lam through a transmission mechanism using a worm and worm wheel (for example, see Japanese Patent Publication No. Hei. 63-166672)." |

| Limitation of '034 Patent Proposed Claim 22 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | E.g., col. 3, lines 18 to 24, "The CPU 16 calculates vehicle speed depending on data from sensors 12 and calculates vehicle height depending on data from sensors 14, judges whether the headlamps are switched on or off, and output to motor drivers 18 (18L, 18R) a control signal for driving the motors 10 (10L, 10R) a magnitude corresponding to operating pitch angle data. A timer 13 is also connected to the CPU 16." | |

| Limitation of '034 Patent Proposed Claim 24 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 24. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 238. | See claim 1 claim chart, above at page 238. |
| wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted relative to the vehicle. | E.g., col. 2, line 65 to col. 3, line 10, "In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and right headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 10R) which includes an | E.g., page 11, lines 21 to 32 "In particular, the method 1) is the simplest method that can change the illumination pattern of the lamp 6 within a vertical plane, in which the entire lamp is rotated about the rotary shaft thereof to thereby change the illumination angle of the lamp 6 with respect to a horizontal plane including the optical axis of the lamp. For example, in the method 1), there can be used a drive mechanism in which the right and left side surfaces of the lamp 6 are supported rotatably, and the rotary shaft of the lamp 6 is rotated directly by a drive source such as a motor or the like, or a member fixed to or formed integrally with the lamp 6 is rotated by the drive device 5." |



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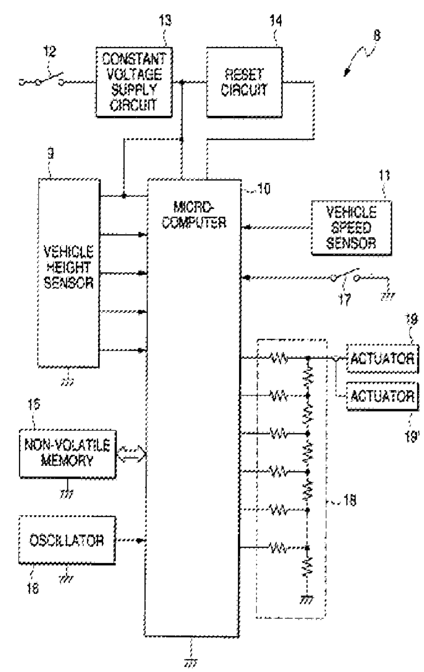
| Limitation of '034 Patent Proposed Claim 24 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | actuator main body and a motor driver 18 (18L, 18R)." | |

| Limitation of '034 Patent Proposed Claim 25 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 25. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 238. | See claim 1 claim chart, above at page 238. |
| wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted up and down relative to a horizontal reference position. | E.g., col. 2, line 65 to col. 3, line 10, "In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and right headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 10R) which includes an actuator main body and a motor driver 18 (18L, 18R)." | E.g., page 11, lines 21 to 32 "In particular, the method 1) is the simplest method that can change the illumination pattern of the lamp 6 within a vertical plane, in which the entire lamp is rotated about the rotary shaft thereof to thereby change the illumination angle of the lamp 6 with respect to a horizontal plane including the optical axis of the lamp. For example, in the method 1), there can be used a drive mechanism in which the right and left side surfaces of the lamp 6 are supported rotatably, and the rotary shaft of the lamp 6 is rotated directly by a drive source such as a motor or the like, or a member fixed to or formed integrally with the lamp 6 is rotated by the drive device 5." |

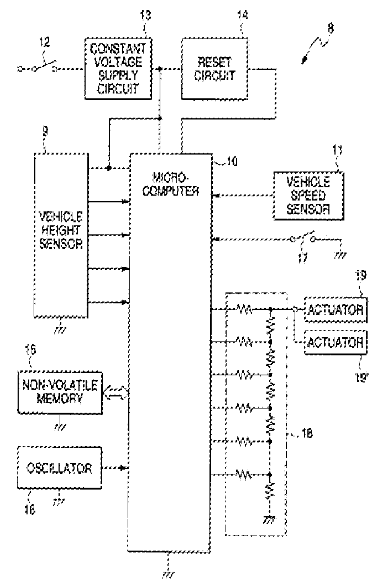
| Limitation of '034 Patent Proposed Claim 28 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 28. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 238. | See claim 1 claim chart, above at page 238. |
| wherein the automatic directional control system is configured such that the controller includes a microprocessor. | E.g., col. 3, lines 18 to 24, "The CPU 16 calculates vehicle speed depending on data from sensors 12 and calculates vehicle height depending on data from sensors 14, judges whether the headlamps are switched on or off, and output to motor drivers 18 (18L, 18R) a control signal for driving the motors 10 (10L, 10R) a magnitude corresponding to operating pitch angle data. A timer 13 is also connected to the CPU 16." | E.g., page 16, lines 1 to 4 "When a turn-on switch 12 for the lamp 6 is put into operation, a supply voltage from a constant voltage supply circuit 13 and a reset signal from a reset circuit 14 are supplied to the microcomputer 10." See also Fig. 9, ref. 10. |

| Limitation of '034 Patent Proposed Claim 28 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | FIG. 9   |

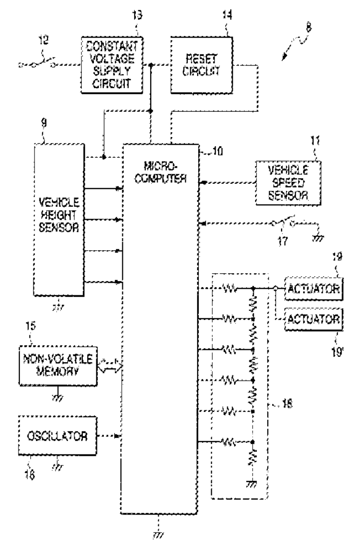
| Limitation of '034 Patent Proposed Claim 29 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 29. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 238. | See claim 1 claim chart, above at page 238. |
| wherein the automatic directional control system is | E.g., col. 3, lines 18 to 24, "The CPU 16 calculates | |

| Limitation of '034 Patent Proposed Claim 29 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| configured such that the controller includes a programmable electronic controller. | vehicle speed depending on data from sensors 12 and calculates vehicle height depending on data from sensors 14, judges whether the headlamps are switched on or off, and output to motor drivers 18 (18L, 18R) a control signal for driving the motors 10 (10L, 10R) a magnitude corresponding to operating pitch angle data. A timer 13 is also connected to the CPU 16." | |

| Limitation of '034 Patent Proposed Claim 33 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 33. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 238. | See claim 1 claim chart, above at page 238. |
| wherein the automatic directional control system further includes memory. | | E.g., page 16, lines 5 to 9 "Also, a non-volatile memory 15 (such as an electrically erasable EEPROM, or the like) for storing control programs and data values therein) [sic] and an oscillator 16 used to generate a clock signal are additionally attached to the microcomputer 10." See also Fig. 9, ref. 15. |

| Limitation of '034 Patent Proposed Claim 33 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | FIG. 9   |

| Limitation of '034 Patent Proposed Claim 34 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 34. The automatic directional control system defined in claim 33, | See claim 33 claim chart, above at page 260. | See claim 33 claim chart, above at page 260. |
| wherein the memory includes non-volatile memory. | | E.g., page 16, lines 5 to 9 "Also, a non-volatile memory 15 (such as an electrically erasable EEPROM, or the like) for storing control programs and data values therein) [sic] and an oscillator 16 used to generate a clock signal are |

| Limitation of '034 Patent Proposed Claim 34 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | additionally attached to the microcomputer 10." See also Fig. 9, ref. 15. FIG. 9   |

| Limitation of '034 Patent Proposed Claim 36 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 36. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 238. | See claim 1 claim chart, above at page 238. |
| wherein the automatic directional control system is configured to position the headlight at or near a calibration position when an electrical system of the vehicle is turned on. | E.g., col. 3, lines 62 to 65, "When the vehicle is stationary, since the proper pitch angle of the vehicle can be detected in principle, the driving of the motors 10 (10L, 10R) is first controlled based | |

| Limitation of '034 Patent Proposed Claim 36 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | on the vehicle pitch angle obtained when the vehicle is at halt." | |

| Limitation of '034 Patent Proposed Claim 37 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 37. The automatic directional control system defined in claim 1,. | See claim 1 claim chart, above at page 238. | See claim 1 claim chart, above at page 238. |
| wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by sensing a front and a rear suspension height of the vehicle. | E.g., col. 3, lines 48 to 53, "When a two-sensor system is used in which vehicle height sensors are provided on both the front and rear wheels, the vehicle pitch angle is obtained from displacement distances of the vehicle height at the front and rear of the vehicle and a wheel base of the vehicle, or a distance between front and rear axles of the vehicle." | E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |

| Limitation of '034 Patent Proposed Claim 38 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 38. The automatic directional control system | See claim 1 claim chart, above at page 238. | See claim 1 claim chart, above at page 238. |

| **Limitation of '034 Patent Proposed Claim 38** | **U.S. Patent No. 6,305,823 (Toda et al.)** | **GB 2 309 774 (Takahashi)** |
|---|---|---|
| defined in claim 1, | | |
| wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by a pitch level sensor. | E.g., col. 3, lines 48 to 53, "When a two-sensor system is used in which vehicle height sensors are provided on both the front and rear wheels, the vehicle pitch angle is obtained from displacement distances of the vehicle height at the front and rear of the vehicle and a wheel base of the vehicle, or a distance between front and rear axles of the vehicle." | E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |

| **Limitation of '034 Patent Proposed Claim 39** | **U.S. Patent No. 6,305,823 (Toda et al.)** | **GB 2 309 774 (Takahashi)** |
|---|---|---|
| 39. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 238. | See claim 1 claim chart, above at page 238. |
| wherein the automatic directional control system is configured such that the controller is programmed to be responsive to changes in the suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle. | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a | |

| Limitation of '034 Patent Proposed Claim 39 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | |

| Limitation of '034 Patent Proposed Claim 40 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 40. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 238. | See claim 1 claim chart, above at page 238. |

| Limitation of '034 Patent Proposed Claim 40 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| wherein the automatic directional control system is configured such that the controller is programmed to be responsive to changes in the suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle, thereby ignoring frequency changes in the suspension height of the vehicle that are a result of bumps in a road. | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | |

| **Limitation of '034 Patent Proposed Claim 41** | **U.S. Patent No. 6,305,823 (Toda et al.)** | **GB 2 309 774 (Takahashi)** |
|---|---|---|
| 41. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 238. | See claim 1 claim chart, above at page 238. |
| wherein the automatic directional control system is configured such that the predetermined minimum threshold amount functions as a filter to minimize undesirable operation of the at least one actuator. | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, | E.g., page 8, lines 26 to 32 "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2."<br><br>E.g., page 9, lines 16 to 34 "Also, in order to prevent the illumination direction of the lamp 6 from being corrected inadvertently when a sudden change in the posture of the vehicle occurs temporarily or due to the wrong operation of the lamp 6 caused by external disturbances, for example, when the vehicle makes a sudden start or a sudden stop, preferably, a threshold value with respect to time may be set in detection of the road gradient and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a threshold value with respect to the running distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given |

| Limitation of '034 Patent Proposed Claim 41 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | reference value and such excessive state continues for a distance equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected." |

| Limitation of '034 Patent Proposed Claim 42 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 42. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 238. | See claim 1 claim chart, above at page 238. |
| wherein said sensed conditions include three or more of road speed, steering angle, pitch, and suspension height of the vehicle. | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the | E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle."<br><br>E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the |

| Limitation of '034 Patent Proposed Claim 42 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br><br>E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |

| Limitation of '034 Patent Proposed Claim 44 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 44. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 238. | See claim 1 claim chart, above at page 238. |
| wherein said controller is configured to be responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the | E.g., page 8, lines 26 to 32 "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that |

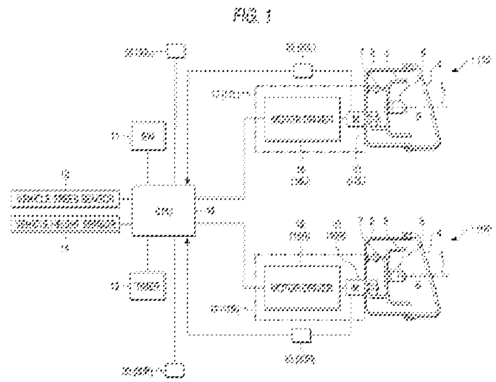
| Limitation of '034 Patent Proposed Claim 44 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated continuously in response to relatively small variations in the sensed operating conditions. | vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2."<br><br>E.g., page 9, lines 16 to 34 "Also, in order to prevent the illumination direction of the lamp 6 from being corrected inadvertently when a sudden change in the posture of the vehicle occurs temporarily or due to the wrong operation of the lamp 6 caused by external disturbances, for example, when the vehicle makes a sudden start or a sudden stop, preferably, a threshold value with respect to time may be set in detection of the road gradient and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a threshold value with respect to the running distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a distance equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected." |

| Limitation of '034 Patent Proposed Claim 45 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 45. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 238. | See claim 1 claim chart, above at page 238. |
| wherein controller is configured to be responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated unduly frequently in response to relatively small variations in the sensed operating conditions. | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 | E.g., page 8, lines 26 to 32 "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2."<br><br>E.g., page 9, lines 16 to 34 "Also, in order to prevent the illumination direction of the lamp 6 from being corrected inadvertently when a sudden change in the posture of the vehicle occurs temporarily or due to the wrong operation of the lamp 6 caused by external disturbances, for example, when the vehicle makes a sudden start or a sudden stop, preferably, a threshold value with respect to time may be set in detection of the road gradient and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a threshold value with respect to the running distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues |

| Limitation of '034 Patent Proposed Claim 45 | U.S. Patent No. 6,305,823 (Toda et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | for a distance equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected." |

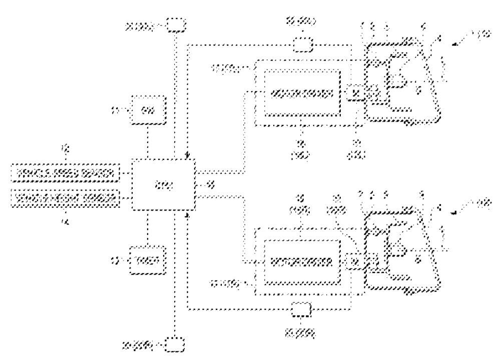
## 26. Proposed Claims 1, 2, 4 to 6, 9 to 13, 17, 18, 20, 21, 22, 24, 25, 28, 29, 36 to 42, 44, and 45 Are Unpatentable Over the Combination of Toda et al. and Hussman Under 35 U.S.C. § 103(a)

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 1. An automatic directional control system for a vehicle headlight, comprising: | E.g., Abstract, "An automatic leveling device for automotive vehicle headlamps is described." | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation." |
| two or more sensors that are each adapted to generate a signal that is representative of a condition of a vehicle, said sensed conditions including two or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1: | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value |

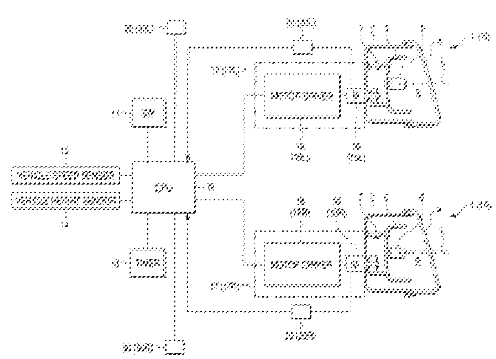
| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| |  | former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles."<br><br>E.g., col. 3, lines 40 to 45, "The curve-recognition device K is electrically conductively coupled with a speed signal sensor, or sender, G and includes a speed threshold value device which itself affects the switchover such that the third filter F3 is only coupled to the regulator R if a minimum speed of the motor vehicle is exceeded." |
| a controller that is responsive to said two or more sensor signals for generating at least one output signal | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is | E.g., col. 3, lines 30 to 39, "The curve-recognition device K is electrically conductively coupled with the switchover device SE and thereby couples the third filter F3 electrically conductively with the regulator R if a difference signal other than zero is fed to it from the subtractor SU. When no difference signal from the subtractor SU is present, the curve-recognition device K switches the switchover device SE so that the first filter F1 is coupled to the regulator R." |

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | |
| only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating conditions; and | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is | E.g., col. 3, lines 30 to 39, "The curve-recognition device K is electrically conductively coupled with the switchover device SE and thereby couples the third filter F3 electrically conductively with the regulator R if a difference signal other than zero is fed to it from the subtractor SU. When no difference signal from the subtractor SU is present, the curve-recognition device K switches the switchover device SE so that the first filter F1 is coupled to the regulator R."<br><br>E.g., col. 4, lines 6 to 12, "At the coupling between the switchover device SE and the regulator R, a matching device AE is, here for example, arranged which, upon a switchover by the switchover device SE, adjusts the various nominal values to one another so that |

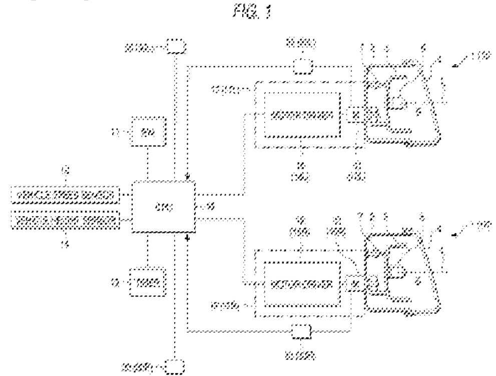
| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | discontinuities or jumps in the adjustment and regulation of the illumination range are avoided."<br><br>E.g., col. 6, line 10 to 34, "In this connection, it is beneficial that upon the presence of a difference between the second, filtered, nominal-value signal to the third, filtered, nominal-value signal and upon termination of a difference is again switched from the third, filtered, nominal-value signal to the first, filtered, nominal-value signal because in this manner, in an uncomplicated and cost effective manner, upon the presence of an inclination change of the motor vehicle body which is not attributable to a change in loading or to road surface unevenness, the regulation of the illumination range of the motor vehicle, in dependence from the third, long, filter time constant results, whereby the third, filtered, nominal-value signal is independent, or substantially independent, from the disturbing, or distorting, short time inclination changes so that after inclination changes of the motor-vehicle body which, for example, are caused by driving about a curve, false adjustments of the illumination range are not caused which can lead to the blinding of oncoming traffic or to losses in illumination range, which eliminates a danger during operation of a motor vehicle." |
| said at least one actuator being adapted to be connected to the headlight to effect movement thereof in accordance with said at least one output | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes | E.g., col. 3, lines 16 to 18, "The regulator R regulates the position of adjusting elements, which are shown here in block form and which change |

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| signal. | L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> | the positions of headlights." |

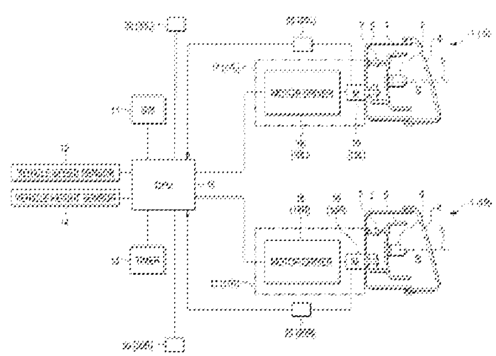
| Limitation of '034 Patent Proposed Claim 2 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 2. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 273. | See claim 1 claim chart, above at page 273. |
| wherein at least one of said two or more sensors generates a signal that is representative of the road | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 | E.g., col. 3, lines 40 to 45, "The curve-recognition device K is electrically conductively coupled with |

| Limitation of '034 Patent Proposed Claim 2 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| speed of the vehicle. | (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> | a speed signal sensor, or sender, G and includes a speed threshold value device which itself affects the switchover such that the third filter F3 is only coupled to the regulator R if a minimum speed of the motor vehicle is exceeded." |

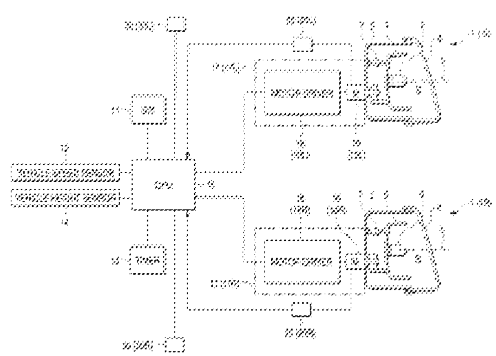
| Limitation of '034 Patent Proposed Claim 4 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 4. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 273. | See claim 1 claim chart, above at page 273. |
| wherein at least one of said two or more sensors | E.g., col. 3, lines 11 to 18, "The headlamp | E.g., Abstract, "In a method and apparatus to |

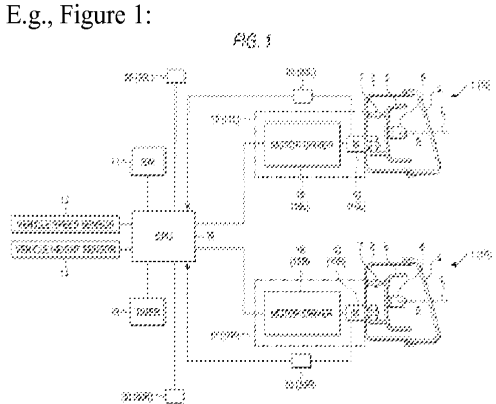
| Limitation of '034 Patent Proposed Claim 4 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| generates a signal that is representative of the pitch of the vehicle. | automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> | regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles." |

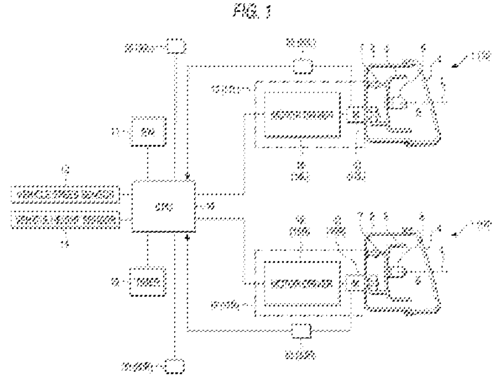
| Limitation of '034 Patent Proposed Claim 5 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 5. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 273. | See claim 1 claim chart, above at page 273. |

| Limitation of '034 Patent Proposed Claim 5 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| wherein at least one of said two or more sensors generates a signal that is representative of the suspension height of the vehicle. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles." |

| Limitation of '034 Patent Proposed Claim 6 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 6. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 273. | See claim 1 claim chart, above at page 273. |

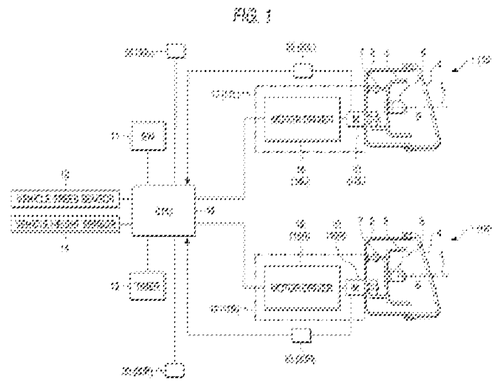
| Limitation of '034 Patent Proposed Claim 6 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| wherein said two or more sensors include a first sensor and a second sensor. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles."<br><br>E.g., col. 3, lines 40 to 45, "The curve-recognition device K is electrically conductively coupled with a speed signal sensor, or sender, G and includes a speed threshold value device which itself affects the switchover such that the third filter F3 is only coupled to the regulator R if a minimum speed of the motor vehicle is exceeded." |

| Limitation of '034 Patent Proposed Claim 9 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 9. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 280. | See claim 6 claim chart, above at page 280. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the suspension height of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br> | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles." |

| Limitation of '034 Patent Proposed Claim 10 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 10. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 280. | See claim 6 claim chart, above at page 280. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the road speed of the vehicle. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1:<br>FIG. 1<br> | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles."<br><br>E.g., col. 3, lines 40 to 45, "The curve-recognition device K is electrically conductively coupled with a speed signal sensor, or sender, G and includes a speed threshold value device which itself affects the switchover such that the third filter F3 is only |

| Limitation of '034 Patent Proposed Claim 10 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | | coupled to the regulator R if a minimum speed of the motor vehicle is exceeded." |

| Limitation of '034 Patent Proposed Claim 11 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 11. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 280. | See claim 6 claim chart, above at page 280. |
| wherein said first sensor is physically separate from said second sensor. | E.g., col. 3, lines 11 to 18, "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit."<br><br>E.g., Figure 1: | |

| Limitation of '034 Patent Proposed Claim 11 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| |  | |

| Limitation of '034 Patent Proposed Claim 12 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 12. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 273. | See claim 1 claim chart, above at page 273. |
| wherein said sensed conditions further include one or more of a rate of change of road speed of the vehicle, a rate of change of steering angle of the vehicle, a rate of change of pitch of the vehicle, or a rate of change of suspension height of the vehicle. | E.g., col. 5, lines 31 to 38, "If YES (the vehicle speed exceeds 30 km/h), in step 124, it is determined whether or not the acceleration is lower than the reference value when the vehicle is at halt. In step 124, if YES (lower than 0.5 m/s2), then in step 126 it is determined whether or not a state continues for a predetermined time period (three seconds) or longer in which the vehicle speed exceeds 30 km/h and the acceleration is lower than 0.5 m/s2" | E.g., col. 5, lines 34 to 40, "So that also such inclination changes of the motor-vehicle body which are not attributable to acceleration changes will be recognized and false adjustments during regulation of the illumination range because of such inclination changes will be avoided, the third filter F3 is only placed in connection with the regulator when no acceleration of the motor vehicle is present." |

| Limitation of '034 Patent Proposed Claim 13 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 13. The automatic directional control system defined in claim 12, | See claim 12 claim chart, above at page 285. | See claim 12 claim chart, above at page 285. |
| wherein at least one of said two or more sensors generate a signal that is representative of the rate of change of road speed of the vehicle. | E.g., col. 5, lines 31 to 38, "If YES (the vehicle speed exceeds 30 km/h), in step 124, it is determined whether or not the acceleration is lower than the reference value when the vehicle is at halt. In step 124, if YES (lower than 0.5 m/s2), then in step 126 it is determined whether or not a state continues for a predetermined time period (three seconds) or longer in which the vehicle speed exceeds 30 km/h and the acceleration is lower than 0.5 m/s2" | E.g., col. 5, lines 34 to 40, "So that also such inclination changes of the motor-vehicle body which are not attributable to acceleration changes will be recognized and false adjustments during regulation of the illumination range because of such inclination changes will be avoided, the third filter F3 is only placed in connection with the regulator when no acceleration of the motor vehicle is present." |

| Limitation of '034 Patent Proposed Claim 17 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 17. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 273. | See claim 1 claim chart, above at page 273. |
| wherein the automatic directional control system is configured to include at least two actuators. | E.g., col. 2, line 65 to col. 3, line 10, "In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and right headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic | |

| Limitation of '034 Patent Proposed Claim 17 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 10R) which includes an actuator main body and a motor driver 18 (18L, 18R)." | |

| Limitation of '034 Patent Proposed Claim 18 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 18. The automatic directional control system defined in claim 17, | See claim 17 claim chart, above at page 286. | See claim 17 claim chart, above at page 286. |
| wherein the at least two actuators include a first actuator that is adapted to be connected to the headlight to effect movement thereof in a vertical direction. | E.g., col. 2, line 65 to col. 3, line 10, "In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and right headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 10R) which includes an actuator main body and a motor driver 18 (18L, 18R)." | |

| Limitation of '034 Patent Proposed Claim 20 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 20. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 273. | See claim 1 claim chart, above at page 273. |
| wherein the at least one actuator includes an electronically controlled mechanical actuator. | E.g., col. 2, line 65 to col. 3, line 10, "In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and right headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 10R) which includes an actuator main body and a motor driver 18 (18L, 18R)."<br><br>E.g., col. 3, lines 18 to 24, "The CPU 16 calculates vehicle speed depending on data from sensors 12 and calculates vehicle height depending on data from sensors 14, judges whether the headlamps are switched on or off, and output to motor drivers 18 (18L, 18R) a control signal for driving the motors 10 (10L, 10R) a magnitude corresponding to operating pitch angle data. A timer 13 is also connected to the CPU 16." | |

| Limitation of '034 Patent Proposed Claim 21 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 21. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 273. | See claim 1 claim chart, above at page 273. |
| wherein the at least one actuator includes a step motor. | E.g., col. 2, line 65 to col. 3, line 10, "In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and right headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 10R) which includes an actuator main body and a motor driver 18 (18L, 18R)." | |

| Limitation of '034 Patent Proposed Claim 22 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 22. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 273. | See claim 1 claim chart, above at page 273. |
| wherein the at least one actuator includes a servo motor. | E.g., col. 2, line 65 to col. 3, line 10, "In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and right headlamps for an automotive vehicle, the | |

| Limitation of '034 Patent Proposed Claim 22 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 10R) which includes an actuator main body and a motor driver 18 (18L, 18R)."<br><br>E.g., col. 3, lines 18 to 24, "The CPU 16 calculates vehicle speed depending on data from sensors 12 and calculates vehicle height depending on data from sensors 14, judges whether the headlamps are switched on or off, and output to motor drivers 18 (18L, 18R) a control signal for driving the motors 10 (10L, 10R) a magnitude corresponding to operating pitch angle data. A timer 13 is also connected to the CPU 16." | |

| Limitation of '034 Patent Proposed Claim 24 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 24. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 273. | See claim 1 claim chart, above at page 273. |

| Limitation of '034 Patent Proposed Claim 24 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted relative to the vehicle. | E.g., col. 2, line 65 to col. 3, line 10, "In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and right headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 10R) which includes an actuator main body and a motor driver 18 (18L, 18R)." | |

| Limitation of '034 Patent Proposed Claim 25 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 25. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 273. | See claim 1 claim chart, above at page 273. |
| wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted up and down relative to a horizontal reference position. | E.g., col. 2, line 65 to col. 3, line 10, "In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and right headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb | |

| Limitation of '034 Patent Proposed Claim 25 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 10R) which includes an actuator main body and a motor driver 18 (18L, 18R)." | |

| Limitation of '034 Patent Proposed Claim 28 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 28. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 273. | See claim 1 claim chart, above at page 273. |
| wherein the automatic directional control system is configured such that the controller includes a microprocessor. | E.g., col. 3, lines 18 to 24, "The CPU 16 calculates vehicle speed depending on data from sensors 12 and calculates vehicle height depending on data from sensors 14, judges whether the headlamps are switched on or off, and output to motor drivers 18 (18L, 18R) a control signal for driving the motors 10 (10L, 10R) a magnitude corresponding to operating pitch angle data. A timer 13 is also connected to the CPU 16." | |

| Limitation of '034 Patent Proposed Claim 29 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 29. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 273. | See claim 1 claim chart, above at page 273. |
| wherein the automatic directional control system is configured such that the controller includes a programmable electronic controller. | E.g., col. 3, lines 18 to 24, "The CPU 16 calculates vehicle speed depending on data from sensors 12 and calculates vehicle height depending on data from sensors 14, judges whether the headlamps are switched on or off, and output to motor drivers 18 (18L, 18R) a control signal for driving the motors 10 (10L, 10R) a magnitude corresponding to operating pitch angle data. A timer 13 is also connected to the CPU 16." | |

| Limitation of '034 Patent Proposed Claim 36 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 36. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 273. | See claim 1 claim chart, above at page 273. |
| wherein the automatic directional control system is configured to position the headlight at or near a calibration position when an electrical system of the vehicle is turned on. | E.g., col. 3, lines 62 to 65, "When the vehicle is stationary, since the proper pitch angle of the vehicle can be detected in principle, the driving of the motors 10 (10L, 10R) is first controlled based on the vehicle pitch angle obtained when the vehicle is at halt." | |

| Limitation of '034 Patent Proposed Claim 37 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 37. The automatic directional control system | See claim 1 claim chart, above at page 273. | See claim 1 claim chart, above at page 273. |

| Limitation of '034 Patent Proposed Claim 37 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| defined in claim 1, | | |
| wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by sensing a front and a rear suspension height of the vehicle. | E.g., col. 3, lines 48 to 53, "When a two-sensor system is used in which vehicle height sensors are provided on both the front and rear wheels, the vehicle pitch angle is obtained from displacement distances of the vehicle height at the front and rear of the vehicle and a wheel base of the vehicle, or a distance between front and rear axles of the vehicle." | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles." |

| Limitation of '034 Patent Proposed Claim 38 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 38. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 273. | See claim 1 claim chart, above at page 273. |

| Limitation of '034 Patent Proposed Claim 38 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
| --- | --- | --- |
| wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by a pitch level sensor. | E.g., col. 3, lines 48 to 53, "When a two-sensor system is used in which vehicle height sensors are provided on both the front and rear wheels, the vehicle pitch angle is obtained from displacement distances of the vehicle height at the front and rear of the vehicle and a wheel base of the vehicle, or a distance between front and rear axles of the vehicle." | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles." |

| Limitation of '034 Patent Proposed Claim 39 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
| --- | --- | --- |
| 39. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 273. | See claim 1 claim chart, above at page 273. |
| wherein the automatic directional control system is | E.g., col. 4, lines 1 to 25, "But while the vehicle is | E.g., Abstract, "In a method and apparatus to |

| Limitation of '034 Patent Proposed Claim 39 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| configured such that the controller is programmed to be responsive to changes in the suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle. | running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles." |

| Limitation of '034 Patent Proposed Claim 40 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 40. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 273. | See claim 1 claim chart, above at page 273. |
| wherein the automatic directional control system is configured such that the controller is programmed to be responsive to changes in the suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle, thereby ignoring frequency changes in the suspension height of the vehicle that are a result of bumps in a road. | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 | |

| Limitation of '034 Patent Proposed Claim 40 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | |

| Limitation of '034 Patent Proposed Claim 41 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 41. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 273. | See claim 1 claim chart, above at page 273. |
| wherein the automatic directional control system is configured such that the predetermined minimum threshold amount functions as a filter to minimize undesirable operation of the at least one actuator. | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the | E.g., col. 4, lines 6 to 12, "At the coupling between the switchover device SE and the regulator R, a matching device AE is, here for example, arranged which, upon a switchover by the switchover device SE, adjusts the various nominal values to one another so that discontinuities or jumps in the adjustment and regulation of the illumination range are avoided." |

| **Limitation of '034 Patent Proposed Claim 41** | **U.S. Patent No. 6,305,823 (Toda et al.)** | **U.S. Patent No. 5,182,460 (Hussman)** |
|---|---|---|
| | vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | |

| **Limitation of '034 Patent Proposed Claim 42** | **U.S. Patent No. 6,305,823 (Toda et al.)** | **U.S. Patent No. 5,182,460 (Hussman)** |
|---|---|---|
| 42. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 273. | See claim 1 claim chart, above at page 273. |
| wherein said sensed conditions include three or more of road speed, steering angle, pitch, and suspension height of the vehicle. | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, | |

| Limitation of '034 Patent Proposed Claim 42 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | |

| Limitation of '034 Patent Proposed Claim 44 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 44. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 273. | See claim 1 claim chart, above at page 273. |
| wherein said controller is configured to be responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated continuously in response to relatively small variations in the sensed operating | E.g., col. 4, lines 1 to 25, "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the | E.g., col. 4, lines 6 to 12, "At the coupling between the switchover device SE and the regulator R, a matching device AE is, here for example, arranged which, upon a switchover by the switchover device SE, adjusts the various nominal values to one another so that discontinuities or jumps in the adjustment and regulation of the illumination range are avoided." |

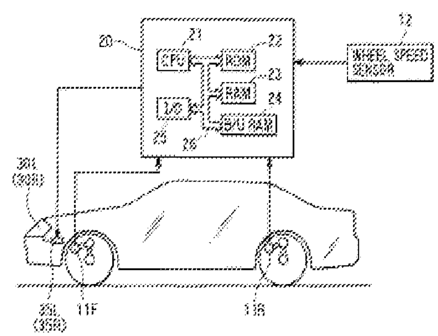
| Limitation of '034 Patent Proposed Claim 44 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| conditions. | reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | |

| Limitation of '034 Patent Proposed Claim 45 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 45. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 273. | See claim 1 claim chart, above at page 273. |
| wherein controller is configured to be responsive | E.g., col. 4, lines 1 to 25, "But while the vehicle is | E.g., col. 4, lines 6 to 12, "At the coupling |

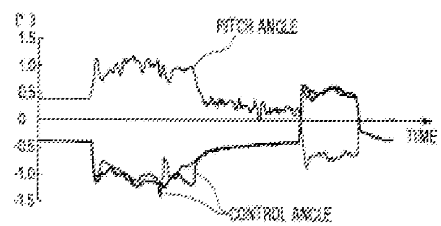
| Limitation of '034 Patent Proposed Claim 45 | U.S. Patent No. 6,305,823 (Toda et al.) | U.S. Patent No. 5,182,460 (Hussman) |
| --- | --- | --- |
| to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated unduly frequently in response to relatively small variations in the sensed operating conditions. | running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." | between the switchover device SE and the regulator R, a matching device AE is, here for example, arranged which, upon a switchover by the switchover device SE, adjusts the various nominal values to one another so that discontinuities or jumps in the adjustment and regulation of the illumination range are avoided." |

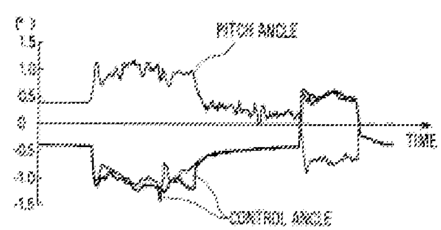
## 27. Proposed Claims 1, 2, 4 to 6, 9 to 13, 15 to 18, 20, 21, 22, 24, 25, 28, 29, 33, 35, 37, 38, 39, 40, 41, 42, 44, and 45 Are Unpatentable Over the Combination of Okuchi et al. and Uchida Under 35 U.S.C. § 103(a)

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 1. An automatic directional control system for a vehicle headlight, comprising: | E.g., Abstract, "In a vehicle headlight optical axis automatic adjusting system, a pitch angle in the longitudinal direction of a vehicle is calculated from a signal of a height sensor." | E.g., page 1, lines 3 to 7, "The present invention relates to a vehicle lamp illumination direction control device which detects the posture of a vehicle and correctly adjusts the illumination direction of a vehicle lamp so that the illumination direction can be always kept in a predetermined direction." |
| two or more sensors that are each adapted to generate a signal that is representative of a condition of a vehicle, said sensed conditions including two or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are | E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2."<br><br>E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2." |

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| | supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG. 1<br> | E.g., Page 9, lines 24 to 28 "Firstly, the method i) is a method which judges whether the vehicle is in the acceleration or deceleration running condition or not by detecting the running speed of the vehicle to calculate the change of the speed with time, that is, by calculating the acceleration of the vehicle."<br><br>E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the |

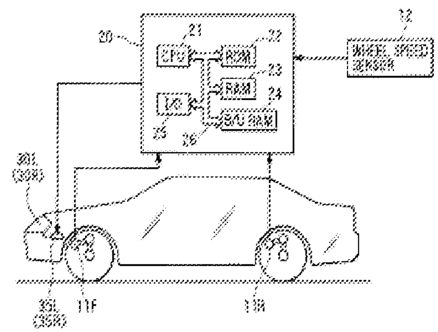
| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | | inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree."<br><br>E.g., page 15, line 30 to page 16, line 2 "As has been described above, according to the respective methods, it is possible to judge whether the vehicle is running in the acceleration condition or in the deceleration condition. Also, these methods can be applied in various manners, for example, the respective methods can be used individually, or some of them may be combined together for the enhanced accuracy of the judgment." |
| a controller that is responsive to said two or more sensor signals for generating at least one output signal | E.g., col. 6, lines 6 to 14, "On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle."<br><br>E.g., col. 6, lines 29 to 38, "When the vehicle speed V is equal to or higher than a few km/h (such as 2 [km/h]) and the acceleration dV/dt | E.g., page 4, lines 16 to 27 "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle." |

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong filtering is performed so as to remove high frequency components of a vibration at the time of driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding."<br><br>E.g., Fig. 7:<br>FIG. 7<br> | |
| only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating conditions; and | E.g., col. 6, lines 6 to 14, "On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so | E.g., page 4, lines 16 to 27 "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, |

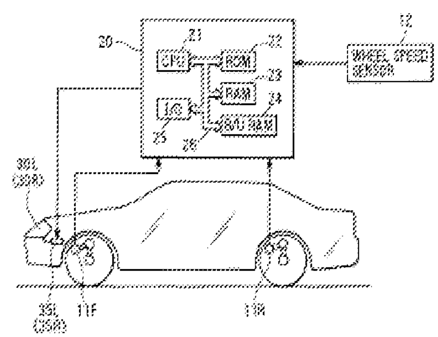
| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | that the actuator is allowed to respond quickly to the change in the pitch angle."<br><br>E.g., col. 6, lines 29 to 38, "When the vehicle speed V is equal to or higher than a few km/h (such as 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong filtering is performed so as to remove high frequency components of a vibration at the time of driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding."<br><br>E.g., Fig. 7:<br>FIG. 7<br>  | thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle." |
| said at least one actuator being adapted to be connected to the headlight to effect movement thereof in accordance with said at least one output | | E.g., page 16, line 28 to page 17, line 6 "Also, if it is judged by the acceleration or deceleration running condition judging device 3b that the |

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| signal. | | vehicle is not in the acceleration or deceleration running condition, then the illumination angle of the lamp 5 can be controlled by one of the following methods when the drive control device 4a receives an instruction from the acceleration or deceleration running condition judging device 3b: 1) a method for fixing the illumination angle; 2) a method for limiting the range of the illumination angle or forbidding part of the range of the illumination angle; and, 3) a method for changing the response speed or control speed of an actuator."<br><br>E.g., page 7, lines 4 to 9, "In particular, the correction calculating device 3a is structured in the following manner: that is, in accordance with a detect signal from the vehicle posture detection device 2, it transmits a control signal to the drive device 4 so that the illumination direction of the lamp 5 can be always kept in a given direction." See also 7:9-32.<br><br>E.g., page 8, lines 1 to 9, "When the judging device 3b judges that the vehicle is in an acceleration or deceleration running condition, in accordance with a control signal transmitted from the correction calculating device 3a to the drive control device 4a, the acceleration or deceleration running condition judging device 3b transmits to the drive control device 4a a signal which allows the illumination direction of the lamp 5 to be corrected in a predetermined direction." |

| Limitation of '034 Patent Proposed Claim 2 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 2. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 303. | See claim 1 claim chart, above at page 303. |
| wherein at least one of said two or more sensors generates a signal that is representative of the road speed of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1: | E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2."<br><br>E.g., Page 9, lines 24 to 28 "Firstly, the method i) is a method which judges whether the vehicle is in the acceleration or deceleration running condition or not by detecting the running speed of the vehicle to calculate the change of the speed with time, that is, by calculating the acceleration of the vehicle." |

| Limitation of '034 Patent Proposed Claim 2 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | FIG. 1   | |

| Limitation of '034 Patent Proposed Claim 4 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 4. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 303. | See claim 1 claim chart, above at page 303. |
| wherein at least one of said two or more sensors generates a signal that is representative of the pitch of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used |

| Limitation of '034 Patent Proposed Claim 4 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG. 1<br> | height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Proposed Claim 5 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 5. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 303. | See claim 1 claim chart, above at page 303. |
| wherein at least one of said two or more sensors generates a signal that is representative of the suspension height of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1: | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Proposed Claim 5 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
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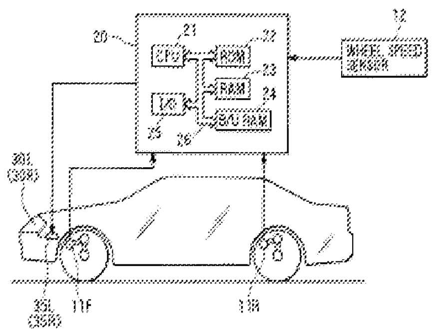
| | FIG. 1  | |

| Limitation of '034 Patent Proposed Claim 6 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| 6. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 303. | See claim 1 claim chart, above at page 303. |
| wherein said two or more sensors include a first sensor and a second sensor. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front | E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2." |

| Limitation of '034 Patent Proposed Claim 6 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
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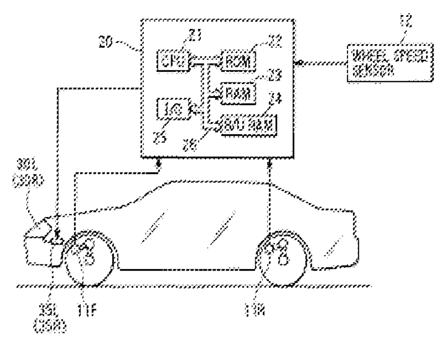
| | wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG. 1<br> | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Proposed Claim 9 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 9. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 313. | See claim 6 claim chart, above at page 313. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the suspension height of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1: | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Proposed Claim 9 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
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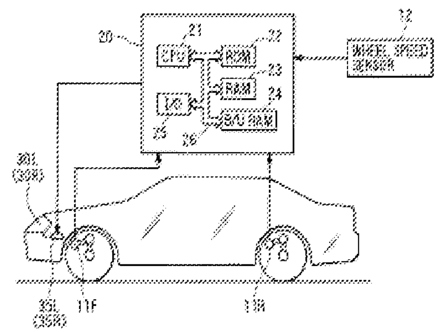
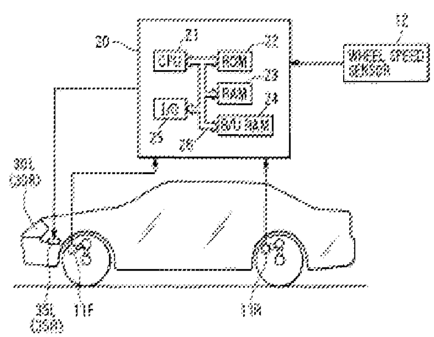
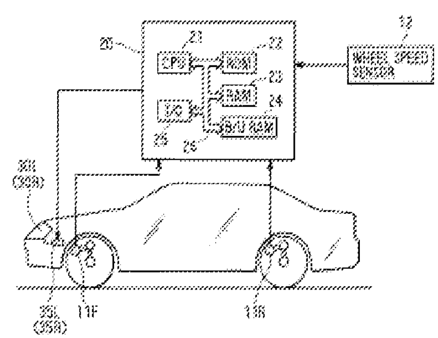
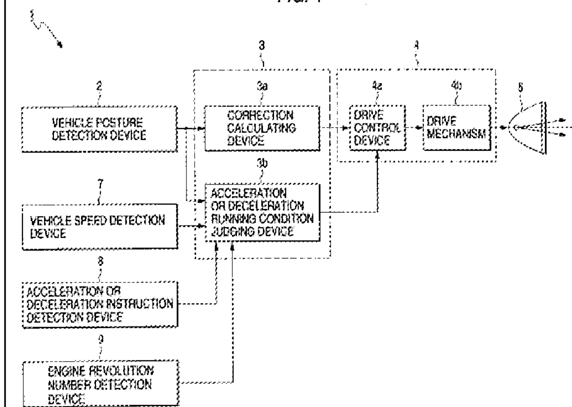
| | FIG. 1  | |

| Limitation of '034 Patent Proposed Claim 10 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 10. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 313. | See claim 6 claim chart, above at page 313. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the road speed of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used |

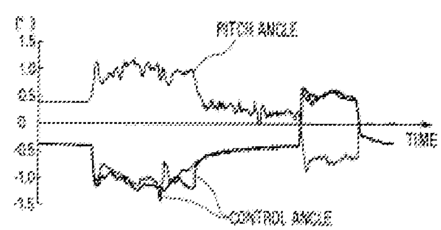
| Limitation of '034 Patent Proposed Claim 10 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| | wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG. 1<br> | height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree."<br><br>E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2."<br><br>E.g., Page 9, lines 24 to 28 "Firstly, the method i) |

| Limitation of '034 Patent Proposed Claim 10 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | | is a method which judges whether the vehicle is in the acceleration or deceleration running condition or not by detecting the running speed of the vehicle to calculate the change of the speed with time, that is, by calculating the acceleration of the vehicle." |

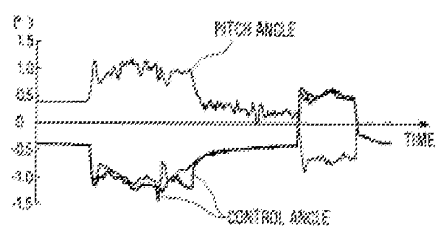
| Limitation of '034 Patent Proposed Claim 11 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 11. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 313. | See claim 6 claim chart, above at page 313. |
| wherein said first sensor is physically separate from said second sensor. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses | E.g., page 6, line 30 to page 7, line 3, "In order for the vehicle posture detection device and the acceleration or deceleration running condition judging device to transmit signals to one another, they must be separate: "The outputs of the vehicle posture detection device 2 are transmitted to the correction calculating device 3a and acceleration or deceleration running condition judging device 3b which cooperate together in forming the control device 3, and these outputs are used as control signals to be applied to the drive device 4 and are then used as instructions for correcting the illumination of lamp 5."<br><br>E.g., Fig. 1: |

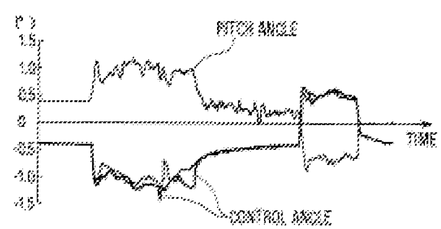
| Limitation of '034 Patent Proposed Claim 11 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG.1<br> | FIG. 1<br> |

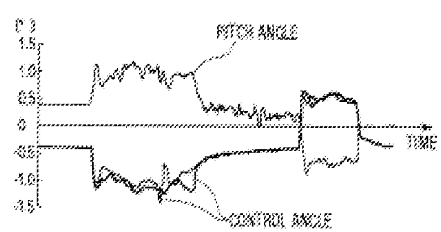
| Limitation of '034 Patent Proposed Claim 12 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 12. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 303. | See claim 1 claim chart, above at page 303. |
| wherein said sensed conditions further include one or more of a rate of change of road speed of the vehicle, a rate of change of steering angle of the | E.g., col. 6, lines 6 to 14, "On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition |

| Limitation of '034 Patent Proposed Claim 12 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| vehicle, a rate of change of pitch of the vehicle, or a rate of change of suspension height of the vehicle. | acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle."<br><br>E.g., Fig. 7:<br>FIG. 7<br><br> | of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Proposed Claim 13 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 13. The automatic directional control system | See claim 12 claim chart, above at page 319. | See claim 12 claim chart, above at page 319. |

| Limitation of '034 Patent Proposed Claim 13 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| defined in claim 12, | | |
| wherein at least one of said two or more sensors generate a signal that is representative of the rate of change of road speed of the vehicle. | E.g., col. 6, lines 6 to 14, "On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle."<br><br>E.g., Fig. 7:<br>FIG. 7<br> | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Proposed Claim 15 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 15. The automatic directional control system defined in claim 12, | See claim 12 claim chart, above at page 319. | See claim 12 claim chart, above at page 319. |
| wherein at least one of said two or more sensors generates a signal that is representative of the rate of change of pitch of the vehicle. | E.g., col. 6, lines 6 to 14, "On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle."<br><br>E.g., Fig. 7:<br>FIG. 7<br> | |

| Limitation of '034 Patent Proposed Claim 16 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 16. The automatic directional control system defined in claim 12, | See claim 12 claim chart, above at page 319. | See claim 12 claim chart, above at page 319. |
| wherein at least one of said two or more sensors generates a signal that is representative of the rate of change of suspension height of the vehicle. | E.g., col. 6, lines 6 to 14, "On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle."<br><br>E.g., Fig. 7:<br>FIG. 7<br> | |

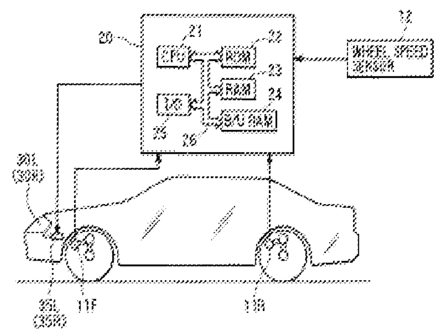
| Limitation of '034 Patent Proposed Claim 17 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 17. The automatic directional control system | See claim 1 claim chart, above at page 303. | See claim 1 claim chart, above at page 303. |

| Limitation of '034 Patent Proposed Claim 17 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| defined in claim 1, | | |
| wherein the automatic directional control system is configured to include at least two actuators. | E.g., col. 5, lines 16 to 20, "Output signals from the ECU 20 are supplied to actuators 35R and 35L of right and left headlights 30R and 30L of the vehicle, thereby adjusting the optical axis direction of the right and left headlights 30R and 30L as will be described hereinlater." | |

| Limitation of '034 Patent Proposed Claim 18 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 18. The automatic directional control system defined in claim 17, | See claim 17 claim chart, above at page 323. | See claim 17 claim chart, above at page 323. |
| wherein the at least two actuators include a first actuator that is adapted to be connected to the headlight to effect movement thereof in a vertical direction. | E.g., col. 5, lines 24 to 40, "As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a DC motor for driving the movable member 34 in the directions shown by the double-headed arrow. The movable member 34 is driven in the back and forth directions by the actuator 35L (35R) so that the reflector 32 is vertically inclined about the end of the supporting member 33 as a fulcrum only by an actuator driving angle (target optical axis direction adjusting angle) Θa which will be | E.g., page 7, lines 4 to 9 "In particular, the correction calculating device 3a is structured in the following manner: that is, in accordance with a detect signal from the vehicle posture detection device 2, it transmits a control signal to the drive device 4 so that the illumination direction of the lamp 5 can be always kept in a given direction." See also 7:9-32.<br><br>E.g., page 8, lines 1 to 9 "When the judging device 3b judges that the vehicle is in an acceleration or deceleration running condition, in accordance with a control signal transmitted from the correction calculating device 3a to the drive control device 4a, the acceleration or deceleration running condition judging device 3b transmits to the drive |

| Limitation of '034 Patent Proposed Claim 18 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | described hereinlater, thereby adjusting the optical axis direction of the headlight 30L (30R). The optical axis direction of the headlight 30L (30R) is initially set on the assumption that one driver is on the vehicle." | control device 4a a signal which allows the illumination direction of the lamp 5 to be corrected in a predetermined direction."<br><br>E.g., page 3, lines 19 to 22 "There is provided a vehicle lamp illumination direction control device for changing the direction of the illumination light of a lamp according to the vertical inclination of a vehicle in the advancing direction thereof." |

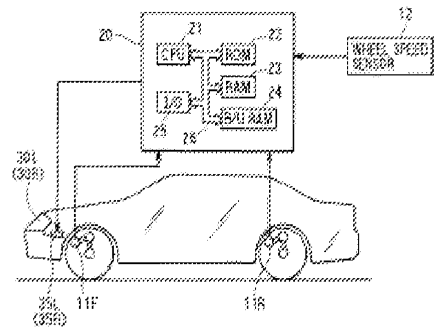
| Limitation of '034 Patent Proposed Claim 20 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 20. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 303. | See claim 1 claim chart, above at page 303. |
| wherein the at least one actuator includes an electronically controlled mechanical actuator. | E.g., col. 5, lines 11 to 15, "The ECU 20 is a logical operating circuit comprising a CPU 21 as a known central processing unit, a ROM 22 in which control programs are stored, a RAM 23 for storing various data, a B/U (back-up) RAM 24, an input/output circuit 25, and a bus line 26 connecting these elements."<br><br>E.g., col. 5, lines 24 to 33, "As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the | E.g., page 19, lines 6 to 22 "For example, when the actuator incorporates therein a DC (direct current) motor, a difference between the control target position (or angle) of the actuator and the current position (or angle) thereof is detected, and a pulse signal having a duty cycle corresponding to the detected position difference is supplied to the DC motor to thereby control the position of the actuator, as shown in Fig. 11, if the characteristic of the duty cycle DT with respect to the position difference δxx is changed from the state of a relatively faster response speed shown by a broken line 10 to the state of a slow response speed shown by a solid line 11, with respect to the same position difference δxx=δxxa, the duty cycle DT |

| Limitation of '034 Patent Proposed Claim 20 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | actuator 35L (35R) such as a stepping motor or a DC motor for driving the movable member 34 in the directions shown by the double-headed arrow."<br><br>E.g., Fig. 1,<br>FIG. 1<br> | in the other running conditions of the vehicle than the acceleration or deceleration running condition thereof is smaller than the duty cycle in the acceleration or deceleration running condition of the vehicle, so that the drive control on the lamp 5 by the actuator is slowed down." |

| Limitation of '034 Patent Proposed Claim 21 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 21. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 303. | See claim 1 claim chart, above at page 303. |
| wherein the at least one actuator includes a step motor. | E.g., col. 5, lines 24 to 40, "As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by | |

| Limitation of '034 Patent Proposed Claim 21 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a DC motor for driving the movable member 34 in the directions shown by the double-headed arrow. | |

| Limitation of '034 Patent Proposed Claim 22 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 22. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 303. | See claim 1 claim chart, above at page 303. |
| wherein the at least one actuator includes a servo motor. | E.g., col. 5, lines 11 to 15, "The ECU 20 is a logical operating circuit comprising a CPU 21 as a known central processing unit, a ROM 22 in which control programs are stored, a RAM 23 for storing various data, a B/U (back-up) RAM 24, an input/output circuit 25, and a bus line 26 connecting these elements."<br><br>E.g., col. 5, lines 24 to 33, "As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a DC motor for driving the movable member 34 in the directions shown by the double-headed arrow." | E.g., page 19, lines 6 to 22 "For example, when the actuator incorporates therein a DC (direct current) motor, a difference between the control target position (or angle) of the actuator and the current position (or angle) thereof is detected, and a pulse signal having a duty cycle corresponding to the detected position difference is supplied to the DC motor to thereby control the position of the actuator, as shown in Fig. 11, if the characteristic of the duty cycle DT with respect to the position difference δxx is changed from the state of a relatively faster response speed shown by a broken line 10 to the state of a slow response speed shown by a solid line 11, with respect to the same position difference δxx=δxxa, the duty cycle DT in the other running conditions of the vehicle than the acceleration or deceleration running condition thereof is smaller than the duty cycle in the acceleration or deceleration running condition of |

| Limitation of '034 Patent Proposed Claim 22 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | E.g., Fig. 1,<br>FIG. 1<br> | the vehicle, so that the drive control on the lamp 5 by the actuator is slowed down.” |

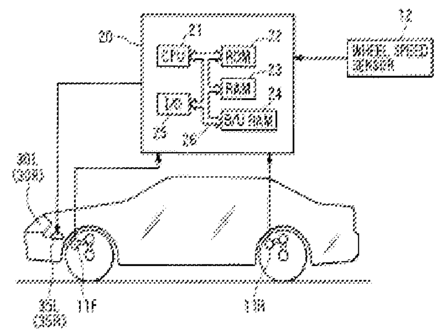
| Limitation of '034 Patent Proposed Claim 24 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 24. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 303. | See claim 1 claim chart, above at page 303. |
| wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted relative to the vehicle. | E.g., col. 5, lines 24 to 40, “As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a | E.g., page 16, lines 6 to 15 “The simplest method for changing the illumination pattern of the lamp 5 in a vertical plane is a method which changes the illumination angle of the lamp 5 with respect to a horizontal plane by rotating the entire lamp 5 about the rotary shaft thereof. For example, the right and left side surfaces of the lamp 5 are supported in a freely rotatable manner and the |

| Limitation of '034 Patent Proposed Claim 24 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | DC motor for driving the movable member 34 in the directions shown by the double-headed arrow. The movable member 34 is driven in the back and forth directions by the actuator 35L (35R) so that the reflector 32 is vertically inclined about the end of the supporting member 33 as a fulcrum only by an actuator driving angle (target optical axis direction adjusting angle) Θa which will be described hereinlater, thereby adjusting the optical axis direction of the headlight 30L (30R). The optical axis direction of the headlight 30L (30R) is initially set on the assumption that one driver is on the vehicle." | rotary shaft of the lamp 5 is rotated directly by a drive source such as a motor or the like, or, there is available a drive mechanism in which a member fixed to the lamp 5 or formed integrally with the lamp 5 is rotated by the drive device 4." |

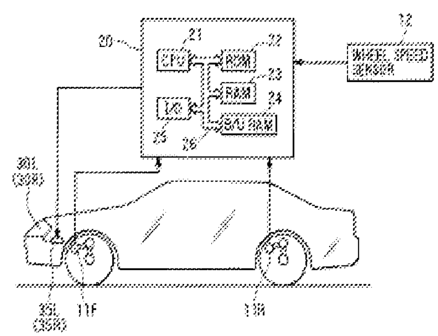
| Limitation of '034 Patent Proposed Claim 25 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 25. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 303. | See claim 1 claim chart, above at page 303. |
| wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted up and down relative to a horizontal reference position. | E.g., col. 5, lines 24 to 40, "As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a DC motor for driving the movable member 34 in the directions shown by the double-headed arrow. The movable member 34 is driven in the back and | E.g., page 16, lines 6 to 15 "The simplest method for changing the illumination pattern of the lamp 5 in a vertical plane is a method which changes the illumination angle of the lamp 5 with respect to a horizontal plane by rotating the entire lamp 5 about the rotary shaft thereof. For example, the right and left side surfaces of the lamp 5 are supported in a freely rotatable manner and the rotary shaft of the lamp 5 is rotated directly by a drive source such as a motor or the like, or, there is available a drive mechanism in which a member |

| Limitation of '034 Patent Proposed Claim 25 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | forth directions by the actuator 35L (35R) so that the reflector 32 is vertically inclined about the end of the supporting member 33 as a fulcrum only by an actuator driving angle (target optical axis direction adjusting angle) Θa which will be described hereinlater, thereby adjusting the optical axis direction of the headlight 30L (30R). The optical axis direction of the headlight 30L (30R) is initially set on the assumption that one driver is on the vehicle." | fixed to the lamp 5 or formed integrally with the lamp 5 is rotated by the drive device 4." |

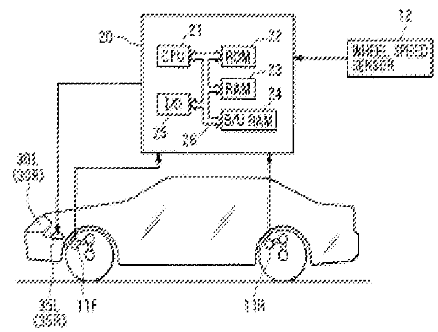
| Limitation of '034 Patent Proposed Claim 28 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 28. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 303. | See claim 1 claim chart, above at page 303. |
| wherein the automatic directional control system is configured such that the controller includes a microprocessor. | E.g., col. 5, lines 11 to 15, "The ECU 20 is a logical operating circuit comprising a CPU 21 as a known central processing unit, a ROM 22 in which control programs are stored, a RAM 23 for storing various data, a B/U (back-up) RAM 24, an input/output circuit 25, and a bus line 26 connecting these elements."<br><br>E.g., Fig. 1, | |

| Limitation of '034 Patent Proposed Claim 28 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | FIG. 1   | |

| Limitation of '034 Patent Proposed Claim 29 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 29. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 303. | See claim 1 claim chart, above at page 303. |
| wherein the automatic directional control system is configured such that the controller includes a programmable electronic controller. | E.g., col. 5, lines 11 to 15, "The ECU 20 is a logical operating circuit comprising a CPU 21 as a known central processing unit, a ROM 22 in which control programs are stored, a RAM 23 for storing various data, a B/U (back-up) RAM 24, an input/output circuit 25, and a bus line 26 connecting these elements."<br><br>E.g., Fig. 1, | |

| Limitation of '034 Patent Proposed Claim 29 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | FIG. 1   | |

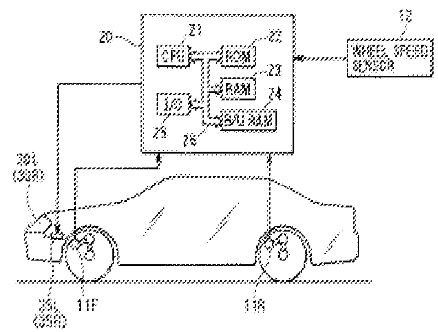
| Limitation of '034 Patent Proposed Claim 33 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 33. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 303. | See claim 1 claim chart, above at page 303. |
| wherein the automatic directional control system further includes memory. | E.g., col. 5, lines 11 to 15, "The ECU 20 is a logical operating circuit comprising a CPU 21 as a known central processing unit, a ROM 22 in which control programs are stored, a RAM 23 for storing various data, a B/U (back-up) RAM 24, an input/output circuit 25, and a bus line 26 connecting these elements."<br><br>E.g., Fig. 1, | |

| Limitation of '034 Patent Proposed Claim 33 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | FIG. 1   | |

| Limitation of '034 Patent Proposed Claim 35 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 35. The automatic directional control system defined in claim 33, | See claim 33 claim chart, above at page 332. | See claim 33 claim chart, above at page 332. |
| wherein the memory is configured to store a predetermined reference position associated with the headlight. | E.g., col. 5, lines 24 to 40, "As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a DC motor for driving the movable member 34 in the directions shown by the double-headed arrow. | |

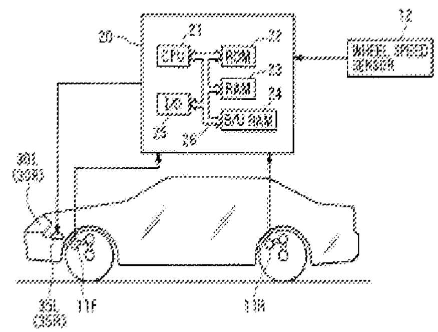
| Limitation of '034 Patent Proposed Claim 35 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | The movable member 34 is driven in the back and forth directions by the actuator 35L (35R) so that the reflector 32 is vertically inclined about the end of the supporting member 33 as a fulcrum only by an actuator driving angle (target optical axis direction adjusting angle) Θa which will be described hereinlater, thereby adjusting the optical axis direction of the headlight 30L (30R). The optical axis direction of the headlight 30L (30R) is initially set on the assumption that one driver is on the vehicle." | |

| Limitation of '034 Patent Proposed Claim 37 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 37. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 303. | See claim 1 claim chart, above at page 303. |
| wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by sensing a front and a rear suspension height of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height |

| Limitation of '034 Patent Proposed Claim 37 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG.1<br> | detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Proposed Claim 38 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 38. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 303. | See claim 1 claim chart, above at page 303. |

| Limitation of '034 Patent Proposed Claim 38 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by a pitch level sensor. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1: | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Proposed Claim 38 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | FIG. 1  | |

| Limitation of '034 Patent Proposed Claim 39 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 39. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 303. | See claim 1 claim chart, above at page 303. |
| wherein the automatic directional control system is configured such that the controller is programmed to be responsive to changes in the suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle. | E.g., col. 6, lines 29 to 38, "When the vehicle speed V is equal to or higher than a few km/h (such as 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong filtering is performed so as to remove high frequency components of a vibration at the time of | |

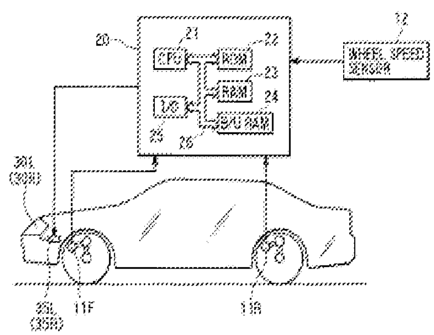
| **Limitation of '034 Patent Proposed Claim 39** | **U.S. Patent No. 6,193,398 (Okuchi et al.)** | **GB 2 309 773 (Uchida)** |
|---|---|---|
| | driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding." | |

| **Limitation of '034 Patent Proposed Claim 40** | **U.S. Patent No. 6,193,398 (Okuchi et al.)** | **GB 2 309 773 (Uchida)** |
|---|---|---|
| 40. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 303. | See claim 1 claim chart, above at page 303. |
| wherein the automatic directional control system is configured such that the controller is programmed to be responsive to changes in the suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle, thereby ignoring frequency changes in the suspension height of the vehicle that are a result of bumps in a road. | E.g., col. 6, lines 29 to 38, "When the vehicle speed V is equal to or higher than a few km/h (such as 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong filtering is performed so as to remove high frequency components of a vibration at the time of driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding." | |

| **Limitation of '034 Patent Proposed Claim 41** | **U.S. Patent No. 6,193,398 (Okuchi et al.)** | **GB 2 309 773 (Uchida)** |
|---|---|---|
| 41. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 303. | See claim 1 claim chart, above at page 303. |

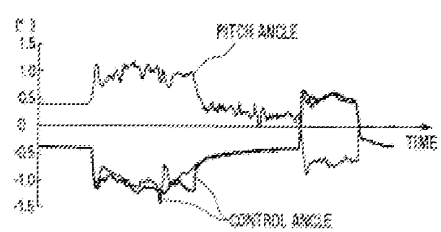
| Limitation of '034 Patent Proposed Claim 41 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| wherein the automatic directional control system is configured such that the predetermined minimum threshold amount functions as a filter to minimize undesirable operation of the at least one actuator. | E.g., col. 6, lines 29 to 38, "When the vehicle speed V is equal to or higher than a few km/h (such as 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong filtering is performed so as to remove high frequency components of a vibration at the time of driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding." | E.g., page 4, lines 16 to 27, "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle." |

| Limitation of '034 Patent Proposed Claim 42 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 42. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 303. | See claim 1 claim chart, above at page 303. |
| wherein said sensed conditions include three or more of road speed, steering angle, pitch, and suspension height of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value | E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture |

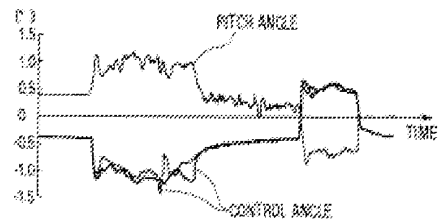
| Limitation of '034 Patent Proposed Claim 42 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG.1<br><br> | detection device 2."<br><br>E.g., Page 9, lines 24 to 28 "Firstly, the method i) is a method which judges whether the vehicle is in the acceleration or deceleration running condition or not by detecting the running speed of the vehicle to calculate the change of the speed with time, that is, by calculating the acceleration of the vehicle."<br><br>E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof |

| Limitation of '034 Patent Proposed Claim 42 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | | and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree."<br><br>E.g., page 15, line 30 to page 16, line 2 "As has been described above, according to the respective methods, it is possible to judge whether the vehicle is running in the acceleration condition or in the deceleration condition. Also, these methods can be applied in various manners, for example, the respective methods can be used individually, or some of them may be combined together for the enhanced accuracy of the judgment." |

| Limitation of '034 Patent Proposed Claim 44 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 44. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 303. | See claim 1 claim chart, above at page 303. |
| wherein said controller is configured to be responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated continuously in response to | E.g., col. 6, lines 6 to 14, "On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is | E.g., page 4, lines 16 to 27 "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the direction of the |

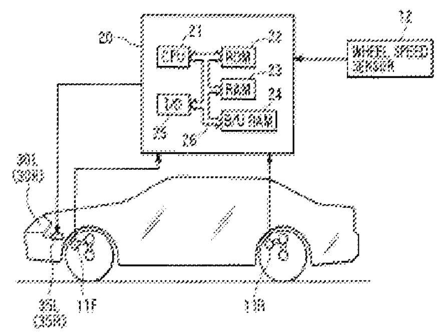
| Limitation of '034 Patent Proposed Claim 44 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| relatively small variations in the sensed operating conditions. | used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle."<br><br>E.g., col. 6, lines 29 to 38, "When the vehicle speed V is equal to or higher than a few km/h (such as 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong filtering is performed so as to remove high frequency components of a vibration at the time of driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding."<br><br>E.g., Fig. 7:<br>FIG. 7<br> | illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle." |

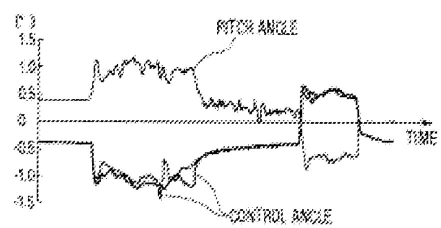
| Limitation of '034 Patent Proposed Claim 45 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| 45. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 303. | See claim 1 claim chart, above at page 303. |
| wherein controller is configured to be responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated unduly frequently in response to relatively small variations in the sensed operating conditions. | E.g., col. 6, lines 6 to 14, "On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle."<br><br>E.g., col. 6, lines 29 to 38, "When the vehicle speed V is equal to or higher than a few km/h (such as 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong filtering is performed so as to remove high frequency components of a vibration at the time of driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding."<br><br>E.g., Fig. 7: | E.g., page 4, lines 16 to 27 "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle." |

| Limitation of '034 Patent Proposed Claim 45 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 773 (Uchida) |
|---|---|---|
| | FIG. 7   | |

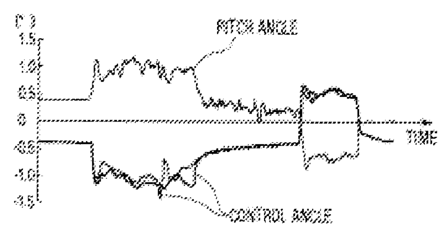
## 28. Proposed Claims 1, 2, 4 to 6, 9 to 13, 15 to 18, 20, 21, 22, 24, 25, 28, 29, 33 to 35, 37 to 42, 44, and 45 Are Unpatentable Over the Combination of Okuchi et al. and Takahashi Under 35 U.S.C. § 103(a)

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 1. An automatic directional control system for a vehicle headlight, comprising: | E.g., Abstract, "In a vehicle headlight optical axis automatic adjusting system, a pitch angle in the longitudinal direction of a vehicle is calculated from a signal of a height sensor." | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp." |
| two or more sensors that are each adapted to generate a signal that is representative of a condition of a vehicle, said sensed conditions including two or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle | E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle."<br><br>E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in |

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG. 1<br> | the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br><br>E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |
| a controller that is responsive to said two or more sensor signals for generating at least one output signal | E.g., col. 6, lines 6 to 14, "On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to | E.g., page 8, lines 26 to 32 "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2." |

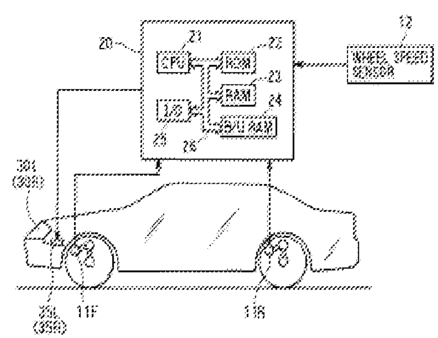
<table>
<tr><th>Limitation of '034 Patent Proposed Claim 1</th><th>U.S. Patent No. 6,193,398 (Okuchi et al.)</th><th>GB 2 309 774 (Takahashi)</th></tr>
<tr><td></td><td>the change in the pitch angle."<br><br>E.g., col. 6, lines 29 to 38, "When the vehicle speed V is equal to or higher than a few km/h (such as 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong filtering is performed so as to remove high frequency components of a vibration at the time of driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding."<br><br>E.g., Fig. 7:<br>FIG. 7<br><br></td><td></td></tr>
<tr><td>only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated</td><td>E.g., col. 6, lines 6 to 14, "On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the</td><td>E.g., page 9, lines 16 to 34 "Also, in order to prevent the illumination direction of the lamp 6 from being corrected inadvertently when a sudden change in the posture of the vehicle occurs</td></tr>
</table>

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| continuously or unduly frequently in response to relatively small variations in the sensed operating conditions; and | vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle."<br><br>E.g., col. 6, lines 29 to 38, "When the vehicle speed V is equal to or higher than a few km/h (such as 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong filtering is performed so as to remove high frequency components of a vibration at the time of driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding."<br><br>E.g., Fig. 7: | temporarily or due to the wrong operation of the lamp 6 caused by external disturbances, for example, when the vehicle makes a sudden start or a sudden stop, preferably, a threshold value with respect to time may be set in detection of the road gradient and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a threshold value with respect to the running distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a distance equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected." |

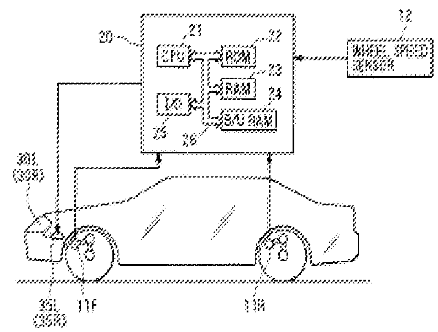
| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
| --- | --- | --- |
| | FIG. 7   | |
| said at least one actuator being adapted to be connected to the headlight to effect movement thereof in accordance with said at least one output signal. | | E.g., page 2, lines 14 to 17 "However, in the above-mentioned automatic adjustment device, since the lamp is driven with high frequency, an actuator used in a drive mechanism for driving the lamp is required to show high response property and high durability."<br><br>E.g., page 6, lines 26 to 32 "When the control device 4 receives the detect signal of the vehicle running condition detection device 3 and finds from this detect signal that the vehicle is standing still, the control device 4, in accordance with information on the vehicle posture obtained from the vehicle posture detection device 2, transmits to the drive signal 5 a control signal for correction of the illumination direction of the lamp 6."<br><br>E.g., page 7, lines 12 to 17 "In view of this, the control device 4 is structured such that, based on the information from the vehicle posture detection device 2, it can detect the amount of variations in |

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | the gradient of the road and, therefore, when the road gradient varies suddenly, it can correct the illumination direction of the lamp 6."<br>E.g., page 11, lines 12 to 16, "The correction of the illumination direction of the lamp 6 in Step S5 is carried out by the drive device 5 based on the control signal transmitted from the control device 4 and, as a method for executing such correction, there are available two methods as follows: 1) a method for inclining the entire lamp, and, 2) a method for moving the component (such as a lens, a reflector, a shade or the like) of the optical system of the lamp." |

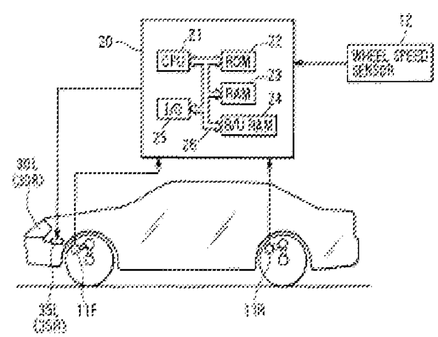
| Limitation of '034 Patent Proposed Claim 2 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 2. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 345. | See claim 1 claim chart, above at page 345. |
| wherein at least one of said two or more sensors generates a signal that is representative of the road speed of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a | E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be |

| Limitation of '034 Patent Proposed Claim 2 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG.1<br> | used to detect the running conditions of the vehicle." |

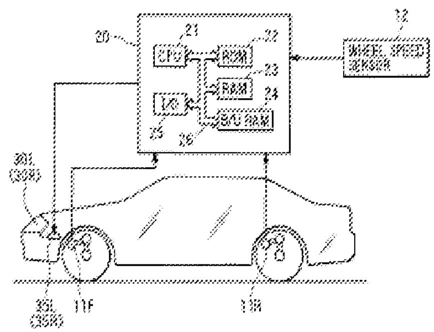
| Limitation of '034 Patent Proposed Claim 4 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 4. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 345. | See claim 1 claim chart, above at page 345. |
| wherein at least one of said two or more sensors generates a signal that is representative of the pitch of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1: | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp." |

| Limitation of '034 Patent Proposed Claim 4 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | FIG. 1  | |

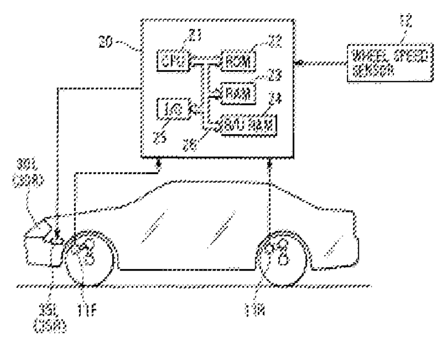
| Limitation of '034 Patent Proposed Claim 5 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 5. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 345. | See claim 1 claim chart, above at page 345. |
| wherein at least one of said two or more sensors generates a signal that is representative of the suspension height of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp." |

| Limitation of '034 Patent Proposed Claim 5 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
| --- | --- | --- |
| | wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG. 1<br> | E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |

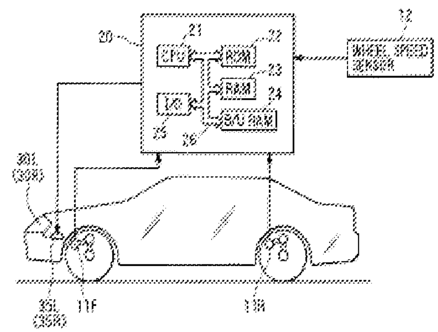
| Limitation of '034 Patent Proposed Claim 6 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 6. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 345. | See claim 1 claim chart, above at page 345. |
| wherein said two or more sensors include a first sensor and a second sensor. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1: | E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle."<br><br>E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the |

| Limitation of '034 Patent Proposed Claim 6 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | FIG. 1<br> | vehicle." |

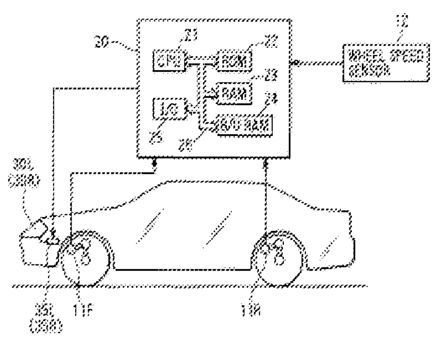
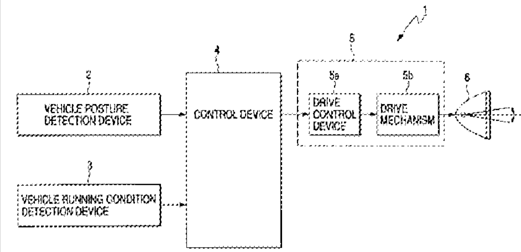
| Limitation of '034 Patent Proposed Claim 9 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 9. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 355. | See claim 6 claim chart, above at page 355. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the suspension height of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp." |

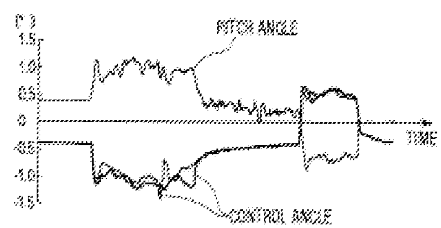
| Limitation of '034 Patent Proposed Claim 9 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
| --- | --- | --- |
| | wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG. 1<br> | E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle."<br><br>E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp." |

| Limitation of '034 Patent Proposed Claim 10 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 10. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 355. | See claim 6 claim chart, above at page 355. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the road speed of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1: | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br><br>E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle." |

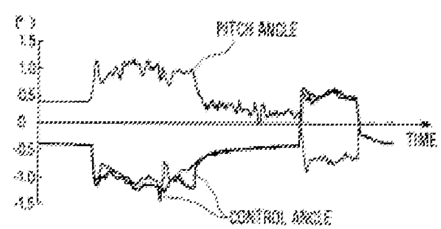
| Limitation of '034 Patent Proposed Claim 10 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | FIG. 1<br> | |

| Limitation of '034 Patent Proposed Claim 11 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 11. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 355. | See claim 6 claim chart, above at page 355. |
| wherein said first sensor is physically separate from said second sensor. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front | See, e.g., Fig. 1, ref. 2, 3 (Separate detection devices). See also 5:25-27 ("an illumination direction control device 1 is composed of vehicle posture detection device 2, vehicle running condition detection device 3, control device 4, drive device 5 . . ., and lamp 6.") |

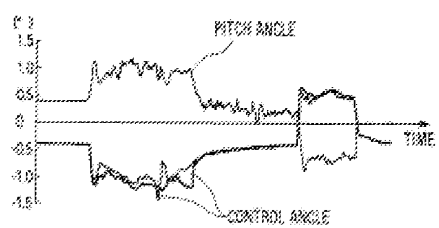
| Limitation of '034 Patent Proposed Claim 11 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG.1<br> | FIG. 1<br> |

| Limitation of '034 Patent Proposed Claim 12 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 12. The automatic directional control system defined in claim 1, | See claim 6 claim chart, above at page 345. | See claim 6 claim chart, above at page 345. |
| wherein said sensed conditions further include one or more of a rate of change of road speed of the vehicle, a rate of change of steering angle of the vehicle, a rate of change of pitch of the vehicle, or a rate of change of suspension height of the vehicle. | E.g., col. 6, lines 6 to 14, "On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle."<br><br>E.g., Fig. 7:<br>FIG. 7<br> | E.g., page 7, lines 29 to 34, to page 8, line 21 "In particular, Fig. 3 shows schematically the amount of variations in the output level V when the vehicle runs first along an uphill slope and thereafter runs along a road having a small gradient. In this case, when the vehicle runs over the uphill slope the output level V falls down suddenly."<br><br>E.g., page 8, lines 19 to 25, "These figures show clearly that the magnitude of the amount of variations in the road gradients is reflected on the amount of variations in the outputs of the height sensor when the vehicle runs from the road having a small gradient to the road having a large gradient or when the vehicle runs from the road having a large gradient to the road having a small gradient." |

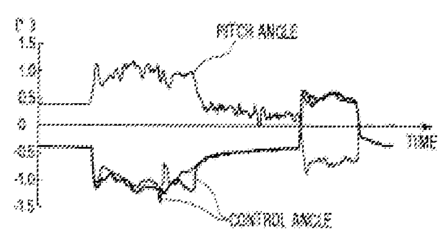
| Limitation of '034 Patent Proposed Claim 13 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 13. The automatic directional control system | See claim 12 claim chart, above at page 361. | See claim 12 claim chart, above at page 361. |

<table>
<tr><th>Limitation of ’034 Patent Proposed Claim 13</th><th>U.S. Patent No. 6,193,398 (Okuchi et al.)</th><th>GB 2 309 774 (Takahashi)</th></tr>
<tr><td>defined in claim 12,</td><td></td><td></td></tr>
<tr><td>wherein at least one of said two or more sensors generate a signal that is representative of the rate of change of road speed of the vehicle.</td><td>E.g., col. 6, lines 6 to 14, “On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle.”<br><br>E.g., Fig. 7:<br>FIG. 7<br><br></td><td></td></tr>
</table>

| Limitation of ’034 Patent Proposed Claim 15 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 15. The automatic directional control system defined in claim 12, | See claim 12 claim chart, above at page 361. | See claim 12 claim chart, above at page 361. |

| Limitation of '034 Patent Proposed Claim 15 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| wherein at least one of said two or more sensors generates a signal that is representative of the rate of change of pitch of the vehicle. | E.g., col. 6, lines 6 to 14, "On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle."<br><br>E.g., Fig. 7:<br>FIG. 7<br> | |

| Limitation of '034 Patent Proposed Claim 16 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 16. The automatic directional control system defined in claim 12, | See claim 12 claim chart, above at page 361. | See claim 12 claim chart, above at page 361. |
| wherein at least one of said two or more sensors | E.g., col. 6, lines 6 to 14, "On the other hand, | E.g., page 7, lines 29 to 34, to page 8, line 21 "In |

| Limitation of '034 Patent Proposed Claim 16 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| generates a signal that is representative of the rate of change of suspension height of the vehicle. | when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle."<br><br>E.g., Fig. 7:<br>FIG. 7<br><br> | particular, Fig. 3 shows schematically the amount of variations in the output level V when the vehicle runs first along an uphill slope and thereafter runs along a road having a small gradient. In this case, when the vehicle runs over the uphill slope the output level V falls down suddenly."<br><br>E.g., page 8, lines 19 to 25, "These figures show clearly that the magnitude of the amount of variations in the road gradients is reflected on the amount of variations in the outputs of the height sensor when the vehicle runs from the road having a small gradient to the road having a large gradient or when the vehicle runs from the road having a large gradient to the road having a small gradient." |

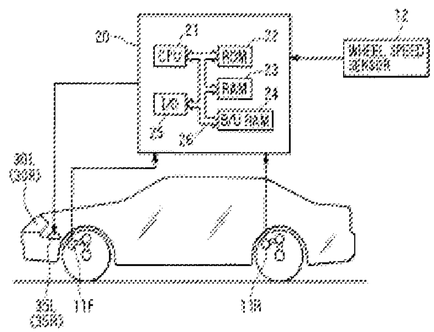
| Limitation of '034 Patent Proposed Claim 17 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 17. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 345. | See claim 1 claim chart, above at page 345. |
| wherein the automatic directional control system is configured to include at least two actuators. | E.g., col. 5, lines 16 to 20, "Output signals from the ECU 20 are supplied to actuators 35R and 35L | E.g., page 16, line 31 to page 17, line 1 "A rudder resistance network 18, which corresponds to the |

| Limitation of '034 Patent Proposed Claim 17 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | of right and left headlights 30R and 30L of the vehicle, thereby adjusting the optical axis direction of the right and left headlights 30R and 30L as will be described hereinlater." | above-mentioned drive control device 5a, is used to convert the output signal of the microcomputer 10 into an analog signal and transmits it to actuators 19 and 19' which are disposed downstream thereof." |

| Limitation of '034 Patent Proposed Claim 18 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 18. The automatic directional control system defined in claim 17, | See claim 17 claim chart, above at page 364. | See claim 17 claim chart, above at page 364. |
| wherein the at least two actuators include a first actuator that is adapted to be connected to the headlight to effect movement thereof in a vertical direction. | E.g., col. 5, lines 24 to 40, "As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a DC motor for driving the movable member 34 in the directions shown by the double-headed arrow. The movable member 34 is driven in the back and forth directions by the actuator 35L (35R) so that the reflector 32 is vertically inclined about the end of the supporting member 33 as a fulcrum only by an actuator driving angle (target optical axis direction adjusting angle) Θa which will be described hereinlater, thereby adjusting the optical axis direction of the headlight 30L (30R). The optical axis direction of the headlight 30L (30R) is | E.g., page 11, lines 21 to 32 "In particular, the method 1) is the simplest method that can change the illumination pattern of the lamp 6 within a vertical plane, in which the entire lamp is rotated about the rotary shaft thereof to thereby change the illumination angle of the lamp 6 with respect to a horizontal plane including the optical axis of the lamp. For example, in the method 1), there can be used a drive mechanism in which the right and left side surfaces of the lamp 6 are supported rotatably, and the rotary shaft of the lamp 6 is rotated directly by a drive source such as a motor or the like, or a member fixed to or formed integrally with the lamp 6 is rotated by the drive device 5." |

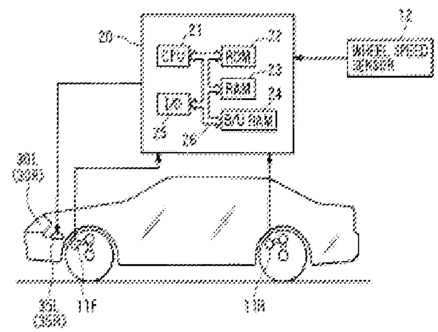
| Limitation of '034 Patent Proposed Claim 18 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | initially set on the assumption that one driver is on the vehicle." | |

| Limitation of '034 Patent Proposed Claim 20 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 20. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 345. | See claim 1 claim chart, above at page 345. |
| wherein the at least one actuator includes an electronically controlled mechanical actuator. | E.g., col. 5, lines 11 to 15, "The ECU 20 is a logical operating circuit comprising a CPU 21 as a known central processing unit, a ROM 22 in which control programs are stored, a RAM 23 for storing various data, a B/U (back-up) RAM 24, an input/output circuit 25, and a bus line 26 connecting these elements."<br><br>E.g., col. 5, lines 24 to 33, "As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a DC motor for driving the movable member 34 in the directions shown by the double-headed arrow."<br><br>E.g., Fig. 1, | E.g., page 16, line 31 to page 17, line 1 "A rudder resistance network 18, which corresponds to the above-mentioned drive control device 5a, is used to convert the output signal of the microcomputer 10 into an analog signal and transmits it to actuators 19 and 19' which are disposed downstream thereof."<br>E.g., page 11, line 32 to page 12, line 3 "As an example of such lamp, there is available a lamp including a mechanism which can use the rotational force of the motor as the rotational force of the lam through a transmission mechanism using a worm and worm wheel (for example, see Japanese Patent Publication No. Hei. 63-166672)." |

| Limitation of '034 Patent Proposed Claim 20 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | FIG. 1   | |

| Limitation of '034 Patent Proposed Claim 21 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 21. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 345. | See claim 1 claim chart, above at page 345. |
| wherein the at least one actuator includes a step motor. | E.g., col. 5, lines 24 to 40, "As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a DC motor for driving the movable member 34 in the directions shown by the double-headed arrow. | E.g., page 18, lines 5 to 8 "Besides this, according to the invention, the lamp or the component thereof can be driven or controlled by use of a stepping motor to thereby correct the illumination direction of the lamp." |

| Limitation of '034 Patent Proposed Claim 22 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 22. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 345. | See claim 1 claim chart, above at page 345. |
| wherein the at least one actuator includes a servo motor. | E.g., col. 5, lines 11 to 15, "The ECU 20 is a logical operating circuit comprising a CPU 21 as a known central processing unit, a ROM 22 in which control programs are stored, a RAM 23 for storing various data, a B/U (back-up) RAM 24, an input/output circuit 25, and a bus line 26 connecting these elements."<br><br>E.g., col. 5, lines 24 to 33, "As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a DC motor for driving the movable member 34 in the directions shown by the double-headed arrow."<br><br>E.g., Fig. 1, | E.g., page 16, line 31 to page 17, line 1 "A rudder resistance network 18, which corresponds to the above-mentioned drive control device 5a, is used to convert the output signal of the microcomputer 10 into an analog signal and transmits it to actuators 19 and 19' which are disposed downstream thereof."<br>E.g., page 11, line 32 to page 12, line 3 "As an example of such lamp, there is available a lamp including a mechanism which can use the rotational force of the motor as the rotational force of the lam through a transmission mechanism using a worm and worm wheel (for example, see Japanese Patent Publication No. Hei. 63-166672)." |

| Limitation of '034 Patent Proposed Claim 22 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | FIG. 1  | |

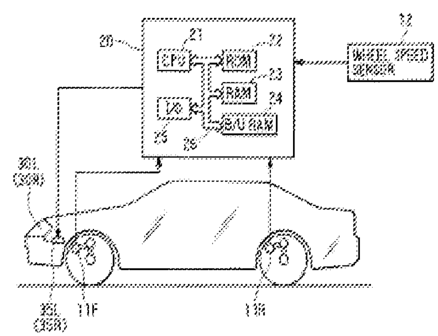
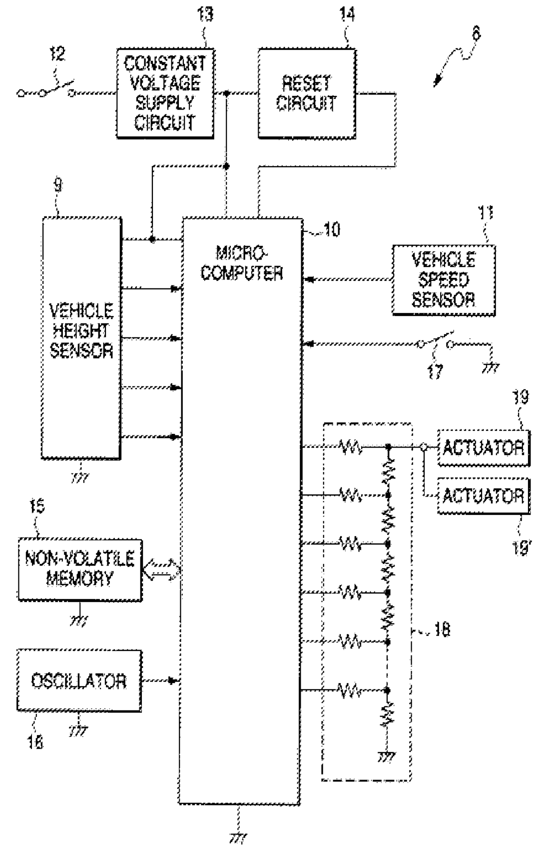
| Limitation of '034 Patent Proposed Claim 24 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 24. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 345. | See claim 1 claim chart, above at page 345. |
| wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted relative to the vehicle. | E.g., col. 5, lines 24 to 40, "As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a DC motor for driving the movable member 34 in the directions shown by the double-headed arrow. | E.g., page 11, lines 21 to 32 "In particular, the method 1) is the simplest method that can change the illumination pattern of the lamp 6 within a vertical plane, in which the entire lamp is rotated about the rotary shaft thereof to thereby change the illumination angle of the lamp 6 with respect to a horizontal plane including the optical axis of the lamp. For example, in the method 1), there can be used a drive mechanism in which the right and left side surfaces of the lamp 6 are supported rotatably, |

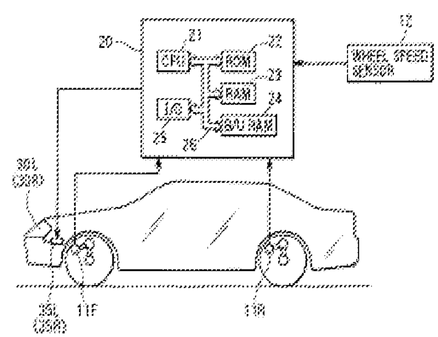
| Limitation of '034 Patent Proposed Claim 24 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | The movable member 34 is driven in the back and forth directions by the actuator 35L (35R) so that the reflector 32 is vertically inclined about the end of the supporting member 33 as a fulcrum only by an actuator driving angle (target optical axis direction adjusting angle) Θa which will be described hereinlater, thereby adjusting the optical axis direction of the headlight 30L (30R). The optical axis direction of the headlight 30L (30R) is initially set on the assumption that one driver is on the vehicle." | and the rotary shaft of the lamp 6 is rotated directly by a drive source such as a motor or the like, or a member fixed to or formed integrally with the lamp 6 is rotated by the drive device 5." |

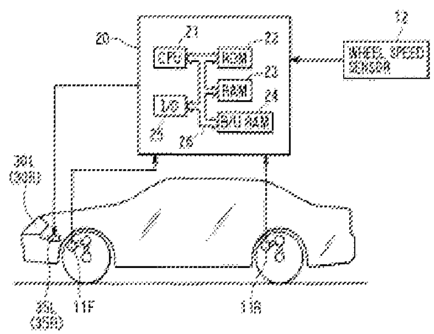
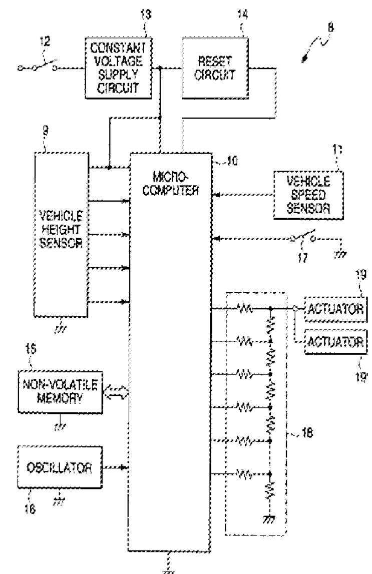
| Limitation of '034 Patent Proposed Claim 25 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 25. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 345. | See claim 1 claim chart, above at page 345. |
| wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted up and down relative to a horizontal reference position. | E.g., col. 5, lines 24 to 40, "As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a DC motor for driving the movable member 34 in the directions shown by the double-headed arrow. The movable member 34 is driven in the back and forth directions by the actuator 35L (35R) so that the reflector 32 is vertically inclined about the end | E.g., page 11, lines 21 to 32 "In particular, the method 1) is the simplest method that can change the illumination pattern of the lamp 6 within a vertical plane, in which the entire lamp is rotated about the rotary shaft thereof to thereby change the illumination angle of the lamp 6 with respect to a horizontal plane including the optical axis of the lamp. For example, in the method 1), there can be used a drive mechanism in which the right and left side surfaces of the lamp 6 are supported rotatably, and the rotary shaft of the lamp 6 is rotated directly by a drive source such as a motor or the like, or a member fixed to or formed integrally |

| Limitation of '034 Patent Proposed Claim 25 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | of the supporting member 33 as a fulcrum only by an actuator driving angle (target optical axis direction adjusting angle) Θa which will be described hereinlater, thereby adjusting the optical axis direction of the headlight 30L (30R). The optical axis direction of the headlight 30L (30R) is initially set on the assumption that one driver is on the vehicle." | with the lamp 6 is rotated by the drive device 5." |

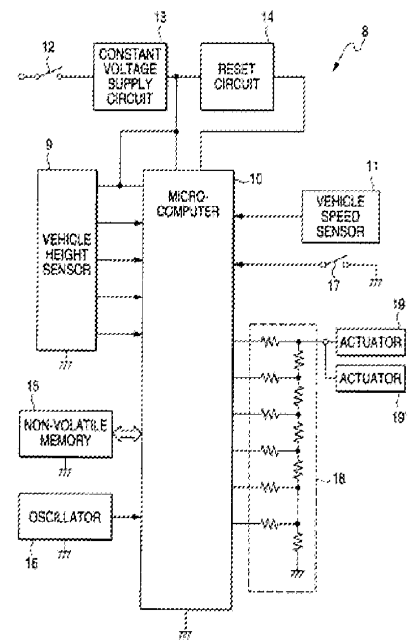
| Limitation of '034 Patent Proposed Claim 28 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 28. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 345. | See claim 1 claim chart, above at page 345. |
| wherein the automatic directional control system is configured such that the controller includes a microprocessor. | E.g., col. 5, lines 11 to 15, "The ECU 20 is a logical operating circuit comprising a CPU 21 as a known central processing unit, a ROM 22 in which control programs are stored, a RAM 23 for storing various data, a B/U (back-up) RAM 24, an input/output circuit 25, and a bus line 26 connecting these elements."<br><br>E.g., Fig. 1, | E.g., page 16, lines 1 to 4 "When a turn-on switch 12 for the lamp 6 is put into operation, a supply voltage from a constant voltage supply circuit 13 and a reset signal from a reset circuit 14 are supplied to the microcomputer 10." See also Fig. 9, ref. 10. |

| Limitation of '034 Patent Proposed Claim 28 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | FIG. 1<br><br> | *FIG. 9*<br><br> |

| Limitation of '034 Patent Proposed Claim 29 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
| --- | --- | --- |
| 29. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 345. | See claim 1 claim chart, above at page 345. |
| wherein the automatic directional control system is configured such that the controller includes a programmable electronic controller. | E.g., col. 5, lines 11 to 15, "The ECU 20 is a logical operating circuit comprising a CPU 21 as a known central processing unit, a ROM 22 in which control programs are stored, a RAM 23 for storing various data, a B/U (back-up) RAM 24, an input/output circuit 25, and a bus line 26 connecting these elements."<br><br>E.g., Fig. 1,<br><br>FIG. 1<br> | |

| Limitation of '034 Patent Proposed Claim 33 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 33. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 345. | See claim 1 claim chart, above at page 345. |
| wherein the automatic directional control system further includes memory. | E.g., col. 5, lines 11 to 15, "The ECU 20 is a logical operating circuit comprising a CPU 21 as a known central processing unit, a ROM 22 in which control programs are stored, a RAM 23 for storing various data, a B/U (back-up) RAM 24, an input/output circuit 25, and a bus line 26 connecting these elements."<br><br>E.g., Fig. 1,<br>FIG. 1<br> | E.g., page 16, lines 5 to 9 "Also, a non-volatile memory 15 (such as an electrically erasable EEPROM, or the like) for storing control programs and data values therein) [sic] and an oscillator 16 used to generate a clock signal are additionally attached to the microcomputer 10." See also Fig. 9, ref. 15.<br><br>FIG. 9<br> |

| Limitation of '034 Patent Proposed Claim 34 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 34. The automatic directional control system defined in claim 33, | See claim 33 claim chart, above at page 374. | See claim 33 claim chart, above at page 374. |
| wherein the memory includes non-volatile memory. | | E.g., page 16, lines 5 to 9 "Also, a non-volatile memory 15 (such as an electrically erasable EEPROM, or the like) for storing control programs and data values therein) [sic] and an oscillator 16 used to generate a clock signal are additionally attached to the microcomputer 10." See also Fig. 9, ref. 15. |

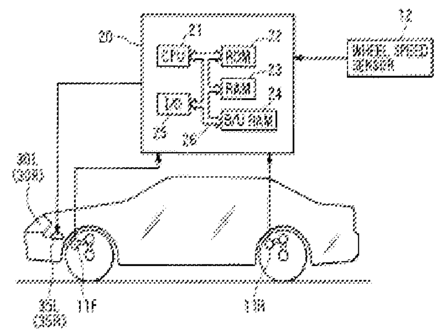
| Limitation of '034 Patent Proposed Claim 34 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | FIG. 9   |

| Limitation of '034 Patent Proposed Claim 35 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 35. The automatic directional control system defined in claim 33, | See claim 33 claim chart, above at page 374. | See claim 33 claim chart, above at page 374. |
| wherein the memory is configured to store a predetermined reference position associated with | E.g., col. 5, lines 24 to 40, "As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a | |

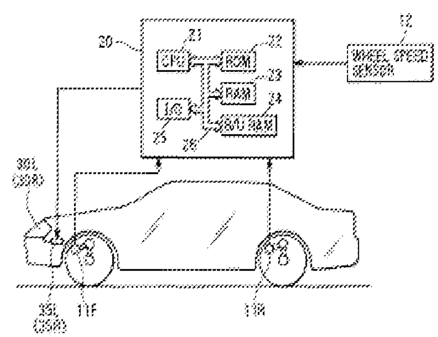
| Limitation of '034 Patent Proposed Claim 35 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| the headlight. | reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a DC motor for driving the movable member 34 in the directions shown by the double-headed arrow. The movable member 34 is driven in the back and forth directions by the actuator 35L (35R) so that the reflector 32 is vertically inclined about the end of the supporting member 33 as a fulcrum only by an actuator driving angle (target optical axis direction adjusting angle) Θa which will be described hereinlater, thereby adjusting the optical axis direction of the headlight 30L (30R). The optical axis direction of the headlight 30L (30R) is initially set on the assumption that one driver is on the vehicle." | |

| Limitation of '034 Patent Proposed Claim 37 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 37. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 345. | See claim 1 claim chart, above at page 345. |
| wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by sensing a front and a rear suspension height of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A | E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used |

| Limitation of '034 Patent Proposed Claim 37 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1: | height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |

| Limitation of '034 Patent Proposed Claim 37 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | FIG. 1   | |

| Limitation of '034 Patent Proposed Claim 38 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 38. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 345. | See claim 1 claim chart, above at page 345. |
| wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by a pitch level sensor. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front | E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such |

| Limitation of '034 Patent Proposed Claim 38 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG. 1<br> | as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |

| Limitation of '034 Patent Proposed Claim 39 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 39. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 345. | See claim 1 claim chart, above at page 345. |
| wherein the automatic directional control system is configured such that the controller is programmed to be responsive to changes in the suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle. | E.g., col. 6, lines 29 to 38, "When the vehicle speed V is equal to or higher than a few km/h (such as 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong filtering is performed so as to remove high frequency components of a vibration at the time of driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding." | |

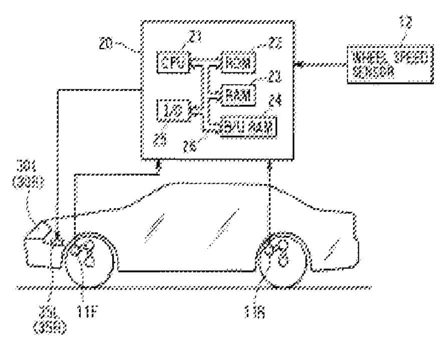
| Limitation of '034 Patent Proposed Claim 40 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 40. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 345. | See claim 1 claim chart, above at page 345. |
| wherein the automatic directional control system is configured such that the controller is programmed to be responsive to changes in the suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle, thereby ignoring frequency changes in the suspension height of the vehicle that are a result of bumps in a road. | E.g., col. 6, lines 29 to 38, "When the vehicle speed V is equal to or higher than a few km/h (such as 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong | |

| Limitation of '034 Patent Proposed Claim 40 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | filtering is performed so as to remove high frequency components of a vibration at the time of driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding." | |

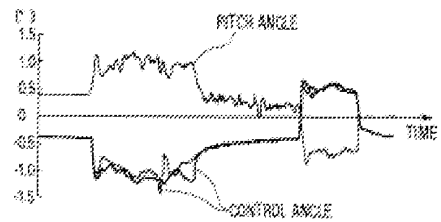
| Limitation of '034 Patent Proposed Claim 41 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 41. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 345. | See claim 1 claim chart, above at page 345. |
| wherein the automatic directional control system is configured such that the predetermined minimum threshold amount functions as a filter to minimize undesirable operation of the at least one actuator. | E.g., col. 6, lines 29 to 38, "When the vehicle speed V is equal to or higher than a few km/h (such as 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong filtering is performed so as to remove high frequency components of a vibration at the time of driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding." | E.g., page 8, lines 26 to 32 "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2."<br><br>E.g., page 9, lines 16 to 34 "Also, in order to prevent the illumination direction of the lamp 6 from being corrected inadvertently when a sudden change in the posture of the vehicle occurs temporarily or due to the wrong operation of the lamp 6 caused by external disturbances, for example, when the vehicle makes a sudden start or a sudden stop, preferably, a threshold value with respect to time may be set in detection of the road gradient and, only when the amount of variations |

| Limitation of '034 Patent Proposed Claim 41 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a threshold value with respect to the running distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a distance equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected." |

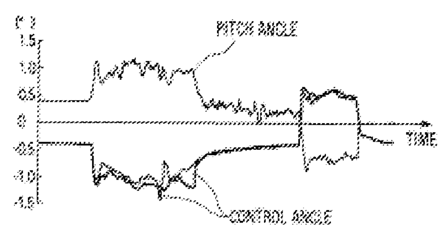
| Limitation of '034 Patent Proposed Claim 42 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 42. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 345. | See claim 1 claim chart, above at page 345. |
| wherein said sensed conditions include three or more of road speed, steering angle, pitch, and suspension height of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a | E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be |

| Limitation of '034 Patent Proposed Claim 42 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG.1<br><br> | used to detect the running conditions of the vehicle."<br><br>E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br><br>E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |

| Limitation of '034 Patent Proposed Claim 44 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 44. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 345. | See claim 1 claim chart, above at page 345. |
| wherein said controller is configured to be responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated continuously in response to relatively small variations in the sensed operating conditions. | E.g., col. 6, lines 6 to 14, "On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle."<br><br>E.g., col. 6, lines 29 to 38, "When the vehicle speed V is equal to or higher than a few km/h (such as 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong filtering is performed so as to remove high frequency components of a vibration at the time of driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding."<br><br>E.g., Fig. 7: | E.g., page 8, lines 26 to 32 "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2."<br>E.g., page 9, lines 16 to 34 "Also, in order to prevent the illumination direction of the lamp 6 from being corrected inadvertently when a sudden change in the posture of the vehicle occurs temporarily or due to the wrong operation of the lamp 6 caused by external disturbances, for example, when the vehicle makes a sudden start or a sudden stop, preferably, a threshold value with respect to time may be set in detection of the road gradient and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a threshold value with respect to the running distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a distance equal to or more than the threshold |

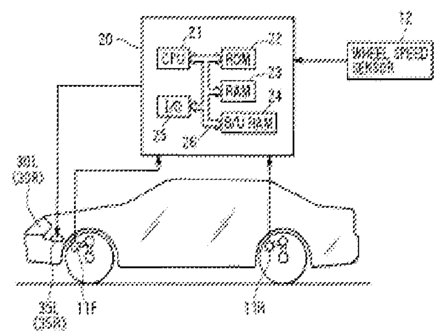
| Limitation of '034 Patent Proposed Claim 44 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | FIG. 7   | value, the illumination direction of the lamp 6 may be corrected." |

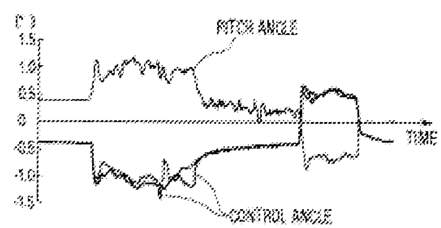
| Limitation of '034 Patent Proposed Claim 45 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 45. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 345. | See claim 1 claim chart, above at page 345. |
| wherein controller is configured to be responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated unduly frequently in response to relatively small variations in the sensed operating conditions. | E.g., col. 6, lines 6 to 14, "On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle."<br><br>E.g., col. 6, lines 29 to 38, "When the vehicle speed V is equal to or higher than a few km/h | E.g., page 8, lines 26 to 32 "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2."<br><br>E.g., page 9, lines 16 to 34 "Also, in order to prevent the illumination direction of the lamp 6 from being corrected inadvertently when a sudden change in the posture of the vehicle occurs temporarily or due to the wrong operation of the |

| Limitation of '034 Patent Proposed Claim 45 | U.S. Patent No. 6,193,398 (Okuchi et al.) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | (such as 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong filtering is performed so as to remove high frequency components of a vibration at the time of driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding."<br><br>E.g., Fig. 7:<br>FIG. 7<br> | lamp 6 caused by external disturbances, for example, when the vehicle makes a sudden start or a sudden stop, preferably, a threshold value with respect to time may be set in detection of the road gradient and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a threshold value with respect to the running distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a distance equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected." |

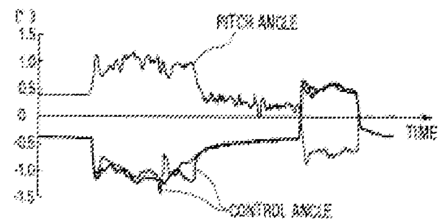
## 29. Proposed Claims 1, 2, 4 to 6, 9 to 13, 15 to 18, 20, 21, 22, 25, 28, 29, 33, 35, 37, 38, 39, 40, 41, 42, 44, and 45 Are Unpatentable Over the Combination of Okuchi et al. and Hussman Under 35 U.S.C. § 103(a)

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 1. An automatic directional control system for a vehicle headlight, comprising: | E.g., Abstract, "In a vehicle headlight optical axis automatic adjusting system, a pitch angle in the longitudinal direction of a vehicle is calculated from a signal of a height sensor." | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation." |
| two or more sensors that are each adapted to generate a signal that is representative of a condition of a vehicle, said sensed conditions including two or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value |

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG. 1<br> | former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles."<br><br>E.g., col. 3, lines 40 to 45, "The curve-recognition device K is electrically conductively coupled with a speed signal sensor, or sender, G and includes a speed threshold value device which itself affects the switchover such that the third filter F3 is only coupled to the regulator R if a minimum speed of the motor vehicle is exceeded." |
| a controller that is responsive to said two or more sensor signals for generating at least one output signal | E.g., col. 6, lines 6 to 14, "On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to | E.g., col. 3, lines 30 to 39, "The curve-recognition device K is electrically conductively coupled with the switchover device SE and thereby couples the third filter F3 electrically conductively with the regulator R if a difference signal other than zero is fed to it from the subtractor SU. When no difference signal from the subtractor SU is present, the curve-recognition device K switches the switchover device SE so that the first filter F1 is coupled to the regulator R." |

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | the change in the pitch angle."<br><br>E.g., col. 6, lines 29 to 38, "When the vehicle speed V is equal to or higher than a few km/h (such as 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong filtering is performed so as to remove high frequency components of a vibration at the time of driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding."<br><br>E.g., Fig. 7:<br>FIG. 7<br> | E.g., col. 4, lines 6 to 12, "At the coupling between the switchover device SE and the regulator R, a matching device AE is, here for example, arranged which, upon a switchover by the switchover device SE, adjusts the various nominal values to one another so that discontinuities or jumps in the adjustment and regulation of the illumination range are avoided." |
| only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated | E.g., col. 6, lines 6 to 14, "On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the | E.g., col. 6, line 10 to 34, "In this connection, it is beneficial that upon the presence of a difference between the second, filtered, nominal-value signal to the third, filtered, nominal-value signal and |

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| continuously or unduly frequently in response to relatively small variations in the sensed operating conditions; and | vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle."<br><br>E.g., col. 6, lines 29 to 38, "When the vehicle speed V is equal to or higher than a few km/h (such as 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong filtering is performed so as to remove high frequency components of a vibration at the time of driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding."<br><br>E.g., Fig. 7: | upon termination of a difference is again switched from the third, filtered, nominal-value signal to the first, filtered, nominal-value signal because in this manner, in an uncomplicated and cost effective manner, upon the presence of an inclination change of the motor vehicle body which is not attributable to a change in loading or to road surface unevenness, the regulation of the illumination range of the motor vehicle, in dependence from the third, long, filter time constant results, whereby the third, filtered, nominal-value signal is independent, or substantially independent, from the disturbing, or distorting, short time inclination changes so that after inclination changes of the motor-vehicle body which, for example, are caused by driving about a curve, false adjustments of the illumination range are not caused which can lead to the blinding of oncoming traffic or to losses in illumination range, which eliminates a danger during operation of a motor vehicle." |

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | FIG. 7   | |
| said at least one actuator being adapted to be connected to the headlight to effect movement thereof in accordance with said at least one output signal. | E.g., col. 5, lines 16 to 20, "Output signals from the ECU 20 are supplied to actuators 35R and 35L of right and left headlights 30R and 30L of the vehicle, thereby adjusting the optical axis direction of the right and left headlights 30R and 30L as will be described hereinlater." | E.g., col. 3, lines 16 to 18, "The regulator R regulates the position of adjusting elements, which are shown here in block form and which change the positions of headlights." |

| Limitation of '034 Patent Proposed Claim 2 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 2. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 388. | See claim 1 claim chart, above at page 388. |
| wherein at least one of said two or more sensors generates a signal that is representative of the road speed of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle | E.g., col. 3, lines 40 to 45, "The curve-recognition device K is electrically conductively coupled with a speed signal sensor, or sender, G and includes a speed threshold value device which itself affects the switchover such that the third filter F3 is only coupled to the regulator R if a minimum speed of the motor vehicle is exceeded." |

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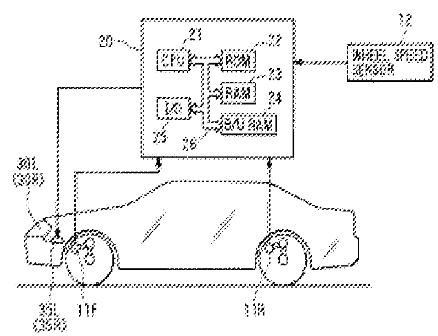
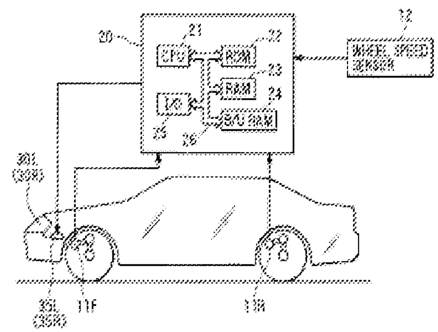
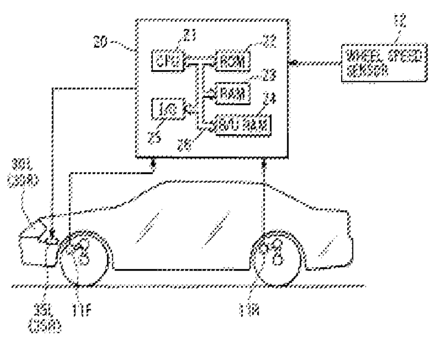
| Limitation of '034 Patent Proposed Claim 2 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG. 1<br> | |

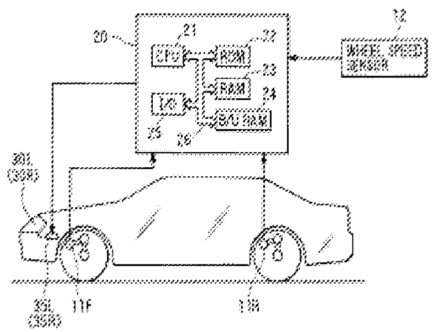
| Limitation of '034 Patent Proposed Claim 4 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 4. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 388. | See claim 1 claim chart, above at page 388. |
| wherein at least one of said two or more sensors generates a signal that is representative of the pitch of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1: | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles." |

| Limitation of '034 Patent Proposed Claim 4 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | FIG. 1  | |

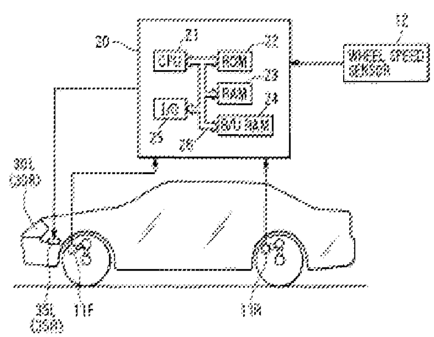
| Limitation of '034 Patent Proposed Claim 5 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 5. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 388. | See claim 1 claim chart, above at page 388. |
| wherein at least one of said two or more sensors generates a signal that is representative of the suspension height of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to |

| Limitation of '034 Patent Proposed Claim 5 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG. 1<br><br> | a first average-value formation."<br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles." |

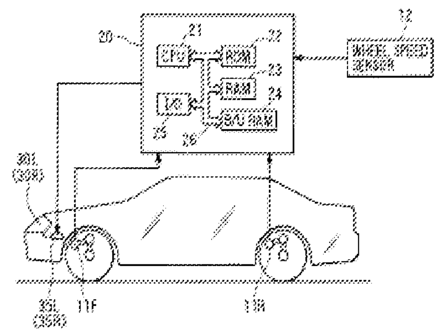
| Limitation of '034 Patent Proposed Claim 6 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 6. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 388. | See claim 1 claim chart, above at page 388. |
| wherein said two or more sensors include a first sensor and a second sensor. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1: | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles."<br><br>E.g., col. 3, lines 40 to 45, "The curve-recognition device K is electrically conductively coupled with a speed signal sensor, or sender, G and includes a speed threshold value device which itself affects the switchover such that the third filter F3 is only |

| Limitation of '034 Patent Proposed Claim 6 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | FIG. 1   | coupled to the regulator R if a minimum speed of the motor vehicle is exceeded." |

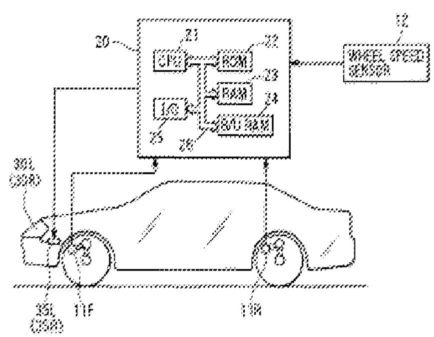
| Limitation of '034 Patent Proposed Claim 9 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 9. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 397. | See claim 6 claim chart, above at page 397. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the suspension height of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to |

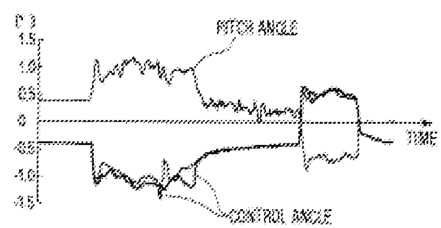
| Limitation of '034 Patent Proposed Claim 9 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG. 1<br><br> | a first average-value formation."<br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles." |

| Limitation of '034 Patent Proposed Claim 10 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 10. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 397. | See claim 6 claim chart, above at page 397. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the road speed of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1: | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles."<br><br>E.g., col. 3, lines 40 to 45, "The curve-recognition device K is electrically conductively coupled with a speed signal sensor, or sender, G and includes a speed threshold value device which itself affects the switchover such that the third filter F3 is only |

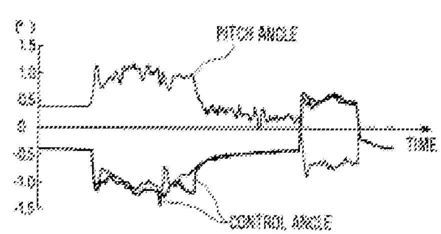
| Limitation of '034 Patent Proposed Claim 10 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | FIG. 1   | coupled to the regulator R if a minimum speed of the motor vehicle is exceeded." |

| Limitation of '034 Patent Proposed Claim 11 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 11. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 397. | See claim 6 claim chart, above at page 397. |
| wherein said first sensor is physically separate from said second sensor. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front | |

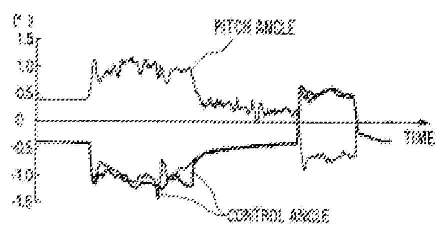
| Limitation of '034 Patent Proposed Claim 11 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG. 1<br><br> | |

| Limitation of '034 Patent Proposed Claim 12 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 12. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 388. | See claim 1 claim chart, above at page 388. |
| wherein said sensed conditions further include one or more of a rate of change of road speed of the vehicle, a rate of change of steering angle of the vehicle, a rate of change of pitch of the vehicle, or a rate of change of suspension height of the vehicle. | E.g., col. 6, lines 6 to 14, "On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle."<br><br>E.g., Fig. 7:<br>FIG. 7<br> | E.g., col. 5, lines 34 to 40, "So that also such inclination changes of the motor-vehicle body which are not attributable to acceleration changes will be recognized and false adjustments during regulation of the illumination range because of such inclination changes will be avoided, the third filter F3 is only placed in connection with the regulator when no acceleration of the motor vehicle is present." |

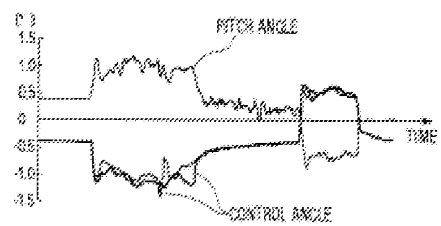
| Limitation of '034 Patent Proposed Claim 13 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 13. The automatic directional control system | See claim 12 claim chart, above at page 403. | See claim 12 claim chart, above at page 403. |

| Limitation of '034 Patent Proposed Claim 13 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| defined in claim 12, | | |
| wherein at least one of said two or more sensors generate a signal that is representative of the rate of change of road speed of the vehicle. | E.g., col. 6, lines 6 to 14, "On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle."<br><br>E.g., Fig. 7:<br>FIG. 7<br> | E.g., col. 5, lines 34 to 40, "So that also such inclination changes of the motor-vehicle body which are not attributable to acceleration changes will be recognized and false adjustments during regulation of the illumination range because of such inclination changes will be avoided, the third filter F3 is only placed in connection with the regulator when no acceleration of the motor vehicle is present." |

| Limitation of '034 Patent Proposed Claim 15 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 15. The automatic directional control system defined in claim 12, | See claim 12 claim chart, above at page 403. | See claim 12 claim chart, above at page 403. |

| Limitation of '034 Patent Proposed Claim 15 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| wherein at least one of said two or more sensors generates a signal that is representative of the rate of change of pitch of the vehicle. | E.g., col. 6, lines 6 to 14, "On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle."<br><br>E.g., Fig. 7:<br>FIG. 7<br> | |

| Limitation of '034 Patent Proposed Claim 16 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 16. The automatic directional control system defined in claim 12, | See claim 12 claim chart, above at page 403. | See claim 12 claim chart, above at page 403. |
| wherein at least one of said two or more sensors | E.g., col. 6, lines 6 to 14, "On the other hand, | |

| Limitation of '034 Patent Proposed Claim 16 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| generates a signal that is representative of the rate of change of suspension height of the vehicle. | when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle."<br><br>E.g., Fig. 7:<br>FIG. 7<br> | |

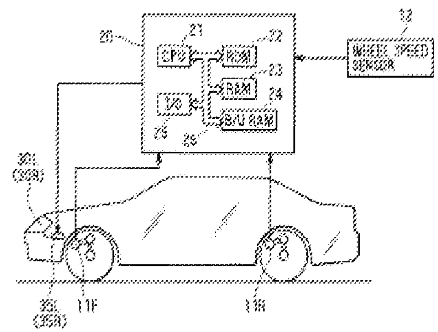
| Limitation of '034 Patent Proposed Claim 17 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 17. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 388. | See claim 1 claim chart, above at page 388. |
| wherein the automatic directional control system is configured to include at least two actuators. | E.g., col. 5, lines 16 to 20, "Output signals from the ECU 20 are supplied to actuators 35R and 35L | |

| Limitation of '034 Patent Proposed Claim 17 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | of right and left headlights 30R and 30L of the vehicle, thereby adjusting the optical axis direction of the right and left headlights 30R and 30L as will be described hereinlater." | |

| Limitation of '034 Patent Proposed Claim 18 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 18. The automatic directional control system defined in claim 17, | See claim 17 claim chart, above at page 406. | See claim 17 claim chart, above at page 406. |
| wherein the at least two actuators include a first actuator that is adapted to be connected to the headlight to effect movement thereof in a vertical direction. | E.g., col. 5, lines 24 to 40, "As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a DC motor for driving the movable member 34 in the directions shown by the double-headed arrow. The movable member 34 is driven in the back and forth directions by the actuator 35L (35R) so that the reflector 32 is vertically inclined about the end of the supporting member 33 as a fulcrum only by an actuator driving angle (target optical axis direction adjusting angle) Θa which will be described hereinlater, thereby adjusting the optical axis direction of the headlight 30L (30R). The optical axis direction of the headlight 30L (30R) is initially set on the assumption that one driver is on | |

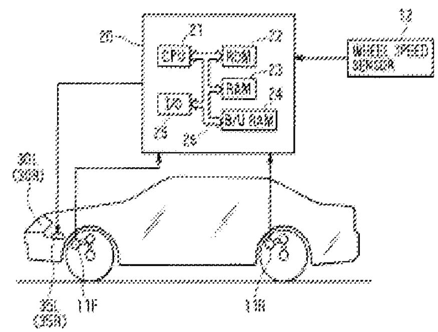
| Limitation of '034 Patent Proposed Claim 18 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | the vehicle." | |

| Limitation of '034 Patent Proposed Claim 20 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 20. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 388. | See claim 1 claim chart, above at page 388. |
| wherein the at least one actuator includes an electronically controlled mechanical actuator. | E.g., col. 5, lines 11 to 15, "The ECU 20 is a logical operating circuit comprising a CPU 21 as a known central processing unit, a ROM 22 in which control programs are stored, a RAM 23 for storing various data, a B/U (back-up) RAM 24, an input/output circuit 25, and a bus line 26 connecting these elements."<br><br>E.g., col. 5, lines 24 to 33, "As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a DC motor for driving the movable member 34 in the directions shown by the double-headed arrow."<br><br>E.g., Fig. 1, | |

| Limitation of '034 Patent Proposed Claim 20 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | FIG. 1   | |

| Limitation of '034 Patent Proposed Claim 21 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 21. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 388. | See claim 1 claim chart, above at page 388. |
| wherein the at least one actuator includes a step motor. | E.g., col. 5, lines 24 to 40, "As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a DC motor for driving the movable member 34 in the directions shown by the double-headed arrow. | |

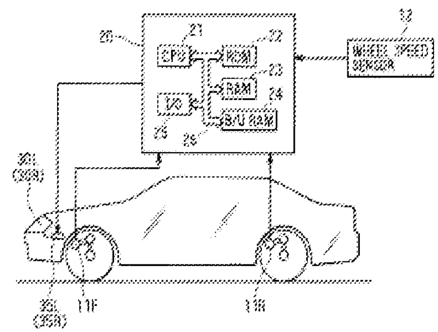
| Limitation of '034 Patent Proposed Claim 22 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 22. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 388. | See claim 1 claim chart, above at page 388. |
| wherein the at least one actuator includes a servo motor. | E.g., col. 5, lines 11 to 15, "The ECU 20 is a logical operating circuit comprising a CPU 21 as a known central processing unit, a ROM 22 in which control programs are stored, a RAM 23 for storing various data, a B/U (back-up) RAM 24, an input/output circuit 25, and a bus line 26 connecting these elements."<br><br>E.g., col. 5, lines 24 to 33, "As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a DC motor for driving the movable member 34 in the directions shown by the double-headed arrow."<br><br>E.g., Fig. 1, | |

| Limitation of '034 Patent Proposed Claim 22 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | FIG. 1  | |

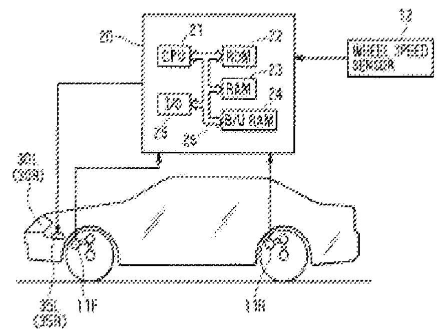
| Limitation of '034 Patent Proposed Claim 25 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 25. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 388. | See claim 1 claim chart, above at page 388. |
| wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted up and down relative to a horizontal reference position. | E.g., col. 5, lines 24 to 40, "As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a DC motor for driving the movable member 34 in the directions shown by the double-headed arrow. | |

| Limitation of '034 Patent Proposed Claim 25 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | The movable member 34 is driven in the back and forth directions by the actuator 35L (35R) so that the reflector 32 is vertically inclined about the end of the supporting member 33 as a fulcrum only by an actuator driving angle (target optical axis direction adjusting angle) Θa which will be described hereinlater, thereby adjusting the optical axis direction of the headlight 30L (30R). The optical axis direction of the headlight 30L (30R) is initially set on the assumption that one driver is on the vehicle." | |

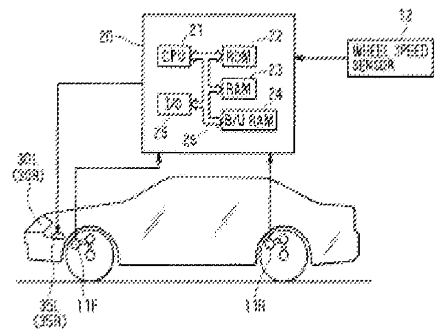
| Limitation of '034 Patent Proposed Claim 28 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 28. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 388. | See claim 1 claim chart, above at page 388. |
| wherein the automatic directional control system is configured such that the controller includes a microprocessor. | E.g., col. 5, lines 11 to 15, "The ECU 20 is a logical operating circuit comprising a CPU 21 as a known central processing unit, a ROM 22 in which control programs are stored, a RAM 23 for storing various data, a B/U (back-up) RAM 24, an input/output circuit 25, and a bus line 26 connecting these elements."<br><br>E.g., Fig. 1, | |

| Limitation of '034 Patent Proposed Claim 28 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | FIG. 1   | |

| Limitation of '034 Patent Proposed Claim 29 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 29. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 388. | See claim 1 claim chart, above at page 388. |
| wherein the automatic directional control system is configured such that the controller includes a programmable electronic controller. | E.g., col. 5, lines 11 to 15, "The ECU 20 is a logical operating circuit comprising a CPU 21 as a known central processing unit, a ROM 22 in which control programs are stored, a RAM 23 for storing various data, a B/U (back-up) RAM 24, an input/output circuit 25, and a bus line 26 connecting these elements."<br><br>E.g., Fig. 1, | |

| Limitation of '034 Patent Proposed Claim 29 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | FIG. 1  | |

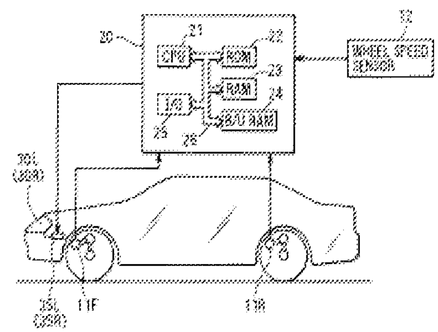
| Limitation of '034 Patent Proposed Claim 33 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 33. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 388. | See claim 1 claim chart, above at page 388. |
| wherein the automatic directional control system further includes memory. | E.g., col. 5, lines 11 to 15, "The ECU 20 is a logical operating circuit comprising a CPU 21 as a known central processing unit, a ROM 22 in which control programs are stored, a RAM 23 for storing various data, a B/U (back-up) RAM 24, an input/output circuit 25, and a bus line 26 connecting these elements."<br><br>E.g., Fig. 1, | |

| Limitation of '034 Patent Proposed Claim 33 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | FIG. 1   | |

| Limitation of '034 Patent Proposed Claim 35 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 35. The automatic directional control system defined in claim 33, | See claim 33 claim chart, above at page 414. | See claim 33 claim chart, above at page 414. |
| wherein the memory is configured to store a predetermined reference position associated with the headlight. | E.g., col. 5, lines 24 to 40, "As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a DC motor for driving the movable member 34 in the directions shown by the double-headed arrow. | |

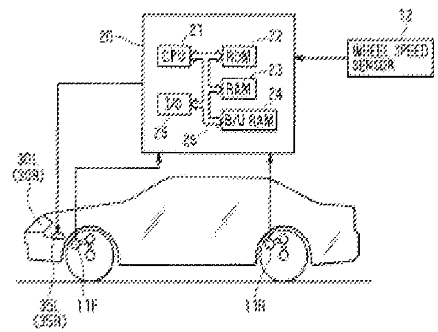
| Limitation of '034 Patent Proposed Claim 35 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | The movable member 34 is driven in the back and forth directions by the actuator 35L (35R) so that the reflector 32 is vertically inclined about the end of the supporting member 33 as a fulcrum only by an actuator driving angle (target optical axis direction adjusting angle) Θa which will be described hereinlater, thereby adjusting the optical axis direction of the headlight 30L (30R). The optical axis direction of the headlight 30L (30R) is initially set on the assumption that one driver is on the vehicle." | |

| Limitation of '034 Patent Proposed Claim 37 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 37. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 388. | See claim 1 claim chart, above at page 388. |
| wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by sensing a front and a rear suspension height of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor |

| Limitation of '034 Patent Proposed Claim 37 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG.1<br> | sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles." |

| Limitation of '034 Patent Proposed Claim 38 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 38. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 388. | See claim 1 claim chart, above at page 388. |

| Limitation of '034 Patent Proposed Claim 38 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by a pitch level sensor. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1: | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles." |

| Limitation of '034 Patent Proposed Claim 38 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | FIG. 1   | |

| Limitation of '034 Patent Proposed Claim 39 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 39. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 388. | See claim 1 claim chart, above at page 388. |
| wherein the automatic directional control system is configured such that the controller is programmed to be responsive to changes in the suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle. | E.g., col. 6, lines 29 to 38, "When the vehicle speed V is equal to or higher than a few km/h (such as 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong filtering is performed so as to remove high frequency components of a vibration at the time of | |

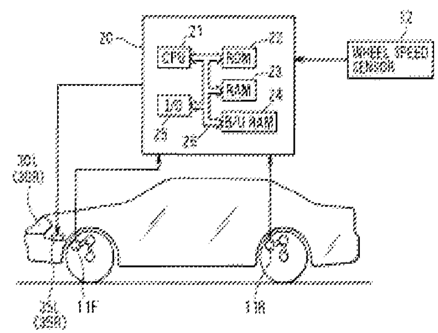
| Limitation of '034 Patent Proposed Claim 39 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
| --- | --- | --- |
| | driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding." | |

| Limitation of '034 Patent Proposed Claim 40 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
| --- | --- | --- |
| 40. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 388. | See claim 1 claim chart, above at page 388. |
| wherein the automatic directional control system is configured such that the controller is programmed to be responsive to changes in the suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle, thereby ignoring frequency changes in the suspension height of the vehicle that are a result of bumps in a road. | E.g., col. 6, lines 29 to 38, "When the vehicle speed V is equal to or higher than a few km/h (such as 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong filtering is performed so as to remove high frequency components of a vibration at the time of driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding." | |

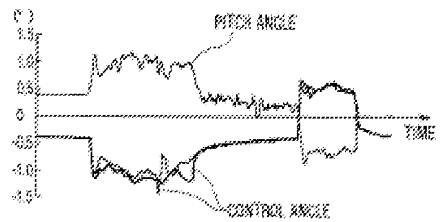
| Limitation of '034 Patent Proposed Claim 41 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
| --- | --- | --- |
| 41. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 388. | See claim 1 claim chart, above at page 388. |

| Limitation of '034 Patent Proposed Claim 41 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| wherein the automatic directional control system is configured such that the predetermined minimum threshold amount functions as a filter to minimize undesirable operation of the at least one actuator. | E.g., col. 6, lines 29 to 38, "When the vehicle speed V is equal to or higher than a few km/h (such as 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong filtering is performed so as to remove high frequency components of a vibration at the time of driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding." | E.g., col. 4, lines 6 to 12, "At the coupling between the switchover device SE and the regulator R, a matching device AE is, here for example, arranged which, upon a switchover by the switchover device SE, adjusts the various nominal values to one another so that discontinuities or jumps in the adjustment and regulation of the illumination range are avoided." |

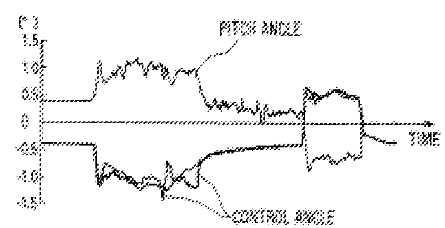
| Limitation of '034 Patent Proposed Claim 42 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 42. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 388. | See claim 1 claim chart, above at page 388. |
| wherein said sensed conditions include three or more of road speed, steering angle, pitch, and suspension height of the vehicle. | E.g., col. 4, line 58 to col. 5, line 8, "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation." |

<table>
<tr><th>Limitation of '034 Patent Proposed Claim 42</th><th>U.S. Patent No. 6,193,398 (Okuchi et al.)</th><th>U.S. Patent No. 5,182,460 (Hussman)</th></tr>
<tr><td></td><td>displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20."<br><br>E.g., Fig. 1:<br>FIG.1<br></td><td>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles."</td></tr>
</table>

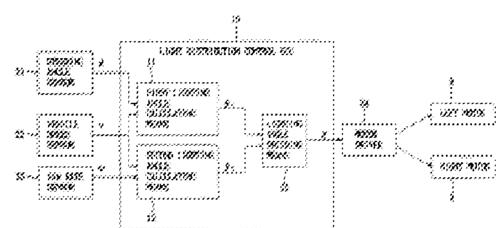
| Limitation of '034 Patent Proposed Claim 44 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 44. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 388. | See claim 1 claim chart, above at page 388. |
| wherein said controller is configured to be responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated continuously in response to relatively small variations in the sensed operating conditions. | E.g., col. 6, lines 6 to 14, "On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle."<br><br>E.g., col. 6, lines 29 to 38, "When the vehicle speed V is equal to or higher than a few km/h (such as 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong filtering is performed so as to remove high frequency components of a vibration at the time of driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding."<br><br>E.g., Fig. 7: | E.g., col. 4, lines 6 to 12, "At the coupling between the switchover device SE and the regulator R, a matching device AE is, here for example, arranged which, upon a switchover by the switchover device SE, adjusts the various nominal values to one another so that discontinuities or jumps in the adjustment and regulation of the illumination range are avoided." |

| Limitation of '034 Patent Proposed Claim 44 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | FIG. 7   | |

| Limitation of '034 Patent Proposed Claim 45 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 45. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 388. | See claim 1 claim chart, above at page 388. |
| wherein controller is configured to be responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated unduly frequently in response to relatively small variations in the sensed operating conditions. | E.g., col. 6, lines 6 to 14, "On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle."<br><br>E.g., col. 6, lines 29 to 38, "When the vehicle speed V is equal to or higher than a few km/h | E.g., col. 4, lines 6 to 12, "At the coupling between the switchover device SE and the regulator R, a matching device AE is, here for example, arranged which, upon a switchover by the switchover device SE, adjusts the various nominal values to one another so that discontinuities or jumps in the adjustment and regulation of the illumination range are avoided." |

| Limitation of '034 Patent Proposed Claim 45 | U.S. Patent No. 6,193,398 (Okuchi et al.) | U.S. Patent No. 5,182,460 (Hussman) |
| --- | --- | --- |
| | (such as 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong filtering is performed so as to remove high frequency components of a vibration at the time of driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding."<br><br>E.g., Fig. 7:<br>FIG. 7<br><br> | |

## 30. Proposed Claims 1 to 13, 20, 22, 24 to 26, 28, 29, 37, 38, 41, 42- 45 Are Unpatentable Over the Combination of Gotoh and Uchida Under 35 U.S.C. § 103(a)

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 A (Uchida) |
|---|---|---|
| 1. An automatic directional control system for a vehicle headlight, comprising: | E.g., Abstract, "A head lamp device for a vehicle capable of changing a lighting region in front of the vehicle in right and left directions, in which change of the lighting region is suppressed so as not to give the driver a sense of incongruity when a steering wheel is operated in one direction and then rapidly in the other as in case of counter-steering." | E.g., page 1, lines 3 to 7, "The present invention relates to a vehicle lamp illumination direction control device which detects the posture of a vehicle and correctly adjusts the illumination direction of a vehicle lamp so that the illumination direction can be always kept in a predetermined direction." |
| two or more sensors that are each adapted to generate a signal that is representative of a condition of a vehicle, said sensed conditions including two or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3<br><br>FIG. 3 | E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2."<br><br>E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture |

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 A (Uchida) |
| --- | --- | --- |
| | | detection device 2."<br><br>E.g., Page 9, lines 24 to 28 "Firstly, the method i) is a method which judges whether the vehicle is in the acceleration or deceleration running condition or not by detecting the running speed of the vehicle to calculate the change of the speed with time, that is, by calculating the acceleration of the vehicle."<br><br>E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof |

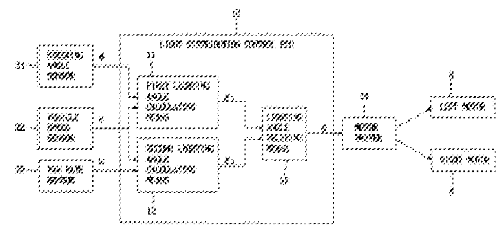
| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 A (Uchida) |
|---|---|---|
| | | and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree."<br><br>E.g., page 15, line 30 to page 16, line 2 "As has been described above, according to the respective methods, it is possible to judge whether the vehicle is running in the acceleration condition or in the deceleration condition. Also, these methods can be applied in various manners, for example, the respective methods can be used individually, or some of them may be combined together for the enhanced accuracy of the judgment." |
| a controller that is responsive to said two or more sensor signals for generating at least one output signal | E.g., Col. 4, lines 59 to 60, "The motor 8 is controlled for its driving by a light distribution control ECU 10." | E.g., page 4, lines 16 to 27 "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of |

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 A (Uchida) |
|---|---|---|
| | | the vehicle." |
| only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating conditions; and | E.g., col. 6, line 42 to col. 7, line 2, "Referring to FIG. 8, from changes of the steering angle φ and the yaw angular velocity ω of FIGS. 7A and 7B, the following is understood. When the vehicle goes around the rightward curve, the steering wheel is turned to the right to have a positive steering angle φ at first, and the vehicle body yaws somewhat after the change of steering angle φ so that the yaw angular velocity ω increases following increase of the steering angle.<br><br>In the meantime, the rear part of the vehicle is swung outside large, and therefore the driver turns the steering wheel to the left or in the opposite direction rapidly for counter-steering to recover direction of the vehicle. Namely, the steering angle φ changes from an upward incline to a downward incline in FIG. 7A. However, the yaw angular velocity ω is maintained due to inertia.<br><br>Further, when the direction of the vehicle comes to show some recovery, the driver again turns the steering wheel to the right for going around the rightward curve, but he comes to carry out the counter-steering again soon after. Thus, the steering angle φ swings rightward and leftward in large variations.<br><br>However, while the steering angle φ is swinging rightward and leftward as described above, the | E.g., page 4, lines 16 to 27 "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle." |

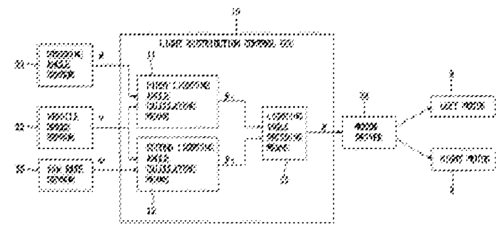
| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 A (Uchida) |
| --- | --- | --- |
| | yaw angular velocity ω is maintained at a certain angular velocity stably in general, and at a time somewhat before the vehicle passes through the curve completely, the yaw angular velocity ω comes to coincide with the steering angle φ."<br><br>E.g., Col. 7, lines 34 to 39, "Since the actual light distribution control is performed on the basis of the above-mentioned final lighting angle θ, even if the steering wheel is operated rapidly for the counter-steering and the like, change of the lighting region is suppressed pertinently and the driver is given no sense of incongruity." | |
| said at least one actuator being adapted to be connected to the headlight to effect movement thereof in accordance with said at least one output signal. | | E.g., page 16, line 28 to page 17, line 6 "Also, if it is judged by the acceleration or deceleration running condition judging device 3b that the vehicle is not in the acceleration or deceleration running condition, then the illumination angle of the lamp 5 can be controlled by one of the following methods when the drive control device 4a receives an instruction from the acceleration or deceleration running condition judging device 3b: 1) a method for fixing the illumination angle; 2) a method for limiting the range of the illumination angle or forbidding part of the range of the illumination angle; and, 3) a method for changing the response speed or control speed of an actuator."<br><br>E.g., page 7, lines 4 to 9, "In particular, the correction calculating device 3a is structured in the |

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 A (Uchida) |
|---|---|---|
| | | following manner: that is, in accordance with a detect signal from the vehicle posture detection device 2, it transmits a control signal to the drive device 4 so that the illumination direction of the lamp 5 can be always kept in a given direction." See also 7:9-32.<br><br>E.g., page 8, lines 1 to 9, "When the judging device 3b judges that the vehicle is in an acceleration or deceleration running condition, in accordance with a control signal transmitted from the correction calculating device 3a to the drive control device 4a, the acceleration or deceleration running condition judging device 3b transmits to the drive control device 4a a signal which allows the illumination direction of the lamp 5 to be corrected in a predetermined direction." |

| Limitation of '034 Patent Proposed Claim 2 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| 2. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 426. | See claim 1 claim chart, above at page 426. |
| wherein at least one of said two or more sensors generates a signal that is representative of the road speed of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v | E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using |

| Limitation of '034 Patent Proposed Claim 2 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| | and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3<br><br><br>FIG. 3 | the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2."<br><br>E.g., Page 9, lines 24 to 28 "Firstly, the method i) is a method which judges whether the vehicle is in the acceleration or deceleration running condition or not by detecting the running speed of the vehicle to calculate the change of the speed with time, that is, by calculating the acceleration of the vehicle." |

| Limitation of '034 Patent Proposed Claim 3 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| 3. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 426. | See claim 1 claim chart, above at page 426. |
| wherein at least one of said two or more sensors generates a signal that is representative of the steering angle of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3 | |

| Limitation of '034 Patent Proposed Claim 3 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| |  FIG. 5 | |

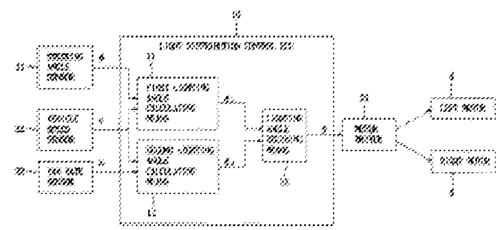
| Limitation of '034 Patent Proposed Claim 4 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| 4. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 426. | See claim 1 claim chart, above at page 426. |
| wherein at least one of said two or more sensors generates a signal that is representative of the pitch of the vehicle. | | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is |

| Limitation of '034 Patent Proposed Claim 4 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| | | calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

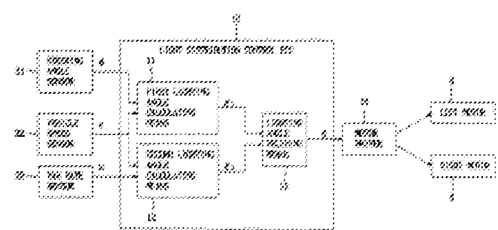
| Limitation of '034 Patent Proposed Claim 5 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| 5. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 426. | See claim 1 claim chart, above at page 426. |
| wherein at least one of said two or more sensors generates a signal that is representative of the suspension height of the vehicle. | | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used |

| Limitation of '034 Patent Proposed Claim 5 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| | | height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Proposed Claim 6 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| 6. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 426. | See claim 1 claim chart, above at page 426. |
| wherein said two or more sensors include a first sensor and a second sensor. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the | E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; |

| Limitation of '034 Patent Proposed Claim 6 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| | vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3<br><br>FIG. 3 | ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2."<br><br>E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is |

| Limitation of '034 Patent Proposed Claim 6 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| | | detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Proposed Claim 7 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| 7. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 435. | See claim 6 claim chart, above at page 435. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the road speed of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the steering angle of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3<br><br>FIG. 3 | E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2."<br><br>E.g., Page 9, lines 24 to 28 "Firstly, the method i) is a method which judges whether the vehicle is in the acceleration or deceleration running condition or not by detecting the running speed of the vehicle to calculate the change of the speed with time, that is, by calculating the acceleration of the vehicle." |

| Limitation of '034 Patent Proposed Claim 8 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| 8. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 435. | See claim 6 claim chart, above at page 435. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the steering angle of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω." | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed |

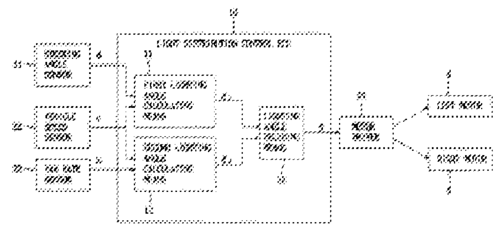
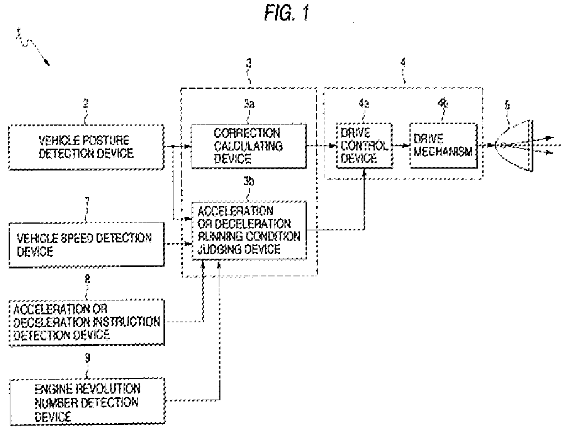
| Limitation of '034 Patent Proposed Claim 8 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| | | to a certain degree." |

| Limitation of '034 Patent Proposed Claim 9 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| 9. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 435. | See claim 6 claim chart, above at page 435. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the suspension height of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle. | | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the |

| Limitation of '034 Patent Proposed Claim 9 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| | | inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Proposed Claim 10 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| 10. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 435. | See claim 6 claim chart, above at page 435. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the road speed of the vehicle. | | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the |

| Limitation of '034 Patent Proposed Claim 10 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| | | acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree."<br><br>E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2."<br><br>E.g., Page 9, lines 24 to 28 "Firstly, the method i) is a method which judges whether the vehicle is in the acceleration or deceleration running condition or not by detecting the running speed of the vehicle to calculate the change of the speed with time, that is, by calculating the acceleration of the vehicle." |

| Limitation of '034 Patent Proposed Claim 11 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| 11. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 435. | See claim 6 claim chart, above at page 435. |
| wherein said first sensor is physically separate from said second sensor. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3<br><br>FIG. 3 | E.g., page 6, line 30 to page 7, line 3, "In order for the vehicle posture detection device and the acceleration or deceleration running condition judging device to transmit signals to one another, they must be separate: "The outputs of the vehicle posture detection device 2 are transmitted to the correction calculating device 3a and acceleration or deceleration running condition judging device 3b which cooperate together in forming the control device 3, and these outputs are used as control signals to be applied to the drive device 4 and are then used as instructions for correcting the illumination of lamp 5."<br><br>E.g., Fig. 1:<br>FIG. 1<br> |

| Limitation of '034 Patent Proposed Claim 12 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| 12. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 426. | See claim 1 claim chart, above at page 426. |
| wherein said sensed conditions further include one or more of a rate of change of road speed of the vehicle, a rate of change of steering angle of the vehicle, a rate of change of pitch of the vehicle, or a rate of change of suspension height of the vehicle. | | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the |

| Limitation of '034 Patent Proposed Claim 12 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| | | running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Proposed Claim 13 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| 13. The automatic directional control system defined in claim 12, | See claim 12 claim chart, above at page 443. | See claim 12 claim chart, above at page 443. |
| wherein at least one of said two or more sensors generate a signal that is representative of the rate of change of road speed of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω." | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof |

| Limitation of '034 Patent Proposed Claim 13 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| | | and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Proposed Claim 20 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| 20. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 426. | See claim 1 claim chart, above at page 426. |
| wherein the at least one actuator includes an electronically controlled mechanical actuator. | | E.g., page 19, lines 6 to 22 "For example, when the actuator incorporates therein a DC (direct current) motor, a difference between the control target position (or angle) of the actuator and the current position (or angle) thereof is detected, and a pulse signal having a duty cycle corresponding to the detected position difference is supplied to the DC motor to thereby control the position of the actuator, as shown in Fig. 11, if the characteristic of the duty cycle DT with respect to the position difference δxx is changed from the state of a relatively faster response speed shown by a broken line 10 to the state of a slow response speed shown by a solid line 11, with respect to the same position difference δxx=δxxa, the duty cycle DT in the other running conditions of the vehicle than the acceleration or deceleration running condition |

| Limitation of '034 Patent Proposed Claim 20 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| | | thereof is smaller than the duty cycle in the acceleration or deceleration running condition of the vehicle, so that the drive control on the lamp 5 by the actuator is slowed down." |

| Limitation of '034 Patent Proposed Claim 22 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| 22. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 426. | See claim 1 claim chart, above at page 426. |
| wherein the at least one actuator includes a servo motor. | | E.g., page 19, lines 6 to 22 "For example, when the actuator incorporates therein a DC (direct current) motor, a difference between the control target position (or angle) of the actuator and the current position (or angle) thereof is detected, and a pulse signal having a duty cycle corresponding to the detected position difference is supplied to the DC motor to thereby control the position of the actuator, as shown in Fig. 11, if the characteristic of the duty cycle DT with respect to the position difference δxx is changed from the state of a relatively faster response speed shown by a broken line 10 to the state of a slow response speed shown by a solid line 11, with respect to the same position difference δxx=δxxa, the duty cycle DT in the other running conditions of the vehicle than the acceleration or deceleration running condition thereof is smaller than the duty cycle in the acceleration or deceleration running condition of the vehicle, so that the drive control on the lamp 5 |

| Limitation of '034 Patent Proposed Claim 22 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| | | by the actuator is slowed down." |

| Limitation of '034 Patent Proposed Claim 24 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| 24. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 426. | See claim 1 claim chart, above at page 426. |
| wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted relative to the vehicle. | E.g., col. 4, lines 32 to 38, "The vehicle 1 of the preferred embodiment has head lights 2 for lighting the space in front of the vehicle installed such that they are swingable in rightward and leftward horizontal directions. FIG. 1 is a view showing the vehicle 1 from above and in this figure, the right and left head lights 2,2 are swung rightward so as to cause the right forward regions to become lighting regions 3, 3." | E.g., page 16, lines 6 to 15 "The simplest method for changing the illumination pattern of the lamp 5 in a vertical plane is a method which changes the illumination angle of the lamp 5 with respect to a horizontal plane by rotating the entire lamp 5 about the rotary shaft thereof. For example, the right and left side surfaces of the lamp 5 are supported in a freely rotatable manner and the rotary shaft of the lamp 5 is rotated directly by a drive source such as a motor or the like, or, there is available a drive mechanism in which a member fixed to the lamp 5 or formed integrally with the lamp 5 is rotated by the drive device 4." |

| Limitation of '034 Patent Proposed Claim 25 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| 25. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 426. | See claim 1 claim chart, above at page 426. |
| wherein the automatic directional control system is configured such that the headlight is adjustably | | E.g., page 16, lines 6 to 15 "The simplest method for changing the illumination pattern of the lamp 5 |

| Limitation of '034 Patent Proposed Claim 25 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted up and down relative to a horizontal reference position. | | in a vertical plane is a method which changes the illumination angle of the lamp 5 with respect to a horizontal plane by rotating the entire lamp 5 about the rotary shaft thereof. For example, the right and left side surfaces of the lamp 5 are supported in a freely rotatable manner and the rotary shaft of the lamp 5 is rotated directly by a drive source such as a motor or the like, or, there is available a drive mechanism in which a member fixed to the lamp 5 or formed integrally with the lamp 5 is rotated by the drive device 4." |

| Limitation of '034 Patent Proposed Claim 26 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| 26. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 426. | See claim 1 claim chart, above at page 426. |
| wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted left and right relative to a vertical reference position. | E.g., col. 4, lines 32 to 38, "The vehicle 1 of the preferred embodiment has head lights 2 for lighting the space in front of the vehicle installed such that they are swingable in rightward and leftward horizontal directions. FIG. 1 is a view showing the vehicle 1 from above and in this figure, the right and left head lights 2,2 are swung rightward so as to cause the right forward regions to become lighting regions 3, 3." | |

| Limitation of '034 Patent Proposed Claim 28 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| 28. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 426. | See claim 1 claim chart, above at page 426. |
| wherein the automatic directional control system is configured such that the controller includes a microprocessor. | E.g., col. 4, lines 56 to 60, "Accordingly, the lamp unit 4 is swung together with the rotary shaft 5 through an engagement between the worm gear 7 and the worm wheel 6 under a driving of the motor 8. The motor 8 is controlled for its driving by a light distribution control ECU 10." | |

| Limitation of '034 Patent Proposed Claim 29 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| 29. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 426. | See claim 1 claim chart, above at page 426. |
| wherein the automatic directional control system is configured such that the controller includes a programmable electronic controller. | E.g., col. 4, lines 56 to 60, "Accordingly, the lamp unit 4 is swung together with the rotary shaft 5 through an engagement between the worm gear 7 and the worm wheel 6 under a driving of the motor 8. The motor 8 is controlled for its driving by a light distribution control ECU 10." | |

| Limitation of '034 Patent Proposed Claim 37 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| 37. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 426. | See claim 1 claim chart, above at page 426. |
| wherein the automatic directional control system is | | E.g., Page 12 line 27 to page 13, line 15 "The |

| Limitation of '034 Patent Proposed Claim 37 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| configured such that the pitch of the vehicle is capable of being determined by sensing a front and a rear suspension height of the vehicle. | | remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Proposed Claim 38 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| 38. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 426. | See claim 1 claim chart, above at page 426. |
| wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by a pitch level sensor. | | E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree." |

| Limitation of '034 Patent Proposed Claim 41 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| 41. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 426. | See claim 1 claim chart, above at page 426. |
| wherein the automatic directional control system is configured such that the predetermined minimum threshold amount functions as a filter to minimize undesirable operation of the at least one actuator. | E.g., col. 6, line 42 to col. 7, line 2, "Referring to FIG. 8, from changes of the steering angle φ and the yaw angular velocity ω of FIGS. 7A and 7B, the following is understood. When the vehicle goes around the rightward curve, the steering wheel is turned to the right to have a positive steering angle φ at first, and the vehicle body yaws somewhat after the change of steering angle φ so that the yaw angular velocity ω increases following increase of the steering angle.<br><br>In the meantime, the rear part of the vehicle is swung outside large, and therefore the driver turns the steering wheel to the left or in the opposite direction rapidly for counter-steering to recover direction of the vehicle. Namely, the steering angle φ changes from an upward incline to a downward incline in FIG. 7A. However, the yaw angular velocity ω is maintained due to inertia.<br><br>Further, when the direction of the vehicle comes to show some recovery, the driver again turns the steering wheel to the right for going around the rightward curve, but he comes to carry out the counter-steering again soon after. Thus, the steering angle φ swings rightward and leftward in large variations. | E.g., page 4, lines 16 to 27, "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle." |

| Limitation of '034 Patent Proposed Claim 41 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| | However, while the steering angle φ is swinging rightward and leftward as described above, the yaw angular velocity ω is maintained at a certain angular velocity stably in general, and at a time somewhat before the vehicle passes through the curve completely, the yaw angular velocity ω comes to coincide with the steering angle φ." E.g., Col. 7, lines 34 to 39, "Since the actual light distribution control is performed on the basis of the above-mentioned final lighting angle θ, even if the steering wheel is operated rapidly for the counter-steering and the like, change of the lighting region is suppressed pertinently and the driver is given no sense of incongruity."<br><br>E.g., col. 7, lines 34 to 39, "Since the actual light distribution control is performed on the basis of the above-mentioned final lighting angle 9, even 35 if the steering wheel is operated rapidly for the countersteering and the like, change of the lighting region is suppressed pertinently and the driver is given no sense of incongruity." | |

| Limitation of '034 Patent Proposed Claim 42 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| 42. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 426. | See claim 1 claim chart, above at page 426. |
| wherein said sensed conditions include three or | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block | E.g., Page 9, lines 13 to 23, "At first, the judging |

| Limitation of '034 Patent Proposed Claim 42 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| more of road speed, steering angle, pitch, and suspension height of the vehicle. | diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω." | method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2."<br><br>E.g., Page 9, lines 24 to 28 "Firstly, the method i) is a method which judges whether the vehicle is in the acceleration or deceleration running condition or not by detecting the running speed of the vehicle to calculate the change of the speed with time, that is, by calculating the acceleration of the vehicle."<br><br>E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the |

| Limitation of '034 Patent Proposed Claim 42 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
| --- | --- | --- |
| | | detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree."<br><br>E.g., page 15, line 30 to page 16, line 2 "As has been described above, according to the respective methods, it is possible to judge whether the vehicle is running in the acceleration condition or in the deceleration condition. Also, these methods can be applied in various manners, for example, the respective methods can be used individually, or some of them may be combined together for the enhanced accuracy of the judgment." |

| Limitation of '034 Patent Proposed Claim 43 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
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| 43. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 426. | See claim 1 claim chart, above at page 426. |

| Limitation of '034 Patent Proposed Claim 43 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| wherein said sensed conditions include all four of road speed, steering angle, pitch, and suspension height of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω." | E.g., Page 9, lines 13 to 23, "At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods: i) a method using the vehicle speed detection device; ii) a method using the acceleration or deceleration instruction detection device 8; iii) a method using the engine revolution number detection device 9; and iv) a method using the vehicle posture detection device 2."<br><br>E.g., Page 9, lines 24 to 28 "Firstly, the method i) is a method which judges whether the vehicle is in the acceleration or deceleration running condition or not by detecting the running speed of the vehicle to calculate the change of the speed with time, that is, by calculating the acceleration of the vehicle."<br><br>E.g., Page 12 line 27 to page 13, line 15 "The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height |

| Limitation of '034 Patent Proposed Claim 43 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| | | detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so-called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree."<br><br>E.g., page 15, line 30 to page, 16, line 2 "As has been described above, according to the respective methods, it is possible to judge whether the vehicle is running in the acceleration condition or in the deceleration condition. Also, these methods can be applied in various manners, for example, the respective methods can be used individually, or some of them may be combined together for the enhanced accuracy of the judgment." |

| Limitation of '034 Patent Proposed Claim 44 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| 44. The automatic directional control system | See claim 1 claim chart, above at page 426. | See claim 1 claim chart, above at page 426. |

| Limitation of '034 Patent Proposed Claim 44 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| defined in claim 1, | | |
| wherein said controller is configured to be responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated continuously in response to relatively small variations in the sensed operating conditions. | E.g., col. 6, line 42 to col. 7, line 2, "Referring to FIG. 8, from changes of the steering angle φ and the yaw angular velocity ω of FIGS. 7A and 7B, the following is understood. When the vehicle goes around the rightward curve, the steering wheel is turned to the right to have a positive steering angle φ at first, and the vehicle body yaws somewhat after the change of steering angle φ so that the yaw angular velocity ω increases following increase of the steering angle.<br><br>In the meantime, the rear part of the vehicle is swung outside large, and therefore the driver turns the steering wheel to the left or in the opposite direction rapidly for counter-steering to recover direction of the vehicle. Namely, the steering angle φ changes from an upward incline to a downward incline in FIG. 7A. However, the yaw angular velocity ω is maintained due to inertia.<br><br>Further, when the direction of the vehicle comes to show some recovery, the driver again turns the steering wheel to the right for going around the rightward curve, but he comes to carry out the counter-steering again soon after. Thus, the steering angle φ swings rightward and leftward in large variations.<br><br>However, while the steering angle φ is swinging rightward and leftward as described above, the | E.g., page 4, lines 16 to 27 "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle." |

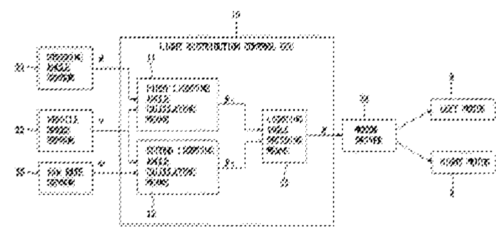
| Limitation of '034 Patent Proposed Claim 44 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| | yaw angular velocity ω is maintained at a certain angular velocity stably in general, and at a time somewhat before the vehicle passes through the curve completely, the yaw angular velocity ω comes to coincide with the steering angle φ."<br><br>E.g., col. 7, lines 34 to 39, "Since the actual light distribution control is performed on the basis of the above-mentioned final lighting angle 9, even 35 if the steering wheel is operated rapidly for the countersteering and the like, change of the lighting region is suppressed pertinently and the driver is given no sense of incongruity." | |

| Limitation of '034 Patent Proposed Claim 45 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| 45. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 426. | See claim 1 claim chart, above at page 426. |
| wherein controller is configured to be responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated unduly frequently in response to relatively small variations in the sensed operating conditions. | E.g., col. 6, line 42 to col. 7, line 2, "Referring to FIG. 8, from changes of the steering angle φ and the yaw angular velocity ω of FIGS. 7A and 7B, the following is understood. When the vehicle goes around the rightward curve, the steering wheel is turned to the right to have a positive steering angle φ at first, and the vehicle body yaws somewhat after the change of steering angle φ so that the yaw angular velocity ω increases following increase of the steering angle. | E.g., page 4, lines 16 to 27 "According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed |

| Limitation of '034 Patent Proposed Claim 45 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 773 (Uchida) |
|---|---|---|
| | In the meantime, the rear part of the vehicle is swung outside large, and therefore the driver turns the steering wheel to the left or in the opposite direction rapidly for counter-steering to recover direction of the vehicle. Namely, the steering angle φ changes from an upward incline to a downward incline in FIG. 7A. However, the yaw angular velocity ω is maintained due to inertia.<br><br>Further, when the direction of the vehicle comes to show some recovery, the driver again turns the steering wheel to the right for going around the rightward curve, but he comes to carry out the counter-steering again soon after. Thus, the steering angle φ swings rightward and leftward in large variations.<br><br>However, while the steering angle φ is swinging rightward and leftward as described above, the yaw angular velocity ω is maintained at a certain angular velocity stably in general, and at a time somewhat before the vehicle passes through the curve completely, the yaw angular velocity ω comes to coincide with the steering angle φ."<br><br>E.g., col. 7, lines 34 to 39, "Since the actual light distribution control is performed on the basis of the above-mentioned final lighting angle 9, even if the steering wheel is operated rapidly for the countersteering and the like, change of the lighting region is suppressed pertinently and the driver is given no sense of incongruity." | excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle." |

## 31. Proposed Claims 1 to 12, 14, 16 to 18, 20 to 22, 24 to 26, 28, 29, 33, 34, 37, 38, and 41 to 45 Are Unpatentable Over the Combination of Gotoh and Takahashi Under 35 U.S.C. § 103(a)

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 1. An automatic directional control system for a vehicle headlight, comprising: | E.g., Abstract, "A head lamp device for a vehicle capable of changing a lighting region in front of the vehicle in right and left directions, in which change of the lighting region is suppressed so as not to give the driver a sense of incongruity when a steering wheel is operated in one direction and then rapidly in the other as in case of counter-steering." | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp." |
| two or more sensors that are each adapted to generate a signal that is representative of a condition of a vehicle, said sensed conditions including two or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3 | E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle."<br><br>E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the |

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
| --- | --- | --- |
| |  FIG. 5 | running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle."<br><br>E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br><br>E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such |

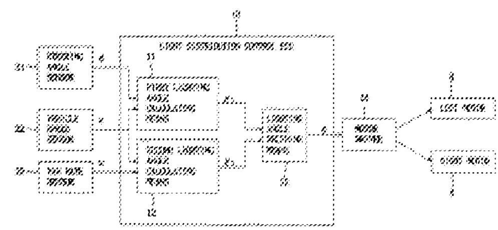
| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
| --- | --- | --- |
| | | as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |
| a controller that is responsive to said two or more sensor signals for generating at least one output signal | E.g., Col. 4, lines 59 to 60, "The motor 8 is controlled for its driving by a light distribution control ECU 10." | E.g., page 8, lines 26 to 32 "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2."<br><br>E.g., page 9, lines 16 to 34 "Also, in order to prevent the illumination direction of the lamp 6 from being corrected inadvertently when a sudden change in the posture of the vehicle occurs temporarily or due to the wrong operation of the lamp 6 caused by external disturbances, for example, when the vehicle makes a sudden start or a sudden stop, preferably, a threshold value with respect to time may be set in detection of the road gradient and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a threshold value with respect to the running |

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a distance equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected." |
| only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating conditions; and | E.g., col. 6, line 42 to col. 7, line 2, "Referring to FIG. 8, from changes of the steering angle φ and the yaw angular velocity ω of FIGS. 7A and 7B, the following is understood. When the vehicle goes around the rightward curve, the steering wheel is turned to the right to have a positive steering angle φ at first, and the vehicle body yaws somewhat after the change of steering angle φ so that the yaw angular velocity ω increases following increase of the steering angle.<br><br>In the meantime, the rear part of the vehicle is swung outside large, and therefore the driver turns the steering wheel to the left or in the opposite direction rapidly for counter-steering to recover direction of the vehicle. Namely, the steering angle φ changes from an upward incline to a downward incline in FIG. 7A. However, the yaw angular velocity ω is maintained due to inertia.<br><br>Further, when the direction of the vehicle comes to show some recovery, the driver again turns the steering wheel to the right for going around the rightward curve, but he comes to carry out the | E.g., page 8, lines 26 to 32 "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2."<br><br>E.g., page 9, lines 16 to 34 "Also, in order to prevent the illumination direction of the lamp 6 from being corrected inadvertently when a sudden change in the posture of the vehicle occurs temporarily or due to the wrong operation of the lamp 6 caused by external disturbances, for example, when the vehicle makes a sudden start or a sudden stop, preferably, a threshold value with respect to time may be set in detection of the road gradient and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a |

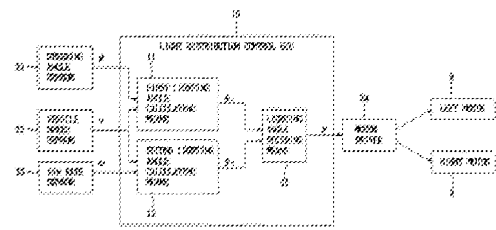
| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | counter-steering again soon after. Thus, the steering angle φ swings rightward and leftward in large variations.<br><br>However, while the steering angle φ is swinging rightward and leftward as described above, the yaw angular velocity ω is maintained at a certain angular velocity stably in general, and at a time somewhat before the vehicle passes through the curve completely, the yaw angular velocity ω comes to coincide with the steering angle φ."<br><br>E.g., Col. 7, lines 34 to 39, "Since the actual light distribution control is performed on the basis of the above-mentioned final lighting angle θ, even if the steering wheel is operated rapidly for the counter-steering and the like, change of the lighting region is suppressed pertinently and the driver is given no sense of incongruity." | threshold value with respect to the running distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a distance equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected." |
| said at least one actuator being adapted to be connected to the headlight to effect movement thereof in accordance with said at least one output signal. | | E.g., page 2, lines 14 to 17 "However, in the above-mentioned automatic adjustment device, since the lamp is driven with high frequency, an actuator used in a drive mechanism for driving the lamp is required to show high response property and high durability."<br><br>E.g., page 6, lines 26 to 32 "When the control device 4 receives the detect signal of the vehicle running condition detection device 3 and finds from this detect signal that the vehicle is standing still, the control device 4, in accordance with |

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
| --- | --- | --- |
| | | information on the vehicle posture obtained from the vehicle posture detection device 2, transmits to the drive signal 5 a control signal for correction of the illumination direction of the lamp 6."<br><br>E.g., page 7, lines 12 to 17 "In view of this, the control device 4 is structured such that, based on the information from the vehicle posture detection device 2, it can detect the amount of variations in the gradient of the road and, therefore, when the road gradient varies suddenly, it can correct the illumination direction of the lamp 6."<br>E.g., page 11, lines 12 to 16, "The correction of the illumination direction of the lamp 6 in Step S5 is carried out by the drive device 5 based on the control signal transmitted from the control device 4 and, as a method for executing such correction, there are available two methods as follows: 1) a method for inclining the entire lamp, and, 2) a method for moving the component (such as a lens, a reflector, a shade or the like) of the optical system of the lamp." |

| Limitation of '034 Patent Proposed Claim 2 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
| --- | --- | --- |
| 2. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 461. | See claim 1 claim chart, above at page 461. |
| wherein at least one of said two or more sensors generates a signal that is representative of the road | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing | E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the |

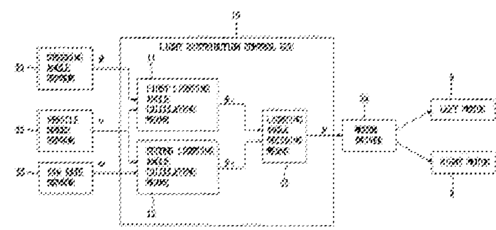
| Limitation of '034 Patent Proposed Claim 2 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| speed of the vehicle. | the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3<br><br><br>FIG. 3 | running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle." |

| Limitation of '034 Patent Proposed Claim 3 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 3. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 461. | See claim 1 claim chart, above at page 461. |
| wherein at least one of said two or more sensors generates a signal that is representative of the steering angle of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle | |

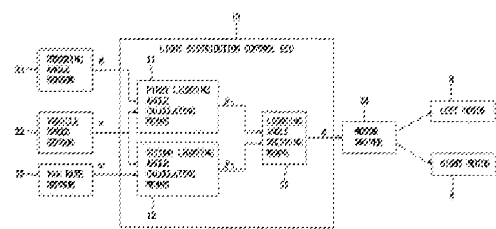
| Limitation of '034 Patent Proposed Claim 3 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3<br><br>FIG. 3 | |

| Limitation of '034 Patent Proposed Claim 4 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 4. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 461. | See claim 1 claim chart, above at page 461. |
| wherein at least one of said two or more sensors generates a signal that is representative of the pitch of the vehicle. | | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp." |

| Limitation of '034 Patent Proposed Claim 5 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 5. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 461. | See claim 1 claim chart, above at page 461. |
| wherein at least one of said two or more sensors generates a signal that is representative of the suspension height of the vehicle. | | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br><br>E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |

| Limitation of '034 Patent Proposed Claim 6 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 6. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 461. | See claim 1 claim chart, above at page 461. |
| wherein said two or more sensors include a first sensor and a second sensor. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3<br><br>FIG. 3 | E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle."<br><br>E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the |

| Limitation of '034 Patent Proposed Claim 6 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | vehicle." |

| Limitation of '034 Patent Proposed Claim 7 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 7. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 470. | See claim 6 claim chart, above at page 470. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the road speed of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the steering angle of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle $\varphi$, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) $\omega$."<br><br>E.g., Figure 3<br><br>FIG. 3 | E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle." |

| Limitation of '034 Patent Proposed Claim 8 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 8. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 470. | See claim 6 claim chart, above at page 470. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the steering angle of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω." | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp." |

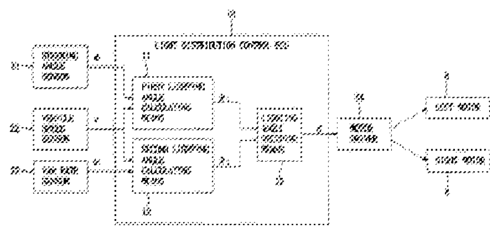
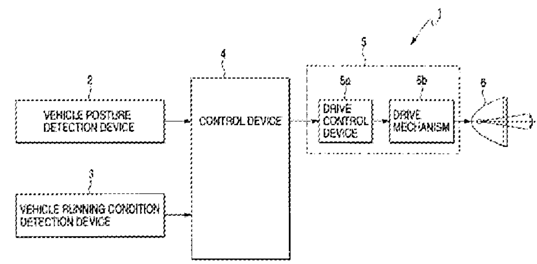
| Limitation of '034 Patent Proposed Claim 9 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 9. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 470. | See claim 6 claim chart, above at page 470. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the suspension height of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle. | | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br><br>E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the |

| Limitation of '034 Patent Proposed Claim 9 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle."<br><br>E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp." |

| Limitation of '034 Patent Proposed Claim 10 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 10. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 470. | See claim 6 claim chart, above at page 470. |

| **Limitation of '034 Patent Proposed Claim 10** | **U.S. Patent No. 5,909,949 (Gotoh)** | **GB 2 309 774 (Takahashi)** |
|---|---|---|
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the road speed of the vehicle. | | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br><br>E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle." |

| **Limitation of '034 Patent Proposed Claim 11** | **U.S. Patent No. 5,909,949 (Gotoh)** | **GB 2 309 774 (Takahashi)** |
|---|---|---|
| 11. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 470. | See claim 6 claim chart, above at page 470. |
| wherein said first sensor is physically separate | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough | See, e.g., Fig. 1, ref. 2, 3 (Separate detection |

| Limitation of '034 Patent Proposed Claim 11 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| from said second sensor. | block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3<br><br>FIG. 3 | devices). See also 5:25-27 ("an illumination direction control device 1 is composed of vehicle posture detection device 2, vehicle running condition detection device 3, control device 4, drive device 5 . . ., and lamp 6.")<br><br>FIG. 1<br><br> |

| Limitation of '034 Patent Proposed Claim 12 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 12. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 461. | See claim 1 claim chart, above at page 461. |
| wherein said sensed conditions further include one or more of a rate of change of road speed of the vehicle, a rate of change of steering angle of the vehicle, a rate of change of pitch of the vehicle, or | | E.g., page 7, lines 29 to 34, to page 8, line 21 "In particular, Fig. 3 shows schematically the amount of variations in the output level V when the vehicle runs first along an uphill slope and |

| Limitation of '034 Patent Proposed Claim 12 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| a rate of change of suspension height of the vehicle. | | thereafter runs along a road having a small gradient. In this case, when the vehicle runs over the uphill slope the output level V falls down suddenly."<br><br>E.g., page 8, lines 19 to 25, "These figures show clearly that the magnitude of the amount of variations in the road gradients is reflected on the amount of variations in the outputs of the height sensor when the vehicle runs from the road having a small gradient to the road having a large gradient or when the vehicle runs from the road having a large gradient to the road having a small gradient." |

| Limitation of '034 Patent Proposed Claim 14 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 14. The automatic directional control system defined in claim 12, | See claim 12 claim chart, above at page 475. | See claim 12 claim chart, above at page 475. |
| wherein at least one of said two or more sensors generates a signal that is representative of the rate of change of steering angle of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle $\varphi$, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) $\omega$." | E.g., page 7, lines 29 to 34, to page 8, line 21 "In particular, Fig. 3 shows schematically the amount of variations in the output level V when the vehicle runs first along an uphill slope and thereafter runs along a road having a small gradient. In this case, when the vehicle runs over the uphill slope the output level V falls down suddenly."<br><br>E.g., page 8, lines 19 to 25, "These figures show clearly that the magnitude of the amount of |

| Limitation of '034 Patent Proposed Claim 14 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | variations in the road gradients is reflected on the amount of variations in the outputs of the height sensor when the vehicle runs from the road having a small gradient to the road having a large gradient or when the vehicle runs from the road having a large gradient to the road having a small gradient." |

| Limitation of '034 Patent Proposed Claim 16 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 16. The automatic directional control system defined in claim 12, | See claim 12 claim chart, above at page 475. | See claim 12 claim chart, above at page 475. |
| wherein at least one of said two or more sensors generates a signal that is representative of the rate of change of suspension height of the vehicle. | | E.g., page 7, lines 29 to 34, to page 8, line 21 "In particular, Fig. 3 shows schematically the amount of variations in the output level V when the vehicle runs first along an uphill slope and thereafter runs along a road having a small gradient. In this case, when the vehicle runs over the uphill slope the output level V falls down suddenly."<br>E.g., page 8, lines 19 to 25, "These figures show clearly that the magnitude of the amount of variations in the road gradients is reflected on the amount of variations in the outputs of the height sensor when the vehicle runs from the road having a small gradient to the road having a large gradient or when the vehicle runs from the road having a large gradient to the road having a small gradient." |

| Limitation of '034 Patent Proposed Claim 17 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 17. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 461. | See claim 1 claim chart, above at page 461. |
| wherein the automatic directional control system is configured to include at least two actuators. | | E.g., page 16, line 31 to page 17, line 1 "A rudder resistance network 18, which corresponds to the above-mentioned drive control device 5a, is used to convert the output signal of the microcomputer 10 into an analog signal and transmits it to actuators 19 and 19' which are disposed downstream thereof." |

| Limitation of '034 Patent Proposed Claim 18 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 18. The automatic directional control system defined in claim 17, | See claim 17 claim chart, above at page 478. | See claim 17 claim chart, above at page 478. |
| wherein the at least two actuators include a first actuator that is adapted to be connected to the headlight to effect movement thereof in a vertical direction. | | E.g., page 11, lines 21 to 32 "In particular, the method 1) is the simplest method that can change the illumination pattern of the lamp 6 within a vertical plane, in which the entire lamp is rotated about the rotary shaft thereof to thereby change the illumination angle of the lamp 6 with respect to a horizontal plane including the optical axis of the lamp. For example, in the method 1), there can be used a drive mechanism in which the right and left side surfaces of the lamp 6 are supported rotatably, and the rotary shaft of the lamp 6 is rotated directly by a drive source such as a motor or the like, or a member fixed to or formed integrally with the lamp 6 is rotated by the drive device 5." |

| Limitation of '034 Patent Proposed Claim 20 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 20. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 461. | See claim 1 claim chart, above at page 461. |
| wherein the at least one actuator includes an electronically controlled mechanical actuator. | | E.g., page 16, line 31 to page 17, line 1 "A rudder resistance network 18, which corresponds to the above-mentioned drive control device 5a, is used to convert the output signal of the microcomputer 10 into an analog signal and transmits it to actuators 19 and 19' which are disposed downstream thereof."<br><br>E.g., page 11, line 32 to page 12, line 3 "As an example of such lamp, there is available a lamp including a mechanism which can use the rotational force of the motor as the rotational force of the lam through a transmission mechanism using a worm and worm wheel (for example, see Japanese Patent Publication No. Hei. 63-166672)." |

| Limitation of '034 Patent Proposed Claim 21 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 21. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 461. | See claim 1 claim chart, above at page 461. |
| wherein the at least one actuator includes a step motor. | | E.g., page 18, lines 5 to 8 "Besides this, according to the invention, the lamp or the component thereof can be driven or controlled by use of a stepping motor to thereby correct the illumination |

| Limitation of '034 Patent Proposed Claim 21 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | direction of the lamp." |

| Limitation of '034 Patent Proposed Claim 22 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 22. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 461. | See claim 1 claim chart, above at page 461. |
| wherein the at least one actuator includes a servo motor. | | E.g., page 16, line 31 to page 17, line 1 "A rudder resistance network 18, which corresponds to the above-mentioned drive control device 5a, is used to convert the output signal of the microcomputer 10 into an analog signal and transmits it to actuators 19 and 19' which are disposed downstream thereof."<br><br>E.g., page 11, line 32 to page 12, line 3 "As an example of such lamp, there is available a lamp including a mechanism which can use the rotational force of the motor as the rotational force of the lam through a transmission mechanism using a worm and worm wheel (for example, see Japanese Patent Publication No. Hei. 63-166672)." |

| Limitation of '034 Patent Proposed Claim 24 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 24. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 461. | See claim 1 claim chart, above at page 461. |

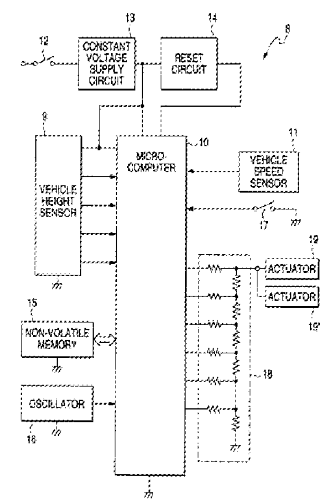
| Limitation of '034 Patent Proposed Claim 24 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted relative to the vehicle. | E.g., col. 4, lines 32 to 38, "The vehicle 1 of the preferred embodiment has head lights 2 for lighting the space in front of the vehicle installed such that they are swingable in rightward and leftward horizontal directions. FIG. 1 is a view showing the vehicle 1 from above and in this figure, the right and left head lights 2,2 are swung rightward so as to cause the right forward regions to become lighting regions 3, 3." | E.g., page 11, lines 21 to 32 "In particular, the method 1) is the simplest method that can change the illumination pattern of the lamp 6 within a vertical plane, in which the entire lamp is rotated about the rotary shaft thereof to thereby change the illumination angle of the lamp 6 with respect to a horizontal plane including the optical axis of the lamp. For example, in the method 1), there can be used a drive mechanism in which the right and left side surfaces of the lamp 6 are supported rotatably, and the rotary shaft of the lamp 6 is rotated directly by a drive source such as a motor or the like, or a member fixed to or formed integrally with the lamp 6 is rotated by the drive device 5." |

| Limitation of '034 Patent Proposed Claim 25 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 25. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 461. | See claim 1 claim chart, above at page 461. |
| wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted up and down relative to a horizontal reference position. | | E.g., page 11, lines 21 to 32 "In particular, the method 1) is the simplest method that can change the illumination pattern of the lamp 6 within a vertical plane, in which the entire lamp is rotated about the rotary shaft thereof to thereby change the illumination angle of the lamp 6 with respect to a horizontal plane including the optical axis of the lamp. For example, in the method 1), there can be used a drive mechanism in which the right and left side surfaces of the lamp 6 are supported rotatably, |

| Limitation of '034 Patent Proposed Claim 25 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | and the rotary shaft of the lamp 6 is rotated directly by a drive source such as a motor or the like, or a member fixed to or formed integrally with the lamp 6 is rotated by the drive device 5." |

| Limitation of '034 Patent Proposed Claim 26 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 26. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 461. | See claim 1 claim chart, above at page 461. |
| wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted left and right relative to a vertical reference position. | E.g., col. 4, lines 32 to 38, "The vehicle 1 of the preferred embodiment has head lights 2 for lighting the space in front of the vehicle installed such that they are swingable in rightward and leftward horizontal directions. FIG. 1 is a view showing the vehicle 1 from above and in this figure, the right and left head lights 2,2 are swung rightward so as to cause the right forward regions to become lighting regions 3, 3." | |

| Limitation of '034 Patent Proposed Claim 28 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 28. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 461. | See claim 1 claim chart, above at page 461. |
| wherein the automatic directional control system is configured such that the controller includes a microprocessor. | E.g., col. 4, lines 56 to 60, "Accordingly, the lamp unit 4 is swung together with the rotary shaft 5 through an engagement between the worm gear 7 | E.g., page 16, lines 1 to 4 "When a turn-on switch 12 for the lamp 6 is put into operation, a supply voltage from a constant voltage supply circuit 13 |

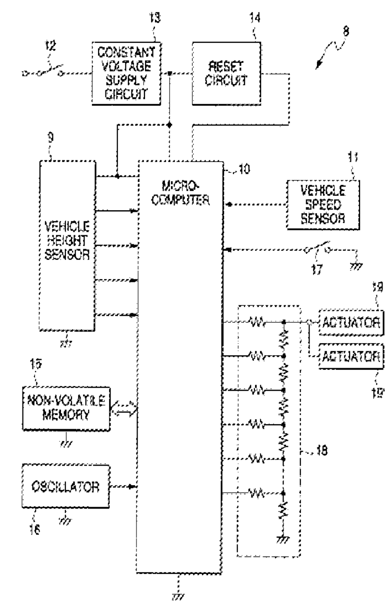
| Limitation of '034 Patent Proposed Claim 28 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | and the worm wheel 6 under a driving of the motor 8. The motor 8 is controlled for its driving by a light distribution control ECU 10." | and a reset signal from a reset circuit 14 are supplied to the microcomputer 10." See also Fig. 9, ref. 10.<br>FIG. 9<br> |



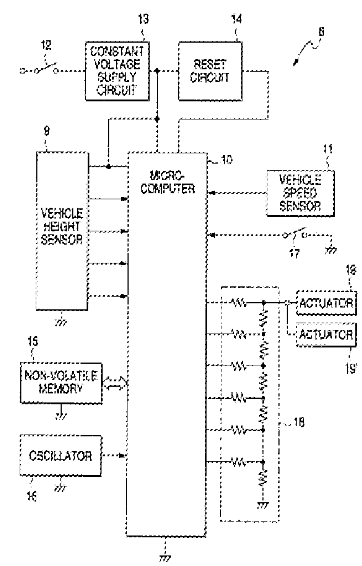
| Limitation of '034 Patent Proposed Claim 29 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 29. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 461. | See claim 1 claim chart, above at page 461. |
| wherein the automatic directional control system is configured such that the controller includes a programmable electronic controller. | E.g., col. 4, lines 56 to 60, "Accordingly, the lamp unit 4 is swung together with the rotary shaft 5 through an engagement between the worm gear 7 | |

| Limitation of '034 Patent Proposed Claim 29 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | and the worm wheel 6 under a driving of the motor 8. The motor 8 is controlled for its driving by a light distribution control ECU 10." | |

| Limitation of '034 Patent Proposed Claim 33 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 33. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 461. | See claim 1 claim chart, above at page 461. |
| wherein the automatic directional control system further includes memory. | | E.g., page 16, lines 5 to 9 "Also, a non-volatile memory 15 (such as an electrically erasable EEPROM, or the like) for storing control programs and data values therein) [sic] and an oscillator 16 used to generate a clock signal are additionally attached to the microcomputer 10." See also Fig. 9, ref. 15. |

| Limitation of '034 Patent Proposed Claim 33 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
| --- | --- | --- |
| | | FIG. 9   |

| Limitation of '034 Patent Proposed Claim 34 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
| --- | --- | --- |
| 34. The automatic directional control system defined in claim 33, | See claim 33 claim chart, above at page 484. | See claim 33 claim chart, above at page 484. |
| wherein the memory includes non-volatile memory. | | E.g., page 16, lines 5 to 9 "Also, a non-volatile memory 15 (such as an electrically erasable EEPROM, or the like) for storing control |

| Limitation of '034 Patent Proposed Claim 34 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
| --- | --- | --- |
| | | programs and data values therein) [sic] and an oscillator 16 used to generate a clock signal are additionally attached to the microcomputer 10." See also Fig. 9, ref. 15. FIG. 9   |

| Limitation of '034 Patent Proposed Claim 37 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
| --- | --- | --- |
| 37. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 461. | See claim 1 claim chart, above at page 461. |

| Limitation of '034 Patent Proposed Claim 37 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by sensing a front and a rear suspension height of the vehicle. | | E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |

| Limitation of '034 Patent Proposed Claim 38 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 38. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 461. | See claim 1 claim chart, above at page 461. |
| wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by a pitch level sensor. | | E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a |

| **Limitation of '034 Patent Proposed Claim 38** | **U.S. Patent No. 5,909,949 (Gotoh)** | **GB 2 309 774 (Takahashi)** |
|---|---|---|
| | | distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle.": |

| **Limitation of '034 Patent Proposed Claim 41** | **U.S. Patent No. 5,909,949 (Gotoh)** | **GB 2 309 774 (Takahashi)** |
|---|---|---|
| 41. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 461. | See claim 1 claim chart, above at page 461. |
| wherein the automatic directional control system is configured such that the predetermined minimum threshold amount functions as a filter to minimize undesirable operation of the at least one actuator. | E.g., col. 6, line 42 to col. 7, line 2, "Referring to FIG. 8, from changes of the steering angle φ and the yaw angular velocity ω of FIGS. 7A and 7B, the following is understood. When the vehicle goes around the rightward curve, the steering wheel is turned to the right to have a positive steering angle φ at first, and the vehicle body yaws somewhat after the change of steering angle φ so that the yaw angular velocity ω increases following increase of the steering angle.<br><br>In the meantime, the rear part of the vehicle is swung outside large, and therefore the driver turns the steering wheel to the left or in the opposite direction rapidly for counter-steering to recover direction of the vehicle. Namely, the steering | E.g., page 8, lines 26 to 32 "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2."<br><br>E.g., page 9, lines 16 to 34 "Also, in order to prevent the illumination direction of the lamp 6 from being corrected inadvertently when a sudden change in the posture of the vehicle occurs temporarily or due to the wrong operation of the lamp 6 caused by external disturbances, for example, when the vehicle makes a sudden start or |

| Limitation of '034 Patent Proposed Claim 41 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | angle φ changes from an upward incline to a downward incline in FIG. 7A. However, the yaw angular velocity ω is maintained due to inertia.<br><br>Further, when the direction of the vehicle comes to show some recovery, the driver again turns the steering wheel to the right for going around the rightward curve, but he comes to carry out the counter-steering again soon after. Thus, the steering angle φ swings rightward and leftward in large variations.<br><br>However, while the steering angle φ is swinging rightward and leftward as described above, the yaw angular velocity ω is maintained at a certain angular velocity stably in general, and at a time somewhat before the vehicle passes through the curve completely, the yaw angular velocity ω comes to coincide with the steering angle φ."<br><br>E.g., col. 7, lines 34 to 39, "Since the actual light distribution control is performed on the basis of the above-mentioned final lighting angle 9, even if the steering wheel is operated rapidly for the countersteering and the like, change of the lighting region is suppressed pertinently and the driver is given no sense of incongruity." | a sudden stop, preferably, a threshold value with respect to time may be set in detection of the road gradient and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a threshold value with respect to the running distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a distance equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected." |

| Limitation of '034 Patent Proposed Claim 42 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 42. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 461. | See claim 1 claim chart, above at page 461. |
| wherein said sensed conditions include three or more of road speed, steering angle, pitch, and suspension height of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω." | E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle."<br><br>E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br><br>E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used |

| Limitation of '034 Patent Proposed Claim 42 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |

| Limitation of '034 Patent Proposed Claim 43 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 43. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 461. | See claim 1 claim chart, above at page 461. |
| wherein said sensed conditions include all four of road speed, steering angle, pitch, and suspension height of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle $\varphi$, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) $\omega$." | E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle." |

| Limitation of '034 Patent Proposed Claim 43 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | | E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br><br>E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |

| Limitation of '034 Patent Proposed Claim 44 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 44. The automatic directional control system | See claim 1 claim chart, above at page 461. | See claim 1 claim chart, above at page 461. |

| Limitation of '034 Patent Proposed Claim 44 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| defined in claim 1, | | |
| wherein said controller is configured to be responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated continuously in response to relatively small variations in the sensed operating conditions. | E.g., col. 6, line 42 to col. 7, line 2, "Referring to FIG. 8, from changes of the steering angle φ and the yaw angular velocity ω of FIGS. 7A and 7B, the following is understood. When the vehicle goes around the rightward curve, the steering wheel is turned to the right to have a positive steering angle φ at first, and the vehicle body yaws somewhat after the change of steering angle φ so that the yaw angular velocity ω increases following increase of the steering angle.<br><br>In the meantime, the rear part of the vehicle is swung outside large, and therefore the driver turns the steering wheel to the left or in the opposite direction rapidly for counter-steering to recover direction of the vehicle. Namely, the steering angle φ changes from an upward incline to a downward incline in FIG. 7A. However, the yaw angular velocity ω is maintained due to inertia.<br><br>Further, when the direction of the vehicle comes to show some recovery, the driver again turns the steering wheel to the right for going around the rightward curve, but he comes to carry out the counter-steering again soon after. Thus, the steering angle φ swings rightward and leftward in large variations.<br><br>However, while the steering angle φ is swinging rightward and leftward as described above, the | E.g., page 8, lines 26 to 32 "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2."<br><br>E.g., page 9, lines 16 to 34 "Also, in order to prevent the illumination direction of the lamp 6 from being corrected inadvertently when a sudden change in the posture of the vehicle occurs temporarily or due to the wrong operation of the lamp 6 caused by external disturbances, for example, when the vehicle makes a sudden start or a sudden stop, preferably, a threshold value with respect to time may be set in detection of the road gradient and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a threshold value with respect to the running distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a distance equal to or more than the threshold |

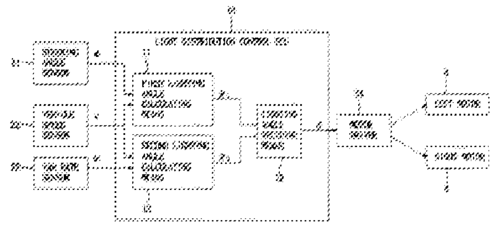
| Limitation of '034 Patent Proposed Claim 44 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| | yaw angular velocity ω is maintained at a certain angular velocity stably in general, and at a time somewhat before the vehicle passes through the curve completely, the yaw angular velocity ω comes to coincide with the steering angle φ."<br><br>E.g., col. 7, lines 34 to 39, "Since the actual light distribution control is performed on the basis of the above-mentioned final lighting angle 9, even 35 if the steering wheel is operated rapidly for the countersteering and the like, change of the lighting region is suppressed pertinently and the driver is given no sense of incongruity." | value, the illumination direction of the lamp 6 may be corrected." |

| Limitation of '034 Patent Proposed Claim 45 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
|---|---|---|
| 45. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 461. | See claim 1 claim chart, above at page 461. |
| wherein controller is configured to be responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated unduly frequently in response to relatively small variations in the sensed operating conditions. | E.g., col. 6, line 42 to col. 7, line 2, "Referring to FIG. 8, from changes of the steering angle φ and the yaw angular velocity ω of FIGS. 7A and 7B, the following is understood. When the vehicle goes around the rightward curve, the steering wheel is turned to the right to have a positive steering angle φ at first, and the vehicle body yaws somewhat after the change of steering angle φ so that the yaw angular velocity ω increases following increase of the steering angle. | E.g., page 8, lines 26 to 32 "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2."<br><br>E.g., page 9, lines 16 to 34 "Also, in order to prevent the illumination direction of the lamp 6 |

| Limitation of '034 Patent Proposed Claim 45 | U.S. Patent No. 5,909,949 (Gotoh) | GB 2 309 774 (Takahashi) |
| --- | --- | --- |
| | In the meantime, the rear part of the vehicle is swung outside large, and therefore the driver turns the steering wheel to the left or in the opposite direction rapidly for counter-steering to recover direction of the vehicle. Namely, the steering angle φ changes from an upward incline to a downward incline in FIG. 7A. However, the yaw angular velocity ω is maintained due to inertia.<br><br>Further, when the direction of the vehicle comes to show some recovery, the driver again turns the steering wheel to the right for going around the rightward curve, but he comes to carry out the counter-steering again soon after. Thus, the steering angle φ swings rightward and leftward in large variations.<br><br>However, while the steering angle φ is swinging rightward and leftward as described above, the yaw angular velocity ω is maintained at a certain angular velocity stably in general, and at a time somewhat before the vehicle passes through the curve completely, the yaw angular velocity ω comes to coincide with the steering angle φ."<br><br>E.g., col. 7, lines 34 to 39, "Since the actual light distribution control is performed on the basis of the above-mentioned final lighting angle 9, even 35 if the steering wheel is operated rapidly for the countersteering and the like, change of the lighting region is suppressed pertinently and the driver is given no sense of incongruity." | from being corrected inadvertently when a sudden change in the posture of the vehicle occurs temporarily or due to the wrong operation of the lamp 6 caused by external disturbances, for example, when the vehicle makes a sudden start or a sudden stop, preferably, a threshold value with respect to time may be set in detection of the road gradient and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a threshold value with respect to the running distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a distance equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected." |

## 32. Proposed Claims 1 to 13, 24, 26, 28, 29, 37, 38, 41 to 45 Are Unpatentable Over the Combination of Gotoh and Hussman Under 35 U.S.C. § 103(a)

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 1. An automatic directional control system for a vehicle headlight, comprising: | E.g., Abstract, "A head lamp device for a vehicle capable of changing a lighting region in front of the vehicle in right and left directions, in which change of the lighting region is suppressed so as not to give the driver a sense of incongruity when a steering wheel is operated in one direction and then rapidly in the other as in case of counter-steering." | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation." |
| two or more sensors that are each adapted to generate a signal that is representative of a condition of a vehicle, said sensed conditions including two or more of road speed, steering angle, pitch, and suspension height of the vehicle; | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3 | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first |

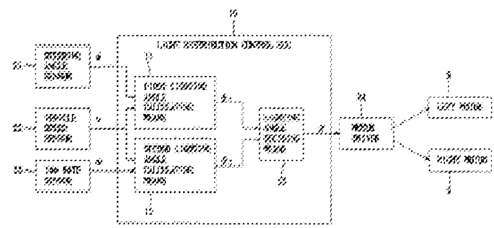
| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| |  FIG. 3 | analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles."<br><br>E.g., col. 3, lines 40 to 45, "The curve-recognition device K is electrically conductively coupled with a speed signal sensor, or sender, G and includes a speed threshold value device which itself affects the switchover such that the third filter F3 is only coupled to the regulator R if a minimum speed of the motor vehicle is exceeded." |
| a controller that is responsive to said two or more sensor signals for generating at least one output signal | E.g., Col. 4, lines 59 to 60, "The motor 8 is controlled for its driving by a light distribution control ECU 10." | E.g., col. 3, lines 30 to 39, "The curve-recognition device K is electrically conductively coupled with the switchover device SE and thereby couples the third filter F3 electrically conductively with the regulator R if a difference signal other than zero is fed to it from the subtractor SU. When no difference signal from the subtractor SU is present, the curve-recognition device K switches the switchover device SE so that the first filter F1 is coupled to the regulator R."<br><br>E.g., col. 4, lines 6 to 12, "At the coupling between the switchover device SE and the regulator R, a matching device AE is, here for example, arranged which, upon a switchover by the switchover device SE, adjusts the various |

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | | nominal values to one another so that discontinuities or jumps in the adjustment and regulation of the illumination range are avoided."<br><br>E.g., col. 6, line 10 to 34, "In this connection, it is beneficial that upon the presence of a difference between the second, filtered, nominal-value signal to the third, filtered, nominal-value signal and upon termination of a difference is again switched from the third, filtered, nominal-value signal to the first, filtered, nominal-value signal because in this manner, in an uncomplicated and cost effective manner, upon the presence of an inclination change of the motor vehicle body which is not attributable to a change in loading or to road surface unevenness, the regulation of the illumination range of the motor vehicle, in dependence from the third, long, filter time constant results, whereby the third, filtered, nominal-value signal is independent, or substantially independent, from the disturbing, or distorting, short time inclination changes so that after inclination changes of the motor-vehicle body which, for example, are caused by driving about a curve, false adjustments of the illumination range are not caused which can lead to the blinding of oncoming traffic or to losses in illumination range, which eliminates a danger during operation of a motor vehicle." |
| only when said at least one of the two or more sensor signals changes by more than a | E.g., col. 6, line 42 to col. 7, line 2, "Referring to FIG. 8, from changes of the steering angle φ and | E.g., col. 4, lines 6 to 12, "At the coupling between the switchover device SE and the |

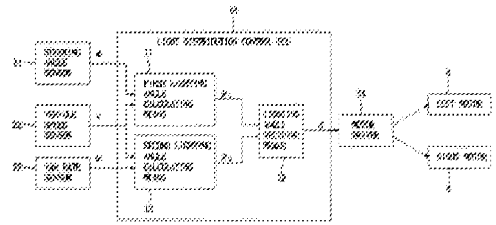
| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| predetermined minimum threshold amount to prevent at least one actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating conditions; and | the yaw angular velocity $\omega$ of FIGS. 7A and 7B, the following is understood. When the vehicle goes around the rightward curve, the steering wheel is turned to the right to have a positive steering angle $\varphi$ at first, and the vehicle body yaws somewhat after the change of steering angle $\varphi$ so that the yaw angular velocity $\omega$ increases following increase of the steering angle.<br><br>In the meantime, the rear part of the vehicle is swung outside large, and therefore the driver turns the steering wheel to the left or in the opposite direction rapidly for counter-steering to recover direction of the vehicle. Namely, the steering angle $\varphi$ changes from an upward incline to a downward incline in FIG. 7A. However, the yaw angular velocity $\omega$ is maintained due to inertia.<br><br>Further, when the direction of the vehicle comes to show some recovery, the driver again turns the steering wheel to the right for going around the rightward curve, but he comes to carry out the counter-steering again soon after. Thus, the steering angle $\varphi$ swings rightward and leftward in large variations.<br><br>However, while the steering angle $\varphi$ is swinging rightward and leftward as described above, the yaw angular velocity $\omega$ is maintained at a certain angular velocity stably in general, and at a time somewhat before the vehicle passes through the curve completely, the yaw angular velocity $\omega$ | regulator R, a matching device AE is, here for example, arranged which, upon a switchover by the switchover device SE, adjusts the various nominal values to one another so that discontinuities or jumps in the adjustment and regulation of the illumination range are avoided."<br><br>E.g., col. 6, line 10 to 34, "In this connection, it is beneficial that upon the presence of a difference between the second, filtered, nominal-value signal to the third, filtered, nominal-value signal and upon termination of a difference is again switched from the third, filtered, nominal-value signal to the first, filtered, nominal-value signal because in this manner, in an uncomplicated and cost effective manner, upon the presence of an inclination change of the motor vehicle body which is not attributable to a change in loading or to road surface unevenness, the regulation of the illumination range of the motor vehicle, in dependence from the third, long, filter time constant results, whereby the third, filtered, nominal-value signal is independent, or substantially independent, from the disturbing, or distorting, short time inclination changes so that after inclination changes of the motor-vehicle body which, for example, are caused by driving about a curve, false adjustments of the illumination range are not caused which can lead to the blinding of oncoming traffic or to losses in illumination range, which eliminates a danger during operation of a motor vehicle." |

| Limitation of '034 Patent Proposed Claim 1 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | comes to coincide with the steering angle $\varphi$."<br><br>E.g., Col. 7, lines 34 to 39, "Since the actual light distribution control is performed on the basis of the above-mentioned final lighting angle $\theta$, even if the steering wheel is operated rapidly for the counter-steering and the like, change of the lighting region is suppressed pertinently and the driver is given no sense of incongruity." | |
| said at least one actuator being adapted to be connected to the headlight to effect movement thereof in accordance with said at least one output signal. | | E.g., col. 3, lines 16 to 18, "The regulator R regulates the position of adjusting elements, which are shown here in block form and which change the positions of headlights." |

| Limitation of '034 Patent Proposed Claim 2 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 2. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 496. | See claim 1 claim chart, above at page 496. |
| wherein at least one of said two or more sensors generates a signal that is representative of the road speed of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle $\varphi$, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) $\omega$." | E.g., col. 3, lines 40 to 45, "The curve-recognition device K is electrically conductively coupled with a speed signal sensor, or sender, G and includes a speed threshold value device which itself affects the switchover such that the third filter F3 is only coupled to the regulator R if a minimum speed of the motor vehicle is exceeded." |

| Limitation of '034 Patent Proposed Claim 2 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | E.g., Figure 3  FIG. 3 | |

| Limitation of '034 Patent Proposed Claim 3 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 3. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 496. | See claim 1 claim chart, above at page 496. |
| wherein at least one of said two or more sensors generates a signal that is representative of the steering angle of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω." <br><br> E.g., Figure 3 | |

| Limitation of '034 Patent Proposed Claim 3 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| |  FIG. 3 | |

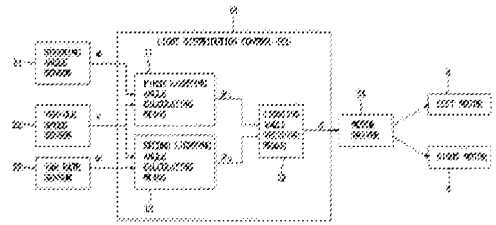
| Limitation of '034 Patent Proposed Claim 4 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 4. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 496. | See claim 1 claim chart, above at page 496. |
| wherein at least one of said two or more sensors generates a signal that is representative of the pitch of the vehicle. | | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here |

| Limitation of '034 Patent Proposed Claim 4 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | | coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles." |

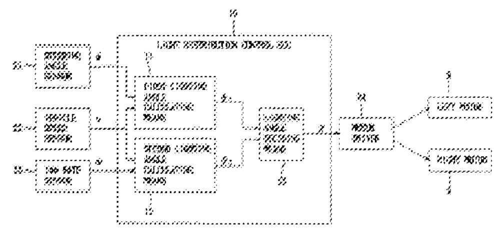
| Limitation of '034 Patent Proposed Claim 5 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 5. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 496. | See claim 1 claim chart, above at page 496. |
| wherein at least one of said two or more sensors generates a signal that is representative of the suspension height of the vehicle. | | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first |

| Limitation of '034 Patent Proposed Claim 5 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | | analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles." |

| Limitation of '034 Patent Proposed Claim 6 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 6. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 496. | See claim 1 claim chart, above at page 496. |
| wherein said two or more sensors include a first sensor and a second sensor. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω."<br><br>E.g., Figure 3 | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value |

| Limitation of '034 Patent Proposed Claim 6 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| |  FIG. 3 | former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles."<br><br>E.g., col. 3, lines 40 to 45, "The curve-recognition device K is electrically conductively coupled with a speed signal sensor, or sender, G and includes a speed threshold value device which itself affects the switchover such that the third filter F3 is only coupled to the regulator R if a minimum speed of the motor vehicle is exceeded." |

| Limitation of '034 Patent Proposed Claim 7 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 7. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 504. | See claim 6 claim chart, above at page 504. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the road speed of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the steering angle of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω." | E.g., col. 3, lines 40 to 45, "The curve-recognition device K is electrically conductively coupled with a speed signal sensor, or sender, G and includes a speed threshold value device which itself affects the switchover such that the third filter F3 is only coupled to the regulator R if a minimum speed of the motor vehicle is exceeded." |

| Limitation of '034 Patent Proposed Claim 7 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | E.g., Figure 3  FIG. 3 | |

| Limitation of '034 Patent Proposed Claim 8 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 8. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 504. | See claim 6 claim chart, above at page 504. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the steering angle of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω." | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a |

| Limitation of '034 Patent Proposed Claim 8 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | | sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles." |

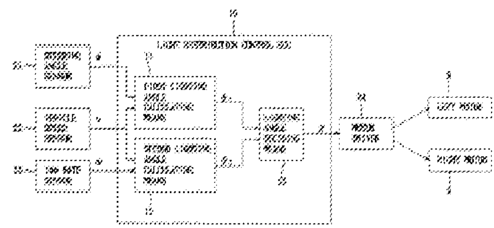
| Limitation of '034 Patent Proposed Claim 9 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 9. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 504. | See claim 6 claim chart, above at page 504. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the suspension height of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle. | | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here |

| Limitation of '034 Patent Proposed Claim 9 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | | coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles." |

| Limitation of '034 Patent Proposed Claim 10 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 10. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 504. | See claim 6 claim chart, above at page 504. |
| wherein said first sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the road speed of the vehicle. | | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first |

| Limitation of '034 Patent Proposed Claim 10 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | | analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles."<br><br>E.g., col. 3, lines 40 to 45, "The curve-recognition device K is electrically conductively coupled with a speed signal sensor, or sender, G and includes a speed threshold value device which itself affects the switchover such that the third filter F3 is only coupled to the regulator R if a minimum speed of the motor vehicle is exceeded." |

| Limitation of '034 Patent Proposed Claim 11 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 11. The automatic directional control system defined in claim 6, | See claim 6 claim chart, above at page 504. | See claim 6 claim chart, above at page 504. |
| wherein said first sensor is physically separate from said second sensor. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω." | |

| Limitation of '034 Patent Proposed Claim 11 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
| --- | --- | --- |
| | E.g., Figure 3  FIG. 3 | |

| Limitation of '034 Patent Proposed Claim 12 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
| --- | --- | --- |
| 12. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 496. | See claim 1 claim chart, above at page 496. |
| wherein said sensed conditions further include one or more of a rate of change of road speed of the vehicle, a rate of change of steering angle of the vehicle, a rate of change of pitch of the vehicle, or a rate of change of suspension height of the vehicle. | | E.g., col. 5, lines 34 to 40, "So that also such inclination changes of the motor-vehicle body which are not attributable to acceleration changes will be recognized and false adjustments during regulation of the illumination range because of such inclination changes will be avoided, the third filter F3 is only placed in connection with the regulator when no acceleration of the motor vehicle is present." |

| Limitation of '034 Patent Proposed Claim 13 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 13. The automatic directional control system defined in claim 12, | See claim 12 claim chart, above at page 510. | See claim 12 claim chart, above at page 510. |
| wherein at least one of said two or more sensors generate a signal that is representative of the rate of change of road speed of the vehicle. | | E.g., col. 5, lines 34 to 40, "So that also such inclination changes of the motor-vehicle body which are not attributable to acceleration changes will be recognized and false adjustments during regulation of the illumination range because of such inclination changes will be avoided, the third filter F3 is only placed in connection with the regulator when no acceleration of the motor vehicle is present." |

| Limitation of '034 Patent Proposed Claim 24 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 24. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 496. | See claim 1 claim chart, above at page 496. |
| wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted relative to the vehicle. | E.g., col. 4, lines 32 to 38, "The vehicle 1 of the preferred embodiment has head lights 2 for lighting the space in front of the vehicle installed such that they are swingable in rightward and leftward horizontal directions. FIG. 1 is a view showing the vehicle 1 from above and in this figure, the right and left head lights 2,2 are swung rightward so as to cause the right forward regions to become lighting regions 3, 3." | |

| Limitation of '034 Patent Proposed Claim 26 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 26. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 496. | See claim 1 claim chart, above at page 496. |
| wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted left and right relative to a vertical reference position. | E.g., col. 4, lines 32 to 38, "The vehicle 1 of the preferred embodiment has head lights 2 for lighting the space in front of the vehicle installed such that they are swingable in rightward and leftward horizontal directions. FIG. 1 is a view showing the vehicle 1 from above and in this figure, the right and left head lights 2,2 are swung rightward so as to cause the right forward regions to become lighting regions 3, 3." | |

| Limitation of '034 Patent Proposed Claim 28 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 28. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 496. | See claim 1 claim chart, above at page 496. |
| wherein the automatic directional control system is configured such that the controller includes a microprocessor. | E.g., col. 4, lines 56 to 60, "Accordingly, the lamp unit 4 is swung together with the rotary shaft 5 through an engagement between the worm gear 7 and the worm wheel 6 under a driving of the motor 8. The motor 8 is controlled for its driving by a light distribution control ECU 10." | |

| Limitation of '034 Patent Proposed Claim 29 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 29. The automatic directional control system | See claim 1 claim chart, above at page 496. | See claim 1 claim chart, above at page 496. |

| Limitation of '034 Patent Proposed Claim 29 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| defined in claim 1, | | |
| wherein the automatic directional control system is configured such that the controller includes a programmable electronic controller. | E.g., col. 4, lines 56 to 60, "Accordingly, the lamp unit 4 is swung together with the rotary shaft 5 through an engagement between the worm gear 7 and the worm wheel 6 under a driving of the motor 8. The motor 8 is controlled for its driving by a light distribution control ECU 10." | |

| Limitation of '034 Patent Proposed Claim 37 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 37. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 496. | See claim 1 claim chart, above at page 496. |
| wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by sensing a front and a rear suspension height of the vehicle. | | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br><br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first |

| Limitation of '034 Patent Proposed Claim 37 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | | analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles." |

| Limitation of '034 Patent Proposed Claim 38 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 38. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 496. | See claim 1 claim chart, above at page 496. |
| wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by a pitch level sensor. | | E.g., Abstract, "In a method and apparatus to regulate the illumination range of a motor vehicle in which, at a position on a front axle and at a position on a rear axle, signals are measured which are dependent upon the relative positions of a motor-vehicle body to the front axle and the rear axle, with a difference formation between the signal from the front axle and that of the rear axle being accomplished with a resulting difference signal, as a nominal-value signal, being filtered to a first average-value formation."<br>E.g., col. 2, lines 40 to 48, "A front axle sensor sender (a device including or associated with a sensor for sending a sensed signal) V is here coupled with a nominal-value former over a first analog/digital converter A1. The nominal-value former S is additionally coupled with a rear axle |

| Limitation of '034 Patent Proposed Claim 38 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | | sensor sender H over a second analog/digital converter A2. The front axle sender and the rear axle sender produce signals which are functions of the relative position of a motor vehicle body to the front and rear axles." |

| Limitation of '034 Patent Proposed Claim 41 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 41. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 496. | See claim 1 claim chart, above at page 496. |
| wherein the automatic directional control system is configured such that the predetermined minimum threshold amount functions as a filter to minimize undesirable operation of the at least one actuator. | E.g., col. 6, line 42 to col. 7, line 2, "Referring to FIG. 8, from changes of the steering angle $\varphi$ and the yaw angular velocity $\omega$ of FIGS. 7A and 7B, the following is understood. When the vehicle goes around the rightward curve, the steering wheel is turned to the right to have a positive steering angle $\varphi$ at first, and the vehicle body yaws somewhat after the change of steering angle $\varphi$ so that the yaw angular velocity $\omega$ increases following increase of the steering angle.<br><br>In the meantime, the rear part of the vehicle is swung outside large, and therefore the driver turns the steering wheel to the left or in the opposite direction rapidly for counter-steering to recover direction of the vehicle. Namely, the steering angle $\varphi$ changes from an upward incline to a downward incline in FIG. 7A. However, the yaw angular velocity $\omega$ is maintained due to inertia. | E.g., col. 4, lines 6 to 12, "At the coupling between the switchover device SE and the regulator R, a matching device AE is, here for example, arranged which, upon a switchover by the switchover device SE, adjusts the various nominal values to one another so that discontinuities or jumps in the adjustment and regulation of the illumination range are avoided." |

| Limitation of '034 Patent Proposed Claim 41 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | Further, when the direction of the vehicle comes to show some recovery, the driver again turns the steering wheel to the right for going around the rightward curve, but he comes to carry out the counter-steering again soon after. Thus, the steering angle φ swings rightward and leftward in large variations.<br><br>However, while the steering angle φ is swinging rightward and leftward as described above, the yaw angular velocity ω is maintained at a certain angular velocity stably in general, and at a time somewhat before the vehicle passes through the curve completely, the yaw angular velocity ω comes to coincide with the steering angle φ."<br><br>E.g., col. 7, lines 34 to 39, "Since the actual light distribution control is performed on the basis of the above-mentioned final lighting angle 9, even 35 if the steering wheel is operated rapidly for the countersteering and the like, change of the lighting region is suppressed pertinently and the driver is given no sense of incongruity." | |

| Limitation of '034 Patent Proposed Claim 42 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 42. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 496. | See claim 1 claim chart, above at page 496. |

| Limitation of '034 Patent Proposed Claim 42 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| wherein said sensed conditions include three or more of road speed, steering angle, pitch, and suspension height of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω." | E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle."<br><br>E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br><br>E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a |

| Limitation of '034 Patent Proposed Claim 42 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | | distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |

| Limitation of '034 Patent Proposed Claim 43 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 43. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 496. | See claim 1 claim chart, above at page 496. |
| wherein said sensed conditions include all four of road speed, steering angle, pitch, and suspension height of the vehicle. | E.g., col. 4, lines 61 to 67, "Fig. 3 is a rough block diagram showing a control system for changing the lighting region in the present embodiment. The vehicle has a steering angle sensor 21 for detecting a direction of a front wheel with respect to the vehicle body, i.e. a steering angle φ, a vehicle speed sensor 22 for detecting a vehicle speed v and a yaw rate sensor 23 for detecting a yaw angular velocity (yaw rate) ω." | E.g., page 6, lines 16 to 25 "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle."<br><br>E.g., page 2, lines 6 to 13 "Therefore, there is conventionally known a device which includes a |

| Limitation of '034 Patent Proposed Claim 43 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | | device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp."<br><br>E.g., page 5, line 30 to page 6, line 9 "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." |

| Limitation of '034 Patent Proposed Claim 44 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 44. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 496. | See claim 1 claim chart, above at page 496. |

| Limitation of '034 Patent Proposed Claim 44 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| wherein said controller is configured to be responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated continuously in response to relatively small variations in the sensed operating conditions. | E.g., col. 6, line 42 to col. 7, line 2, "Referring to FIG. 8, from changes of the steering angle φ and the yaw angular velocity ω of FIGS. 7A and 7B, the following is understood. When the vehicle goes around the rightward curve, the steering wheel is turned to the right to have a positive steering angle φ at first, and the vehicle body yaws somewhat after the change of steering angle φ so that the yaw angular velocity ω increases following increase of the steering angle.<br><br>In the meantime, the rear part of the vehicle is swung outside large, and therefore the driver turns the steering wheel to the left or in the opposite direction rapidly for counter-steering to recover direction of the vehicle. Namely, the steering angle φ changes from an upward incline to a downward incline in FIG. 7A. However, the yaw angular velocity ω is maintained due to inertia.<br><br>Further, when the direction of the vehicle comes to show some recovery, the driver again turns the steering wheel to the right for going around the rightward curve, but he comes to carry out the counter-steering again soon after. Thus, the steering angle φ swings rightward and leftward in large variations.<br><br>However, while the steering angle φ is swinging rightward and leftward as described above, the yaw angular velocity ω is maintained at a certain angular velocity stably in general, and at a time | E.g., col. 4, lines 6 to 12, "At the coupling between the switchover device SE and the regulator R, a matching device AE is, here for example, arranged which, upon a switchover by the switchover device SE, adjusts the various nominal values to one another so that discontinuities or jumps in the adjustment and regulation of the illumination range are avoided." |

| Limitation of '034 Patent Proposed Claim 44 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | somewhat before the vehicle passes through the curve completely, the yaw angular velocity $\omega$ comes to coincide with the steering angle $\varphi$."<br><br>E.g., col. 7, lines 34 to 39, "Since the actual light distribution control is performed on the basis of the above-mentioned final lighting angle 9, even 35 if the steering wheel is operated rapidly for the countersteering and the like, change of the lighting region is suppressed pertinently and the driver is given no sense of incongruity." | |

| Limitation of '034 Patent Proposed Claim 45 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| 45. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 496. | See claim 1 claim chart, above at page 496. |
| wherein controller is configured to be responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one actuator from being operated unduly frequently in response to relatively small variations in the sensed operating conditions. | E.g., col. 6, line 42 to col. 7, line 2, "Referring to FIG. 8, from changes of the steering angle $\varphi$ and the yaw angular velocity $\omega$ of FIGS. 7A and 7B, the following is understood. When the vehicle goes around the rightward curve, the steering wheel is turned to the right to have a positive steering angle $\varphi$ at first, and the vehicle body yaws somewhat after the change of steering angle $\varphi$ so that the yaw angular velocity $\omega$ increases following increase of the steering angle.<br><br>In the meantime, the rear part of the vehicle is swung outside large, and therefore the driver turns | E.g., col. 4, lines 6 to 12, "At the coupling between the switchover device SE and the regulator R, a matching device AE is, here for example, arranged which, upon a switchover by the switchover device SE, adjusts the various nominal values to one another so that discontinuities or jumps in the adjustment and regulation of the illumination range are avoided." |

| Limitation of '034 Patent Proposed Claim 45 | U.S. Patent No. 5,909,949 (Gotoh) | U.S. Patent No. 5,182,460 (Hussman) |
|---|---|---|
| | the steering wheel to the left or in the opposite direction rapidly for counter-steering to recover direction of the vehicle. Namely, the steering angle φ changes from an upward incline to a downward incline in FIG. 7A. However, the yaw angular velocity ω is maintained due to inertia.<br><br>Further, when the direction of the vehicle comes to show some recovery, the driver again turns the steering wheel to the right for going around the rightward curve, but he comes to carry out the counter-steering again soon after. Thus, the steering angle φ swings rightward and leftward in large variations.<br><br>However, while the steering angle φ is swinging rightward and leftward as described above, the yaw angular velocity ω is maintained at a certain angular velocity stably in general, and at a time somewhat before the vehicle passes through the curve completely, the yaw angular velocity ω comes to coincide with the steering angle φ."<br><br>E.g., col. 7, lines 34 to 39, "Since the actual light distribution control is performed on the basis of the above-mentioned final lighting angle 9, even 35 if the steering wheel is operated rapidly for the countersteering and the like, change of the lighting region is suppressed pertinently and the driver is given no sense of incongruity." | |

### 33. Proposed Claims 17 to 19, 21, 23, 26, and 30 to 32 Are Unpatentable in View of the Combination of Uchida and the Admitted Prior Art Described in the '034 Patent Specification Under 35 U.S.C. § 103(a)

| Limitation of '034 Patent Proposed Claim 17 | GB 2 309 773 (Uchida) | Admitted Prior Art |
|---|---|---|
| 17. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 156. | |
| wherein the automatic directional control system is configured to include at least two actuators. | | E.g., col. 3, lines 26 to 41, "To effect movement of the illustrated headlight 11 relative to the vehicle, an up/down actuator 12 and a left/right actuator 13 are provided. The actuators 12 and 13 are conventional in the art and may, for example, be embodied as servo motors, step motors, or any other electronically controlled mechanical actuators. It has been found to be desirable to use microstepping motors for the actuators 12 and 13. Such microstepping motors are known in the art and consist of conventional step motors that have appropriate hardware (i.e., driver integrated circuits) and software that allow the step motors to be operated in fractional step increments. The use of such microstepping motors has been found to be desirable because they can effect movements of the headlights in a somewhat faster, smoother, and quieter manner than conventional step motors, and further permit more precise positioning of the headlights 11." |

| Limitation of '034 Patent Proposed Claim 18 | GB 2 309 773 (Uchida) | Admitted Prior Art |
|---|---|---|
| 18. The automatic directional control system | See claim 17 claim chart, above at page 523. | |

| Limitation of '034 Patent Proposed Claim 18 | GB 2 309 773 (Uchida) | Admitted Prior Art |
|---|---|---|
| defined in claim 17, | | |
| wherein the at least two actuators include a first actuator that is adapted to be connected to the headlight to effect movement thereof in a vertical direction. | | E.g., col. 3, lines 26 to 41, "To effect movement of the illustrated headlight 11 relative to the vehicle, an up/down actuator 12 and a left/right actuator 13 are provided. The actuators 12 and 13 are conventional in the art and may, for example, be embodied as servo motors, step motors, or any other electronically controlled mechanical actuators. It has been found to be desirable to use microstepping motors for the actuators 12 and 13. Such microstepping motors are known in the art and consist of conventional step motors that have appropriate hardware (i.e., driver integrated circuits) and software that allow the step motors to be operated in fractional step increments. The use of such microstepping motors has been found to be desirable because they can effect movements of the headlights in a somewhat faster, smoother, and quieter manner than conventional step motors, and further permit more precise positioning of the headlights 11." |

| Limitation of '034 Patent Proposed Claim 19 | GB 2 309 773 A (Uchida) | Admitted Prior Art |
|---|---|---|
| 19. The automatic directional control system defined in claim 18, | See claim 18 claim chart, above at page 523. | |
| wherein the at least two actuators include a second | | E.g., col. 3, lines 26 to 41, "To effect movement of |

| Limitation of '034 Patent Proposed Claim 19 | GB 2 309 773 A (Uchida) | Admitted Prior Art |
|---|---|---|
| actuator that is adapted to be connected to the headlight to effect movement thereof in a horizontal direction. | | the illustrated headlight 11 relative to the vehicle, an up/down actuator 12 and a left/right actuator 13 are provided. The actuators 12 and 13 are conventional in the art and may, for example, be embodied as servo motors, step motors, or any other electronically controlled mechanical actuators. It has been found to be desirable to use microstepping motors for the actuators 12 and 13. Such microstepping motors are known in the art and consist of conventional step motors that have appropriate hardware (i.e., driver integrated circuits) and software that allow the step motors to be operated in fractional step increments. The use of such microstepping motors has been found to be desirable because they can effect movements of the headlights in a somewhat faster, smoother, and quieter manner than conventional step motors, and further permit more precise positioning of the headlights 11." |

| Limitation of '034 Patent Proposed Claim 21 | GB 2 309 773 (Uchida) | Admitted Prior Art |
|---|---|---|
| 21. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 156. | |
| wherein the at least one actuator includes a step motor. | | E.g., col. 3, lines 26 to 41, "To effect movement of the illustrated headlight 11 relative to the vehicle, an up/down actuator 12 and a left/right actuator 13 are provided. The actuators 12 and 13 are conventional in the art and may, for example, be |

| Limitation of '034 Patent Proposed Claim 21 | GB 2 309 773 (Uchida) | Admitted Prior Art |
|---|---|---|
| | | embodied as servo motors, step motors, or any other electronically controlled mechanical actuators. It has been found to be desirable to use microstepping motors for the actuators 12 and 13. Such microstepping motors are known in the art and consist of conventional step motors that have appropriate hardware (i.e., driver integrated circuits) and software that allow the step motors to be operated in fractional step increments. The use of such microstepping motors has been found to be desirable because they can effect movements of the headlights in a somewhat faster, smoother, and quieter manner than conventional step motors, and further permit more precise positioning of the headlights 11." |

| Limitation of '034 Patent Proposed Claim 23 | GB 2 309 773 (Uchida) | Admitted Prior Art |
|---|---|---|
| 23. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 156. | |
| wherein the at least one actuator includes a microstepping motor capable of being operated in fractional step increments. | | E.g., col. 3, lines 26 to 41, "To effect movement of the illustrated headlight 11 relative to the vehicle, an up/down actuator 12 and a left/right actuator 13 are provided. The actuators 12 and 13 are conventional in the art and may, for example, be embodied as servo motors, step motors, or any other electronically controlled mechanical actuators. It has been found to be desirable to use microstepping motors for the actuators 12 and 13. |

| Limitation of '034 Patent Proposed Claim 23 | GB 2 309 773 (Uchida) | Admitted Prior Art |
|---|---|---|
| | | Such microstepping motors are known in the art and consist of conventional step motors that have appropriate hardware (i.e., driver integrated circuits) and software that allow the step motors to be operated in fractional step increments. The use of such microstepping motors has been found to be desirable because they can effect movements of the headlights in a somewhat faster, smoother, and quieter manner than conventional step motors, and further permit more precise positioning of the headlights 11." |

| Limitation of '034 Patent Proposed Claim 26 | GB 2 309 773 A (Uchida) | Admitted Prior Art |
|---|---|---|
| 26. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 156. | |
| wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted left and right relative to a vertical reference position. | | E.g., col. 1, lines 36 to 61, "In the past, these headlights have been mounted on the vehicle in fixed positions relative thereto such that the beams of light are projected therefrom at predetermined directional aiming angles relative to the vehicle. Although such fixed aiming angle headlight systems have and continue to function adequately, they cannot alter the directional aiming angles of the headlights to account for changes in the operating conditions of the vehicle. For example, if the speed of the vehicle is increased, it would be desirable to adjust the aiming angle of the headlights upwardly such that an area that is |

| Limitation of '034 Patent Proposed Claim 26 | GB 2 309 773 A (Uchida) | Admitted Prior Art |
|---|---|---|
| | | somewhat farther in front of the vehicle is more brightly illuminated. On the other hand, if the speed of the vehicle is decreased, it would be desirable to adjust the aiming angle of the headlights downwardly such that an area that is somewhat closer in front of the vehicle is more brightly illuminated. Similarly, if the vehicle turns a corner, it would be desirable to adjust the aiming angle of the headlights either toward the left or toward the right (depending on the direction of the turn) such that an area that is somewhat lateral to the front of the vehicle is more brightly illuminated.<br><br>To accomplish this, it is known to provide a directional control system for vehicle headlights that is capable of automatically altering the directional aiming angles of the headlights to account for changes in the operating conditions of the vehicle. A variety of such automatic directional control systems for vehicle headlights are known in the art. However, such known automatic headlight directional control systems have been found to be deficient for various reasons." |

| Limitation of '034 Patent Proposed Claim 30 | GB 2 309 773 (Uchida) | Admitted Prior Art |
|---|---|---|
| 30. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 156. | |

| Limitation of '034 Patent Proposed Claim 30 | GB 2 309 773 (Uchida) | Admitted Prior Art |
| --- | --- | --- |
| wherein the automatic directional control system further includes at least one position feedback sensor capable of providing a position feedback signal associated with the at least one actuator. | | E.g., col. 3, line 49 to col. 4, line 6, "A headlight directional controller 14 is provided for controlling the operations of the up/down actuator 12 and the left/right actuator 13 and, therefore, the angle at which the beam of light projects from the headlight 11 relative to the vehicle. The headlight directional controller 14 can be embodied as any control system, such as a microprocessor or programmable electronic controller, that is responsive to one or more sensed operating conditions of the vehicle for selectively operating the up/down actuator 12 and the left/right actuator 13. To accomplish this, the automatic directional control system 10 can include, for example, a pair of condition sensors 15 and 16 that are connected to the headlight directional controller 14. The condition sensors 15 and 16 are conventional in the art and are responsive to respective sensed operating conditions of the vehicle for generating electrical signals to the headlight directional controller 14. However, if desired, only a single one of the condition sensors 15 and 16 need be provided. Alternatively, additional condition sensors (not shown) may be provided if desired to generate electrical signals that are representative of any other operating conditions of the vehicle. A conventional input/output device 17 is connected to (or can be connected to) the headlight directional controller 14 for facilitating communication therewith in the manner described below." |

| Limitation of '034 Patent Proposed Claim 31 | GB 2 309 773 (Uchida) | Admitted Prior Art |
|---|---|---|
| 31. The automatic directional control system defined in claim 30, | See claim 30 claim chart, above at page 528. | |
| wherein the at least one position feedback sensor includes a Hall Effect sensor. | | E.g., col. 4, lines 24 to 30, "The position feedback sensors 18 and 19 can be embodied as any conventional sensor structures, such as Hall effect sensors, that are responsive to movements of the headlight 11 (or to the movements of the respective actuators 12 and 13 that are connected to move the headlight 11) for generating such signals." |

| Limitation of '034 Patent Proposed Claim 32 | GB 2 309 773 (Uchida) | Admitted Prior Art |
|---|---|---|
| 32. The automatic directional control system defined in claim 30, | See claim 30 claim chart, above at page 528. | |
| wherein the at least one position feedback sensor includes an optical interrupter. | | E.g., col. 4, lines 31 to 36, "Alternatively, the position feedback sensors 18 and 19 can be embodied as respective devices that generate electrical signals whenever the headlight 11 has achieved respective predetermined up/down or left/right positions. This can be accomplished, for example, using a conventional optical interrupter (not shown) for each of the actuators 12 and 13." |

## 34. Proposed Claims 19, 23, 26, and 30 to 32 Are Unpatentable in View of the Combination of Takahashi and the Admitted Prior Art Described in the '034 Patent Specification Under 35 U.S.C. § 103(a)

| Limitation of '034 Patent Proposed Claim 19 | GB 2 309 774 (Takahashi) | Admitted Prior Art |
|---|---|---|
| 19. The automatic directional control system defined in claim 18, | See claim 18 claim chart, above at page 182. | |
| wherein the at least two actuators include a second actuator that is adapted to be connected to the headlight to effect movement thereof in a horizontal direction. | | E.g., col. 3, lines 26 to 41, "To effect movement of the illustrated headlight 11 relative to the vehicle, an up/down actuator 12 and a left/right actuator 13 are provided. The actuators 12 and 13 are conventional in the art and may, for example, be embodied as servo motors, step motors, or any other electronically controlled mechanical actuators. It has been found to be desirable to use microstepping motors for the actuators 12 and 13. Such microstepping motors are known in the art and consist of conventional step motors that have appropriate hardware (i.e., driver integrated circuits) and software that allow the step motors to be operated in fractional step increments. The use of such microstepping motors has been found to be desirable because they can effect movements of the headlights in a somewhat faster, smoother, and quieter manner than conventional step motors, and further permit more precise positioning of the headlights 11." |

| Limitation of '034 Patent Proposed Claim 23 | GB 2 309 774 (Takahashi) | Admitted Prior Art |
|---|---|---|
| 23. The automatic directional control system | See claim 1 claim chart, above at page 173. | |

| Limitation of '034 Patent Proposed Claim 23 | GB 2 309 774 (Takahashi) | Admitted Prior Art |
|---|---|---|
| defined in claim 1, | | |
| wherein the at least one actuator includes a microstepping motor capable of being operated in fractional step increments. | | E.g., col. 3, lines 26 to 41, "To effect movement of the illustrated headlight 11 relative to the vehicle, an up/down actuator 12 and a left/right actuator 13 are provided. The actuators 12 and 13 are conventional in the art and may, for example, be embodied as servo motors, step motors, or any other electronically controlled mechanical actuators. It has been found to be desirable to use microstepping motors for the actuators 12 and 13. Such microstepping motors are known in the art and consist of conventional step motors that have appropriate hardware (i.e., driver integrated circuits) and software that allow the step motors to be operated in fractional step increments. The use of such microstepping motors has been found to be desirable because they can effect movements of the headlights in a somewhat faster, smoother, and quieter manner than conventional step motors, and further permit more precise positioning of the headlights 11." |

| Limitation of '034 Patent Proposed Claim 26 | GB 2 309 774 (Takahashi) | Admitted Prior Art |
|---|---|---|
| 26. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 173. | |
| wherein the automatic directional control system is configured such that the headlight is adjustably | | E.g., col. 1, lines 36 to 61, "In the past, these headlights have been mounted on the vehicle in |

| Limitation of '034 Patent Proposed Claim 26 | GB 2 309 774 (Takahashi) | Admitted Prior Art |
|---|---|---|
| mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted left and right relative to a vertical reference position. | | fixed positions relative thereto such that the beams of light are projected therefrom at predetermined directional aiming angles relative to the vehicle. Although such fixed aiming angle headlight systems have and continue to function adequately, they cannot alter the directional aiming angles of the headlights to account for changes in the operating conditions of the vehicle. For example, if the speed of the vehicle is increased, it would be desirable to adjust the aiming angle of the headlights upwardly such that an area that is somewhat farther in front of the vehicle is more brightly illuminated. On the other hand, if the speed of the vehicle is decreased, it would be desirable to adjust the aiming angle of the headlights downwardly such that an area that is somewhat closer in front of the vehicle is more brightly illuminated. Similarly, if the vehicle turns a corner, it would be desirable to adjust the aiming angle of the headlights either toward the left or toward the right (depending on the direction of the turn) such that an area that is somewhat lateral to the front of the vehicle is more brightly illuminated.<br><br>To accomplish this, it is known to provide a directional control system for vehicle headlights that is capable of automatically altering the directional aiming angles of the headlights to account for changes in the operating conditions of the vehicle. A variety of such automatic directional control systems for vehicle headlights |

| Limitation of '034 Patent Proposed Claim 26 | GB 2 309 774 (Takahashi) | Admitted Prior Art |
|---|---|---|
| | | are known in the art. However, such known automatic headlight directional control systems have been found to be deficient for various reasons." |

| Limitation of '034 Patent Proposed Claim 30 | GB 2 309 774 (Takahashi) | Admitted Prior Art |
|---|---|---|
| 30. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 173. | |
| wherein the automatic directional control system further includes at least one position feedback sensor capable of providing a position feedback signal associated with the at least one actuator. | | E.g., col. 3, line 49 to col. 4, line 6, "A headlight directional controller 14 is provided for controlling the operations of the up/down actuator 12 and the left/right actuator 13 and, therefore, the angle at which the beam of light projects from the headlight 11 relative to the vehicle. The headlight directional controller 14 can be embodied as any control system, such as a microprocessor or programmable electronic controller, that is responsive to one or more sensed operating conditions of the vehicle for selectively operating the up/down actuator 12 and the left/right actuator 13. To accomplish this, the automatic directional control system 10 can include, for example, a pair of condition sensors 15 and 16 that are connected to the headlight directional controller 14. The condition sensors 15 and 16 are conventional in the art and are responsive to respective sensed operating conditions of the vehicle for generating electrical signals to the headlight directional |

| Limitation of '034 Patent Proposed Claim 30 | GB 2 309 774 (Takahashi) | Admitted Prior Art |
|---|---|---|
| | | controller 14. However, if desired, only a single one of the condition sensors 15 and 16 need be provided. Alternatively, additional condition sensors (not shown) may be provided if desired to generate electrical signals that are representative of any other operating conditions of the vehicle. A conventional input/output device 17 is connected to (or can be connected to) the headlight directional controller 14 for facilitating communication therewith in the manner described below." |

| Limitation of '034 Patent Proposed Claim 31 | GB 2 309 774 (Takahashi) | Admitted Prior Art |
|---|---|---|
| 31. The automatic directional control system defined in claim 30, | See claim 30 claim chart, above at page 534. | See claim 30 claim chart, above at page 534. |
| wherein the at least one position feedback sensor includes a Hall Effect sensor. | | E.g., col. 4, lines 24 to 30, "The position feedback sensors 18 and 19 can be embodied as any conventional sensor structures, such as Hall effect sensors, that are responsive to movements of the headlight 11 (or to the movements of the respective actuators 12 and 13 that are connected to move the headlight 11) for generating such signals." |

| Limitation of '034 Patent Proposed Claim 32 | GB 2 309 774 (Takahashi) | Admitted Prior Art |
|---|---|---|
| 32. The automatic directional control system defined in claim 30, | See claim 30 claim chart, above at page 534. | See claim 30 claim chart, above at page 534. |
| wherein the at least one position feedback sensor includes an optical interrupter. | | E.g., col. 4, lines 31 to 36, "Alternatively, the position feedback sensors 18 and 19 can be embodied as respective devices that generate electrical signals whenever the headlight 11 has achieved respective predetermined up/down or left/right positions. This can be accomplished, for example, using a conventional optical interrupter (not shown) for each of the actuators 12 and 13." |

## 35. Proposed Claims 17 to 21, 23 to 26, and 30 to 32 Are Unpatentable in View of the Combination of Hussman and the Admitted Prior Art Described in the '034 Patent Specification Under 35 U.S.C. § 103(a)

| Limitation of '034 Patent Proposed Claim 17 | U.S. Patent No. 5,182,460 (Hussman) | Admitted Prior Art |
|---|---|---|
| 17. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 193. | |
| wherein the automatic directional control system is configured to include at least two actuators. | | E.g., col. 3, lines 26 to 41, "To effect movement of the illustrated headlight 11 relative to the vehicle, an up/down actuator 12 and a left/right actuator 13 are provided. The actuators 12 and 13 are conventional in the art and may, for example, be embodied as servo motors, step motors, or any other electronically controlled mechanical actuators. It has been found to be desirable to use microstepping motors for the actuators 12 and 13. Such microstepping motors are known in the art and consist of conventional step motors that have appropriate hardware (i.e., driver integrated circuits) and software that allow the step motors to be operated in fractional step increments. The use of such microstepping motors has been found to be desirable because they can effect movements of the headlights in a somewhat faster, smoother, and quieter manner than conventional step motors, and further permit more precise positioning of the headlights 11." |

| Limitation of '034 Patent Proposed Claim 18 | U.S. Patent No. 5,182,460 (Hussman) | Admitted Prior Art |
|---|---|---|
| 18. The automatic directional control system | See claim 17 claim chart, above at page 537. | See claim 17 claim chart, above at page 537. |

| Limitation of '034 Patent Proposed Claim 18 | U.S. Patent No. 5,182,460 (Hussman) | Admitted Prior Art |
|---|---|---|
| defined in claim 17, | | |
| wherein the at least two actuators include a first actuator that is adapted to be connected to the headlight to effect movement thereof in a vertical direction. | | E.g., col. 3, lines 26 to 41, "To effect movement of the illustrated headlight 11 relative to the vehicle, an up/down actuator 12 and a left/right actuator 13 are provided. The actuators 12 and 13 are conventional in the art and may, for example, be embodied as servo motors, step motors, or any other electronically controlled mechanical actuators. It has been found to be desirable to use microstepping motors for the actuators 12 and 13. Such microstepping motors are known in the art and consist of conventional step motors that have appropriate hardware (i.e., driver integrated circuits) and software that allow the step motors to be operated in fractional step increments. The use of such microstepping motors has been found to be desirable because they can effect movements of the headlights in a somewhat faster, smoother, and quieter manner than conventional step motors, and further permit more precise positioning of the headlights 11." |

| Limitation of '034 Patent Proposed Claim 19 | U.S. Patent No. 5,182,460 (Hussman) | Admitted Prior Art |
|---|---|---|
| 19. The automatic directional control system defined in claim 18, | See claim 18 claim chart, above at page 537. | See claim 18 claim chart, above at page 537. |
| wherein the at least two actuators include a second actuator that is adapted to be connected to the | | E.g., col. 3, lines 26 to 41, "To effect movement of the illustrated headlight 11 relative to the vehicle, |

| Limitation of '034 Patent Proposed Claim 19 | U.S. Patent No. 5,182,460 (Hussman) | Admitted Prior Art |
|---|---|---|
| headlight to effect movement thereof in a horizontal direction. | | an up/down actuator 12 and a left/right actuator 13 are provided. The actuators 12 and 13 are conventional in the art and may, for example, be embodied as servo motors, step motors, or any other electronically controlled mechanical actuators. It has been found to be desirable to use microstepping motors for the actuators 12 and 13. Such microstepping motors are known in the art and consist of conventional step motors that have appropriate hardware (i.e., driver integrated circuits) and software that allow the step motors to be operated in fractional step increments. The use of such microstepping motors has been found to be desirable because they can effect movements of the headlights in a somewhat faster, smoother, and quieter manner than conventional step motors, and further permit more precise positioning of the headlights 11." |

| Limitation of '034 Patent Proposed Claim 20 | U.S. Patent No. 5,182,460 (Hussman) | Admitted Prior Art |
|---|---|---|
| 20. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 193. | |
| wherein the at least one actuator includes an electronically controlled mechanical actuator. | | E.g., col. 3, lines 26 to 41, "To effect movement of the illustrated headlight 11 relative to the vehicle, an up/down actuator 12 and a left/right actuator 13 are provided. The actuators 12 and 13 are conventional in the art and may, for example, be embodied as servo motors, step motors, or any |

| Limitation of '034 Patent Proposed Claim 20 | U.S. Patent No. 5,182,460 (Hussman) | Admitted Prior Art |
|---|---|---|
| | | other electronically controlled mechanical actuators. It has been found to be desirable to use microstepping motors for the actuators 12 and 13. Such microstepping motors are known in the art and consist of conventional step motors that have appropriate hardware (i.e., driver integrated circuits) and software that allow the step motors to be operated in fractional step increments. The use of such microstepping motors has been found to be desirable because they can effect movements of the headlights in a somewhat faster, smoother, and quieter manner than conventional step motors, and further permit more precise positioning of the headlights 11." |

| Limitation of '034 Patent Proposed Claim 21 | U.S. Patent No. 5,182,460 (Hussman) | Admitted Prior Art |
|---|---|---|
| 21. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 193. | |
| wherein the at least one actuator includes a step motor. | | E.g., col. 3, lines 26 to 41, "To effect movement of the illustrated headlight 11 relative to the vehicle, an up/down actuator 12 and a left/right actuator 13 are provided. The actuators 12 and 13 are conventional in the art and may, for example, be embodied as servo motors, step motors, or any other electronically controlled mechanical actuators. It has been found to be desirable to use microstepping motors for the actuators 12 and 13. Such microstepping motors are known in the art |

| Limitation of '034 Patent Proposed Claim 21 | U.S. Patent No. 5,182,460 (Hussman) | Admitted Prior Art |
|---|---|---|
| | | and consist of conventional step motors that have appropriate hardware (i.e., driver integrated circuits) and software that allow the step motors to be operated in fractional step increments. The use of such microstepping motors has been found to be desirable because they can effect movements of the headlights in a somewhat faster, smoother, and quieter manner than conventional step motors, and further permit more precise positioning of the headlights 11." |

| Limitation of '034 Patent Proposed Claim 23 | U.S. Patent No. 5,182,460 (Hussman) | Admitted Prior Art |
|---|---|---|
| 23. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 193. | |
| wherein the at least one actuator includes a microstepping motor capable of being operated in fractional step increments. | | E.g., col. 3, lines 26 to 41, "To effect movement of the illustrated headlight 11 relative to the vehicle, an up/down actuator 12 and a left/right actuator 13 are provided. The actuators 12 and 13 are conventional in the art and may, for example, be embodied as servo motors, step motors, or any other electronically controlled mechanical actuators. It has been found to be desirable to use microstepping motors for the actuators 12 and 13. Such microstepping motors are known in the art and consist of conventional step motors that have appropriate hardware (i.e., driver integrated circuits) and software that allow the step motors to be operated in fractional step increments. The use |

| Limitation of '034 Patent Proposed Claim 23 | U.S. Patent No. 5,182,460 (Hussman) | Admitted Prior Art |
|---|---|---|
| | | of such microstepping motors has been found to be desirable because they can effect movements of the headlights in a somewhat faster, smoother, and quieter manner than conventional step motors, and further permit more precise positioning of the headlights 11." |

| Limitation of '034 Patent Proposed Claim 24 | U.S. Patent No. 5,182,460 (Hussman) | Admitted Prior Art |
|---|---|---|
| 24. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 193. | |
| wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted relative to the vehicle. | | E.g., col. 1, lines 36 to 61, "n the past, these headlights have been mounted on the vehicle in fixed positions relative thereto such that the beams of light are projected therefrom at predetermined directional aiming angles relative to the vehicle. Although such fixed aiming angle headlight systems have and continue to function adequately, they cannot alter the directional aiming angles of the headlights to account for changes in the operating conditions of the vehicle. For example, if the speed of the vehicle is increased, it would be desirable to adjust the aiming angle of the headlights upwardly such that an area that is somewhat farther in front of the vehicle is more brightly illuminated. On the other hand, if the speed of the vehicle is decreased, it would be desirable to adjust the aiming angle of the headlights downwardly such that an area that is |

| Limitation of '034 Patent Proposed Claim 24 | U.S. Patent No. 5,182,460 (Hussman) | Admitted Prior Art |
|---|---|---|
| | | somewhat closer in front of the vehicle is more brightly illuminated. Similarly, if the vehicle turns a corner, it would be desirable to adjust the aiming angle of the headlights either toward the left or toward the right (depending on the direction of the turn) such that an area that is somewhat lateral to the front of the vehicle is more brightly illuminated.<br><br>To accomplish this, it is known to provide a directional control system for vehicle headlights that is capable of automatically altering the directional aiming angles of the headlights to account for changes in the operating conditions of the vehicle. A variety of such automatic directional control systems for vehicle headlights are known in the art. However, such known automatic headlight directional control systems have been found to be deficient for various reasons." |

| Limitation of '034 Patent Proposed Claim 25 | U.S. Patent No. 5,182,460 (Hussman) | Admitted Prior Art |
|---|---|---|
| 25. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 193. | |
| wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects | | E.g., col. 1, lines 36 to 61, "In the past, these headlights have been mounted on the vehicle in fixed positions relative thereto such that the beams of light are projected therefrom at predetermined |

| Limitation of '034 Patent Proposed Claim 25 | U.S. Patent No. 5,182,460 (Hussman) | Admitted Prior Art |
| --- | --- | --- |
| therefrom is capable of being adjusted up and down relative to a horizontal reference position. | | directional aiming angles relative to the vehicle. Although such fixed aiming angle headlight systems have and continue to function adequately, they cannot alter the directional aiming angles of the headlights to account for changes in the operating conditions of the vehicle. For example, if the speed of the vehicle is increased, it would be desirable to adjust the aiming angle of the headlights upwardly such that an area that is somewhat farther in front of the vehicle is more brightly illuminated. On the other hand, if the speed of the vehicle is decreased, it would be desirable to adjust the aiming angle of the headlights downwardly such that an area that is somewhat closer in front of the vehicle is more brightly illuminated. Similarly, if the vehicle turns a corner, it would be desirable to adjust the aiming angle of the headlights either toward the left or toward the right (depending on the direction of the turn) such that an area that is somewhat lateral to the front of the vehicle is more brightly illuminated.<br><br>To accomplish this, it is known to provide a directional control system for vehicle headlights that is capable of automatically altering the directional aiming angles of the headlights to account for changes in the operating conditions of the vehicle. A variety of such automatic directional control systems for vehicle headlights are known in the art. However, such known automatic headlight directional control systems |

| Limitation of '034 Patent Proposed Claim 25 | U.S. Patent No. 5,182,460 (Hussman) | Admitted Prior Art |
|---|---|---|
| | | have been found to be deficient for various reasons." |

| Limitation of '034 Patent Proposed Claim 26 | U.S. Patent No. 5,182,460 (Hussman) | Admitted Prior Art |
|---|---|---|
| 26. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 193. | |
| wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted left and right relative to a vertical reference position. | | E.g., col. 1, lines 36 to 61, "In the past, these headlights have been mounted on the vehicle in fixed positions relative thereto such that the beams of light are projected therefrom at predetermined directional aiming angles relative to the vehicle. Although such fixed aiming angle headlight systems have and continue to function adequately, they cannot alter the directional aiming angles of the headlights to account for changes in the operating conditions of the vehicle. For example, if the speed of the vehicle is increased, it would be desirable to adjust the aiming angle of the headlights upwardly such that an area that is somewhat farther in front of the vehicle is more brightly illuminated. On the other hand, if the speed of the vehicle is decreased, it would be desirable to adjust the aiming angle of the headlights downwardly such that an area that is somewhat closer in front of the vehicle is more brightly illuminated. Similarly, if the vehicle turns a corner, it would be desirable to adjust the aiming angle of the headlights either toward the left or |

| Limitation of '034 Patent Proposed Claim 26 | U.S. Patent No. 5,182,460 (Hussman) | Admitted Prior Art |
|---|---|---|
| | | toward the right (depending on the direction of the turn) such that an area that is somewhat lateral to the front of the vehicle is more brightly illuminated.<br><br>To accomplish this, it is known to provide a directional control system for vehicle headlights that is capable of automatically altering the directional aiming angles of the headlights to account for changes in the operating conditions of the vehicle. A variety of such automatic directional control systems for vehicle headlights are known in the art. However, such known automatic headlight directional control systems have been found to be deficient for various reasons." |

| Limitation of '034 Patent Proposed Claim 30 | U.S. Patent No. 5,182,460 (Hussman) | Admitted Prior Art |
|---|---|---|
| 30. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 193. | |
| wherein the automatic directional control system further includes at least one position feedback sensor capable of providing a position feedback signal associated with the at least one actuator. | | E.g., col. 3, line 49 to col. 4, line 6, "A headlight directional controller 14 is provided for controlling the operations of the up/down actuator 12 and the left/right actuator 13 and, therefore, the angle at which the beam of light projects from the headlight 11 relative to the vehicle. The headlight directional controller 14 can be embodied as any control system, such as a microprocessor or |

| Limitation of '034 Patent Proposed Claim 30 | U.S. Patent No. 5,182,460 (Hussman) | Admitted Prior Art |
|---|---|---|
| | | programmable electronic controller, that is responsive to one or more sensed operating conditions of the vehicle for selectively operating the up/down actuator 12 and the left/right actuator 13. To accomplish this, the automatic directional control system 10 can include, for example, a pair of condition sensors 15 and 16 that are connected to the headlight directional controller 14. The condition sensors 15 and 16 are conventional in the art and are responsive to respective sensed operating conditions of the vehicle for generating electrical signals to the headlight directional controller 14. However, if desired, only a single one of the condition sensors 15 and 16 need be provided. Alternatively, additional condition sensors (not shown) may be provided if desired to generate electrical signals that are representative of any other operating conditions of the vehicle. A conventional input/output device 17 is connected to (or can be connected to) the headlight directional controller 14 for facilitating communication therewith in the manner described below." |

| Limitation of '034 Patent Proposed Claim 31 | U.S. Patent No. 5,182,460 (Hussman) | Admitted Prior Art |
|---|---|---|
| 31. The automatic directional control system defined in claim 30, | See claim 30 claim chart, above at page 546. | See claim 30 claim chart, above at page 546. |
| wherein the at least one position feedback sensor | | E.g., col. 4, lines 24 to 30, "The position feedback |

| Limitation of '034 Patent Proposed Claim 31 | U.S. Patent No. 5,182,460 (Hussman) | Admitted Prior Art |
|---|---|---|
| includes a Hall Effect sensor. | | sensors 18 and 19 can be embodied as any conventional sensor structures, such as Hall effect sensors, that are responsive to movements of the headlight 11 (or to the movements of the respective actuators 12 and 13 that are connected to move the headlight 11) for generating such signals." |

| Limitation of '034 Patent Proposed Claim 32 | U.S. Patent No. 5,182,460 (Hussman) | Admitted Prior Art |
|---|---|---|
| 32. The automatic directional control system defined in claim 30, | See claim 30 claim chart, above at page 546. | See claim 30 claim chart, above at page 546. |
| wherein the at least one position feedback sensor includes an optical interrupter. | | E.g., col. 4, lines 31 to 36, "Alternatively, the position feedback sensors 18 and 19 can be embodied as respective devices that generate electrical signals whenever the headlight 11 has achieved respective predetermined up/down or left/right positions. This can be accomplished, for example, using a conventional optical interrupter (not shown) for each of the actuators 12 and 13." |

## 36. Proposed Claim 27 Is Unpatentable Over the Combination of Uchida and Wassen et al. Under 35 U.S.C. § 103(a)

| Limitation of '034 Patent Proposed Claim 27 | GB 2 309 773 (Uchida) | U.S. Patent No. 4,954,933 (Wassen et al.) |
|---|---|---|
| 27. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 156. | |
| wherein the automatic directional control system is configured such that, while in a calibration mode, a directional orientation at which a beam of light projects therefrom is capable of being adjusted relative to the vehicle by manual operation of the at least one actuator. | | E.g., col. 3, lines 17 to 30, "When a driving member such as a small electrical motor M is associated with such an adjustment device, it is placed so as to face the lower bearing point A3 and is functionally connected thereto so as to be capable of achieving, by remote control, possibly in an automated way, the heightwise adjustment of the beam emitted by the headlight. In this case, the directional adjustment of the beam is still done manually because, as pointed out, it would be extremely complicated to provide for means for the mechanical switching-over of the mechanical power and a linkage for making the selective connection of the adjusting point A1 to the motor while, at the same time disengaging the connection with the diagonally opposite point A3." |

## 37. Proposed Claim 27 Is Unpatentable Over the Combination of Takahashi and Wassen et al. Under 35 U.S.C. § 103(a)

| Limitation of '034 Patent Proposed Claim 27 | GB 2 309 774 (Takahashi) | U.S. Patent No. 4,954,933 (Wassen et al.) |
|---|---|---|
| 27. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 173. | |
| wherein the automatic directional control system is configured such that, while in a calibration mode, a directional orientation at which a beam of light projects therefrom is capable of being adjusted relative to the vehicle by manual operation of the at least one actuator. | | E.g., col. 3, lines 17 to 30, "When a driving member such as a small electrical motor M is associated with such an adjustment device, it is placed so as to face the lower bearing point A3 and is functionally connected thereto so as to be capable of achieving, by remote control, possibly in an automated way, the heightwise adjustment of the beam emitted by the headlight. In this case, the directional adjustment of the beam is still done manually because, as pointed out, it would be extremely complicated to provide for means for the mechanical switching-over of the mechanical power and a linkage for making the selective connection of the adjusting point A1 to the motor while, at the same time disengaging the connection with the diagonally opposite point A3." |

## 38. Proposed Claim 27 Is Unpatentable Over the Combination of Hussman and Wassen et al. Under 35 U.S.C. § 103(a)

| Limitation of '034 Patent Proposed Claim 27 | U.S. Patent No. 5,182,460 (Hussman) | U.S. Patent No. 4,954,933 (Wassen et al.) |
|---|---|---|
| 27. The automatic directional control system defined in claim 1, | See claim 1 claim chart, above at page 193. | |
| wherein the automatic directional control system is configured such that, while in a calibration mode, a directional orientation at which a beam of light projects therefrom is capable of being adjusted relative to the vehicle by manual operation of the at least one actuator. | | E.g., col. 3, lines 17 to 30, "When a driving member such as a small electrical motor M is associated with such an adjustment device, it is placed so as to face the lower bearing point A3 and is functionally connected thereto so as to be capable of achieving, by remote control, possibly in an automated way, the heightwise adjustment of the beam emitted by the headlight. In this case, the directional adjustment of the beam is still done manually because, as pointed out, it would be extremely complicated to provide for means for the mechanical switching-over of the mechanical power and a linkage for making the selective connection of the adjusting point A1 to the motor while, at the same time disengaging the connection with the diagonally opposite point A3." |

# Electronic Patent Application Fee Transmittal

| | |
|---|---|
| **Application Number:** | |
| **Filing Date:** | |
| **Title of Invention:** | Automatic Directional Control System for Vehicle Headlights |
| **First Named Inventor/Applicant Name:** | James E. Smith |
| **Filer:** | Clifford A. Ulrich/Helen Tam |
| **Attorney Docket Number:** | |
| Filed as Large Entity | |

## inter partes reexam Filing Fees

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Basic Filing:** | | | | |
| Request for inter reexamination | 1813 | 1 | 8800 | 8800 |
| **Pages:** | | | | |
| **Claims:** | | | | |
| **Miscellaneous-Filing:** | | | | |
| **Petition:** | | | | |
| **Patent-Appeals-and-Interference:** | | | | |
| **Post-Allowance-and-Post-Issuance:** | | | | |
| **Extension-of-Time:** | | | | |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Miscellaneous:** | | | | |
| | | **Total in USD ($)** | | **8800** |

# Electronic Acknowledgement Receipt

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| EFS ID: | 10100775 |
| Application Number: | 95001621 |
| International Application Number: | |
| Confirmation Number: | 1240 |
| Title of Invention: | Automatic Directional Control System for Vehicle Headlights |
| First Named Inventor/Applicant Name: | James E. Smith |
| Customer Number: | 26646 |
| Filer: | Clifford A. Ulrich |
| Filer Authorized By: | |
| Attorney Docket Number: | |
| Receipt Date: | 16-MAY-2011 |
| Filing Date: | |
| Time Stamp: | 19:02:48 |
| Application Type: | inter partes reexam |

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## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | Copy of patent for which reexamination is requested | Exhibit-1.pdf | 2230858<br>c7a3e627f160be377c24c737f251c416a62e15c8 | no | 17 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 2 | Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party | Exhibit-2.pdf | 2502387<br>ebb0e342ef5fc969be99252a9de7029d0fa6ec2b | no | 40 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 3 | Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party | Exhibit-3.pdf | 105836<br>cc269293a417533b72b471022426ec496b3df0d6 | no | 4 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 4 | Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party | Exhibit-4.pdf | 49359<br>c8c55ae0e7b8af4984e47469ce5056b3bc4ae40d | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 5 | Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party | Exhibit-6.pdf | 3190640<br>4c51f928043e9067057b7ba8096810867bc8aca5 | no | 39 |
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| **Information:** | | | | | |
| 6 | Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party | Exhibit-7.pdf | 2588815<br>cf88543b3c2a4f0515c1c0e65a699eeed5e553a8 | no | 31 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 7 | Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party | Exhibit-8.pdf | 1472739<br>02a806a62d84a55161fc67b521d728a0d3795a3d | no | 9 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 8 | Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party | Exhibit-9.pdf | 558013<br>ef2f09aa5e5cb13b435aa987e38fe47b8dd699d2 | no | 9 |

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| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 9 | Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party | Exhibit-10.pdf | 519887<br>5700f1ba3c331e504bf6b3f1582dfe5cb14b1d38 | no | 8 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 10 | Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party | Exhibit-11.pdf | 1800741<br>367185e06d877cbb12583f4d321802482e06a57f | no | 25 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 11 | Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party | Exhibit-12.pdf | 8390138<br>797c9dd79957838e2987abd680c100a60568440f | no | 45 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 12 | Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party | Exhibit-13.pdf | 1464677<br>60bc9f44975c3804ac39f54a12daf50219d054b0 | no | 12 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 13 | Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party | Exhibit-14.pdf | 3997637<br>6692bc8dc5739981e046e3d7fa0fbd8066dbeb46 | no | 33 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 14 | Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party | Exhibit-15.pdf | 1486379<br>0bd3bc027e78d7c9f5bf6ab1633238b0d9430331 | no | 14 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 15 | Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party | Exhibit-16.pdf | 1178725<br>1935db152912a7ba2026e1925b6a799bec8793b9 | no | 9 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 16 | Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party | Exhibit-5.pdf | 107242<br>6f0f086f98be4f2f6fed469af7dd6e2b8823a3fa | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 17 | Reexam Certificate of Service | Exhibit-17.pdf | 91381<br>6b36a30df9f4ef300059ea9171f6506aa96813a1 | no | 2 |

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| **Information:** | | | | | |
| 18 | Receipt of Original Inter Partes Reexam Request | Transmittal-Letter.pdf | 416434<br>d2a458fa7cc27cf6c4edab3f3c2911e9cdd2d87e | no | 3 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 19 | Receipt of Original Inter Partes Reexam Request | Request-for-Inter-Partes-Reeexamination.pdf | 603780<br>dbc094e94e20d5c0d8e4aaf93273e2fcc4be4656 | no | 95 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 20 | Receipt of Original Inter Partes Reexam Request | Reexamination-Claim-Charts.pdf | 1568050<br>3f079106309142efaaf991bc3d78b41f76ab49a4 | no | 551 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 21 | Fee Worksheet (PTO-875) | fee-info.pdf | 28932<br>eaeb97fc02eba20bd95a0b6a02bc9497469acf63 | no | 2 |
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| | | **Total Files Size (in bytes):** | 34352650 | | |

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**New Applications Under 35 U.S.C. 111**
**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**
**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**
**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

# EXHIBIT 1

US007241034B2

(12) United States Patent
Smith et al.

(10) Patent No.: US 7,241,034 B2
(45) Date of Patent: Jul. 10, 2007

# (54) AUTOMATIC DIRECTIONAL CONTROL SYSTEM FOR VEHICLE HEADLIGHTS

(75) Inventors: **James E. Smith**, Berkey, OH (US); **Anthony B. McDonald**, Perrysburg, OH (US)

(73) Assignee: **Dana Corporation**, Toledo, OH (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **10/285,312**

(22) Filed: **Oct. 31, 2002**

(65) **Prior Publication Data**

US 2003/0107898 A1 Jun. 12, 2003

**Related U.S. Application Data**

(60) Provisional application No. 60/369,447, filed on Apr. 2, 2002, provisional application No. 60/356,703, filed on Feb. 13, 2002, provisional application No. 60/335, 409, filed on Oct. 31, 2001.

(51) **Int. Cl.**
***B60Q 1/00*** (2006.01)
***B60R 22/00*** (2006.01)

(52) **U.S. Cl.** .......................................... **362/465**; 701/49

(58) **Field of Classification Search** .................. 362/37, 362/465–466; 315/82; 701/49

See application file for complete search history.

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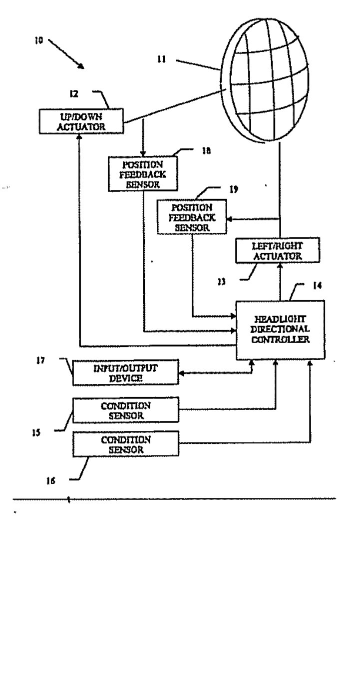
*Primary Examiner*—Ali Alavi
(74) *Attorney, Agent, or Firm*—MacMillan, Sobanski & Todd, LLC

(57) **ABSTRACT**

A structure and method for operating a directional control system for vehicle headlights that is capable of altering the directional aiming angles of the headlights to account for changes in the operating conditions of the vehicle. One or more operating condition sensors may be provided that generate signals that are representative of a condition of the vehicle, such as road speed, steering angle, pitch, suspension height, rate of change of road speed, rate of change of steering angle, rate of change of pitch, and rate of change of suspension height of the vehicle. A controller is responsive to the sensor signal for generating an output signal. An actuator is adapted to be connected to the headlight to effect movement thereof in accordance with the output signal. The controller can include a table that relates values of sensed operating condition to values of the output signal. The controller is responsive to the sensor signal for looking up the output signal in the table.

**5 Claims, 7 Drawing Sheets**



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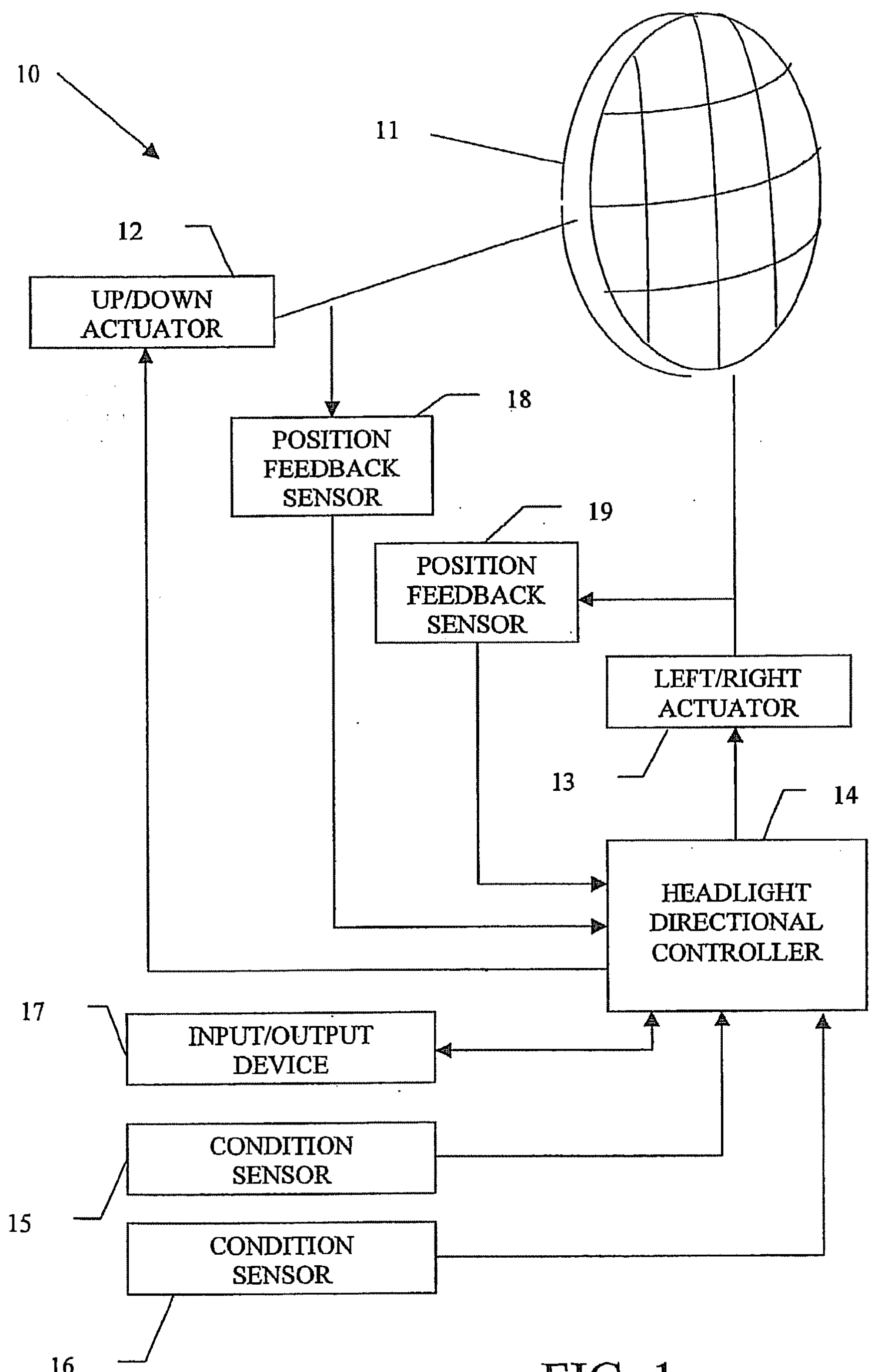
10
11
12
UP/DOWN ACTUATOR
18
POSITION FEEDBACK SENSOR
19
POSITION FEEDBACK SENSOR
LEFT/RIGHT ACTUATOR
13
14
HEADLIGHT DIRECTIONAL CONTROLLER
17
INPUT/OUTPUT DEVICE
CONDITION SENSOR
15
CONDITION SENSOR
16

FIG. 1

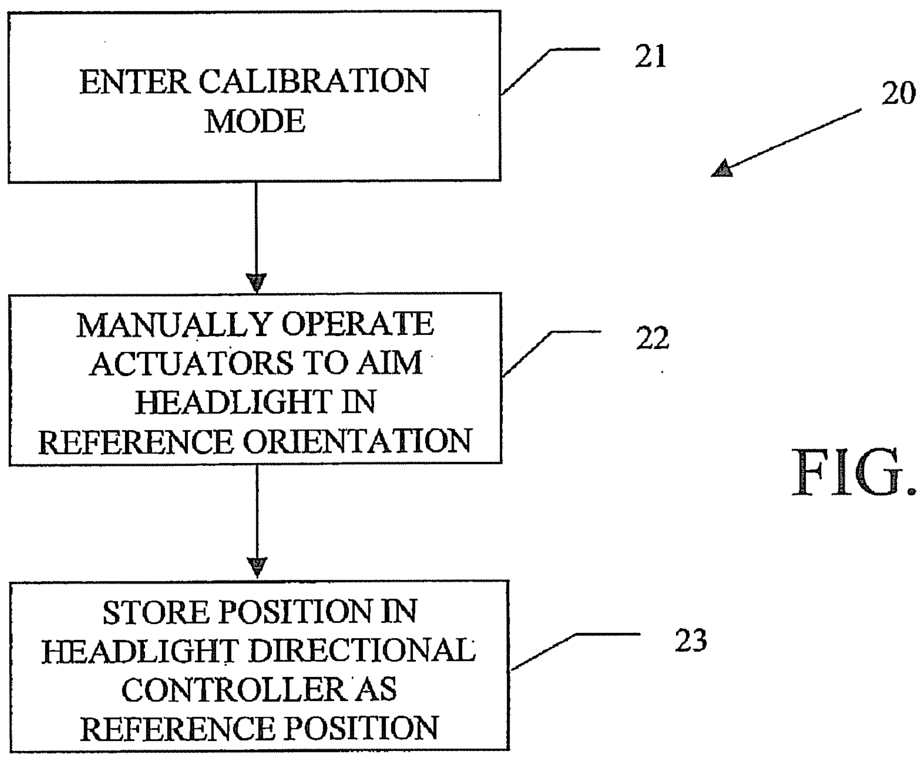
ENTER CALIBRATION MODE
21
20
MANUALLY OPERATE ACTUATORS TO AIM HEADLIGHT IN REFERENCE ORIENTATION
22
STORE POSITION IN HEADLIGHT DIRECTIONAL CONTROLLER AS REFERENCE POSITION
23

FIG. 2

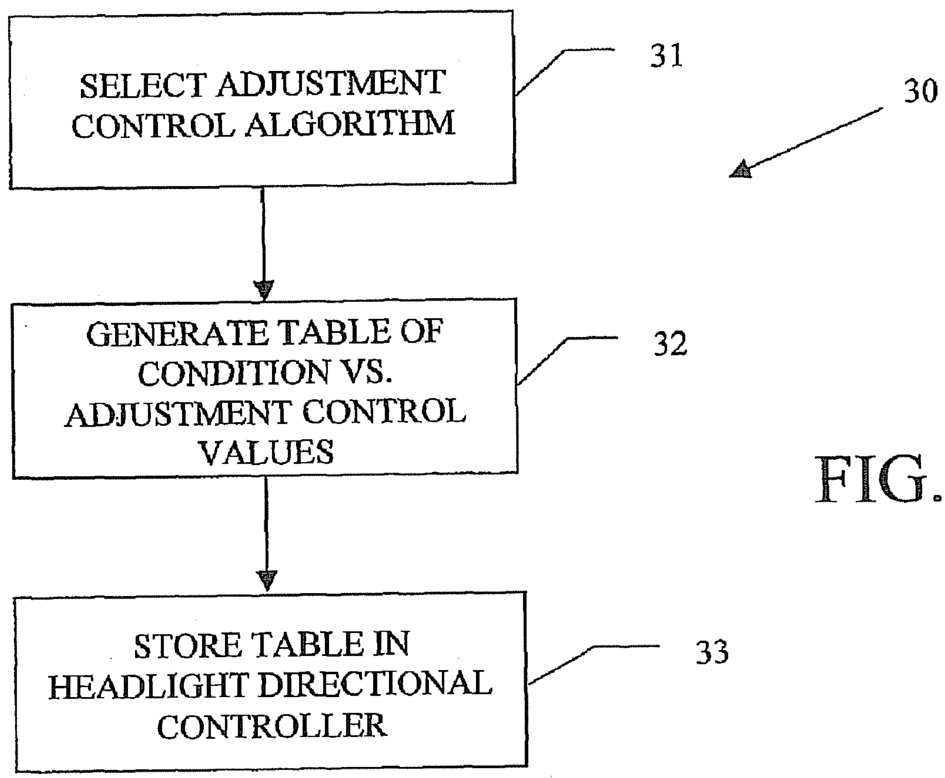
SELECT ADJUSTMENT CONTROL ALGORITHM
31
30
GENERATE TABLE OF CONDITION VS. ADJUSTMENT CONTROL VALUES
32
STORE TABLE IN HEADLIGHT DIRECTIONAL CONTROLLER
33

FIG. 3

40

| SENSED CONDITION (STEERING ANGLE) VALUES | UP/DOWN ADJUSTMENT FACTORS | LEFT/RIGHT ADJUSTMENT FACTORS |
|---|---|---|
| +6° | -3.00° | +4.50° |
| +5° | -2.50° | +3.75° |
| +4° | -2.00° | +3.00° |
| +3° | -1.50° | +2.25° |
| +2° | -1.00° | +1.50° |
| +1° | -0.50° | +0.75° |
| 0° | 0.00° | 0.00° |
| -1° | -0.50° | -0.75° |
| -2° | -1.00° | -1.50° |
| -3° | -1.50° | -2.25° |
| -4° | -2.00° | -3.00° |
| -5° | -2.50° | -3.75° |
| -6° | -3.00° | -4.50° |

FIG. 4

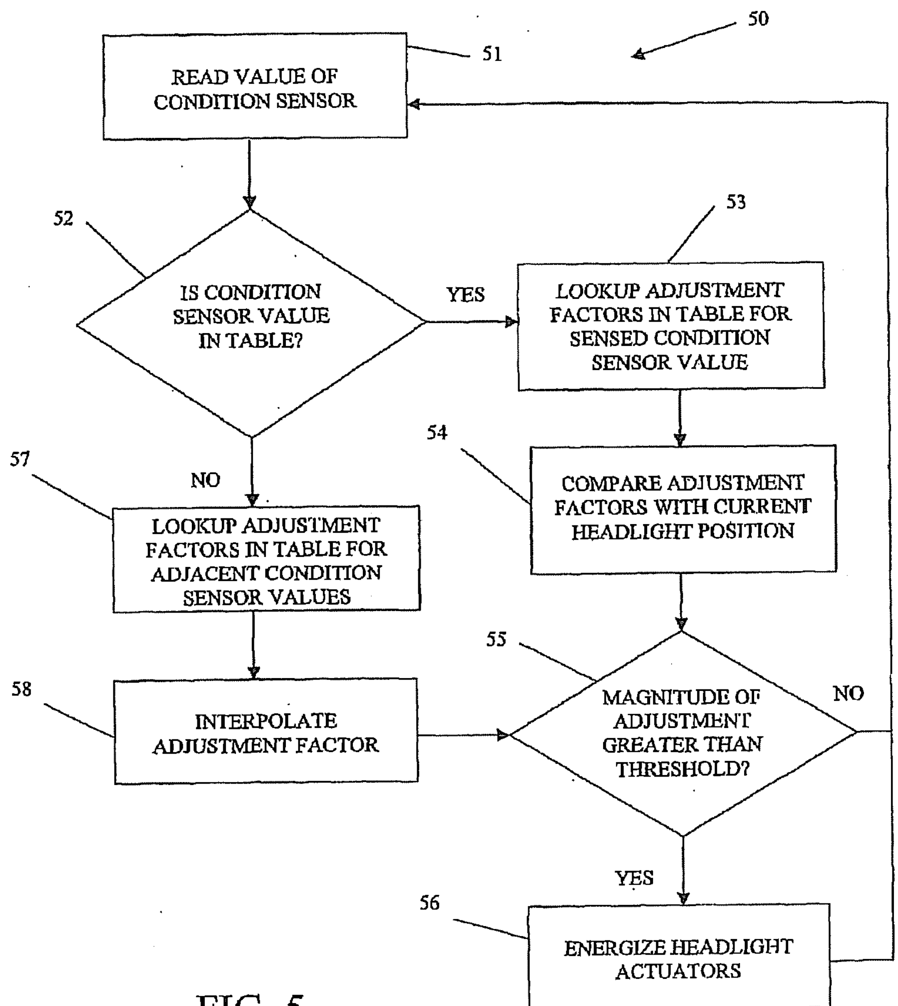
50
51
READ VALUE OF CONDITION SENSOR
52
IS CONDITION SENSOR VALUE IN TABLE?
YES
53
LOOKUP ADJUSTMENT FACTORS IN TABLE FOR SENSED CONDITION SENSOR VALUE
54
COMPARE ADJUSTMENT FACTORS WITH CURRENT HEADLIGHT POSITION
57
NO
LOOKUP ADJUSTMENT FACTORS IN TABLE FOR ADJACENT CONDITION SENSOR VALUES
55
58
INTERPOLATE ADJUSTMENT FACTOR
MAGNITUDE OF ADJUSTMENT GREATER THAN THRESHOLD?
NO
YES
56
ENERGIZE HEADLIGHT ACTUATORS

FIG. 5

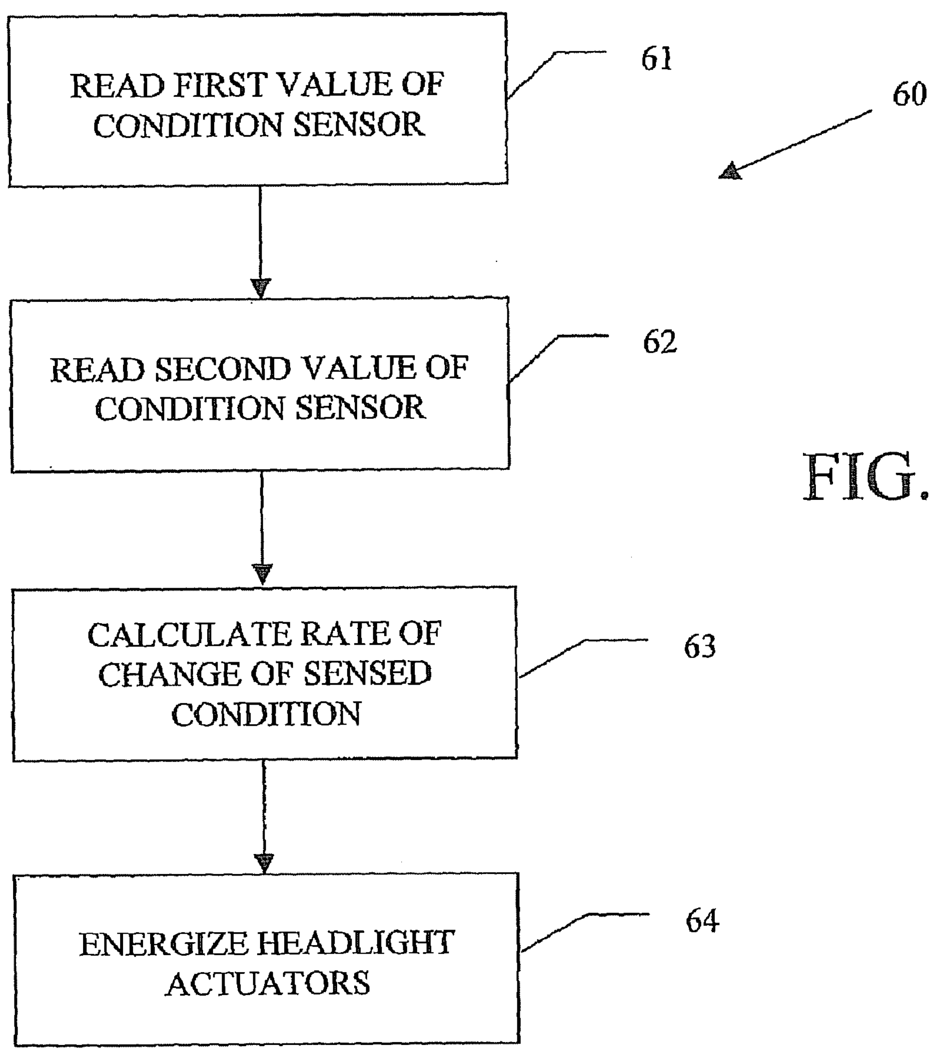
READ FIRST VALUE OF CONDITION SENSOR
61
60
READ SECOND VALUE OF CONDITION SENSOR
62
CALCULATE RATE OF CHANGE OF SENSED CONDITION
63
ENERGIZE HEADLIGHT ACTUATORS
64

FIG. 6

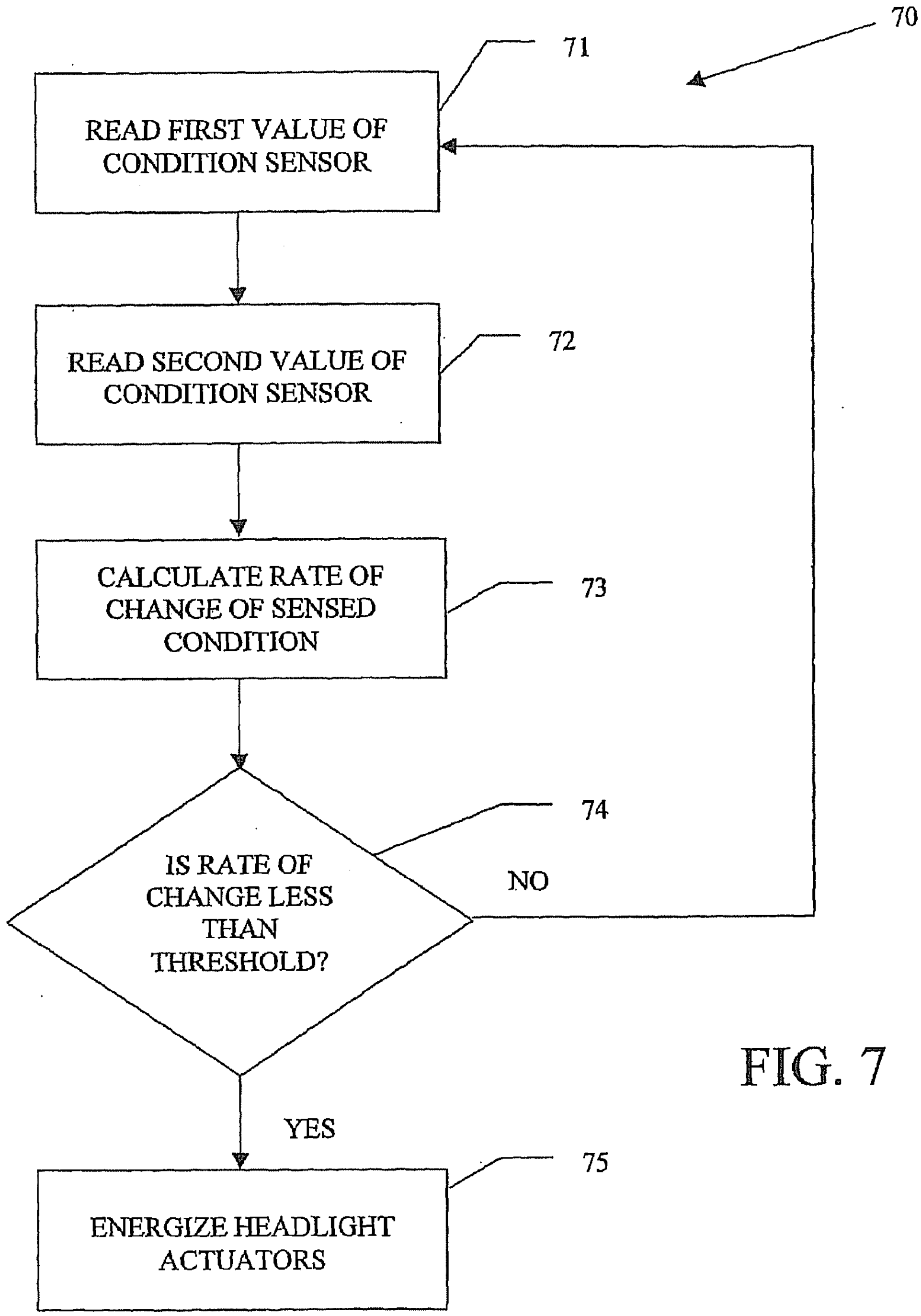
70
71
READ FIRST VALUE OF CONDITION SENSOR
72
READ SECOND VALUE OF CONDITION SENSOR
CALCULATE RATE OF CHANGE OF SENSED CONDITION
73
74
IS RATE OF CHANGE LESS THAN THRESHOLD?
NO
YES
75
ENERGIZE HEADLIGHT ACTUATORS

FIG. 7

# AUTOMATIC DIRECTIONAL CONTROL SYSTEM FOR VEHICLE HEADLIGHTS

## CROSS REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional Application Nos. 60/335,409, filed Oct. 31, 2001; 60/356,703, filed Feb. 13, 2002; and 60/369,447, filed Apr. 2, 2002, the disclosures of which are incorporated herein by reference.

## BACKGROUND OF THE INVENTION

This invention relates in general to headlights that are provided on vehicles for illuminating dark road surfaces or other areas in the path of movement. In particular, this invention relates to an automatic directional control system for such vehicle headlights.

Virtually all land vehicles, and many other types of vehicles (such as boats and airplanes, for example), are provided with one or more headlights that are adapted to illuminate a portion of a dark road surface or other area in the path of movement of the vehicle to facilitate safe travel thereon. Typically, each headlight is mounted on or near the front end of the vehicle and is oriented in such a manner that a beam of light is projected forwardly therefrom. The angle at which the beam of light projects from the headlight can, for example, be characterized in a variety of ways, including (1) up and down relative to a horizontal reference position or plane and (2) left and right relative to a vertical reference position or plane. Such directional aiming angles are usually set at the time of assembly of the headlight into the vehicle so as to illuminate a predetermined portion of the road surface or other area in the path of movement of the vehicle.

In the past, these headlights have been mounted on the vehicle in fixed positions relative thereto such that the beams of light are projected therefrom at predetermined directional aiming angles relative to the vehicle. Although such fixed aiming angle headlight systems have and continue to function adequately, they cannot alter the directional aiming angles of the headlights to account for changes in the operating conditions of the vehicle. For example, if the speed of the vehicle is increased, it would be desirable to adjust the aiming angle of the headlights upwardly such that an area that is somewhat farther in front of the vehicle is more brightly illuminated. On the other hand, if the speed of the vehicle is decreased, it would be desirable to adjust the aiming angle of the headlights downwardly such that an area that is somewhat closer in front of the vehicle is more brightly illuminated. Similarly, if the vehicle turns a corner, it would be desirable to adjust the aiming angle of the headlights either toward the left or toward the right (depending on the direction of the turn) such that an area that is somewhat lateral to the front of the vehicle is more brightly illuminated.

To accomplish this, it is known to provide a directional control system for vehicle headlights that is capable of automatically altering the directional aiming angles of the headlights to account for changes in the operating conditions of the vehicle. A variety of such automatic directional control systems for vehicle headlights are known in the art. However, such known automatic headlight directional control systems have been found to be deficient for various reasons. Thus, it would be desirable to provide an improved structure for an automatic headlight directional control system that addresses such deficiencies.



## SUMMARY OF THE INVENTION

This invention relates to an improved structure and method for operating a directional control system for vehicle headlights that is capable of automatically altering the directional aiming angles of the headlights to account for changes in the operating conditions of the vehicle. One or more operating condition sensors may be provided that generate signals that are representative of an operating condition of the vehicle, such as road speed, steering angle, pitch, suspension height, rate of change of road speed, rate of change of steering angle, rate of change of pitch, and rate of change of suspension height of the vehicle. A controller is responsive to the sensor signal for generating an output signal. An actuator is adapted to be connected to the headlight to effect movement thereof in accordance with the output signal. The controller can include a table that relates values of sensed operating condition to values of the output signal. The controller is responsive to the sensor signal for looking up the output signal in the table.

Various objects and advantages of this invention will become apparent to those skilled in the art from the following detailed description of the preferred embodiments, when read in light of the accompanying drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram of an automatic directional control system for a vehicle headlight in accordance with this invention.

FIG. **2** is a flow chart of an algorithm for calibrating the automatic directional control system illustrated in FIG. **1** so as to define an initial reference position for the headlight from which the headlight directional controller can implement directional angle adjustments.

FIG. **3** is a flow chart of an algorithm for generating a table that relates one or more sensed vehicle operating condition values to one or more headlight directional angle adjustment factors and for storing such table in the headlight directional controller illustrated in FIG. **1**.

FIG. **4** is an example of a table that can be generated and stored in the headlight directional controller in accordance with the table generating algorithm illustrated in FIG. **3**.

FIG. **5** is a flow chart of an algorithm for operating the headlight directional controller illustrated in FIG. **1** to automatically implement directional angle adjustments in accordance with sensed condition values.

FIG. **6** is a flow chart of an algorithm for operating the headlight directional controller illustrated in FIG. **1** to automatically implement directional angle adjustments in accordance with the rate of change of one or more of the sensed condition values.

FIG. **7** is a flow chart of an algorithm for operating the headlight directional controller illustrated in FIG. **1** to automatically implement directional angle adjustments, but only when the rate of change of one or more of the sensed condition values is less than (or greater than) a predetermined value.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, there is illustrated in FIG. **1** an automatic directional control system, indicated generally at **10**, for a vehicle headlight **11** in accordance with this invention. The illustrated headlight **11** is, of itself, conventional in the art and is intended to be representative of any device that can be supported on any type of vehicle for the purpose of illuminating any area, such as an area in the path of movement of the vehicle. The headlight **11** is typically mounted on or near the front end of a vehicle (not shown) and is oriented in such a manner that a beam of light is projected therefrom. In a manner that is well known in the art, the headlight **11** is adapted to illuminate a portion of a dark road surface or other area in the path of movement of the vehicle to facilitate safe travel thereon.

The headlight **11** is adjustably mounted on the vehicle such that the directional orientation at which the beam of light projects therefrom can be adjusted relative to the vehicle. Any desired mounting structure can be provided to accomplish this. Typically, the headlight **11** is mounted on the vehicle such that the angle at which the beam of light projects therefrom can be adjusted both (1) up and down relative to a horizontal reference position or plane and (2) left and right relative to a vertical reference position or plane. Although this invention will be described and illustrated in the context of a headlight that is adjustable in both the up/down direction and the left/right direction, it will be appreciated that this invention may be practiced with any headlight **11** that is adjustable in any single direction or multiple directions of movement, whether up/down, left/right, or any other direction.

To effect movement of the illustrated headlight **11** relative to the vehicle, an up/down actuator **12** and a left/right actuator **13** are provided. The actuators **12** and **13** are conventional in the art and may, for example, be embodied as servo motors, step motors, or any other electronically controlled mechanical actuators. It has been found to be desirable to use microstepping motors for the actuators **12** and **13**. Such microstepping motors are known in the art and consist of conventional step motors that have appropriate hardware (i.e., driver integrated circuits) and software that allow the step motors to be operated in fractional step increments. The use of such microstepping motors has been found to be desirable because they can effect movements of the headlights in a somewhat faster, smoother, and quieter manner than conventional step motors, and further permit more precise positioning of the headlights **11**. In the illustrated embodiment, the up/down actuator **12** is mechanically connected to the headlight **11** such that the headlight **11** can be selectively adjusted up and down relative to a horizontal reference position or plane. Similarly, the illustrated left/right actuator **13** is mechanically connected to the headlight **11** such that the headlight **11** can be selectively adjusted left and right relative to a vertical reference position or plane.

A headlight directional controller **14** is provided for controlling the operations of the up/down actuator **12** and the left/right actuator **13** and, therefore, the angle at which the beam of light projects from the headlight **11** relative to the vehicle. The headlight directional controller **14** can be embodied as any control system, such as a microprocessor or programmable electronic controller, that is responsive to one or more sensed operating conditions of the vehicle for selectively operating the up/down actuator **12** and the left/right actuator **13**. To accomplish this, the automatic directional control system **10** can include, for example, a pair of condition sensors **15** and **16** that are connected to the headlight directional controller **14**. The condition sensors **15** and **16** are conventional in the art and are responsive to respective sensed operating conditions of the vehicle for generating electrical signals to the headlight directional controller **14**. However, if desired, only a single one of the condition sensors **15** and **16** need be provided. Alternatively, additional condition sensors (not shown) may be provided if desired to generate electrical signals that are representative of any other operating conditions of the vehicle. A conventional input/output device **17** is connected to (or can be connected to) the headlight directional controller **14** for facilitating communication therewith in the manner described below.

If desired, a first position feedback sensor **18** may be provided for the up/down actuator **12**, and a second position feedback sensor **19** may be provided for the left/right actuator **13**. The position feedback sensors **18** and **19** are conventional in the art and are adapted to generate respective electrical signals that are representative of the actual up/down and left/right positions of the headlight **11**. Thus, the first position feedback sensor **18** is responsive to the actual up/down position of the headlight **11** (as determined by a portion of the up/down actuator **12**, for example) for generating an electrical signal to the headlight directional controller **14** that is representative thereof. Similarly, the second position feedback sensor **19** is responsive to the actual left/right position of the headlight **11** (as determined by a portion of the left/right actuator **13**, for example) for generating an electrical signal to the headlight directional controller **14** that is representative thereof. The position feedback sensors **18** and **19** can be embodied as any conventional sensor structures, such as Hall effect sensors, that are responsive to movements of the headlight **11** (or to the movements of the respective actuators **12** and **13** that are connected to move the headlight **11**) for generating such signals.

Alternatively, the position feedback sensors **18** and **19** can be embodied as respective devices that generate electrical signals whenever the headlight **11** has achieved respective predetermined up/down or left/right positions. This can be accomplished, for example, using a conventional optical interrupter (not shown) for each of the actuators **12** and **13**. Each of the optical interrupters includes a flag or other component that is mounted on or connected to the headlight **11** for movement therewith. Each of the optical interrupters further includes an optical source and sensor assembly. As the headlight **11** is moved by the actuators **12** and **13**, the flag moves therewith relative to the optical source and sensor assembly between a first position, wherein the flag permits light emitted from the source from reaching the sensor, and a second position, wherein the flag prevents light emitted from the source from reaching the sensor. When the flag is in the first position relative to the optical source and sensor assembly, the sensor is permitted to receive light emitted from the source. As a result, a first signal is generated from the optical source and sensor assembly to the headlight directional controller **14**. Conversely, when the flag is in the second position relative to the optical source and sensor assembly, the sensor is not permitted to receive light emitted from the source. As a result, a second signal is generated from the optical source and sensor assembly to the headlight directional controller **14**. Thus, the edge of the flag defines a transition between the first and second positions of the flag relative to the optical source and sensor assembly and, therefore, defines a predetermined up/down or left/right position of the headlight **11**. The nature of the signal generated from the optical source and sensor assembly to the headlight directional controller **14** (i.e., the first signal or the second signal) can also be used to determine on which side of the predetermined position (the left side or the right side, for example) that the headlight **11** is positioned. The purpose for such position feedback sensors **18** and **19** will be discussed below.

FIG. 2 is a flow chart of an algorithm, indicated generally at 20, for calibrating the automatic directional control system illustrated in FIG. 1 so as to define an initial reference position or positions for the headlight 11 from which the headlight directional controller 14 can implement directional angle adjustments. As mentioned above, the headlight 11 is mounted on the vehicle such that the angle at which the beam of light projects therefrom can be adjusted both up and down relative to a horizontal reference position or plane and left and right relative to a vertical reference position or plane. To insure accurate positioning of the headlight 11, it is desirable that a reference position or positions be initially established by the headlight directional controller 14. Subsequent directional angle adjustments can be made by the headlight directional controller 14 from the pre-established reference position or positions established by this calibration algorithm 20.

To accomplish this, the calibration algorithm 20 has a first step 21 wherein the headlight directional controller 14 is caused to enter a calibration mode of operation. In the calibration mode of operation, the headlight directional controller 14 is responsive to input signals from the input/output device 17 (or from another source, if desired) for causing manual operation of the up/down actuator 12 and the left/right actuator 13. Thus, while the headlight directional controller 14 is in the calibration mode of operation, an operator of the input/output device 17 can manually effect either up/down movement of the headlight 11, left/right movement of the headlight 11, or both, as desired.

In a second step 22 of the calibration algorithm 20, the up/down actuator 12 and the left/right actuator 13 are manually operated to aim the headlight 11 in a predetermined reference orientation. This can be accomplished by use of the input/output device 17 that, as mentioned above, is connected to (or can be connected to) the headlight directional controller 14. Traditionally, the aiming of a headlight 11 has been accomplished by parking the vehicle on a surface near a wall or other vertical structure, providing a reference target at a predetermined location on the wall or other structure, and mechanically adjusting the mounting structure of the headlight 11 such that the center of the beam therefrom is projected at the reference target. In this invention, the vehicle is parked on a surface near a wall or other vertical structure, and a reference target is provided at a predetermined location on the wall or other structure, as described above. Next, in accordance with the second step 22 of this calibration algorithm 20, the input/output device 17 is operated to generate electrical signals to the headlight directional controller 14. In response to such electrical signals, the headlight directional controller 14 operates the up/down actuator 12 and the left/right actuator 13 to move the headlight 11 such that center of the beam projecting therefrom is aimed at the reference target. When the beam from the headlight 11 is so aimed, then the headlight 11 is determined to be oriented in the initial reference position from which the headlight directional controller 14 can subsequently implement directional angle adjustments.

In a third step 23 of the calibration algorithm 20, once this initial reference position for the headlight 11 has been achieved, such position is stored in the headlight directional controller 14 as the predetermined initial reference position. This can be accomplished by means of the position feedback sensors 18 and 19. As discussed above, the position feedback sensors 18 and 19 are adapted to generate respective electrical signals that are representative of the actual up/down and left/right positions of the headlight 11 or of the predetermined positions for the headlight. Thus, the first position feedback sensor 18 is responsive to the actual up/down position of the headlight 11 (as determined by the up/down actuator 12, for example) for generating an electrical signal to the headlight directional controller 14 that is representative thereof. Similarly, the second position feedback sensor 19 is responsive to the actual left/right position of the headlight 11 (as determined by the left/right actuator 13, for example) for generating an electrical signal to the headlight directional controller 14 that is representative thereof. Accordingly, the third step 23 of the calibration algorithm 20 can be performed by causing the headlight directional controller 14 to read the signals from the position feedback sensors 18 and 19 and store the current up/down and left/right positions of the headlight 11 as the initial reference positions from which the headlight directional controller 14 can subsequently implement directional angle adjustments.

The current position of the headlight 11 is preferably stored in the non-volatile memory of the headlight directional controller 14 for reference during normal operation of the automatic directional control system 10 described below. Thus, when the automatic directional control system 10 is initially activated (such as when the electrical system of the vehicle is initially turned on), the headlight directional controller 14 can position the headlight 11 at or near the calibrated position utilizing the signals comparing the current position of the headlight 11 (as determined by the signals generated by the position feedback sensors 18 and 19) with the predetermined reference position determined by the calibration algorithm 20.

FIG. 3 is a flow chart of an algorithm, indicated generally at 30, for generating a table that relates the sensed condition values from the condition sensors 15 and 16 to the headlight directional angle adjustment factors that will be implemented by the headlight directional controller 14, and further for storing such table in the headlight directional controller 14 illustrated in FIG. 1. As used herein, the term "table" is intended to be representative of any collection or association of data that relates one or more of the sensed condition values to one or more of the headlight directional angle adjustment factors. The table of data can be generated, stored, and expressed in any desired format. For example, this table of data can be generated, stored, and expressed in a conventional spreadsheet format, such as shown in FIG. 4, which will be discussed in detail below.

In a first step 31 of the table generating algorithm 30, an adjustment control algorithm is selected. The adjustment control algorithm can be, generally speaking, any desired relationship that relates one or more operating conditions of the vehicle to one or more angular orientations of the headlight 11. A variety of such relationships are known in the art, and this invention is not intended to be limited to any particular relationship. Typically, such relationships will be expressed in terms of a mathematical equation or similar relationship that can be readily processed using a microprocessor or similar electronic computing apparatus, such as the above-described headlight directional controller 14. The particular adjustment control algorithm that is selected may, if desired, vary from vehicle to vehicle in accordance with a variety of factors, including relative size and performance characteristics of the vehicle or any other desired condition.

As mentioned above, a plurality of operating conditions may be sensed by the condition sensors 15 and 16 and provided to the headlight directional controller 14 for use with the adjustment control mechanism. For example, the condition sensors 15 and 16 may generate electrical signals to the headlight directional controller 14 that are representative of the road speed, the steering angle, and the pitch of the vehicle (which can, for example, be determined by sensing the front and rear suspension heights of the vehicle or by a pitch or level sensor). Additionally, the time derivative of these operating conditions (i.e., the rate of change of the road speed, steering angle, and pitch of the vehicle) can be sensed or calculated. However, any other operating condition or conditions of the vehicle may be sensed and provided to the headlight directional controller **14**.

In a second step **32** of the table generating algorithm **30**, the table is generated using the adjustment control algorithm selected in the first step **31**. The table can be generated in any desired manner. For example, let it be assumed that the selected adjustment control algorithm relates a single sensed operating condition to each of the angular adjustment control values for adjusting both the up/down orientation and the left/right orientation of the headlight **11**. The table can be generated by initially selecting a first discrete sensed operating condition value that might be encountered during operation of the vehicle. Then, the selected adjustment control algorithm is solved using such first discrete sensed operating condition value to obtain the corresponding adjustment control values for the up/down and left/right orientation of the headlight **11**. Then, the first discrete sensed operating condition value and the corresponding adjustment control values are stored in the table. This process can be repeated for any desired number of other discrete sensed operating condition values that might be encountered during operation of the vehicle.

As mentioned above, FIG. **4** is a representative example of a table, indicated generally at **40**, that can be generated in accordance with the second step **32** of the table generating algorithm **30** illustrated in FIG. **3**. As shown therein, a series of discrete sensed operating condition values (degrees of steering angles, for example) is related to the angular adjustment control values (degrees of movement from the associated up/down and left/right reference positions or planes, for example) for adjusting both the up/down orientation and the left/right orientation of the headlight **11**. For the purposes of illustration only, let it be assumed that (1) a positive steering angle value represents steering toward left, while a negative steering angle value represents steering toward the right, (2) a positive up/down adjustment factor represents aiming the headlight **11** upwardly, while a negative up/down adjustment factor represents aiming the headlight **11** downwardly, and (3) a positive left/right adjustment factor represents aiming the headlight **11** toward the left, while a negative left/right adjustment factor represents aiming the headlight **11** toward the right.

Thus, in accordance with the selected adjustment control algorithm, a sensed steering angle of +6° results in an up/down adjustment factor of –3.00° and a left/right adjustment factor of +4.50°. Similarly, a sensed steering angle of +5° results in an up/down adjustment factor of –2.50° and a left/right adjustment factor of +3.75°, and so on as shown in the table **40**. The illustrated table **40** relates thirteen different sensed steering angle values to their corresponding adjustment control values for both the up/down and left/right orientation of the headlight **11**. However, the table **40** can include a greater or lesser number of such sensed operating condition values, together with their corresponding adjustment control values. Furthermore, although the illustrated table **40** relates only a single sensed operating condition value (steering angle) to the corresponding adjustment control values for both the up/down and left/right orientation of the headlight **11**, the selected adjustment control algorithm may, as mentioned above, be responsive to a plurality of sensed operating condition values for determining the corresponding adjustment control values. Alternatively, as will be discussed further below, a plurality of tables **40** can be generated, one for each of the plurality of sensed operating condition values. The size and extent of the table **40** or tables can be varied to accommodate any desired number of such sensed operating conditions.

Referring back to FIG. **3**, in a third step **33** of the table generating algorithm **30**, the table **40** generated in the second step **32** is stored in the memory of the headlight directional controller **14** illustrated in FIG. **1**. The contents of the table **40** can be communicated serially to the headlight directional controller **14** by means of the input/output device **17** illustrated in FIG. **1** or in any other desired manner. Regardless of how it is communicated, the table **40** is preferably stored in a non-volatile memory of the headlight directional controller **14** for subsequent use in the manner described further below when the vehicle is operated.

As mentioned above, it may be desirable to vary the algorithm that is selected for use in implementing the headlight directional angle adjustment factors. The generation of the table **40** and the storage of such table **40** in the memory of the headlight directional controller **14** allow a designer of the automatic directional control system **10** to quickly and easily alter the response characteristics of the system **10** as desired, without the need for direct access to the computer code or software that is used to operate the headlight directional controller **14**. Rather, to effect such alterations, a designer can simply change some or all of the data points that are contained within the table **40**. As will be described in detail below, the headlight directional controller **14** will use whatever data points that are contained within the table **40** in determining the need for adjustments in the angular orientation of the headlight **11**. This structure also reduces the amount of processing power that is necessary for the headlight directional controller **14** because it can operate on a relatively simple look-up basis using the table **40**, rather than having to calculate relatively high order equations that may be used to determine the data points contained within the table **40**.

FIG. **5** is a flow chart of an algorithm, indicated generally at **50**, for operating the headlight directional controller illustrated in FIG. **1** to automatically implement directional angle adjustments in accordance with one or more of the sensed condition values from the condition sensors **15** and **16**. In a first step **51** of the operating algorithm **50**, the values of one or more of the condition sensors **15** and **16** are read by the headlight directional controller **14**. Then, the operating algorithm **50** enters a decision point **52**, wherein it is determined whether the value or values of the condition sensors **15** and **16** that have been read by the headlight directional controller **14** are specifically contained in the table **40**. For example, using the table **40** illustrated in FIG. **4**, if the headlight directional controller **14** has read a steering angle value of –2°, then it is determined that the value of the condition sensor **15** is specifically contained within the table **40**. In this instance, the operating algorithm **50** branches from the decision point **52** to an instruction **53**, wherein the adjustment factors contained in the table **40** that correspond to the sensed condition value are looked up and stored in the headlight directional controller **14**.

The operating algorithm **50** next enters an instruction **54** wherein the value of the magnitude of the adjustment factor (i.e., the desired position for the headlight **11**) is compared with the current position of the headlight **11**. This step **54** of the operating algorithm **50** is optional and can be performed if one or more of the position feedback sensors **18** and **19** are provided in the automatic directional control system **10** to generate respective electrical signals that are representative of the actual up/down and left/right positions of the headlight **11**, as described above. This step **54** of the operating algorithm **50** can be performed to determine how much of an adjustment is necessary to move the headlight **11** from its current position, as determined by the position feedback sensors **18** and **19**, to the desired position, as defined by the adjustment factor obtained from the table **40**. To accomplish this, the value of the adjustment factor may, for example, be subtracted from the current position of the headlight **11** to determine the magnitude of the difference therebetween and, therefore, the magnitude of the adjustment that is necessary to move the headlight **11** from its current position to the desired position. However, this step **54** of the operating algorithm **50** can be accomplished in any other desired manner.

Next, the operating algorithm **50** enters a decision point **55**, wherein it is determined whether the magnitude of the adjustment that is necessary to move the headlight **11** from its current position to the desired position is greater than a predetermined minimum threshold. This step in the operating algorithm **50** is also optional, but may be desirable to prevent the actuators **12** and **13** from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition or conditions, such as relatively small bumps in the road. For example, if the current position of the headlight **11** is relatively close to the desired position, then it may be undesirable to effect any movement thereof. This step **55** will prevent the actuators **12** and **13** from being operated unless the current position of the headlight **11** is relatively far from the desired position. As another example, if the condition sensors **15** and **16** are respectively responsive to the front and rear suspension heights of the vehicle for the purpose of determining the pitch thereof, then the headlight directional controller **14** may be programmed to be responsive only to changes in the suspension heights that occur at frequencies that are lower than the suspension rebound frequency of the vehicle (thereby ignoring relatively high frequency changes in suspension height that are likely the result of bumps in the road). However, relatively high frequency changes in the suspension heights could also be monitored to assist in deciphering relatively rough suspension changes from other suspension changes.

In any event, the provision of the predetermined minimum threshold functions as a filter or dead band that minimizes or eliminates undesirable "hunting" of the actuators **12** and **13** for relatively small magnitudes of movement of the headlight **11**. If the magnitude of the adjustment factor is not greater than the predetermined minimum threshold, then the operation of the actuators **12** and **13** is considered to be undesirable. Thus, the operating algorithm **50** branches from the decision point **55** back to the instruction **51**, wherein the above-described steps of the operating algorithm **50** are repeated.

If, on the other hand, the magnitude of the adjustment factor is greater than the predetermined minimum threshold, then the operation of the actuators **12** and **13** is considered to be desirable. Thus, the operating algorithm **50** branches from the decision point **55** to an instruction **56**, wherein either or both of the actuators **12** and **13** are actuated to effect movement of the headlight **11**. For example, using the table **40** illustrated in FIG. **4**, if the headlight directional controller **14** has read a steering angle value of −2°, then the headlight directional controller **14** will look up an up/down adjustment factor of −1.00° and a left/right adjustment factor of −1.50° from the table **40**. The headlight directional controller **14** operates the actuators **12** and **13** to adjust the angular orientation of the headlight **11** to achieve the noted adjustment factors.

In some instances, the amounts of movement that are to be implemented by the two actuators **12** and **13** will be the same (i.e., the amount of up/down movement of the headlight **11** will be the same as the amount of left/right movement). More frequently, however, the amounts of movement that are to be implemented by the two actuators **12** and **13** will be different from one another. In the latter instances, it may be desirable to operate the two actuators **12** and **13** at two different speeds such that the overall movement of the headlight **11** is relatively uniform. For example, if the amount of movement that is to be implemented by the up/down actuator **12** is twice as large as the amount of movement that is to be implemented by the left/right actuator **13**, then it may be desirable to operate the up/down actuator **12** at one-half of the speed of the left/right actuator **13** so that the movements of both actuators **12** and **13** (and, therefore, the overall movement of the headlight **11**) will start and stop at approximately the same time. Similarly, if the vehicle is provided with two different headlights **11**, as is commonly found, then it may be desirable to control the respective movements of such different headlights **11** in such a manner that they both start and stop at approximately the same time. This can be accomplished, for example, by providing a single headlight directional controller **14** for not only controlling, but also coordinating the movements of both of the headlights **11** in response to the sensed operating conditions.

Such operations can be performed in an open loop manner if desired, wherein the actuators **12** and **13** are operated to achieve predetermined amounts of movement. For example, the actuators **12** and **13** can be embodied as step motors that are operated a predetermined number of steps to achieve predetermined amounts of movement. Alternatively, the actuators **12** and **13** can be operated for predetermined periods of time to achieve the predetermined amounts of movement. However, more desirably, the operations of the actuators **12** and **13** are performed in a closed loop manner. To accomplish this, the actuators **12** and **13** are operated until either or both of the position feedback sensors **18** and **19** generate signals indicate that the headlight **11** has actually achieved the predetermined amounts of movement or desired position. In either event, the operating algorithm **50** then branches back to the instruction **51**, wherein the above-described steps of the algorithm **50** are repeated.

Referring back to the decision point **52**, if the value or values of the condition sensors **15** and **16** that have been read by the headlight directional controller **14** are not specifically contained in the table **40**, then the operating algorithm **50** branches from the decision point **52** to an instruction **57**, wherein the adjustment factors that are specifically contained in the table **40** that correspond to the adjacent sensed condition values are looked up and stored in the headlight directional controller **14**. For example, using the table **40** illustrated in FIG. **4**, if the headlight directional controller **14** has read a steering angle value of −1.5°, then it is determined that the value of the condition sensor **15** is not specifically contained within the table **40**. Rather than simply default to the closest value that is contained within the table **40**, the two adjustment factors specifically contained in the table **40** that are adjacent to the sensed condition value (namely, the adjustment factors for the steering angle values of −1° and −2°) are looked up and stored in the headlight directional controller **14**.

The operating algorithm **50** next enters an instruction **58**, wherein the actual adjustment factors to be implemented by the headlight directional controller **14** are interpolated or otherwise calculated from the stored adjustment factors that are adjacent to the sensed condition value. For example, as mentioned above, if the actual sensed steering angle value is −1.5°, then the headlight directional controller **14** looks up the adjustment factors for the steering angle values of −1° and −2°. The up/down adjustment factor for a steering angle value of −1° is −0.50 while the up/down adjustment factor for a steering angle value of −2° is −1.00°. If the calculation that is performed by the headlight directional controller **14** is a simple arithmetic mean, then the interpolated up/down adjustment factor would be −0.75°. Similarly, the left/right adjustment factor for a steering angle value of −1° is −0.75°, while the left/right adjustment factor for a steering angle value of −2° is −1.50°. If the calculation that is performed by the headlight directional controller **14** is a simple arithmetic mean, then the interpolated left/right adjustment factor would be −1.13°. Thereafter, the operating algorithm **50** branches to the decision point **55**, and the remainder of the operating algorithm **50** is performed as described above.

The interpolation that is performed by the headlight directional controller **14** can be accomplished in any desired manner. The performance of the simple arithmetic mean described above is intended to be representative of any mathematical or other function that can be performed to calculate, derive, or otherwise obtain adjustment factors that are not present in the table **40**. Furthermore, although this interpolation has been described in the context of using only the two condition values that are directly adjacent to the actual sensed condition value, it will be appreciated that the adjustment values for any single condition value or combination of sensed condition values may be selected for the interpolation. For example, several of the condition values both above and below the sensed condition value can be read from the table **40** to derive a trend line or other good estimate of the adjustment factors that are not present in the table **40**. Performance of this interpolation does not require any significant increase in the amount of processing power that is necessary for the headlight directional controller **14**.

The above discussion has assumed the use of a single table **40** that provides adjustment values based upon a single sensed operating condition (steering angle of the vehicle, in the illustrated embodiment). However, as discussed above, this invention may be practiced by sensing a plurality of operating conditions of the vehicle. For example, let it be assumed that both steering angle and vehicle road speed are sensed by the condition sensors **15** and **16**. As previously discussed, the adjustment control algorithm that is selected in the first step **31** of the table generating algorithm **30** can be designed to accommodate multiple sensed conditions. Alternatively, however, a first table (such as the table **40** illustrated in FIG. **4**) may be generated that relates the steering angle of the vehicle to the angular adjustment control values for adjusting both the up/down orientation and the left/right orientation of the headlight **11**. A second, similar table (not shown) may also be generated that relates the road speed of the vehicle to the angular adjustment control values for adjusting both the up/down orientation and the left/right orientation of the headlight **11**. Thus, for a given steering angle and road speed of the vehicle, the first and second tables may provide differing angular adjustment control values. To address this, the interpolation step **57** of the operating algorithm **50** can be performed to interpolate a single composite adjustment value that is based upon the two different values provided in the first and second tables for the pair of sensed operating conditions. This interpolation can be performed in the same manner as described above for each of the actuators **12** and **13**.



A variety of control strategies can be implemented using the automatic directional control system **10** described above. For example, the pitch of the vehicle can change as a result of a variety of factors, including acceleration, deceleration, and weight distribution of the vehicle. These pitch variations can alter the angle at which the beam of light projects from the headlight **11** in the up and down direction relative to a horizontal reference position or plane. The automatic directional control system **10** can be responsive to such pitch variations for operating the up/down actuator **12** to maintain the angle at which the beam of light projects from the headlight **11** in the up and down direction relatively constant to the horizontal reference position or plane.

As discussed above, the angle at which the beam of light projects from the headlight **11** in the left and right direction relative to a vertical reference position or plane can be adjusted in accordance with the sensed steering angle. However, the angle at which the beam of light projects from the headlight **11** in the up and down direction relative to a horizontal reference position or plane can also be adjusted in accordance with the sensed steering angle. This can be done to lower the headlight beams as the vehicle is turning a corner. The advantages of this are not only to better illuminate the road surface in the path of movement of the vehicle, but also to reduce headlight glare to other vehicles as the turn is negotiated.

Lastly, many vehicles on the road today have halogen lamps or other lights that are aimed to illuminate the sides of the roads in front of the vehicle during the turn. These other lights are activated by the manual operation of the turn signals of the vehicle. The automatic directional control system **10** of this invention can be responsive to one or more operating conditions of the vehicle to automatically activate these other lights on the vehicle. For example, the automatic directional control system **10** of this invention can be responsive to a steering angle in excess of a predetermined magnitude for automatically activating these other lights on the vehicle. This can be effective to extend the angular range of illumination of the road surface.

FIG. **6** is a flow chart of an algorithm, indicated generally at **60**, for operating the headlight directional controller illustrated in FIG. **1** to automatically implement directional angle adjustments in accordance with the rate of change of one or more of the sensed condition values. As mentioned above, the headlight directional controller **14** can be operated to automatically implement directional angle adjustments in accordance with one or more of the sensed condition values or in accordance with the rate of change of one or more of the sensed condition values.

To accomplish this, the algorithm **60** has a first step **61** wherein the values of one or more of the condition sensors **15** and **16** are initially read by the headlight directional controller **14**. Then, the algorithm **60** enters a second step **62** wherein the values of one or more of the condition sensors **15** and **16** are subsequently read a second time by the headlight directional controller **14**. The second reading of the condition sensors **15** and **16** occurs a predetermined amount of time after the first reading thereof. Next, the algorithm enters a third step **63** wherein a rate of change of the sensed condition or conditions is calculated. The rate of change of the sensed condition can be calculated as the difference between the first and second readings divided by the amount of time therebetween or by any other desired means. For example, if the sensed condition is vehicle speed, then the difference between the first sensed vehicle speed and the second sensed vehicle speed, divided by the amount of time therebetween, would yield a number that is representative of the acceleration of the vehicle. In a final step **64** of the algorithm **60**, either or both of the actuators **12** and **13** are actuated to effect movement of the headlight **11** in accordance with the calculated rate of change of the sensed condition. Such movement of the headlight **11** can be effected in a manner that is similar to that described above.

FIG. **7** is a flow chart of an algorithm, indicated generally at **70**, for operating the headlight directional controller illustrated in FIG. **1** to automatically implement directional angle adjustments, but only when the rate of change of one or more of the sensed condition values is less than (or greater than) a predetermined value. As mentioned above, the headlight directional controller **14** can be operated to automatically implement directional angle adjustments in accordance with one or more of the sensed condition values. In this variation of the invention, the headlight directional controller **14** automatically implements directional angle adjustments in response to the sensed condition values (or in response to the rate of change of the sensed condition values), but only when the rate of change of one or more of the sensed condition values is less than (or greater than) a predetermined value.

To accomplish this, the algorithm **70** has a first step **71** wherein the values of one or more of the condition sensors **15** and **16** are initially read by the headlight directional controller **14**. Then, the algorithm **70** enters a second step **72** wherein the values of one or more of the condition sensors **15** and **16** are subsequently read a second time by the headlight directional controller **14**. The second reading of the condition sensors **15** and **16** occurs a predetermined amount of time after the first reading thereof. Next, the algorithm enters a third step **73** wherein a rate of change of the sensed condition or conditions is calculated. The rate of change of the sensed condition can be calculated as the difference between the first and second readings divided by the amount of time therebetween or by any other desired means. For example, if the sensed condition is suspension height, then the difference between the first sensed suspension height and the second sensed suspension height, divided by the amount of time therebetween, would yield a number that is representative of the rate of change of the suspension height of the vehicle.

In a fourth step **74** of the algorithm **70**, a determination is made as to whether the rate of change of the sensed condition value is less than a predetermined threshold value. If the rate of change of the sensed condition value is less than this predetermined threshold value, then the algorithm **70** branches from the decision point **74** to a final step **75** of the algorithm **70**, wherein either or both of the actuators **12** and **13** are actuated to effect movement of the headlight **11** in accordance with the calculated rate of change of the sensed condition. Such movement of the headlight **11** can be effected in a manner that is similar to that described above. If, however, the rate of change of the sensed condition value is not less than this predetermined threshold value, then the algorithm **70** branches from the decision point **74** back to the first step **71**, wherein the algorithm **70** is repeated. This threshold sensing algorithm **70** can function to prevent the headlight directional controller **14** from being operated to automatically implement directional angle adjustments when the rate of change of the suspension height of the vehicle changes more rapidly than the system can effect corrective changes. For example, if the vehicle is operated on a bumpy road, the algorithm **70** will prevent the headlight directional controller **14** from attempting to correct for every single bump that is encountered. However, for relatively low frequency or rates of change in the suspension height of the vehicle, such as can occur when accelerating, decelerating, and weight changes, the headlight directional controller **14** will be operated in the normal manner to effect corrective actions, as described above.

As mentioned above, the input/output device **17** is connected to (or can be connected to) the headlight directional controller **14** for facilitating communication therewith, and the input/output device **17** can be used for calibrating the automatic directional control system illustrated in FIG. **1** so as to define an initial reference position or positions for the headlight **11** from which the headlight directional controller **14** can implement directional angle adjustments. Additionally, however, the input/output device **17** can be employed as a diagnostic tool. To accomplish this, the input/output device **17** can be embodied as a conventional microprocessor or similar electronically programmable device that can be connected to the headlight directional controller **14** to read fault codes that may be generated during the operation thereof. The headlight directional controller **14** can be programmed to generate fault codes whenever a fault condition or other anomaly occurs or is detected. Such fault codes can be stored in the headlight directional controller **14** until the input/output device **17** is subsequently connected thereto. When so connected, the input/output device **17** can read such codes and display them for an operator. As a result, the operator can take whatever corrective actions are necessary to address the fault condition or anomaly. The input/output device **17** can also be programmed to clear the fault codes from the headlight directional controller **14** after they are read.

In accordance with the provisions of the patent statutes, the principle and mode of operation of this invention have been explained and illustrated in its preferred embodiments. However, it must be understood that this invention may be practiced otherwise than as specifically explained and illustrated without departing from its spirit or scope.

What is claimed is:

**1**. An automatic directional control system for a vehicle headlight comprising:

- a sensor that is adapted to generate a signal that is representative of a condition of the vehicle, said sensed condition includes one or more of road speed, steering angle, pitch, and suspension height of the vehicle;
- a controller that is responsive to said sensor signal for generating an output signal only when said sensor signal changes by more than a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition; and
- an actuator that is adapted to be connected to the headlight to effect movement thereof in accordance with said output signal.

**2**. The automatic directional control system defined in claim **1** wherein said sensor generates a signal that is representative of the road speed of the vehicle.

**3**. The automatic directional control system defined in claim **1** wherein said sensor generates a signal that is representative of the steering angle of the vehicle.

**4**. The automatic directional control system defined in claim **1** wherein said sensor generates a signal that is representative of the pitch of the vehicle.

**5**. The automatic directional control system defined in claim **1** wherein said sensor generates a signal that is representative of the suspension height of the vehicle.

* * * * *

# EXHIBIT 2

**IN THE UNITED STATES DISTRICT COURT**

**FOR THE EASTERN DISTRICT OF TEXAS**

**TYLER DIVISION**

| | | |
|---|---|---|
| **BALTHER TECHNOLOGIES, LLC,**<br><br>**Plaintiff,**<br><br>**v.**<br><br>**AMERICAN HONDA MOTOR CO. INC., HONDA MOTOR COMPANY, LTD., BMW OF NORTH AMERICA, LLC, BMW AG, CHRYSLER GROUP LLC, FERRARI NORTH AMERICA, INC., FERRARI S.P.A., GENERAL MOTORS, LLC, HYUNDAI MOTOR AMERICA, HYUNDAI MOTOR COMPANY, JAGUAR LAND ROVER NORTH AMERICA, LLC, JAGUAR CARS LIMITED, MASERATI NORTH AMERICA, INC., MASERATI S.P.A., MERCEDES-BENZ USA, LLC, DAIMLER NORTH AMERICA CORP., DAIMLER AG, MAZDA MOTOR OF NORTH AMERICA, INC., MAZDA MOTOR CORP., MITSUBISHI MOTORS NORTH AMERICA, INC., MITSUBISHI MOTORS CORP., NISSAN NORTH AMERICA, INC., NISSAN MOTOR CO., LTD., PORSCHE CARS NORTH AMERICA, INC., DR. ING. HC. F. PORSCHE AG, SAAB CARS NORTH AMERICA, INC., TOYOTA MOTOR NORTH AMERICA, INC., TOYOTA MOTOR SALES, U.S.A., INC., TOYOTA MOTOR CORP., VOLKSWAGEN GROUP OF AMERICA, INC., AUTOMOBILI LAMBORGHINI S.P.A., AUDI AG, VOLKSWAGEN AG, FORD MOTOR COMPANY, VOLVO CARS OF NORTH AMERICA, LLC, and VOLVO CAR CORP.,**<br><br>**Defendants.** | § § § § § § § § § § § § § § § § § § § § § § § § § § § § § § § § § § § § § § | **Civil Action No. 6:10-CV-78**<br><br>**JURY TRIAL DEMANDED** |

## ORIGINAL COMPLAINT FOR PATENT INFRINGEMENT

This is an action for patent infringement in which Plaintiff Balther Technologies, LLC ("Balther") complains against Defendants American Honda Motor Co. Inc. and Honda Motor Company, Ltd. (collectively "Honda"); BMW of North America, LLC and BMW AG (collectively "BMW"); Chrysler Group LLC ("Chrysler"); Ferrari North America, Inc. and Ferrari S.p.A. (collectively "Ferrari"); General Motors, LLC (formerly known as General Motors Company) ("GM"); Hyundai Motor America and Hyundai Motor Company (collectively "Hyundai"); Jaguar Land Rover North America, LLC and Jaguar Cars Limited (collectively "Jaguar"); Maserati North America, Inc. and Maserati S.p.A. (collectively "Maserati"); Mercedes-Benz USA, LLC, Daimler North America Corporation, and Daimler AG (collectively "Mercedes-Benz"); Mazda Motor of America, Inc. (also known as Mazda North American Operations) and Mazda Motor Corporation (collectively "Mazda"); Mitsubishi Motors North America, Inc. and Mitsubishi Motors Corporation (collectively "Mitsubishi"); Nissan North America, Inc. and Nissan Motor Co., Ltd. (collectively "Nissan"); Porsche Cars North America, Inc. and Dr. Ing. hc. F. Porsche AG (collectively "Porsche"); SAAB Cars North America, Inc. ("SAAB"); Toyota Motor North America, Inc., Toyota Motor Sales, U.S.A., Inc., and Toyota Motor Corporation (collectively "Toyota"); Volkswagen Group of America, Inc. (also known as Audi of America, Inc.) ("VW-Audi US"); Automobili Lamborghini S.p.A. ("Lamborghini"); Audi AG; Volkswagen AG ("VW AG"); Ford Motor Company ("Ford"); and Volvo Cars of North America, LLC and Volvo Car Corporation (collectively "Volvo"), as follows:

## PARTIES

1. Plaintiff Balther Technologies, LLC is a Texas limited liability company having its principal place of business in Longview, Texas.

2. On information and belief, Defendant American Honda Motor Co. Inc. is a California corporation having its principal place of business in Torrance, California.

3. On information and belief, Defendant Honda Motor Company, Ltd. is a Japanese corporation having its principal place of business in Tokyo, Japan.

4. On information and belief, Defendant American Honda Motor Co. Inc. is a subsidiary of Defendant Honda Motor Company, Ltd.

5. On information and belief, Defendant BMW of North America, LLC is a Delaware limited liability company having its principal place of business in Woodcliff Lake, New Jersey.

6. On information and belief, Defendant BMW AG is a German corporation having its principal place of business in Munich, Germany.

7. On information and belief, Defendant BMW of North America, LLC is a wholly owned subsidiary of BMW (US) Holding Corp., which is a wholly owned subsidiary of Defendant BMW AG.

8. On information and belief, Defendant Chrysler is a Delaware limited liability company having its principal place of business in Auburn Hills, Michigan.

9. On information and belief, Defendant Ferrari North America, Inc. is a Delaware corporation having its principal place of business in Englewood Cliffs, New Jersey.

10. On information and belief, Defendant Ferrari S.p.A. is an Italian corporation having its principal place of business in Maranello, Italy.

11. On information and belief, Defendant Ferrari North America, Inc. is a wholly-owned subsidiary of Defendant Ferrari S.p.A.

12. On information and belief, Defendant GM is a Delaware limited liability company having its principal place of business in Detroit, Michigan.

13. On information and belief, Defendant Hyundai Motor America is a California corporation having its principal place of business in Fountain Valley, California.

14. On information and belief, Defendant Hyundai Motor Company is a Korean corporation having its principal place of business in Seoul, South Korea.

15. On information and belief, Defendant Hyundai Motor America is a wholly owned subsidiary of Defendant Hyundai Motor Company.

16. On information and belief, Defendant Jaguar Land Rover North America, LLC is a Delaware limited liability company having its principal place of business in Mahwah, New Jersey.

17. On information and belief, Defendant Jaguar Cars Limited is a UK corporation having its principal place of business in Whitley, England.

18. On information and belief, Defendant Jaguar Land Rover North America LLC is a wholly owned subsidiary of Defendant Jaguar Cars Limited.

19. On information and belief, Defendant Maserati North America, Inc. is a Delaware corporation having its principal place of business in Englewood Cliffs, New Jersey.

20. On information and belief, Defendant Maserati S.p.A. is an Italian corporation having its principal place of business in Modena, Italy.

21. On information and belief, Defendant Maserati North America, Inc. is a wholly owned subsidiary of Defendant Maserati S.p.A.

22. On information and belief, Defendant Mercedes-Benz USA, LLC is a Delaware limited liability company having its principal place of business in Montvale, New Jersey.

23. On information and belief, Defendant Daimler North America Corp. is a Delaware corporation having its principal place of business in Bingham Farms, Michigan.

24. On information and belief, Defendant Daimler AG is a German corporation having its principal place of business in Stuttgart, Germany.

25. On information and belief, Defendant Mercedes-Benz USA LLC is a wholly owned subsidiary of Defendant Daimler North America Corp., which is a wholly owned subsidiary of Defendant Daimler AG.

26. On information and belief, Defendant Mazda Motor of America, Inc. is a California corporation having its principal place of business in Irvine, California.

27. On information and belief, Defendant Mazda Motor Corporation is a Japanese corporation having its principal place of business in Hiroshima, Japan.

28. On information and belief, Defendant Mazda Motor of America, Inc. is a subsidiary of Defendant Mazda Motor Corporation.

29. On information and belief, Defendant Mitsubishi Motors North America, Inc. is a California corporation having its principal place of business in Cypress, California.

30. On information and belief, Defendant Mitsubishi Motors Corporation is a Japanese corporation having its principal place of business in Tokyo, Japan.

31. On information and belief, Defendant Mitsubishi Motors North America, Inc. is a wholly owned subsidiary of Defendant Mitsubishi Motors Corporation.

32. On information and belief, Defendant Nissan North America, Inc. is a California corporation having its principal place of business in Franklin, Tennessee.

33. On information and belief, Defendant Nissan Motor Co., Ltd. is a Japanese corporation having its principal place of business in Kanagawa, Japan.

34. On information and belief, Defendant Nissan North America, Inc. is a subsidiary of Defendant Nissan Motor Co., Ltd.

35. On information and belief, Defendant Porsche Cars North America, Inc. is a Delaware corporation having its principal place of business in Atlanta, Georgia.

36. On information and belief, Defendant Dr. Ing. hc. F. Porsche AG is a German corporation having its principal place of business in Stuttgart, Germany.

37. On information and belief, Defendant Dr. Ing. hc. F. Porsche AG indirectly owns the stock of Defendant Porsche Cars North America, Inc.

38. On information and belief, Defendant SAAB is a Delaware corporation having its principal place of business in Detroit, Michigan.

39. On information and belief, Defendant Toyota Motor North America, Inc. is a California corporation having its principal place of business in New York, New York.

40. On information and belief, Defendant Toyota Motor Sales, U.S.A., Inc. is a California corporation having its principal place of business in Torrance, California.

41. On information and belief, Defendant Toyota Motor Corporation is a Japanese corporation having its principal place of business in Toyota City, Japan.

42. On information and belief, Defendant Toyota Motor North America, Inc. and Defendant Toyota Motor Sales, U.S.A., Inc. are each wholly owned subsidiaries of Defendant Toyota Motor Corporation.

43. On information and belief, Defendant VW-Audi US is a New Jersey corporation having its principal place of business in Herndon, Virginia.

44. On information and belief, Defendant Lamborghini is an Italian corporation having its principal place of business in Sant' Agata Bolognese, Italy.

45. On information and belief, Defendant VW AG is a German corporation having its principal place of business in Wolfsburg, Germany.

46. On information and belief, Defendant VW-Audi US and Defendant Lamborghini are each wholly owned subsidiaries of Defendant VW AG.

47. On information and belief, Defendant Audi AG is a German corporation having its principal place of business in Ingolstadt, Germany.

48. On information and belief, Defendant Audi AG is a 99.55% owned subsidiary of Defendant VW AG.

49. On information and belief, Defendant Ford Motor Company is a Delaware corporation having its principal place of business in Dearborn, Michigan.

50. On information and belief, Defendant Volvo Cars of North America, LLC is a Delaware limited liability company having its principal place of business in Rockleigh, New Jersey.

51. On information and belief, Defendant Volvo Car Corporation is a Swedish corporation having its principal place of business in Göteborg, Sweden.

52. On information and belief, Defendant Volvo Cars of North America, LLC is a subsidiary of Defendant Volvo Car Corporation.

**JURISDICTION AND VENUE**

53. This action arises under the patent laws of the United States, Title 35 of the United States Code. This Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

54. Venue is proper in this district under 28 U.S.C. §§ 1391(c) and 1400(b). On information and belief, each Defendant has transacted business in this district and has committed and/or induced and/or contributed to acts of patent infringement in this district.

55. On information and belief, Defendants are subject to this Court's specific and general personal jurisdiction pursuant to due process and/or the Texas Long Arm Statute, due at least to their substantial business in this forum, directly or through intermediaries, including: (i) at least a portion of the infringements alleged herein; and (ii) regularly doing or soliciting business, engaging in other persistent courses of conduct, and/or deriving substantial revenue from goods and services provided to individuals in Texas and in this Judicial District.

**PATENT INFRINGEMENT**

56. Balther is the owner by assignment of United States Patent No. 7,241,034 ("the '034 patent") entitled "Automatic Directional Control System for Vehicle Headlights." The '034 patent was duly and legally issued on July 10, 2007. A true and correct copy of the '034 patent is attached as Exhibit A.

57. On information and belief, Defendant Honda has been and now is directly infringing, and/or inducing infringement by others, and/or contributing to the infringement by others of the '034 patent in the State of Texas, in this judicial district, and elsewhere in the United States. Honda's infringements include, without limitation, making, using, offering for sale, and/or selling within the United States, and/or importing into the United States, at least the Acura RL product that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features, and any other product made, used, offered for sale, and/or sold by Honda that includes automatic directional and/or leveling control system(s) for vehicle lights

or similar features that infringe one or more claims of the '034 patent. Honda is thus liable for infringement of the '034 patent pursuant to 35 U.S.C. § 271.

58. On information and belief, Defendant BMW has been and now is directly infringing, and/or inducing infringement by others, and/or contributing to the infringement by others of the '034 patent in the State of Texas, in this judicial district, and elsewhere in the United States. BMW's infringements include, without limitation, making, using, offering for sale, and/or selling within the United States, and/or importing into the United States, at least the BMW 5 Series and Mini Cooper S products that include automatic directional and/or leveling control system(s) for vehicle lights or similar features, and any other product made, used, offered for sale, and/or sold by BMW that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features that infringe one or more claims of the '034 patent. BMW is thus liable for infringement of the '034 patent pursuant to 35 U.S.C. § 271.

59. On information and belief, Defendant Chrysler has been and now is directly infringing, and/or inducing infringement by others, and/or contributing to the infringement by others of the '034 patent in the State of Texas, in this judicial district, and elsewhere in the United States. Chrysler's infringements include, without limitation, making, using, offering for sale, and/or selling within the United States at least the Jeep Grand Cherokee product that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features, and any other product made, used, offered for sale, and/or sold by Chrysler that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features that infringe one or more claims of the '034 patent. Chrysler is thus liable for infringement of the '034 patent pursuant to 35 U.S.C. § 271.

60. On information and belief, Defendant Ferrari has been and now is directly infringing, and/or inducing infringement by others, and/or contributing to the infringement by others of the '034 patent in the State of Texas, in this judicial district, and elsewhere in the United States. Ferrari's infringements include, without limitation, making, using, offering for sale, and/or selling within the United States, and/or importing into the United States, at least the Ferrari California product that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features, and any other product made, used, offered for sale, and/or sold by Ferrari that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features that infringe one or more claims of the '034 patent. Ferrari is thus liable for infringement of the '034 patent pursuant to 35 U.S.C. § 271.

61. On information and belief, Defendant GM has been and now is directly infringing, and/or inducing infringement by others, and/or contributing to the infringement by others of the '034 patent in the State of Texas, in this judicial district, and elsewhere in the United States. GM's infringements include, without limitation, making, using, offering for sale, and/or selling within the United States at least the Cadillac CTS and Buick Enclave products that include automatic directional and/or leveling control system(s) for vehicle lights or similar features, and any other product made, used, offered for sale, and/or sold by GM that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features that infringe one or more claims of the '034 patent. GM is thus liable for infringement of the '034 patent pursuant to 35 U.S.C. § 271.

62. On information and belief, Defendant Hyundai has been and now is directly infringing, and/or inducing infringement by others, and/or contributing to the infringement by others of the '034 patent in the State of Texas, in this judicial district, and elsewhere in the

United States. Hyundai's infringements include, without limitation, making, using, offering for sale, and/or selling within the United States, and/or importing into the United States, at least the Hyundai Genesis product that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features, and any other product made, used, offered for sale, and/or sold by Hyundai that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features that infringe one or more claims of the '034 patent. Hyundai is thus liable for infringement of the '034 patent pursuant to 35 U.S.C. § 271.

63. On information and belief, Defendant Jaguar has been and now is directly infringing, and/or inducing infringement by others, and/or contributing to the infringement by others of the '034 patent in the State of Texas, in this judicial district, and elsewhere in the United States. Jaguar's infringements include, without limitation, making, using, offering for sale, and/or selling within the United States, and/or importing into the United States, at least the Jaguar XKR and Land Rover Range Rover Sport products that include automatic directional and/or leveling control system(s) for vehicle lights or similar features, and any other product made, used, offered for sale, and/or sold by Jaguar that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features that infringe one or more claims of the '034 patent. Jaguar is thus liable for infringement of the '034 patent pursuant to 35 U.S.C. § 271.

64. On information and belief, Defendant Maserati has been and now is directly infringing, and/or inducing infringement by others, and/or contributing to the infringement by others of the '034 patent in the State of Texas, in this judicial district, and elsewhere in the United States. Maserati's infringements include, without limitation, making, using, offering for sale, and/or selling within the United States, and/or importing into the United States, at least the

Maserati GranTurismo product that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features, and any other product made, used, offered for sale, and/or sold by Maserati that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features that infringe one or more claims of the '034 patent. Maserati is thus liable for infringement of the '034 patent pursuant to 35 U.S.C. § 271.

65. On information and belief, Defendant Mercedes-Benz has been and now is directly infringing, and/or inducing infringement by others, and/or contributing to the infringement by others of the '034 patent in the State of Texas, in this judicial district, and elsewhere in the United States. Mercedes-Benz's infringements include, without limitation, making, using, offering for sale, and/or selling within the United States, and/or importing into the United States, at least the Mercedes-Benz GL550 and Maybach 57 products that include automatic directional and/or leveling control system(s) for vehicle lights or similar features, and any other product made, used, offered for sale, and/or sold by Mercedes-Benz that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features that infringe one or more claims of the '034 patent. Mercedes-Benz is thus liable for infringement of the '034 patent pursuant to 35 U.S.C. § 271.

66. On information and belief, Defendant Mazda has been and now is directly infringing, and/or inducing infringement by others, and/or contributing to the infringement by others of the '034 patent in the State of Texas, in this judicial district, and elsewhere in the United States. Mazda's infringements include, without limitation, making, using, offering for sale, and/or selling within the United States, and/or importing into the United States, at least the Mazda RX-8 product that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features, and any other product made, used, offered for sale, and/or sold

by Mazda that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features that infringe one or more claims of the '034 patent. Mazda is thus liable for infringement of the '034 patent pursuant to 35 U.S.C. § 271.

67. On information and belief, Defendant Mitsubishi has been and now is directly infringing, and/or inducing infringement by others, and/or contributing to the infringement by others of the '034 patent in the State of Texas, in this judicial district, and elsewhere in the United States. Mitsubishi's infringements include, without limitation, making, using, offering for sale, and/or selling within the United States, and/or importing into the United States, at least the Mitsubishi Outlander XLS product that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features, and any other product made, used, offered for sale, and/or sold by Mitsubishi that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features that infringe one or more claims of the '034 patent. Mitsubishi is thus liable for infringement of the '034 patent pursuant to 35 U.S.C. § 271.

68. On information and belief, Defendant Nissan has been and now is directly infringing, and/or inducing infringement by others, and/or contributing to the infringement by others of the '034 patent in the State of Texas, in this judicial district, and elsewhere in the United States. Nissan's infringements include, without limitation, making, using, offering for sale, and/or selling within the United States, and/or importing into the United States, at least the Infiniti G37 Sport product that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features, and any other product made, used, offered for sale, and/or sold by Nissan that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features that infringe one or more claims of the '034 patent. Nissan is thus liable for infringement of the '034 patent pursuant to 35 U.S.C. § 271.

69. On information and belief, Defendant Porsche has been and now is directly infringing, and/or inducing infringement by others, and/or contributing to the infringement by others of the '034 patent in the State of Texas, in this judicial district, and elsewhere in the United States. Porsche's infringements include, without limitation, making, using, offering for sale, and/or selling within the United States, and/or importing into the United States, at least the Porsche 911 GT3 product that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features, and any other product made, used, offered for sale, and/or sold by Porsche that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features that infringe one or more claims of the '034 patent. Porsche is thus liable for infringement of the '034 patent pursuant to 35 U.S.C. § 271.

70. On information and belief, Defendant SAAB has been and now is directly infringing, and/or inducing infringement by others, and/or contributing to the infringement by others of the '034 patent in the State of Texas, in this judicial district, and elsewhere in the United States. SAAB's infringements include, without limitation, making, using, offering for sale, and/or selling within the United States, and/or importing into the United States, at least the Saab 9-3 2.0T product that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features, and any other product made, used, offered for sale, and/or sold by SAAB that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features that infringe one or more claims of the '034 patent. SAAB is thus liable for infringement of the '034 patent pursuant to 35 U.S.C. § 271.

71. On information and belief, Defendant Toyota has been and now is directly infringing, and/or inducing infringement by others, and/or contributing to the infringement by others of the '034 patent in the State of Texas, in this judicial district, and elsewhere in the

United States. Toyota's infringements include, without limitation, making, using, offering for sale, and/or selling within the United States, and/or importing into the United States, at least the Toyota Avalon product that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features, and any other product made, used, offered for sale, and/or sold by Toyota that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features that infringe one or more claims of the '034 patent. Toyota is thus liable for infringement of the '034 patent pursuant to 35 U.S.C. § 271.

72. On information and belief, Defendants Toyota Motor Sales, U.S.A., Inc. and Toyota Motor Corporation have been and now are further directly infringing, and/or inducing infringement by others, and/or contributing to the infringement by others of the '034 patent in the State of Texas, in this judicial district, and elsewhere in the United States. Toyota Motor Sales, U.S.A., Inc. and Toyota Motor Corporation's further infringements include, without limitation, making, using, offering for sale, and/or selling within the United States, and/or importing into the United States, at least the Lexus IS 250 product that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features, and any other product made, used, offered for sale, and/or sold by Toyota Motor Sales, U.S.A., Inc. and Toyota Motor Corporation that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features that infringe one or more claims of the '034 patent. Toyota Motor Sales, U.S.A., Inc. and Toyota Motor Corporation are thus liable for further infringement of the '034 patent pursuant to 35 U.S.C. § 271.

73. On information and belief, Defendants VW-Audi US, Audi AG, and VW AG have been and now are directly infringing, and/or inducing infringement by others, and/or contributing to the infringement by others of the '034 patent in the State of Texas, in this judicial

district, and elsewhere in the United States. VW-Audi US, Audi AG, and VW AG's infringements include, without limitation, making, using, offering for sale, and/or selling within the United States, and/or importing into the United States, at least the Audi S4 Avant product that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features, and any other product made, used, offered for sale, and/or sold by VW-Audi US, Audi AG, and VW AG that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features that infringe one or more claims of the '034 patent. VW-Audi US, Audi AG, and VW AG are thus liable for infringement of the '034 patent pursuant to 35 U.S.C. § 271.

74. On information and belief, Defendants VW-Audi US and VW AG have been and now are further directly infringing, and/or inducing infringement by others, and/or contributing to the infringement by others of the '034 patent in the State of Texas, in this judicial district, and elsewhere in the United States. VW-Audi US and VW AG's further infringements include, without limitation, making, using, offering for sale, and/or selling within the United States, and/or importing into the United States, at least the Volkswagen Passat Lux product that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features, and any other product made, used, offered for sale, and/or sold by VW-Audi US and VW AG that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features that infringe one or more claims of the '034 patent. VW-Audi US and VW AG are thus liable for further infringement of the '034 patent pursuant to 35 U.S.C. § 271.

75. On information and belief, Defendants Lamborghini and VW AG have been and now are directly infringing, and/or inducing infringement by others, and/or contributing to the infringement by others of the '034 patent in the State of Texas, in this judicial district, and

elsewhere in the United States. Lamborghini and VW AG's infringements include, without limitation, making, using, offering for sale, and/or selling within the United States, and/or importing into the United States, at least the Lamborghini Gallardo product that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features, and any other product made, used, offered for sale, and/or sold by Lamborghini and VW AG that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features that infringe one or more claims of the '034 patent. Lamborghini and VW AG are thus liable for infringement of the '034 patent pursuant to 35 U.S.C. § 271.

76. On information and belief, Defendant Ford has been and now is directly infringing, and/or inducing infringement by others, and/or contributing to the infringement by others of the '034 patent in the State of Texas, in this judicial district, and elsewhere in the United States. Ford's infringements include, without limitation, making, using, offering for sale, and/or selling within the United States at least the Lincoln MKX product that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features, and any other product made, used, offered for sale, and/or sold by Ford that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features that infringe one or more claims of the '034 patent. Ford is thus liable for infringement of the '034 patent pursuant to 35 U.S.C. § 271.

77. On information and belief, Defendant Volvo has been and now is directly infringing, and/or inducing infringement by others, and/or contributing to the infringement by others of the '034 patent in the State of Texas, in this judicial district, and elsewhere in the United States. Volvo's infringements include, without limitation, making, using, offering for sale, and/or selling within the United States, and/or importing into the United States, at least the

Volvo S80 product that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features, and any other product made, used, offered for sale, and/or sold by Volvo that includes automatic directional and/or leveling control system(s) for vehicle lights or similar features that infringe one or more claims of the '034 patent. Volvo is thus liable for infringement of the '034 patent pursuant to 35 U.S.C. § 271.

78. As a result of Defendants' infringement of the '034 patent, Balther has suffered monetary damages that are adequate to compensate it for the infringement under 35 U.S.C. § 284, but in no event less than a reasonable royalty.

**PRAYER FOR RELIEF**

WHEREFORE, Balther requests that this Court enter:

A. A judgment in favor of Balther that Defendants have directly infringed, induced others to infringe, and/or contributed to others' infringement of the '034 patent;

B. A judgment and order requiring Defendants to pay Balther its damages, costs, expenses, and prejudgment and post-judgment interest for Defendants' infringement of the '034 patent as provided under 35 U.S.C. § 284; and

C. Any and all other relief to which the Court may deem Balther entitled.

**DEMAND FOR JURY TRIAL**

Balther, under Rule 38 of the Federal Rules of Civil Procedure, requests a trial by jury of any issues so triable by right.

Respectfully submitted,

EMAlbritton

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*Attorneys for Balther Technologies, LLC*

**CERTIFICATE OF SERVICE**

The undersigned certifies that the foregoing document was filed electronically in compliance with Local Rule CV-5(a). As such, this motion was served on all counsel who are deemed to have consented to electronic service. Local Rule CV-5(a)(3)(A). Pursuant to Fed. R. Civ. P. 5(d) and Local Rule CV-5(d) and (e), all other counsel of record not deemed to have consented to electronic service were served with a true and correct copy of the foregoing by email and/or fax, on this the 8th day of March 2010.

Eric M. Albritton

**IN THE UNITED STATES DISTRICT COURT**

**FOR THE EASTERN DISTRICT OF TEXAS**

**TYLER DIVISION**

| | | |
|---|---|---|
| **BALTHER TECHNOLOGIES, LLC,** | § | |
| | § | |
| **Plaintiff,** | § | **Civil Action No. 6:10-CV-78** |
| | § | |
| **v.** | § | |
| | § | |
| **AMERICAN HONDA MOTOR CO. INC., *et al.*,** | § | **JURY TRIAL DEMANDED** |
| | § | |
| | § | |
| **Defendants.** | § | |

**ORIGINAL COMPLAINT FOR PATENT INFRINGEMENT**

**EXHIBIT A**

US007241034B2

(12) **United States Patent**
**Smith et al.**

(10) **Patent No.: US 7,241,034 B2**
(45) **Date of Patent: Jul. 10, 2007**

(54) **AUTOMATIC DIRECTIONAL CONTROL SYSTEM FOR VEHICLE HEADLIGHTS**

(75) Inventors: **James E. Smith**, Berkey, OH (US); **Anthony B. McDonald**, Perrysburg, OH (US)

(73) Assignee: **Dana Corporation**, Toledo, OH (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **10/285,312**

(22) Filed: **Oct. 31, 2002**

(65) **Prior Publication Data**

US 2003/0107898 A1 Jun. 12, 2003

**Related U.S. Application Data**

(60) Provisional application No. 60/369,447, filed on Apr. 2, 2002, provisional application No. 60/356,703, filed on Feb. 13, 2002, provisional application No. 60/335,409, filed on Oct. 31, 2001.

(51) **Int. Cl.**
***B60Q 1/00*** (2006.01)
***B60R 22/00*** (2006.01)

(52) **U.S. Cl.** ........................................ **362/465**; 701/49

(58) **Field of Classification Search** .................. 362/37, 362/465–466; 315/82; 701/49
See application file for complete search history.

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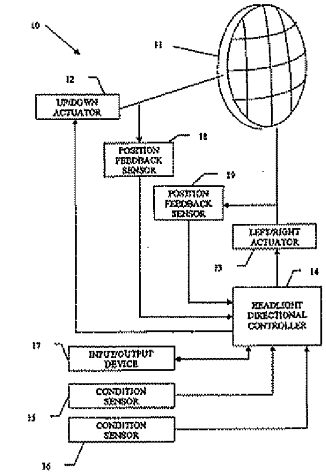
*Primary Examiner*—Ali Alavi
(74) *Attorney, Agent, or Firm*—MacMillan, Sobanski & Todd, LLC

(57) **ABSTRACT**

A structure and method for operating a directional control system for vehicle headlights that is capable of altering the directional aiming angles of the headlights to account for changes in the operating conditions of the vehicle. One or more operating condition sensors may be provided that generate signals that are representative of a condition of the vehicle, such as road speed, steering angle, pitch, suspension height, rate of change of road speed, rate of change of steering angle, rate of change of pitch, and rate of change of suspension height of the vehicle. A controller is responsive to the sensor signal for generating an output signal. An actuator is adapted to be connected to the headlight to effect movement thereof in accordance with the output signal. The controller can include a table that relates values of sensed operating condition to values of the output signal. The controller is responsive to the sensor signal for looking up the output signal in the table.

**5 Claims, 7 Drawing Sheets**



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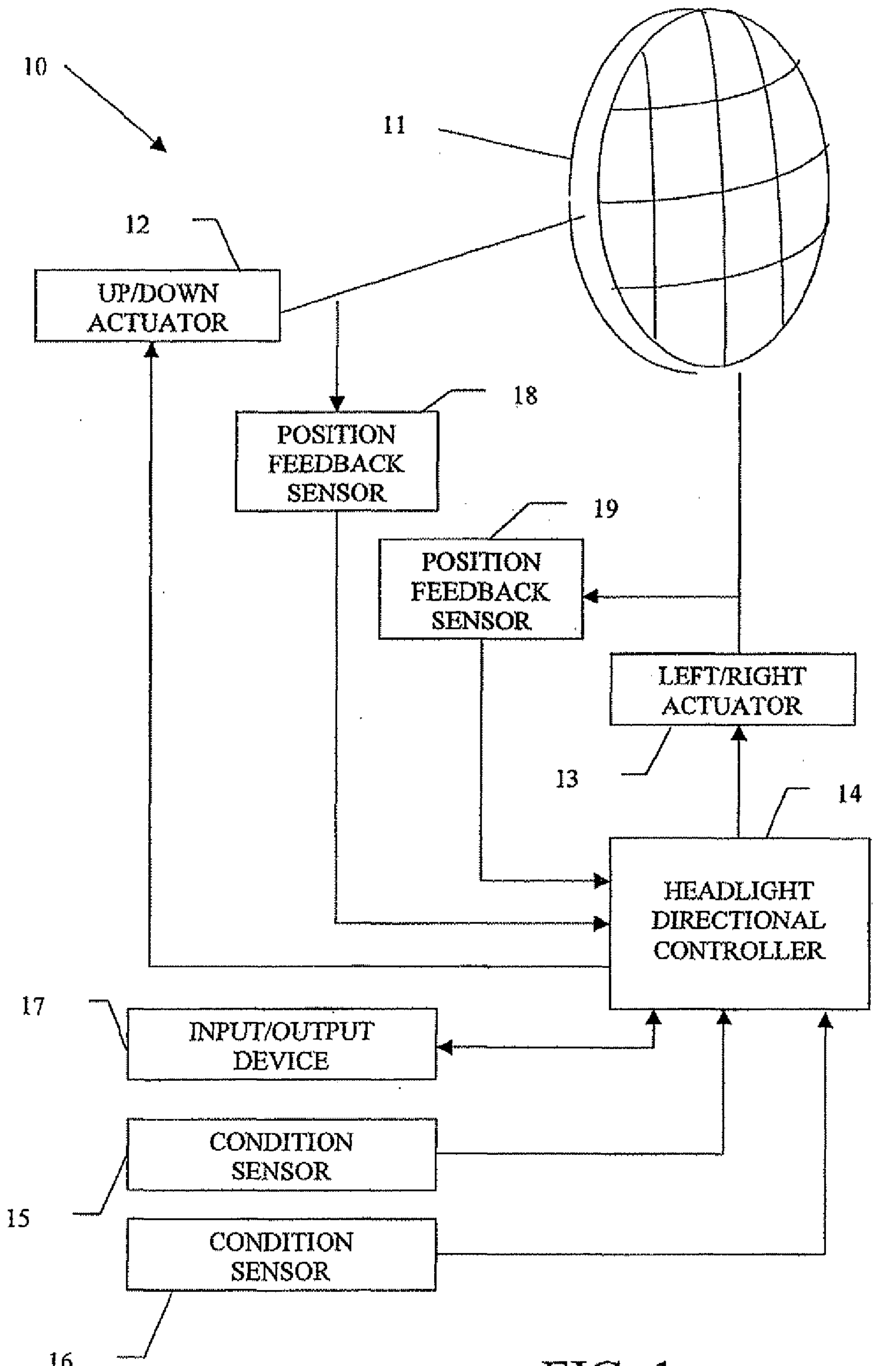

10
11
12
UP/DOWN ACTUATOR
18
POSITION FEEDBACK SENSOR
19
POSITION FEEDBACK SENSOR
LEFT/RIGHT ACTUATOR
13
14
HEADLIGHT DIRECTIONAL CONTROLLER
17
INPUT/OUTPUT DEVICE
CONDITION SENSOR
15
CONDITION SENSOR
16

FIG. 1

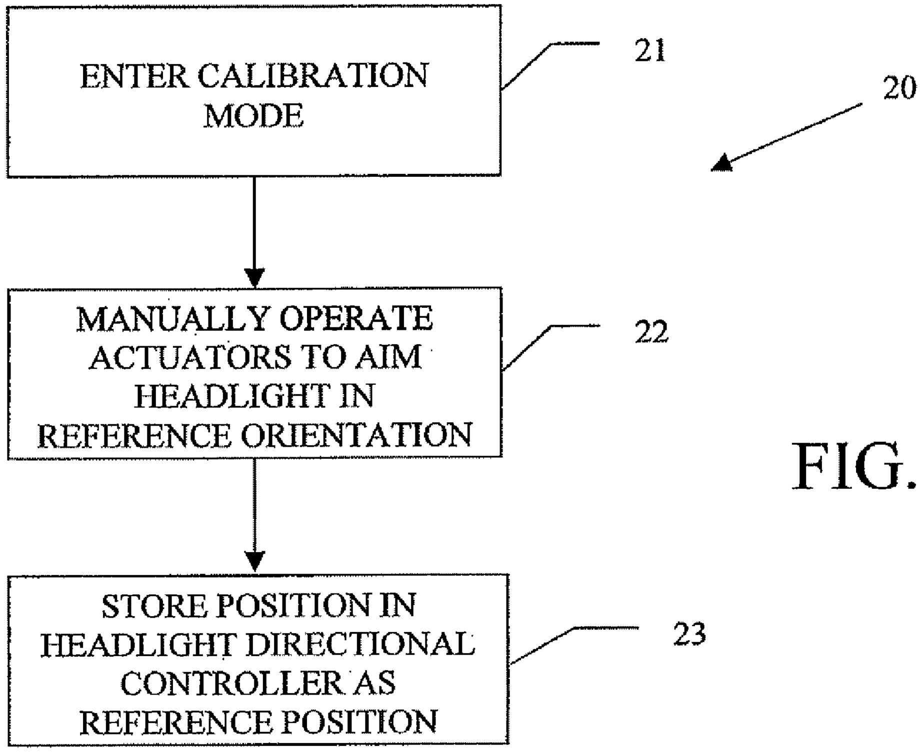

ENTER CALIBRATION MODE
21
20
MANUALLY OPERATE ACTUATORS TO AIM HEADLIGHT IN REFERENCE ORIENTATION
22
STORE POSITION IN HEADLIGHT DIRECTIONAL CONTROLLER AS REFERENCE POSITION
23

FIG. 2

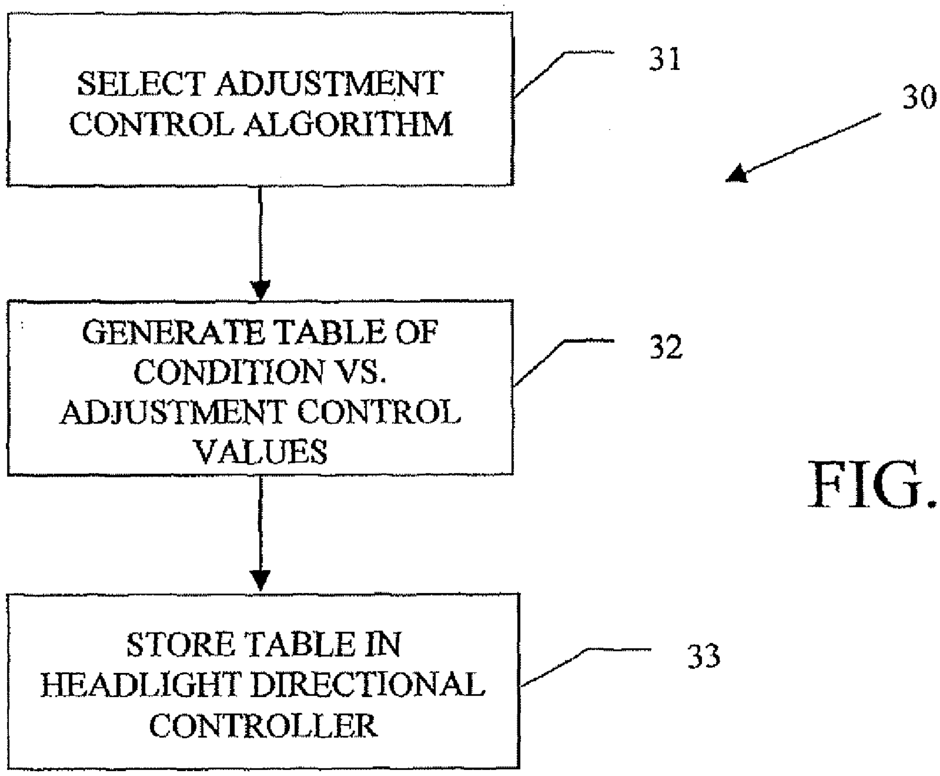
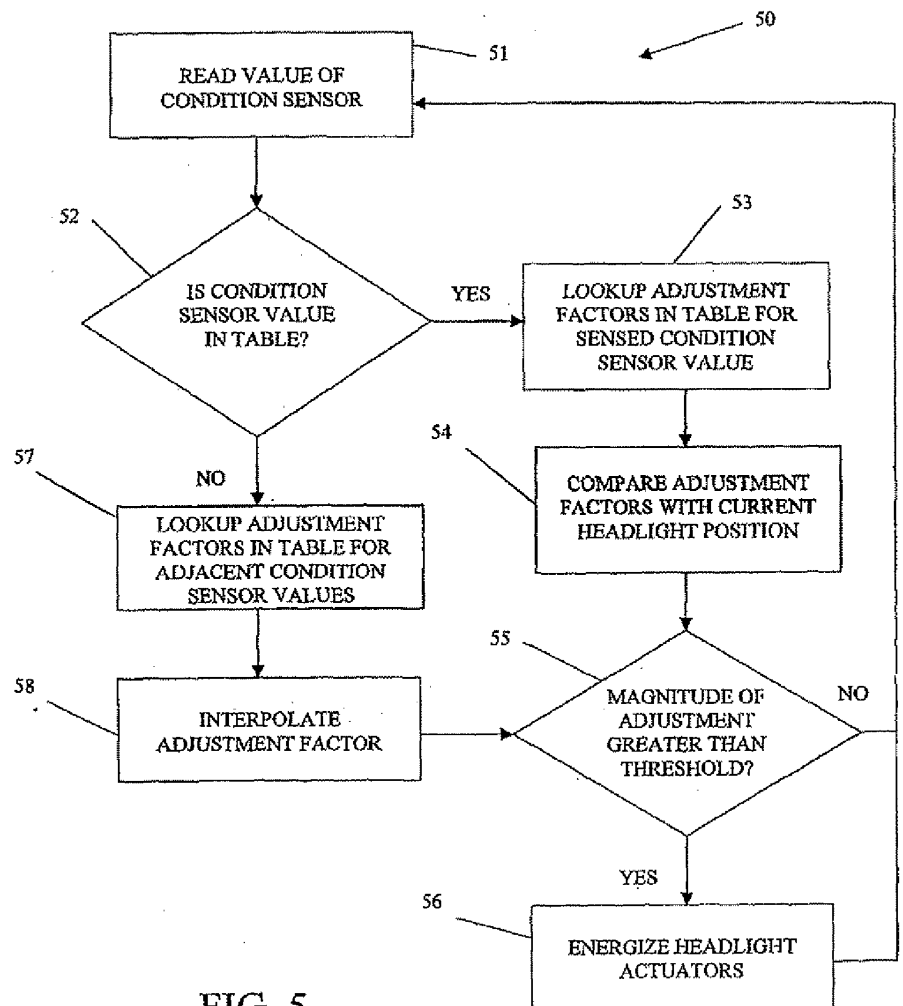

SELECT ADJUSTMENT CONTROL ALGORITHM
31
30
GENERATE TABLE OF CONDITION VS. ADJUSTMENT CONTROL VALUES
32
STORE TABLE IN HEADLIGHT DIRECTIONAL CONTROLLER
33

FIG. 3

40

| SENSED CONDITION (STEERING ANGLE) VALUES | UP/DOWN ADJUSTMENT FACTORS | LEFT/RIGHT ADJUSTMENT FACTORS |
|---|---|---|
| +6° | -3.00° | +4.50° |
| +5° | -2.50° | +3.75° |
| +4° | -2.00° | +3.00° |
| +3° | -1.50° | +2.25° |
| +2° | -1.00° | +1.50° |
| +1° | -0.50° | +0.75° |
| 0° | 0.00° | 0.00° |
| -1° | -0.50° | -0.75° |
| -2° | -1.00° | -1.50° |
| -3° | -1.50° | -2.25° |
| -4° | -2.00° | -3.00° |
| -5° | -2.50° | -3.75° |
| -6° | -3.00° | -4.50° |

FIG. 4



50
51
READ VALUE OF CONDITION SENSOR
52
IS CONDITION SENSOR VALUE IN TABLE?
YES
53
LOOKUP ADJUSTMENT FACTORS IN TABLE FOR SENSED CONDITION SENSOR VALUE
54
COMPARE ADJUSTMENT FACTORS WITH CURRENT HEADLIGHT POSITION
57
NO
LOOKUP ADJUSTMENT FACTORS IN TABLE FOR ADJACENT CONDITION SENSOR VALUES
55
58
INTERPOLATE ADJUSTMENT FACTOR
MAGNITUDE OF ADJUSTMENT GREATER THAN THRESHOLD?
NO
YES
56
ENERGIZE HEADLIGHT ACTUATORS


FIG. 5

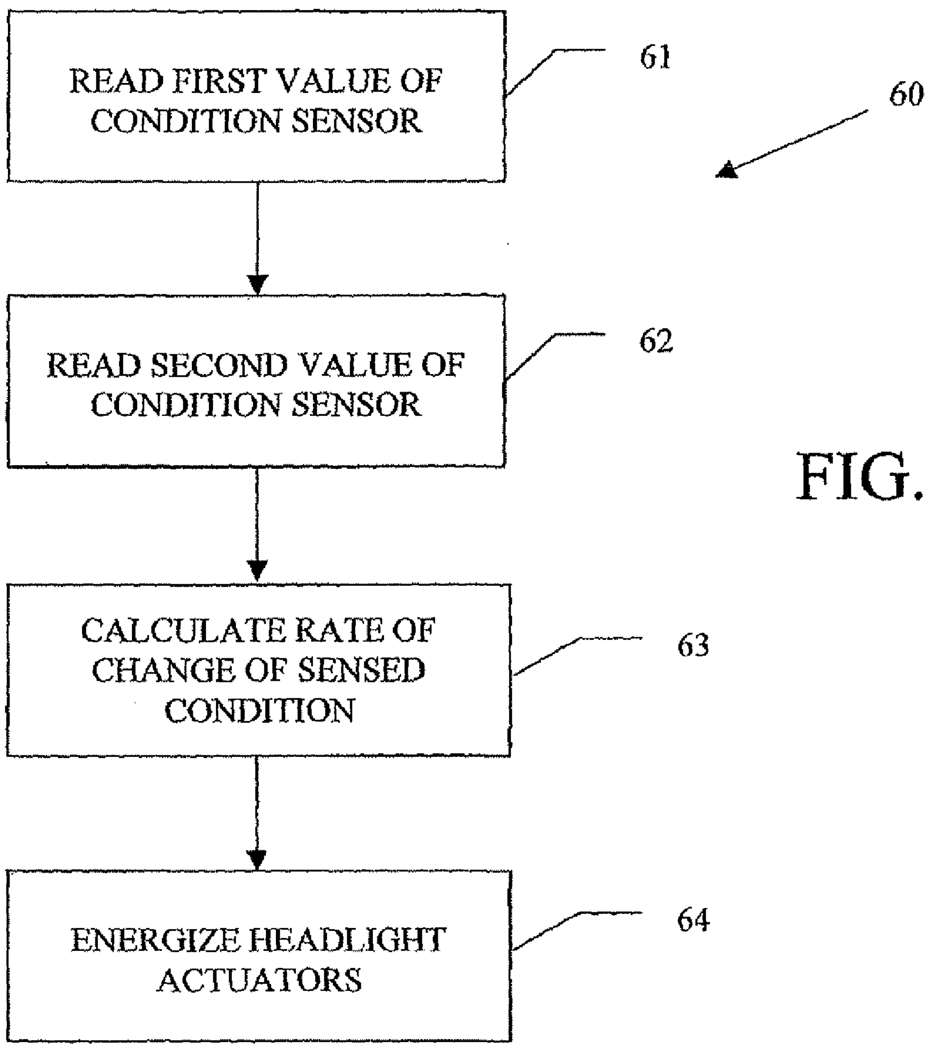

READ FIRST VALUE OF CONDITION SENSOR
61
60
READ SECOND VALUE OF CONDITION SENSOR
62
CALCULATE RATE OF CHANGE OF SENSED CONDITION
63
ENERGIZE HEADLIGHT ACTUATORS
64

FIG. 6

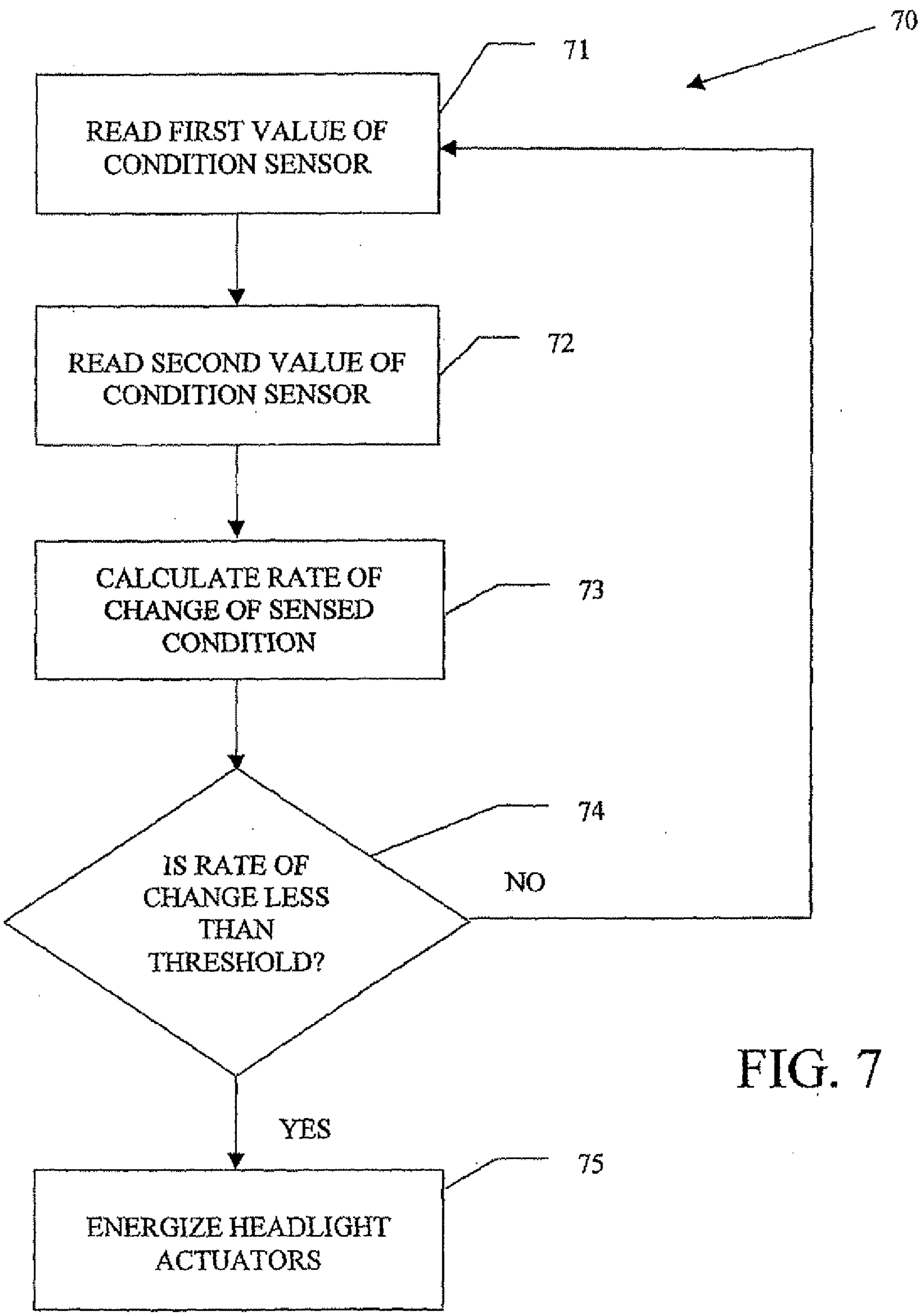

70
71
READ FIRST VALUE OF CONDITION SENSOR
72
READ SECOND VALUE OF CONDITION SENSOR
73
CALCULATE RATE OF CHANGE OF SENSED CONDITION
74
IS RATE OF CHANGE LESS THAN THRESHOLD?
NO
YES
75
ENERGIZE HEADLIGHT ACTUATORS

FIG. 7

# AUTOMATIC DIRECTIONAL CONTROL SYSTEM FOR VEHICLE HEADLIGHTS

## CROSS REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional Application Nos. 60/335,409, filed Oct. 31, 2001; 60/356,703, filed Feb. 13, 2002; and 60/369,447, filed Apr. 2, 2002, the disclosures of which are incorporated herein by reference.

## BACKGROUND OF THE INVENTION

This invention relates in general to headlights that are provided on vehicles for illuminating dark road surfaces or other areas in the path of movement. In particular, this invention relates to an automatic directional control system for such vehicle headlights.

Virtually all land vehicles, and many other types of vehicles (such as boats and airplanes, for example), are provided with one or more headlights that are adapted to illuminate a portion of a dark road surface or other area in the path of movement of the vehicle to facilitate safe travel thereon. Typically, each headlight is mounted on or near the front end of the vehicle and is oriented in such a manner that a beam of light is projected forwardly therefrom. The angle at which the beam of light projects from the headlight can, for example, be characterized in a variety of ways, including (1) up and down relative to a horizontal reference position or plane and (2) left and right relative to a vertical reference position or plane. Such directional aiming angles are usually set at the time of assembly of the headlight into the vehicle so as to illuminate a predetermined portion of the road surface or other area in the path of movement of the vehicle.

In the past, these headlights have been mounted on the vehicle in fixed positions relative thereto such that the beams of light are projected therefrom at predetermined directional aiming angles relative to the vehicle. Although such fixed aiming angle headlight systems have and continue to function adequately, they cannot alter the directional aiming angles of the headlights to account for changes in the operating conditions of the vehicle. For example, if the speed of the vehicle is increased, it would be desirable to adjust the aiming angle of the headlights upwardly such that an area that is somewhat farther in front of the vehicle is more brightly illuminated. On the other hand, if the speed of the vehicle is decreased, it would be desirable to adjust the aiming angle of the headlights downwardly such that an area that is somewhat closer in front of the vehicle is more brightly illuminated. Similarly, if the vehicle turns a corner, it would be desirable to adjust the aiming angle of the headlights either toward the left or toward the right (depending on the direction of the turn) such that an area that is somewhat lateral to the front of the vehicle is more brightly illuminated.

To accomplish this, it is known to provide a directional control system for vehicle headlights that is capable of automatically altering the directional aiming angles of the headlights to account for changes in the operating conditions of the vehicle. A variety of such automatic directional control systems for vehicle headlights are known in the art. However, such known automatic headlight directional control systems have been found to be deficient for various reasons. Thus, it would be desirable to provide an improved structure for an automatic headlight directional control system that addresses such deficiencies.



## SUMMARY OF THE INVENTION

This invention relates to an improved structure and method for operating a directional control system for vehicle headlights that is capable of automatically altering the directional aiming angles of the headlights to account for changes in the operating conditions of the vehicle. One or more operating condition sensors may be provided that generate signals that are representative of an operating condition of the vehicle, such as road speed, steering angle, pitch, suspension height, rate of change of road speed, rate of change of steering angle, rate of change of pitch, and rate of change of suspension height of the vehicle. A controller is responsive to the sensor signal for generating an output signal. An actuator is adapted to be connected to the headlight to effect movement thereof in accordance with the output signal. The controller can include a table that relates values of sensed operating condition to values of the output signal. The controller is responsive to the sensor signal for looking up the output signal in the table.

Various objects and advantages of this invention will become apparent to those skilled in the art from the following detailed description of the preferred embodiments, when read in light of the accompanying drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram of an automatic directional control system for a vehicle headlight in accordance with this invention.

FIG. **2** is a flow chart of an algorithm for calibrating the automatic directional control system illustrated in FIG. **1** so as to define an initial reference position for the headlight from which the headlight directional controller can implement directional angle adjustments.

FIG. **3** is a flow chart of an algorithm for generating a table that relates one or more sensed vehicle operating condition values to one or more headlight directional angle adjustment factors and for storing such table in the headlight directional controller illustrated in FIG. **1**.

FIG. **4** is an example of a table that can be generated and stored in the headlight directional controller in accordance with the table generating algorithm illustrated in FIG. **3**.

FIG. **5** is a flow chart of an algorithm for operating the headlight directional controller illustrated in FIG. **1** to automatically implement directional angle adjustments in accordance with sensed condition values.

FIG. **6** is a flow chart of an algorithm for operating the headlight directional controller illustrated in FIG. **1** to automatically implement directional angle adjustments in accordance with the rate of change of one or more of the sensed condition values.

FIG. **7** is a flow chart of an algorithm for operating the headlight directional controller illustrated in FIG. **1** to automatically implement directional angle adjustments, but only when the rate of change of one or more of the sensed condition values is less than (or greater than) a predetermined value.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, there is illustrated in FIG. **1** an automatic directional control system, indicated generally at **10**, for a vehicle headlight **11** in accordance with this invention. The illustrated headlight **11** is, of itself, conventional in the art and is intended to be representative of any device that can be supported on any type of vehicle for the purpose of illuminating any area, such as an area in the path of movement of the vehicle. The headlight **11** is typically mounted on or near the front end of a vehicle (not shown) and is oriented in such a manner that a beam of light is projected therefrom. In a manner that is well known in the art, the headlight **11** is adapted to illuminate a portion of a dark road surface or other area in the path of movement of the vehicle to facilitate safe travel thereon.

The headlight **11** is adjustably mounted on the vehicle such that the directional orientation at which the beam of light projects therefrom can be adjusted relative to the vehicle. Any desired mounting structure can be provided to accomplish this. Typically, the headlight **11** is mounted on the vehicle such that the angle at which the beam of light projects therefrom can be adjusted both (1) up and down relative to a horizontal reference position or plane and (2) left and right relative to a vertical reference position or plane. Although this invention will be described and illustrated in the context of a headlight that is adjustable in both the up/down direction and the left/right direction, it will be appreciated that this invention may be practiced with any headlight **11** that is adjustable in any single direction or multiple directions of movement, whether up/down, left/right, or any other direction.

To effect movement of the illustrated headlight **11** relative to the vehicle, an up/down actuator **12** and a left/right actuator **13** are provided. The actuators **12** and **13** are conventional in the art and may, for example, be embodied as servo motors, step motors, or any other electronically controlled mechanical actuators. It has been found to be desirable to use microstepping motors for the actuators **12** and **13**. Such microstepping motors are known in the art and consist of conventional step motors that have appropriate hardware (i.e., driver integrated circuits) and software that allow the step motors to be operated in fractional step increments. The use of such microstepping motors has been found to be desirable because they can effect movements of the headlights in a somewhat faster, smoother, and quieter manner than conventional step motors, and further permit more precise positioning of the headlights **11**. In the illustrated embodiment, the up/down actuator **12** is mechanically connected to the headlight **11** such that the headlight **11** can be selectively adjusted up and down relative to a horizontal reference position or plane. Similarly, the illustrated left/right actuator **13** is mechanically connected to the headlight **11** such that the headlight **11** can be selectively adjusted left and right relative to a vertical reference position or plane.

A headlight directional controller **14** is provided for controlling the operations of the up/down actuator **12** and the left/right actuator **13** and, therefore, the angle at which the beam of light projects from the headlight **11** relative to the vehicle. The headlight directional controller **14** can be embodied as any control system, such as a microprocessor or programmable electronic controller, that is responsive to one or more sensed operating conditions of the vehicle for selectively operating the up/down actuator **12** and the left/right actuator **13**. To accomplish this, the automatic directional control system **10** can include, for example, a pair of condition sensors **15** and **16** that are connected to the headlight directional controller **14**. The condition sensors **15** and **16** are conventional in the art and are responsive to respective sensed operating conditions of the vehicle for generating electrical signals to the headlight directional controller **14**. However, if desired, only a single one of the condition sensors **15** and **16** need be provided. Alternatively, additional condition sensors (not shown) may be provided if desired to generate electrical signals that are representative of any other operating conditions of the vehicle. A conventional input/output device **17** is connected to (or can be connected to) the headlight directional controller **14** for facilitating communication therewith in the manner described below.



If desired, a first position feedback sensor **18** may be provided for the up/down actuator **12**, and a second position feedback sensor **19** may be provided for the left/right actuator **13**. The position feedback sensors **18** and **19** are conventional in the art and are adapted to generate respective electrical signals that are representative of the actual up/down and left/right positions of the headlight **11**. Thus, the first position feedback sensor **18** is responsive to the actual up/down position of the headlight **11** (as determined by a portion of the up/down actuator **12**, for example) for generating an electrical signal to the headlight directional controller **14** that is representative thereof. Similarly, the second position feedback sensor **19** is responsive to the actual left/right position of the headlight **11** (as determined by a portion of the left/right actuator **13**, for example) for generating an electrical signal to the headlight directional controller **14** that is representative thereof. The position feedback sensors **18** and **19** can be embodied as any conventional sensor structures, such as Hall effect sensors, that are responsive to movements of the headlight **11** (or to the movements of the respective actuators **12** and **13** that are connected to move the headlight **11**) for generating such signals.

Alternatively, the position feedback sensors **18** and **19** can be embodied as respective devices that generate electrical signals whenever the headlight **11** has achieved respective predetermined up/down or left/right positions. This can be accomplished, for example, using a conventional optical interrupter (not shown) for each of the actuators **12** and **13**. Each of the optical interrupters includes a flag or other component that is mounted on or connected to the headlight **11** for movement therewith. Each of the optical interrupters further includes an optical source and sensor assembly. As the headlight **11** is moved by the actuators **12** and **13**, the flag moves therewith relative to the optical source and sensor assembly between a first position, wherein the flag permits light emitted from the source from reaching the sensor, and a second position, wherein the flag prevents light emitted from the source from reaching the sensor. When the flag is in the first position relative to the optical source and sensor assembly, the sensor is permitted to receive light emitted from the source. As a result, a first signal is generated from the optical source and sensor assembly to the headlight directional controller **14**. Conversely, when the flag is in the second position relative to the optical source and sensor assembly, the sensor is not permitted to receive light emitted from the source. As a result, a second signal is generated from the optical source and sensor assembly to the headlight directional controller **14**. Thus, the edge of the flag defines a transition between the first and second positions of the flag relative to the optical source and sensor assembly and, therefore, defines a predetermined up/down or left/right position of the headlight **11**. The nature of the signal generated from the optical source and sensor assembly to the headlight directional controller **14** (i.e., the first signal or the second signal) can also be used to determine on which side of the predetermined position (the left side or the right side, for example) that the headlight **11** is positioned. The purpose for such position feedback sensors **18** and **19** will be discussed below.

FIG. 2 is a flow chart of an algorithm, indicated generally at **20**, for calibrating the automatic directional control system illustrated in FIG. **1** so as to define an initial reference position or positions for the headlight **11** from which the headlight directional controller **14** can implement directional angle adjustments. As mentioned above, the headlight **11** is mounted on the vehicle such that the angle at which the beam of light projects therefrom can be adjusted both up and down relative to a horizontal reference position or plane and left and right relative to a vertical reference position or plane. To insure accurate positioning of the headlight **11**, it is desirable that a reference position or positions be initially established by the headlight directional controller **14**. Subsequent directional angle adjustments can be made by the headlight directional controller **14** from the pre-established reference position or positions established by this calibration algorithm **20**.

To accomplish this, the calibration algorithm **20** has a first step **21** wherein the headlight directional controller **14** is caused to enter a calibration mode of operation. In the calibration mode of operation, the headlight directional controller **14** is responsive to input signals from the input/output device **17** (or from another source, if desired) for causing manual operation of the up/down actuator **12** and the left/right actuator **13**. Thus, while the headlight directional controller **14** is in the calibration mode of operation, an operator of the input/output device **17** can manually effect either up/down movement of the headlight **11**, left/right movement of the headlight **11**, or both, as desired.

In a second step **22** of the calibration algorithm **20**, the up/down actuator **12** and the left/right actuator **13** are manually operated to aim the headlight **11** in a predetermined reference orientation. This can be accomplished by use of the input/output device **17** that, as mentioned above, is connected to (or can be connected to) the headlight directional controller **14**. Traditionally, the aiming of a headlight **11** has been accomplished by parking the vehicle on a surface near a wall or other vertical structure, providing a reference target at a predetermined location on the wall or other structure, and mechanically adjusting the mounting structure of the headlight **11** such that the center of the beam therefrom is projected at the reference target. In this invention, the vehicle is parked on a surface near a wall or other vertical structure, and a reference target is provided at a predetermined location on the wall or other structure, as described above. Next, in accordance with the second step **22** of this calibration algorithm **20**, the input/output device **17** is operated to generate electrical signals to the headlight directional controller **14**. In response to such electrical signals, the headlight directional controller **14** operates the up/down actuator **12** and the left/right actuator **13** to move the headlight **11** such that center of the beam projecting therefrom is aimed at the reference target. When the beam from the headlight **11** is so aimed, then the headlight **11** is determined to be oriented in the initial reference position from which the headlight directional controller **14** can subsequently implement directional angle adjustments.

In a third step **23** of the calibration algorithm **20**, once this initial reference position for the headlight **11** has been achieved, such position is stored in the headlight directional controller **14** as the predetermined initial reference position. This can be accomplished by means of the position feedback sensors **18** and **19**. As discussed above, the position feedback sensors **18** and **19** are adapted to generate respective electrical signals that are representative of the actual up/down and left/right positions of the headlight **11** or of the predetermined positions for the headlight. Thus, the first



position feedback sensor **18** is responsive to the actual up/down position of the headlight **11** (as determined by the up/down actuator **12**, for example) for generating an electrical signal to the headlight directional controller **14** that is representative thereof. Similarly, the second position feedback sensor **19** is responsive to the actual left/right position of the headlight **11** (as determined by the left/right actuator **13**, for example) for generating an electrical signal to the headlight directional controller **14** that is representative thereof. Accordingly, the third step **23** of the calibration algorithm **20** can be performed by causing the headlight directional controller **14** to read the signals from the position feedback sensors **18** and **19** and store the current up/down and left/right positions of the headlight **11** as the initial reference positions from which the headlight directional controller **14** can subsequently implement directional angle adjustments.

The current position of the headlight **11** is preferably stored in the non-volatile memory of the headlight directional controller **14** for reference during normal operation of the automatic directional control system **10** described below. Thus, when the automatic directional control system **10** is initially activated (such as when the electrical system of the vehicle is initially turned on), the headlight directional controller **14** can position the headlight **11** at or near the calibrated position utilizing the signals comparing the current position of the headlight **11** (as determined by the signals generated by the position feedback sensors **18** and **19**) with the predetermined reference position determined by the calibration algorithm **20**.

FIG. **3** is a flow chart of an algorithm, indicated generally at **30**, for generating a table that relates the sensed condition values from the condition sensors **15** and **16** to the headlight directional angle adjustment factors that will be implemented by the headlight directional controller **14**, and further for storing such table in the headlight directional controller **14** illustrated in FIG. **1**. As used herein, the term "table" is intended to be representative of any collection or association of data that relates one or more of the sensed condition values to one or more of the headlight directional angle adjustment factors. The table of data can be generated, stored, and expressed in any desired format. For example, this table of data can be generated, stored, and expressed in a conventional spreadsheet format, such as shown in FIG. **4**, which will be discussed in detail below.

In a first step **31** of the table generating algorithm **30**, an adjustment control algorithm is selected. The adjustment control algorithm can be, generally speaking, any desired relationship that relates one or more operating conditions of the vehicle to one or more angular orientations of the headlight **11**. A variety of such relationships are known in the art, and this invention is not intended to be limited to any particular relationship. Typically, such relationships will be expressed in terms of a mathematical equation or similar relationship that can be readily processed using a microprocessor or similar electronic computing apparatus, such as the above-described headlight directional controller **14**. The particular adjustment control algorithm that is selected may, if desired, vary from vehicle to vehicle in accordance with a variety of factors, including relative size and performance characteristics of the vehicle or any other desired condition.

As mentioned above, a plurality of operating conditions may be sensed by the condition sensors **15** and **16** and provided to the headlight directional controller **14** for use with the adjustment control mechanism. For example, the condition sensors **15** and **16** may generate electrical signals to the headlight directional controller **14** that are representative of the road speed, the steering angle, and the pitch of the vehicle (which can, for example, be determined by sensing the front and rear suspension heights of the vehicle or by a pitch or level sensor). Additionally, the time derivative of these operating conditions (i.e., the rate of change of the road speed, steering angle, and pitch of the vehicle) can be sensed or calculated. However, any other operating condition or conditions of the vehicle may be sensed and provided to the headlight directional controller **14**.

In a second step **32** of the table generating algorithm **30**, the table is generated using the adjustment control algorithm selected in the first step **31**. The table can be generated in any desired manner. For example, let it be assumed that the selected adjustment control algorithm relates a single sensed operating condition to each of the angular adjustment control values for adjusting both the up/down orientation and the left/right orientation of the headlight **11**. The table can be generated by initially selecting a first discrete sensed operating condition value that might be encountered during operation of the vehicle. Then, the selected adjustment control algorithm is solved using such first discrete sensed operating condition value to obtain the corresponding adjustment control values for the up/down and left/right orientation of the headlight **11**. Then, the first discrete sensed operating condition value and the corresponding adjustment control values are stored in the table. This process can be repeated for any desired number of other discrete sensed operating condition values that might be encountered during operation of the vehicle.

As mentioned above, FIG. **4** is a representative example of a table, indicated generally at **40**, that can be generated in accordance with the second step **32** of the table generating algorithm **30** illustrated in FIG. **3**. As shown therein, a series of discrete sensed operating condition values (degrees of steering angles, for example) is related to the angular adjustment control values (degrees of movement from the associated up/down and left/right reference positions or planes, for example) for adjusting both the up/down orientation and the left/right orientation of the headlight **11**. For the purposes of illustration only, let it be assumed that (1) a positive steering angle value represents steering toward left, while a negative steering angle value represents steering toward the right, (2) a positive up/down adjustment factor represents aiming the headlight **11** upwardly, while a negative up/down adjustment factor represents aiming the headlight **11** downwardly, and (3) a positive left/right adjustment factor represents aiming the headlight **11** toward the left, while a negative left/right adjustment factor represents aiming the headlight **11** toward the right.

Thus, in accordance with the selected adjustment control algorithm, a sensed steering angle of +6° results in an up/down adjustment factor of −3.00° and a left/right adjustment factor of +4.50°. Similarly, a sensed steering angle of +5° results in an up/down adjustment factor of −2.50° and a left/right adjustment factor of +3.75°, and so on as shown in the table **40**. The illustrated table **40** relates thirteen different sensed steering angle values to their corresponding adjustment control values for both the up/down and left/right orientation of the headlight **11**. However, the table **40** can include a greater or lesser number of such sensed operating condition values, together with their corresponding adjustment control values. Furthermore, although the illustrated table **40** relates only a single sensed operating condition value (steering angle) to the corresponding adjustment control values for both the up/down and left/right orientation of the headlight **11**, the selected adjustment control algorithm may, as mentioned above, be responsive to a plurality of sensed operating condition values for determining the corresponding adjustment control values. Alternatively, as will be discussed further below, a plurality of tables **40** can be generated, one for each of the plurality of sensed operating condition values. The size and extent of the table **40** or tables can be varied to accommodate any desired number of such sensed operating conditions.



Referring back to FIG. **3**, in a third step **33** of the table generating algorithm **30**, the table **40** generated in the second step **32** is stored in the memory of the headlight directional controller **14** illustrated in FIG. **1**. The contents of the table **40** can be communicated serially to the headlight directional controller **14** by means of the input/output device **17** illustrated in FIG. **1** or in any other desired manner. Regardless of how it is communicated, the table **40** is preferably stored in a non-volatile memory of the headlight directional controller **14** for subsequent use in the manner described further below when the vehicle is operated.

As mentioned above, it may be desirable to vary the algorithm that is selected for use in implementing the headlight directional angle adjustment factors. The generation of the table **40** and the storage of such table **40** in the memory of the headlight directional controller **14** allow a designer of the automatic directional control system **10** to quickly and easily alter the response characteristics of the system **10** as desired, without the need for direct access to the computer code or software that is used to operate the headlight directional controller **14**. Rather, to effect such alterations, a designer can simply change some or all of the data points that are contained within the table **40**. As will be described in detail below, the headlight directional controller **14** will use whatever data points that are contained within the table **40** in determining the need for adjustments in the angular orientation of the headlight **11**. This structure also reduces the amount of processing power that is necessary for the headlight directional controller **14** because it can operate on a relatively simple look-up basis using the table **40**, rather than having to calculate relatively high order equations that may be used to determine the data points contained within the table **40**.

FIG. **5** is a flow chart of an algorithm, indicated generally at **50**, for operating the headlight directional controller illustrated in FIG. **1** to automatically implement directional angle adjustments in accordance with one or more of the sensed condition values from the condition sensors **15** and **16**. In a first step **51** of the operating algorithm **50**, the values of one or more of the condition sensors **15** and **16** are read by the headlight directional controller **14**. Then, the operating algorithm **50** enters a decision point **52**, wherein it is determined whether the value or values of the condition sensors **15** and **16** that have been read by the headlight directional controller **14** are specifically contained in the table **40**. For example, using the table **40** illustrated in FIG. **4**, if the headlight directional controller **14** has read a steering angle value of −2°, then it is determined that the value of the condition sensor **15** is specifically contained within the table **40**. In this instance, the operating algorithm **50** branches from the decision point **52** to an instruction **53**, wherein the adjustment factors contained in the table **40** that correspond to the sensed condition value are looked up and stored in the headlight directional controller **14**.

The operating algorithm **50** next enters an instruction **54** wherein the value of the magnitude of the adjustment factor (i.e., the desired position for the headlight **11**) is compared with the current position of the headlight **11**. This step **54** of the operating algorithm **50** is optional and can be performed if one or more of the position feedback sensors **18** and **19** are provided in the automatic directional control system **10** to generate respective electrical signals that are representative of the actual up/down and left/right positions of the headlight **11**, as described above. This step **54** of the operating algorithm **50** can be performed to determine how much of an adjustment is necessary to move the headlight **11** from its current position, as determined by the position feedback sensors **18** and **19**, to the desired position, as defined by the adjustment factor obtained from the table **40**. To accomplish this, the value of the adjustment factor may, for example, be subtracted from the current position of the headlight **11** to determine the magnitude of the difference therebetween and, therefore, the magnitude of the adjustment that is necessary to move the headlight **11** from its current position to the desired position. However, this step **54** of the operating algorithm **50** can be accomplished in any other desired manner.

Next, the operating algorithm **50** enters a decision point **55**, wherein it is determined whether the magnitude of the adjustment that is necessary to move the headlight **11** from its current position to the desired position is greater than a predetermined minimum threshold. This step in the operating algorithm **50** is also optional, but may be desirable to prevent the actuators **12** and **13** from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition or conditions, such as relatively small bumps in the road. For example, if the current position of the headlight **11** is relatively close to the desired position, then it may be undesirable to effect any movement thereof. This step **55** will prevent the actuators **12** and **13** from being operated unless the current position of the headlight **11** is relatively far from the desired position. As another example, if the condition sensors **15** and **16** are respectively responsive to the front and rear suspension heights of the vehicle for the purpose of determining the pitch thereof, then the headlight directional controller **14** may be programmed to be responsive only to changes in the suspension heights that occur at frequencies that are lower than the suspension rebound frequency of the vehicle (thereby ignoring relatively high frequency changes in suspension height that are likely the result of bumps in the road). However, relatively high frequency changes in the suspension heights could also be monitored to assist in deciphering relatively rough suspension changes from other suspension changes.

In any event, the provision of the predetermined minimum threshold functions as a filter or dead band that minimizes or eliminates undesirable "hunting" of the actuators **12** and **13** for relatively small magnitudes of movement of the headlight **11**. If the magnitude of the adjustment factor is not greater than the predetermined minimum threshold, then the operation of the actuators **12** and **13** is considered to be undesirable. Thus, the operating algorithm **50** branches from the decision point **55** back to the instruction **51**, wherein the above-described steps of the operating algorithm **50** are repeated.

If, on the other hand, the magnitude of the adjustment factor is greater than the predetermined minimum threshold, then the operation of the actuators **12** and **13** is considered to be desirable. Thus, the operating algorithm **50** branches from the decision point **55** to an instruction **56**, wherein either or both of the actuators **12** and **13** are actuated to effect movement of the headlight **11**. For example, using the table **40** illustrated in FIG. 4, if the headlight directional controller **14** has read a steering angle value of −2°, then the headlight directional controller **14** will look up an up/down adjustment factor of −1.00° and a left/right adjustment factor of −1.50° from the table **40**. The headlight directional controller **14** operates the actuators **12** and **13** to adjust the angular orientation of the headlight **11** to achieve the noted adjustment factors.

In some instances, the amounts of movement that are to be implemented by the two actuators **12** and **13** will be the same (i.e., the amount of up/down movement of the headlight **11** will be the same as the amount of left/right movement). More frequently, however, the amounts of movement that are to be implemented by the two actuators **12** and **13** will be different from one another. In the latter instances, it may be desirable to operate the two actuators **12** and **13** at two different speeds such that the overall movement of the headlight **11** is relatively uniform. For example, if the amount of movement that is to be implemented by the up/down actuator **12** is twice as large as the amount of movement that is to be implemented by the left/right actuator **13**, then it may be desirable to operate the up/down actuator **12** at one-half of the speed of the left/right actuator **13** so that the movements of both actuators **12** and **13** (and, therefore, the overall movement of the headlight **11**) will start and stop at approximately the same time. Similarly, if the vehicle is provided with two different headlights **11**, as is commonly found, then it may be desirable to control the respective movements of such different headlights **11** in such a manner that they both start and stop at approximately the same time. This can be accomplished, for example, by providing a single headlight directional controller **14** for not only controlling, but also coordinating the movements of both of the headlights **11** in response to the sensed operating conditions.

Such operations can be performed in an open loop manner if desired, wherein the actuators **12** and **13** are operated to achieve predetermined amounts of movement. For example, the actuators **12** and **13** can be embodied as step motors that are operated a predetermined number of steps to achieve predetermined amounts of movement. Alternatively, the actuators **12** and **13** can be operated for predetermined periods of time to achieve the predetermined amounts of movement. However, more desirably, the operations of the actuators **12** and **13** are performed in a closed loop manner. To accomplish this, the actuators **12** and **13** are operated until either or both of the position feedback sensors **18** and **19** generate signals indicate that the headlight **11** has actually achieved the predetermined amounts of movement or desired position. In either event, the operating algorithm **50** then branches back to the instruction **51**, wherein the above-described steps of the algorithm **50** are repeated.

Referring back to the decision point **52**, if the value or values of the condition sensors **15** and **16** that have been read by the headlight directional controller **14** are not specifically contained in the table **40**, then the operating algorithm **50** branches from the decision point **52** to an instruction **57**, wherein the adjustment factors that are specifically contained in the table **40** that correspond to the adjacent sensed condition values are looked up and stored in the headlight directional controller **14**. For example, using the table **40** illustrated in FIG. 4, if the headlight directional controller **14** has read a steering angle value of −1.5°, then it is determined that the value of the condition sensor **15** is not specifically contained within the table **40**. Rather than simply default to the closest value that is contained within the table **40**, the two adjustment factors specifically contained in the table **40** that are adjacent to the sensed condition value (namely, the adjustment factors for the steering angle values of −1° and −2°) are looked up and stored in the headlight directional controller **14**.

The operating algorithm **50** next enters an instruction **58**, wherein the actual adjustment factors to be implemented by the headlight directional controller **14** are interpolated or otherwise calculated from the stored adjustment factors that are adjacent to the sensed condition value. For example, as mentioned above, if the actual sensed steering angle value is −1.5°, then the headlight directional controller **14** looks up the adjustment factors for the steering angle values of −1° and −2°. The up/down adjustment factor for a steering angle value of −1° is −0.50 while the up/down adjustment factor for a steering angle value of −2° is −1.00°. If the calculation that is performed by the headlight directional controller **14** is a simple arithmetic mean, then the interpolated up/down adjustment factor would be −0.75°. Similarly, the left/right adjustment factor for a steering angle value of −1° is −0.75°, while the left/right adjustment factor for a steering angle value of −2° is −1.50°. If the calculation that is performed by the headlight directional controller **14** is a simple arithmetic mean, then the interpolated left/right adjustment factor would be −1.13°. Thereafter, the operating algorithm **50** branches to the decision point **55**, and the remainder of the operating algorithm **50** is performed as described above.

The interpolation that is performed by the headlight directional controller **14** can be accomplished in any desired manner. The performance of the simple arithmetic mean described above is intended to be representative of any mathematical or other function that can be performed to calculate, derive, or otherwise obtain adjustment factors that are not present in the table **40**. Furthermore, although this interpolation has been described in the context of using only the two condition values that are directly adjacent to the actual sensed condition value, it will be appreciated that the adjustment values for any single condition value or combination of sensed condition values may be selected for the interpolation. For example, several of the condition values both above and below the sensed condition value can be read from the table **40** to derive a trend line or other good estimate of the adjustment factors that are not present in the table **40**. Performance of this interpolation does not require any significant increase in the amount of processing power that is necessary for the headlight directional controller **14**.

The above discussion has assumed the use of a single table **40** that provides adjustment values based upon a single sensed operating condition (steering angle of the vehicle, in the illustrated embodiment). However, as discussed above, this invention may be practiced by sensing a plurality of operating conditions of the vehicle. For example, let it be assumed that both steering angle and vehicle road speed are sensed by the condition sensors **15** and **16**. As previously discussed, the adjustment control algorithm that is selected in the first step **31** of the table generating algorithm **30** can be designed to accommodate multiple sensed conditions. Alternatively, however, a first table (such as the table **40** illustrated in FIG. **4**) may be generated that relates the steering angle of the vehicle to the angular adjustment control values for adjusting both the up/down orientation and the left/right orientation of the headlight **11**. A second, similar table (not shown) may also be generated that relates the road speed of the vehicle to the angular adjustment control values for adjusting both the up/down orientation and the left/right orientation of the headlight **11**. Thus, for a given steering angle and road speed of the vehicle, the first and second tables may provide differing angular adjustment control values. To address this, the interpolation step **57** of the operating algorithm **50** can be performed to interpolate a single composite adjustment value that is based upon the two different values provided in the first and second tables for the pair of sensed operating conditions. This interpolation can be performed in the same manner as described above for each of the actuators **12** and **13**.

A variety of control strategies can be implemented using the automatic directional control system **10** described above. For example, the pitch of the vehicle can change as a result of a variety of factors, including acceleration, deceleration, and weight distribution of the vehicle. These pitch variations can alter the angle at which the beam of light projects from the headlight **11** in the up and down direction relative to a horizontal reference position or plane. The automatic directional control system **10** can be responsive to such pitch variations for operating the up/down actuator **12** to maintain the angle at which the beam of light projects from the headlight **11** in the up and down direction relatively constant to the horizontal reference position or plane.

As discussed above, the angle at which the beam of light projects from the headlight **11** in the left and right direction relative to a vertical reference position or plane can be adjusted in accordance with the sensed steering angle. However, the angle at which the beam of light projects from the headlight **11** in the up and down direction relative to a horizontal reference position or plane can also be adjusted in accordance with the sensed steering angle. This can be done to lower the headlight beams as the vehicle is turning a corner. The advantages of this are not only to better illuminate the road surface in the path of movement of the vehicle, but also to reduce headlight glare to other vehicles as the turn is negotiated.

Lastly, many vehicles on the road today have halogen lamps or other lights that are aimed to illuminate the sides of the roads in front of the vehicle during the turn. These other lights are activated by the manual operation of the turn signals of the vehicle. The automatic directional control system **10** of this invention can be responsive to one or more operating conditions of the vehicle to automatically activate these other lights on the vehicle. For example, the automatic directional control system **10** of this invention can be responsive to a steering angle in excess of a predetermined magnitude for automatically activating these other lights on the vehicle. This can be effective to extend the angular range of illumination of the road surface.

FIG. **6** is a flow chart of an algorithm, indicated generally at **60**, for operating the headlight directional controller illustrated in FIG. **1** to automatically implement directional angle adjustments in accordance with the rate of change of one or more of the sensed condition values. As mentioned above, the headlight directional controller **14** can be operated to automatically implement directional angle adjustments in accordance with one or more of the sensed condition values or in accordance with the rate of change of one or more of the sensed condition values.

To accomplish this, the algorithm **60** has a first step **61** wherein the values of one or more of the condition sensors **15** and **16** are initially read by the headlight directional controller **14**. Then, the algorithm **60** enters a second step **62** wherein the values of one or more of the condition sensors **15** and **16** are subsequently read a second time by the headlight directional controller **14**. The second reading of the condition sensors **15** and **16** occurs a predetermined amount of time after the first reading thereof. Next, the algorithm enters a third step **63** wherein a rate of change of the sensed condition or conditions is calculated. The rate of change of the sensed condition can be calculated as the difference between the first and second readings divided by the amount of time therebetween or by any other desired means. For example, if the sensed condition is vehicle speed, then the difference between the first sensed vehicle speed and the second sensed vehicle speed, divided by the amount of time therebetween, would yield a number that is representative of the acceleration of the vehicle. In a final step 64 of the algorithm 60, either or both of the actuators 12 and 13 are actuated to effect movement of the headlight 11 in accordance with the calculated rate of change of the sensed condition. Such movement of the headlight 11 can be effected in a manner that is similar to that described above.

FIG. 7 is a flow chart of an algorithm, indicated generally at 70, for operating the headlight directional controller illustrated in FIG. 1 to automatically implement directional angle adjustments, but only when the rate of change of one or more of the sensed condition values is less than (or greater than) a predetermined value. As mentioned above, the headlight directional controller 14 can be operated to automatically implement directional angle adjustments in accordance with one or more of the sensed condition values. In this variation of the invention, the headlight directional controller 14 automatically implements directional angle adjustments in response to the sensed condition values (or in response to the rate of change of the sensed condition values), but only when the rate of change of one or more of the sensed condition values is less than (or greater than) a predetermined value.

To accomplish this, the algorithm 70 has a first step 71 wherein the values of one or more of the condition sensors 15 and 16 are initially read by the headlight directional controller 14. Then, the algorithm 70 enters a second step 72 wherein the values of one or more of the condition sensors 15 and 16 are subsequently read a second time by the headlight directional controller 14. The second reading of the condition sensors 15 and 16 occurs a predetermined amount of time after the first reading thereof. Next, the algorithm enters a third step 73 wherein a rate of change of the sensed condition or conditions is calculated. The rate of change of the sensed condition can be calculated as the difference between the first and second readings divided by the amount of time therebetween or by any other desired means. For example, if the sensed condition is suspension height, then the difference between the first sensed suspension height and the second sensed suspension height, divided by the amount of time therebetween, would yield a number that is representative of the rate of change of the suspension height of the vehicle.

In a fourth step 74 of the algorithm 70, a determination is made as to whether the rate of change of the sensed condition value is less than a predetermined threshold value. If the rate of change of the sensed condition value is less than this predetermined threshold value, then the algorithm 70 branches from the decision point 74 to a final step 75 of the algorithm 70, wherein either or both of the actuators 12 and 13 are actuated to effect movement of the headlight 11 in accordance with the calculated rate of change of the sensed condition. Such movement of the headlight 11 can be effected in a manner that is similar to that described above. If, however, the rate of change of the sensed condition value is not less than this predetermined threshold value, then the algorithm 70 branches from the decision point 74 back to the first step 71, wherein the algorithm 70 is repeated. This threshold sensing algorithm 70 can function to prevent the headlight directional controller 14 from being operated to automatically implement directional angle adjustments when the rate of change of the suspension height of the vehicle changes more rapidly than the system can effect corrective changes. For example, if the vehicle is operated on a bumpy road, the algorithm 70 will prevent the headlight directional controller 14 from attempting to correct for every single bump that is encountered. However, for relatively low frequency or rates of change in the suspension height of the vehicle, such as can occur when accelerating, decelerating, and weight changes, the headlight directional controller 14 will be operated in the normal manner to effect corrective actions, as described above.

As mentioned above, the input/output device 17 is connected to (or can be connected to) the headlight directional controller 14 for facilitating communication therewith, and the input/output device 17 can be used for calibrating the automatic directional control system illustrated in FIG. 1 so as to define an initial reference position or positions for the headlight 11 from which the headlight directional controller 14 can implement directional angle adjustments. Additionally, however, the input/output device 17 can be employed as a diagnostic tool. To accomplish this, the input/output device 17 can be embodied as a conventional microprocessor or similar electronically programmable device that can be connected to the headlight directional controller 14 to read fault codes that may be generated during the operation thereof. The headlight directional controller 14 can be programmed to generate fault codes whenever a fault condition or other anomaly occurs or is detected. Such fault codes can be stored in the headlight directional controller 14 until the input/output device 17 is subsequently connected thereto. When so connected, the input/output device 17 can read such codes and display them for an operator. As a result, the operator can take whatever corrective actions are necessary to address the fault condition or anomaly. The input/output device 17 can also be programmed to clear the fault codes from the headlight directional controller 14 after they are read.

In accordance with the provisions of the patent statutes, the principle and mode of operation of this invention have been explained and illustrated in its preferred embodiments. However, it must be understood that this invention may be practiced otherwise than as specifically explained and illustrated without departing from its spirit or scope.

What is claimed is:

1. An automatic directional control system for a vehicle headlight comprising:

a sensor that is adapted to generate a signal that is representative of a condition of the vehicle, said sensed condition includes one or more of road speed, steering angle, pitch, and suspension height of the vehicle;

a controller that is responsive to said sensor signal for generating an output signal only when said sensor signal changes by more than a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition; and

an actuator that is adapted to be connected to the headlight to effect movement thereof in accordance with said output signal.

2. The automatic directional control system defined in claim 1 wherein said sensor generates a signal that is representative of the road speed of the vehicle.

3. The automatic directional control system defined in claim 1 wherein said sensor generates a signal that is representative of the steering angle of the vehicle.

4. The automatic directional control system defined in claim 1 wherein said sensor generates a signal that is representative of the pitch of the vehicle.

5. The automatic directional control system defined in claim 1 wherein said sensor generates a signal that is representative of the suspension height of the vehicle.

* * * * *

JS 44 (Rev 12/07)

# CIVIL COVER SHEET

The JS 44 civil cover sheet and the information contained herein neither replace nor supplement the filing and service of pleadings or other papers as required by law, except as provided by local rules of court. This form, approved by the Judicial Conference of the United States in September 1974, is required for the use of the Clerk of Court for the purpose of initiating the civil docket sheet. (SEE INSTRUCTIONS ON THE REVERSE OF THE FORM.)

**I. (a) PLAINTIFFS**

BALTHER TECHNOLOGIES, LLC

(b) County of Residence of First Listed Plaintiff GREGG, TX
(EXCEPT IN U.S. PLAINTIFF CASES)

(c) Attorney's (Firm Name, Address, and Telephone Number)
(see attachment)

**DEFENDANTS**

AMERICAN HONDA MOTOR CO. INC., ET AL

County of Residence of First Listed Defendant
(IN U.S. PLAINTIFF CASES ONLY)
NOTE: IN LAND CONDEMNATION CASES, USE THE LOCATION OF THE LAND INVOLVED.

Attorneys (If Known)

**II. BASIS OF JURISDICTION** (Place an "X" in One Box Only)

- ☐ 1 U.S. Government Plaintiff
- ☒ 3 Federal Question (U.S. Government Not a Party)
- ☐ 2 U.S. Government Defendant
- ☐ 4 Diversity (Indicate Citizenship of Parties in Item III)

**III. CITIZENSHIP OF PRINCIPAL PARTIES** (Place an "X" in One Box for Plaintiff and One Box for Defendant) (For Diversity Cases Only)

| | PTF | DEF | | PTF | DEF |
|---|---|---|---|---|---|
| Citizen of This State | ☐ 1 | ☐ 1 | Incorporated or Principal Place of Business In This State | ☐ 4 | ☐ 4 |
| Citizen of Another State | ☐ 2 | ☐ 2 | Incorporated and Principal Place of Business In Another State | ☐ 5 | ☐ 5 |
| Citizen or Subject of a Foreign Country | ☐ 3 | ☐ 3 | Foreign Nation | ☐ 6 | ☐ 6 |

**IV. NATURE OF SUIT** (Place an "X" in One Box Only)

**CONTRACT**
- ☐ 110 Insurance
- ☐ 120 Marine
- ☐ 130 Miller Act
- ☐ 140 Negotiable Instrument
- ☐ 150 Recovery of Overpayment & Enforcement of Judgment
- ☐ 151 Medicare Act
- ☐ 152 Recovery of Defaulted Student Loans (Excl. Veterans)
- ☐ 153 Recovery of Overpayment of Veteran's Benefits
- ☐ 160 Stockholders' Suits
- ☐ 190 Other Contract
- ☐ 195 Contract Product Liability
- ☐ 196 Franchise

**REAL PROPERTY**
- ☐ 210 Land Condemnation
- ☐ 220 Foreclosure
- ☐ 230 Rent Lease & Ejectment
- ☐ 240 Torts to Land
- ☐ 245 Tort Product Liability
- ☐ 290 All Other Real Property

**TORTS**

PERSONAL INJURY
- ☐ 310 Airplane
- ☐ 315 Airplane Product Liability
- ☐ 320 Assault, Libel & Slander
- ☐ 330 Federal Employers' Liability
- ☐ 340 Marine
- ☐ 345 Marine Product Liability
- ☐ 350 Motor Vehicle
- ☐ 355 Motor Vehicle Product Liability
- ☐ 360 Other Personal Injury

PERSONAL INJURY
- ☐ 362 Personal Injury - Med. Malpractice
- ☐ 365 Personal Injury - Product Liability
- ☐ 368 Asbestos Personal Injury Product Liability

PERSONAL PROPERTY
- ☐ 370 Other Fraud
- ☐ 371 Truth in Lending
- ☐ 380 Other Personal Property Damage
- ☐ 385 Property Damage Product Liability

**CIVIL RIGHTS**
- ☐ 441 Voting
- ☐ 442 Employment
- ☐ 443 Housing/ Accommodations
- ☐ 444 Welfare
- ☐ 445 Amer. w/Disabilities - Employment
- ☐ 446 Amer. w/Disabilities - Other
- ☐ 440 Other Civil Rights

**PRISONER PETITIONS**
- ☐ 510 Motions to Vacate Sentence

Habeas Corpus:
- ☐ 530 General
- ☐ 535 Death Penalty
- ☐ 540 Mandamus & Other
- ☐ 550 Civil Rights
- ☐ 555 Prison Condition

**FORFEITURE/PENALTY**
- ☐ 610 Agriculture
- ☐ 620 Other Food & Drug
- ☐ 625 Drug Related Seizure of Property 21 USC 881
- ☐ 630 Liquor Laws
- ☐ 640 R.R. & Truck
- ☐ 650 Airline Regs.
- ☐ 660 Occupational Safety/Health
- ☐ 690 Other

**LABOR**
- ☐ 710 Fair Labor Standards Act
- ☐ 720 Labor/Mgmt. Relations
- ☐ 730 Labor/Mgmt. Reporting & Disclosure Act
- ☐ 740 Railway Labor Act
- ☐ 790 Other Labor Litigation
- ☐ 791 Empl. Ret. Inc. Security Act

**IMMIGRATION**
- ☐ 462 Naturalization Application
- ☐ 463 Habeas Corpus - Alien Detainee
- ☐ 465 Other Immigration Actions

**BANKRUPTCY**
- ☐ 422 Appeal 28 USC 158
- ☐ 423 Withdrawal 28 USC 157

**PROPERTY RIGHTS**
- ☐ 820 Copyrights
- ☒ 830 Patent
- ☐ 840 Trademark

**SOCIAL SECURITY**
- ☐ 861 HIA (1395ff)
- ☐ 862 Black Lung (923)
- ☐ 863 DIWC/DIWW (405(g))
- ☐ 864 SSID Title XVI
- ☐ 865 RSI (405(g))

**FEDERAL TAX SUITS**
- ☐ 870 Taxes (U.S. Plaintiff or Defendant)
- ☐ 871 IRS—Third Party 26 USC 7609

**OTHER STATUTES**
- ☐ 400 State Reapportionment
- ☐ 410 Antitrust
- ☐ 430 Banks and Banking
- ☐ 450 Commerce
- ☐ 460 Deportation
- ☐ 470 Racketeer Influenced and Corrupt Organizations
- ☐ 480 Consumer Credit
- ☐ 490 Cable/Sat TV
- ☐ 810 Selective Service
- ☐ 850 Securities/Commodities/ Exchange
- ☐ 875 Customer Challenge 12 USC 3410
- ☐ 890 Other Statutory Actions
- ☐ 891 Agricultural Acts
- ☐ 892 Economic Stabilization Act
- ☐ 893 Environmental Matters
- ☐ 894 Energy Allocation Act
- ☐ 895 Freedom of Information Act
- ☐ 900 Appeal of Fee Determination Under Equal Access to Justice
- ☐ 950 Constitutionality of State Statutes

**V. ORIGIN** (Place an "X" in One Box Only)

☒ 1 Original Proceeding ☐ 2 Removed from State Court ☐ 3 Remanded from Appellate Court ☐ 4 Reinstated or Reopened ☐ 5 Transferred from another district (specify) ☐ 6 Multidistrict Litigation ☐ 7 Appeal to District Judge from Magistrate Judgment

**VI. CAUSE OF ACTION**

Cite the U.S. Civil Statute under which you are filing (Do not cite jurisdictional statutes unless diversity):
35 U.S.C. §§ 271, 284

Brief description of cause:
Patent Infringement

**VII. REQUESTED IN COMPLAINT:** ☐ CHECK IF THIS IS A CLASS ACTION UNDER F.R.C.P. 23 DEMAND $

CHECK YES only if demanded in complaint:
JURY DEMAND: ☑ Yes ☐ No

**VIII. RELATED CASE(S) IF ANY** (See instructions): JUDGE DOCKET NUMBER

DATE
03/08/2010

SIGNATURE OF ATTORNEY OF RECORD

FOR OFFICE USE ONLY

RECEIPT # AMOUNT APPLYING IFP JUDGE MAG. JUDGE

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# EXHIBIT 3

**IN THE UNITED STATES DISTRICT COURT**

**FOR THE EASTERN DISTRICT OF TEXAS**

**TYLER DIVISION**

| | | |
|---|---|---|
| **BALTHER TECHNOLOGIES, LLC,** | § | |
| | § | |
| **Plaintiff,** | § | **Civil Action No. 6:10-CV-78-LED** |
| | § | |
| **v.** | § | |
| | § | |
| **AMERICAN HONDA MOTOR CO. INC., *et al.*,** | § | **JURY TRIAL DEMANDED** |
| | § | |
| | § | |
| **Defendants.** | § | |

**PLAINTIFF'S NOTICE OF VOLUNTARY DISMISSAL**

Balther Technologies, LLC, plaintiff in the above-entitled and numbered civil action, files this notice of voluntary dismissal of this civil action without prejudice pursuant to Fed. R. Civ. P. 41(a)(1)(A)(i). To date, none of the defendants have filed an answer to Plaintiff's Original Complaint for Patent Infringement or a motion for summary judgment.

Plaintiff and Defendants shall bear their own costs, expenses and legal fees.

Respectfully submitted,

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***Attorneys for Balther Technologies, LLC***

**CERTIFICATE OF SERVICE**

The undersigned hereby certifies that all counsel of record who are deemed to have consented to electronic service are being served with a copy of this document via the Court's CM/ECF system per Local Rule CV-5(a)(3). Any other counsel of record will be served by e-mail, facsimile transmission and/or first class mail on May 17, 2010.

Eric M. Albritton

**IN THE UNITED STATES DISTRICT COURT**

**FOR THE EASTERN DISTRICT OF TEXAS**

**TYLER DIVISION**

| | | |
|---|---|---|
| **BALTHER TECHNOLOGIES, LLC,** | § | |
| | § | |
| **Plaintiff,** | § | **Civil Action No. 6:10-CV-78-LED** |
| | § | |
| **v.** | § | |
| | § | |
| **AMERICAN HONDA MOTOR CO. INC., *et al.*,** | § | **JURY TRIAL DEMANDED** |
| | § | |
| | § | |
| **Defendants.** | § | |

**ORDER**

Pursuant to the Plaintiff's Notice of Voluntary Dismissal this civil action, shall be, and is hereby, DISMISSED WITHOUT PREJUDICE.

Plaintiff and Defendants shall bear their own costs, expenses and legal fees.

# EXHIBIT 4

**IN THE UNITED STATES DISTRICT COURT**

**FOR THE EASTERN DISTRICT OF TEXAS**

**TYLER DIVISION**

| | | |
|---|---|---|
| **BALTHER TECHNOLOGIES, LLC,** | § | |
| | § | |
| **Plaintiff,** | § | **Civil Action No. 6:10-CV-78-LED** |
| | § | |
| **v.** | § | |
| | § | |
| **AMERICAN HONDA MOTOR CO. INC.,** ***et al.*****,** | § | **JURY TRIAL DEMANDED** |
| | § | |
| | § | |
| **Defendants.** | § | |

**ORDER**

Pursuant to the Plaintiff's Notice of Voluntary Dismissal this civil action, shall be, and is hereby, DISMISSED WITHOUT PREJUDICE.

Plaintiff and Defendants shall bear their own costs, expenses and legal fees.

**So ORDERED and SIGNED this 18th day of May, 2010.**

**LEONARD DAVIS**
**UNITED STATES DISTRICT JUDGE**

# EXHIBIT 6

# (12) UK Patent Application (19) GB (11) 2 309 773 (13) A

(43) Date of A Publication 06.08.1997

(21) Application No 9701821.2

(22) Date of Filing 29.01.1997

(30) Priority Data
(31) 08037109 (32) 01.02.1996 (33) JP

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(51) INT CL$^6$
B60Q 1/115

(52) UK CL (Edition O )
F4R RMC R364 R41Y R765 R78X R789
U1S S1934

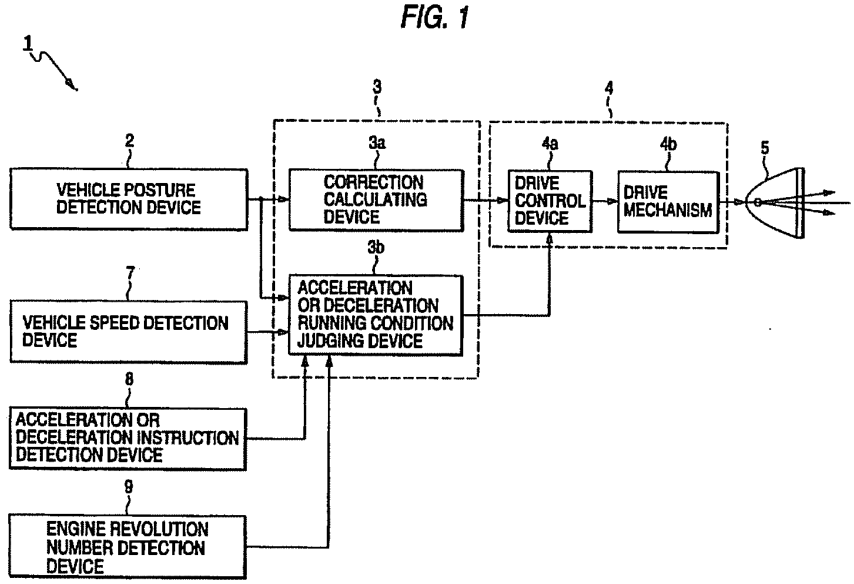
(56) Documents Cited
GB 2053439 A EP 0709240 A2 EP 0699559 A1
EP 0652134 A1 WO 96/18524 A1

(58) Field of Search
UK CL (Edition O ) F4R RMC
INT CL$^6$ B60Q 1/08 1/10 1/105 1/11 1/115
Online : WPI, CLAIMS, JAPIO

## (54) Controlling direction of vehicle lights

(57) The illumination direction of lights in a vehicle is controlled by detecting (1) vehicle posture (stationary and/or moving) and (2) whether the vehicle is accelerating/ decelerating and directing the illumination of the lights to a predetermined direction in accordance with signals received from the posture detection device. The signals to the drive means are over-ridden when acceleration/deceleration is detected in order to fix the lights in a predetermined direction and/or limit the permitted range of light movement and/or slow the speed of direction change. Reference values may be used to determine whether and what direction change occurs. The system may include means to distinguish true acceleration/deceleration from vehicle movements caused by rough roads.

*FIG. 1*




At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

GB 2 309 773 A

*FIG. 1*

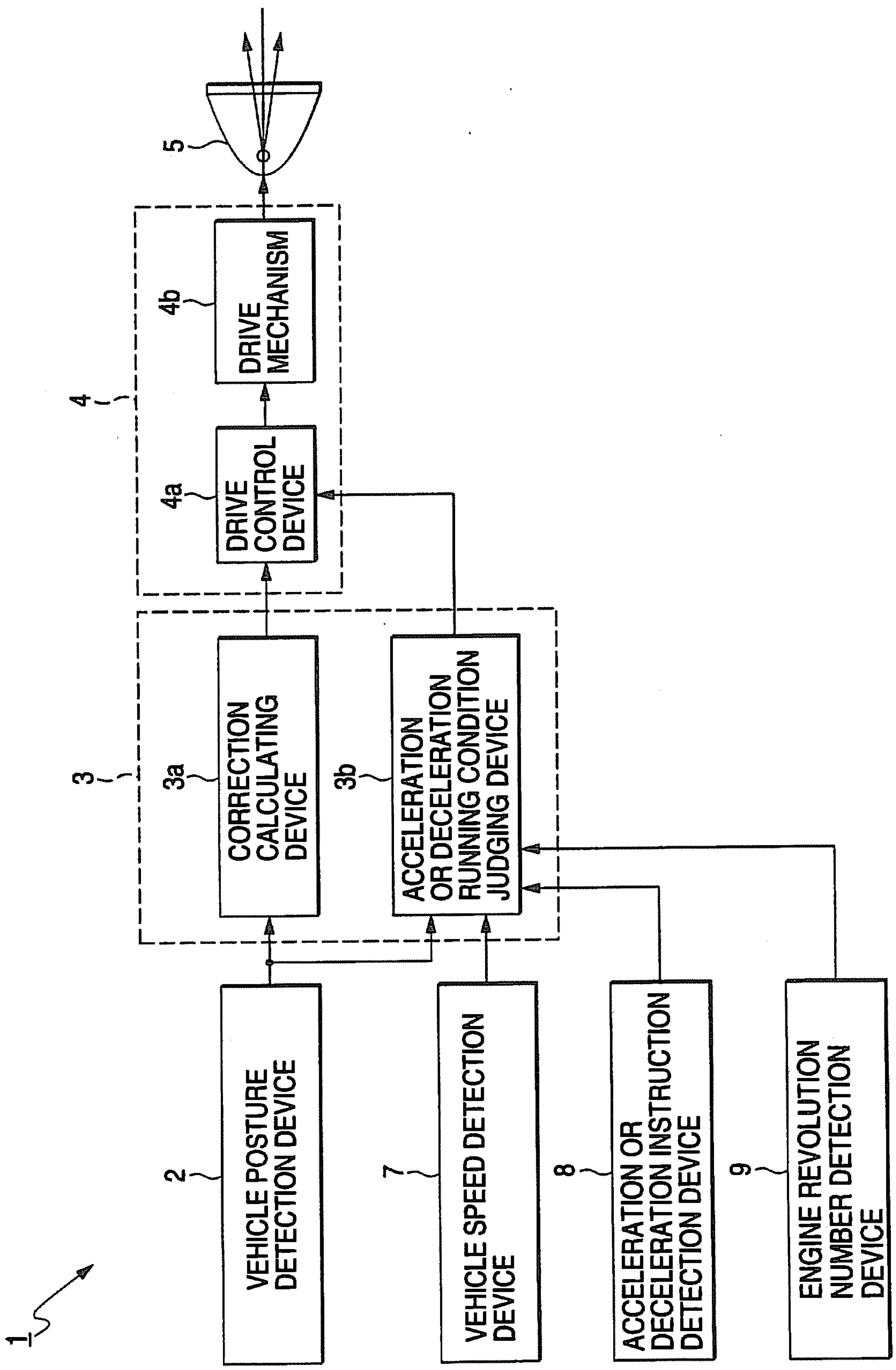

1
2
VEHICLE POSTURE DETECTION DEVICE
7
VEHICLE SPEED DETECTION DEVICE
8
ACCELERATION OR DECELERATION INSTRUCTION DETECTION DEVICE
9
ENGINE REVOLUTION NUMBER DETECTION DEVICE
3
3a
CORRECTION CALCULATING DEVICE
3b
ACCELERATION OR DECELERATION RUNNING CONDITION JUDGING DEVICE
4
4a
DRIVE CONTROL DEVICE
4b
DRIVE MECHANISM
5

FIG. 2

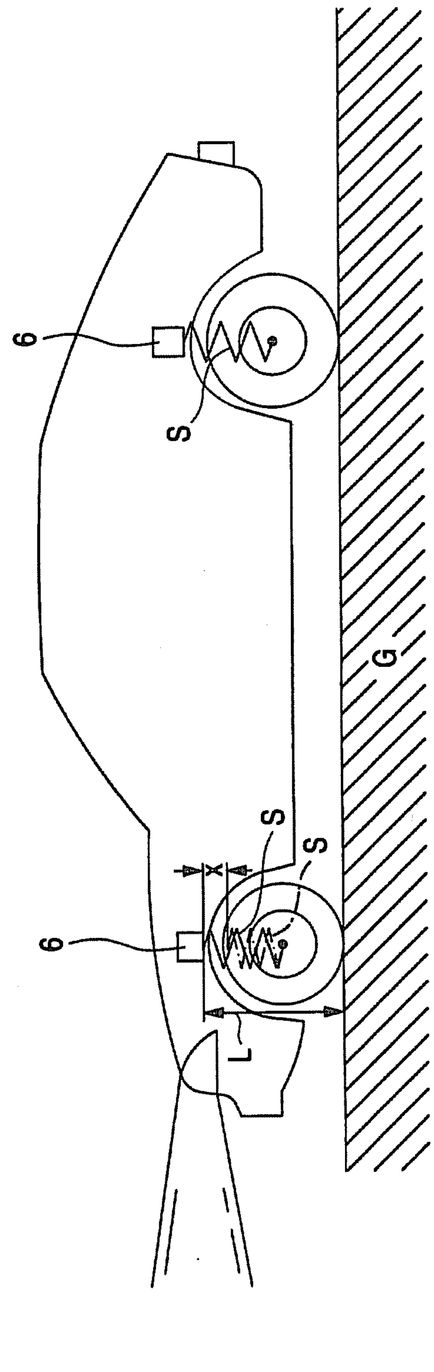


FIG. 3

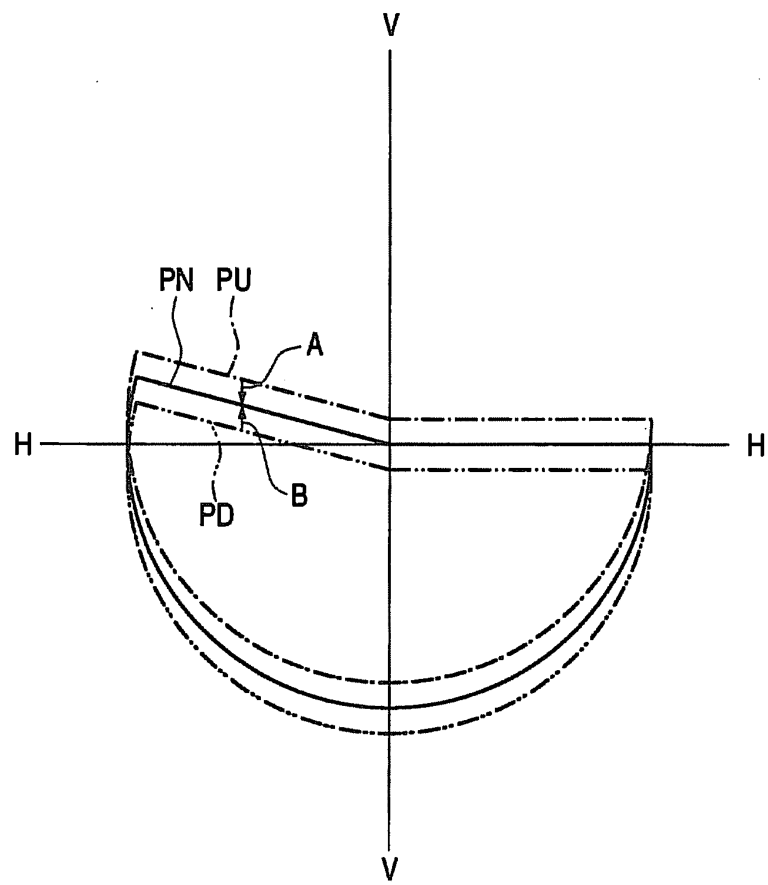


FIG. 4

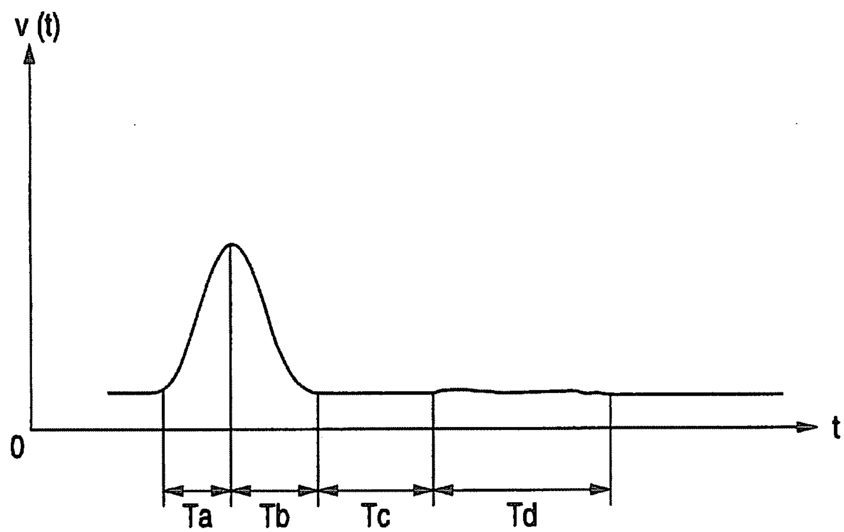


FIG. 5

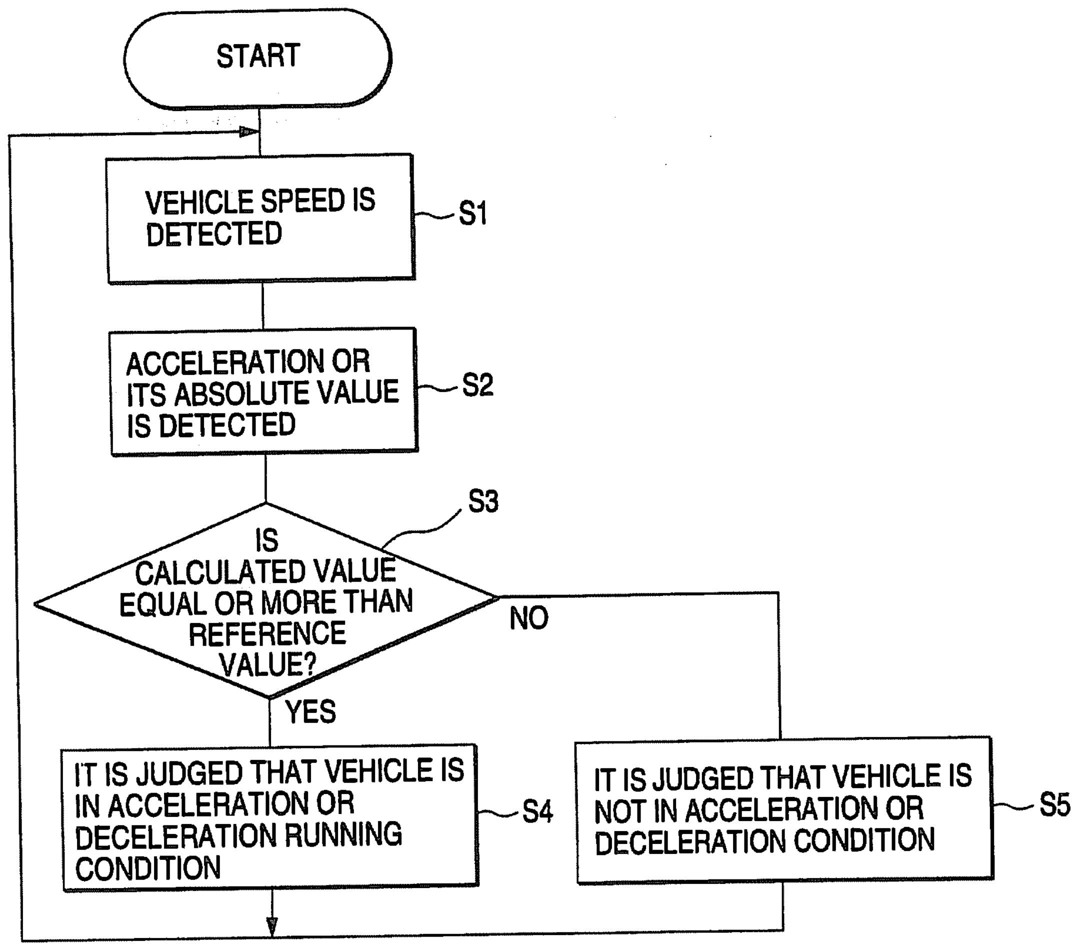

START
VEHICLE SPEED IS DETECTED
S1
ACCELERATION OR ITS ABSOLUTE VALUE IS DETECTED
S2
S3
IS CALCULATED VALUE EQUAL OR MORE THAN REFERENCE VALUE?
NO
YES
IT IS JUDGED THAT VEHICLE IS IN ACCELERATION OR DECELERATION RUNNING CONDITION
S4
IT IS JUDGED THAT VEHICLE IS NOT IN ACCELERATION OR DECELERATION CONDITION
S5

FIG. 6

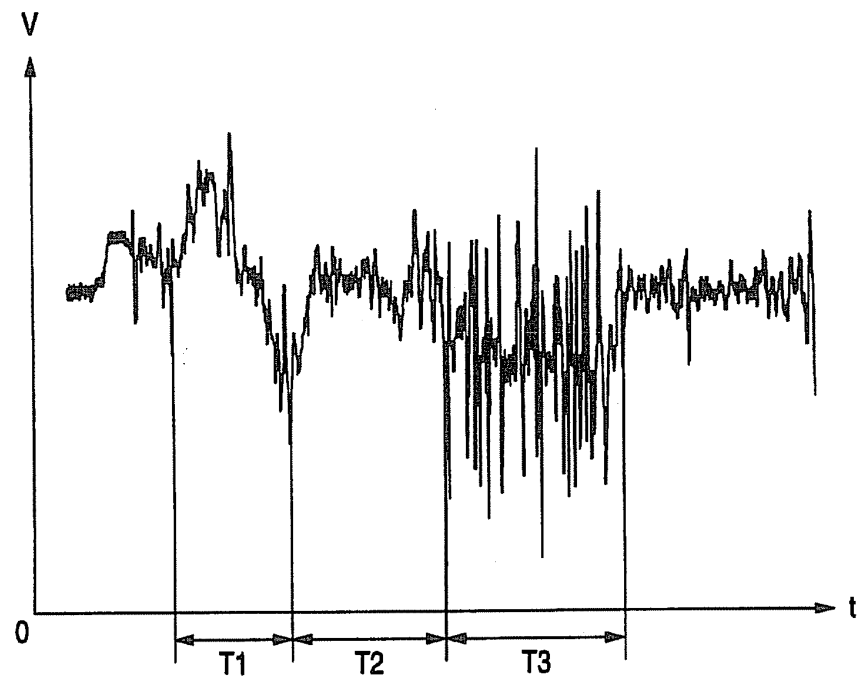


FIG. 7

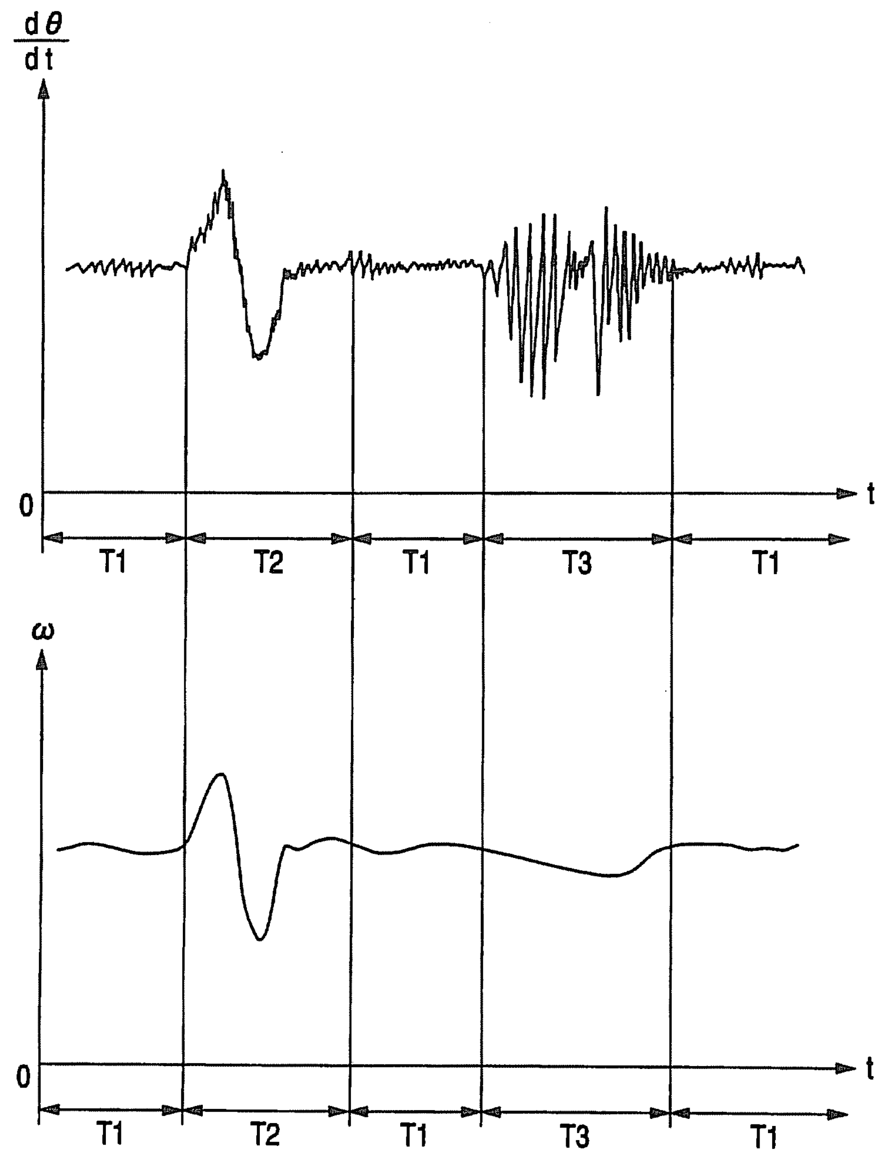


*FIG. 8*

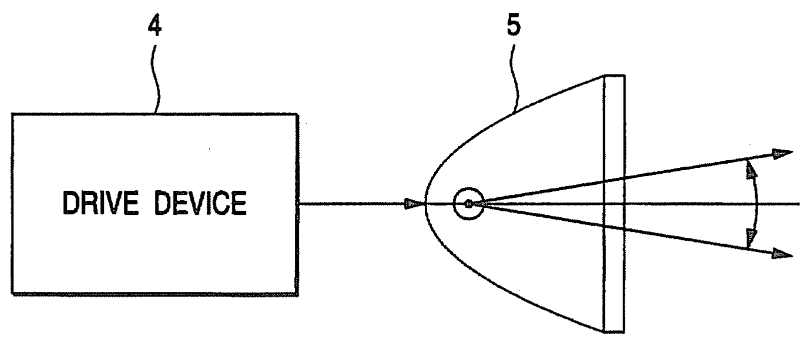



*FIG. 9*

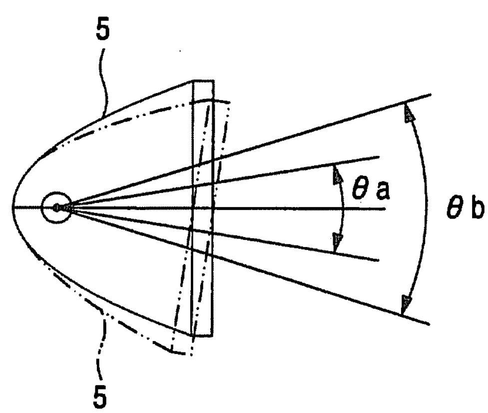


FIG. 10

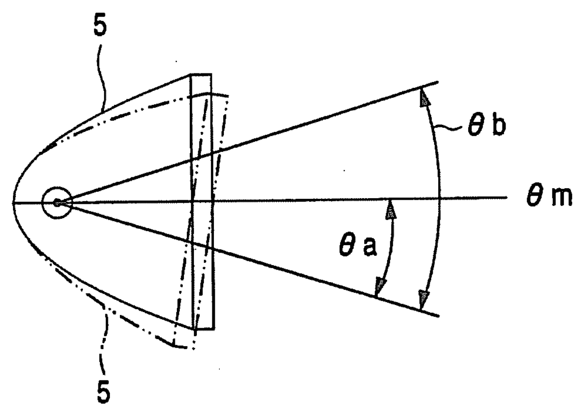



FIG. 11

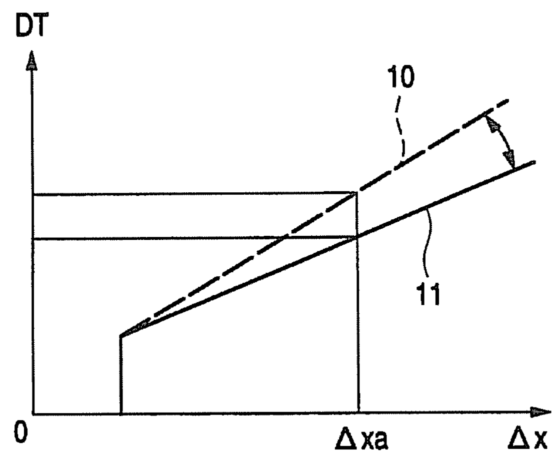


FIG. 12

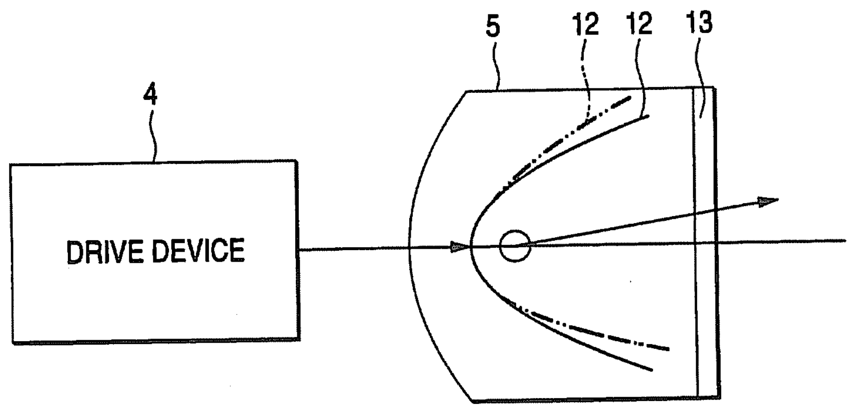



FIG. 13

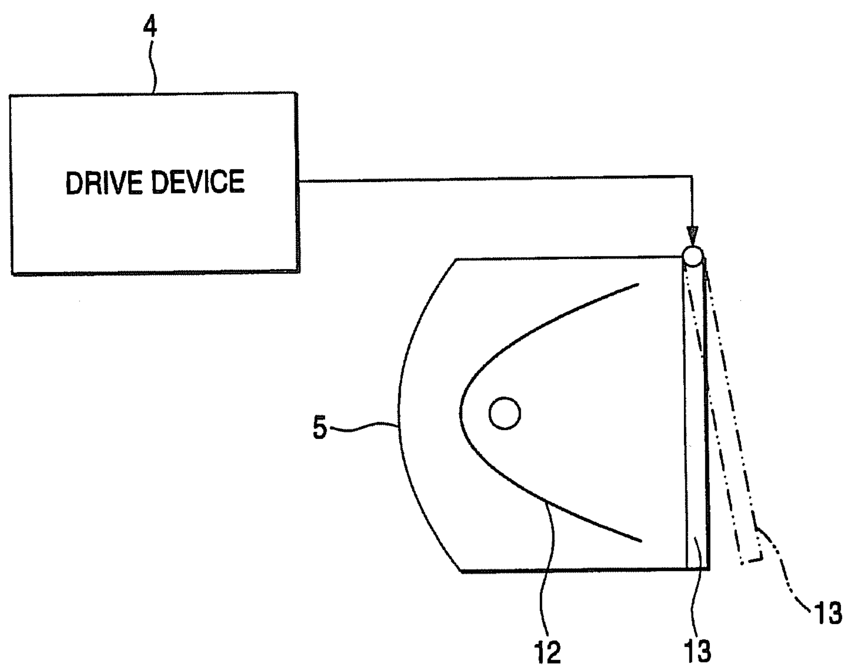
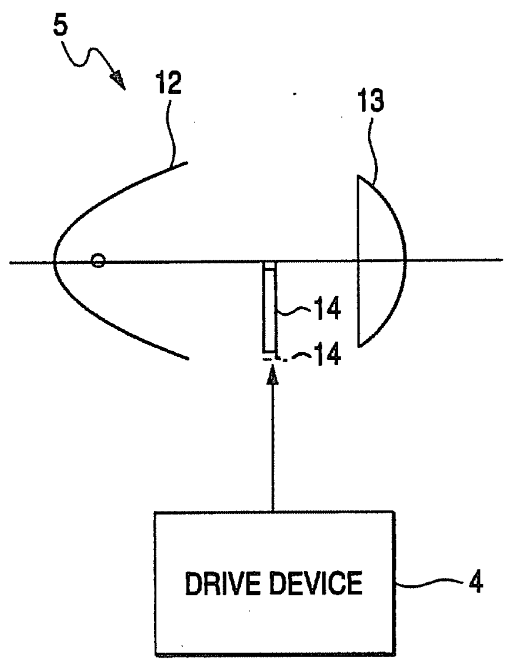


FIG. 14



2309773

# A VEHICLE LAMP ILLUMINATION DIRECTION CONTROL DEVICE

The present invention relates to a vehicle lamp illumination direction control device which detects the posture of a vehicle and correctly adjusts the illumination direction of a vehicle lamp so that the illumination direction can be always kept in a predetermined direction.

Conventionally, there has been known a device (a so called automatic leveling device) which, even when the inclination of a vehicle body varies, is capable of automatically adjusting the illumination direction of the vehicle lamp so that the illumination direction of the vehicle lamp can be kept at a predetermined direction. The conventional device of this type includes a detection device which detects the inclination and height of the vehicle body variable according to the conditions of occupants (such as the number of occupants, the position arrangement of the occupants and the like), the loaded conditions of loads on board the vehicle, the running conditions of the vehicle, and the like, calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detection device, and adjusts the illumination angle of the vehicle lamp with respect to the initially adjusted value of the vehicle lamp so that the illumination state of the vehicle lamp can be always kept in a desired state, thereby to control the illumination direction of the vehicle lamp for desired light distribution.

For example, when a load is applied to the rear portion of the vehicle, the device finds the then inclination angle of the vehicle body in the longitudinal direction thereof, and inclines the vehicle lamp downward because the illumination direction of which would be displaced upwardly of the reference direction if the posture of the vehicle lamp is left as it is, thereby adjusting the illumination direction of the vehicle lamp (a so called leveling adjustment) so that the vehicle lamp illumination direction can be always kept in the reference direction.

However, in the above-mentioned conventional device, while the vehicle is running along a rough road including an uneven and rough surface, when the device makes the above-mentioned automatic adjustment of the illumination direction of the vehicle lamp, there is a possibility that the detection device can respond excessively to the illumination direction of the vehicle lamp and thus the illumination direction of the vehicle lamp can be controlled or adjusted excessively, which causes the light distribution of the vehicle lamp and the field of view to vary. Such variations in the light distribution and visibility in turn can give a driver a strange feeling, or can dazzle the driver of an oncoming vehicle, a pedestrian, and the like.

For example, when the vehicle runs into a rough road at a rather high speed, vibrations and the like applied to the vehicle wheels from the surface of the rough road are relieved by the expansion and contraction of the suspension of the vehicle and, therefore, there is a possibility that variations in the inclination of the vehicle body are not as large as variations in the output of the detection device due to the vehicle height and the like. That is, if the leveling adjustment is made faithfully according to the output of the detection device, then there is a possibility that the illumination direction of the vehicle lamp can be corrected excessively when compared with the actual inclination of the vehicle body.

The present invention was made in view of the foregoing problems accompanying the conventional device as discussed above. Therefore, it is an object of the present invention to provide a vehicle lamp illumination direction control device capable of controlling and properly adjusting the vehicle lamp illumination direction without correcting the same excessively while the vehicle is running along a rough road, whereby the visibility of the driver of the vehicle can be enhanced while the controlled vehicle lamp illumination direction can never dazzle the driver of an oncoming vehicle, so that the safety of the vehicle driving can be assured.

In attaining the above object, according to the invention, in view of the fact that the posture change of the vehicle in the constant speed running condition of the vehicle or in the bad road running condition thereof is relatively smaller than the posture change of the vehicle in the acceleration or deceleration running condition of thereof, there is provided a vehicle lamp illumination direction control device for changing the direction of the illumination light of a lamp according to the vertical inclination of a vehicle in the advancing direction thereof, the control device comprising:

a vehicle posture detection device for detecting the posture of the vehicle during the stationary and/or moving condition thereof;

an acceleration or deceleration running condition judging device for judging whether the vehicle is in the acceleration running condition or in the deceleration running condition or not;

a drive device for directing the illumination light of the lamp in a predetermined direction; and

a correction calculating device for transmitting to the drive device a correction signal for holding the illumination light of the lamp in a given direction, in accordance with a signal received from the vehicle posture detection device, wherein, when it is judged by the acceleration or deceleration running condition judging device that the vehicle is in the acceleration running condition or in the deceleration running condition, the direction of the lamp can be controlled by the signal transmitted from the correction calculating device to the drive device, and, when it is judged by the acceleration or deceleration running condition judging device that the vehicle is not in the acceleration running condition or in the deceleration running condition, the drive device can fix the direction of the illumination light of the lamp in a given direction or can limit the allowable range of the direction of the illumination light, or the response speed of the drive device can be slowed down.

According to the invention, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a given direction, or by limiting the direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle.

In the accompanying drawings:

Fig. 1 is a block diagram of the structure of a vehicle lamp illumination direction control device according to the invention;

Fig. 2 is a schematic view of a vehicle for explanation of height detection device;

Fig. 3 is an explanatory view of a correction control on the illumination direction of a vehicle lamp;

Fig. 4 is a graphical representation of an example of the change with time of a detect level detected by vehicle speed detection device;

Fig. 5 is a flow chart of a judging processing on the acceleration or deceleration running condition of the vehicle;

Fig. 6 is a graphical representation of an example of a detect level detected by a height sensor;

Fig. 7 is an explanatory view of a method for judging the bad road running condition of the vehicle by combined use of a height sensor and an angular velocity sensor;

Fig. 8 is a schematic view of an example of a method for changing the illumination direction of the lamp by driving and controlling the entire lamp;

Fig. 9 is an explanatory view of a method for limiting the allowable range of the illumination angle of the lamp when it is judged that the vehicle is in the acceleration or deceleration running condition;

Fig. 10 is an explanatory view of a method for limiting the allowable range of the illumination angle of the lamp to thereby prohibit the occurrence of an upwardly directed light when it is judged that the vehicle is in the acceleration or deceleration running condition;

Fig. 11 is an explanatory view of a method for slowing down the response speed of drive device when it is judged that the vehicle is in the acceleration or deceleration running condition;

Fig. 12 is an explanatory view of a method for changing the illumination direction of a reflector by driving or controlling the reflector;

Fig. 13 is an explanatory view of a method for changing the illumination direction of a lens by driving or controlling the lens; and,

Fig. 14 is an explanatory view of a method for changing the illumination direction of a shade by driving or controlling the shade.

Now, description will be given below of an embodiment of a vehicle lamp illumination direction control device according to the invention with reference to the accompanying drawings.

Fig. 1 shows the basic structure of the present invention, in which an illumination direction control device 1 includes a vehicle posture detection device 2, a control device 3 (which is composed of correction calculating device 3a and acceleration or deceleration running condition judging device 3b), a drive device 4 (which is composed of a drive control device 4a and a drive mechanism 4b), and a lamp 5.

The vehicle posture detection device 2 is used to detect the posture of a vehicle while it is standing still and/or moving (including the vertical inclination of the vehicle while it is running). For example, when there is used a vehicle height detection device 6 which detects the height of the vehicle body according to the uneven surface of the road, as shown in Fig. 2, there are available a method for measuring a distance L between the vehicle height detection device 6 and the road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the vehicle height detection device 6 detects the amount x of the expansion and contraction of a suspension S. These two methods are both advantageous in that the existing facilities in the vehicle can be used.

The outputs of the vehicle posture detection device 2 are transmitted to the correction calculating device 3a and acceleration or deceleration running condition judging device 3b which cooperate together in forming the control device 3, and these outputs are used as control signals to be applied to the drive device 4 and are then used as instructions for correcting the illumination condition of the lamp 5.

In particular, the correction calculating device 3a is structured in the following manner: that is, in accordance with a detect signal from the vehicle posture detection device 2, it transmits a control signal to the drive device 4 so that the illumination direction of the lamp 5 can be always kept in a given direction. For example, as shown in Fig. 3, when the vehicle body rises in the front portion thereof with respect to a light distribution pattern PN (shown by a solid line in Fig. 3) which is set using a horizontal line H-H or a vertical line V-V as a reference line, the illumination direction of the lamp 5 varies upward with respect to the horizontal line H-H and thus the light distribution pattern varies upward like a pattern PU (shown by a one-dot chained line in Fig. 3). In this case, the correction calculating device 3a transmits to the drive control device 4a a signal which causes the illumination direction of the lamp 5 to vary downward as well as the light distribution pattern thereof to vary downward and coincide with the light distribution patter PN as shown by an arrow A in Fig. 3. Also, contrary to this, when the vehicle body falls down in the front portion thereof, the illumination direction of the lamp 5 varies downward with respect to the horizontal line H-H and thus the light distribution pattern also varies downward like a pattern PD (shown by a two-dot chained line in Fig. 3). In this case, the correction calculating device 3a transmits to the drive control device 4a a signal which causes the illumination direction of the lamp 5 to vary upward as well as the light distribution pattern thereof to vary upward and coincide with the light distribution pattern PN as shown by an arrow B in Fig. 3.

Now, the acceleration or deceleration running condition judging device 3b is used to judge whether the vehicle is increasing its speed or decreasing its speed. When the judging device 3b judges that the vehicle is in an acceleration or deceleration running condition, in accordance with a control signal transmitted from the correction calculating device 3a to the drive control device 4a, the acceleration or deceleration running condition judging device 3b transmits to the drive control device 4a a signal which allows the illumination direction of the lamp 5 to be corrected in a predetermined direction. Also, when the acceleration or deceleration running condition judging device 3b judges that the vehicle is not in the acceleration or deceleration running condition (that is, it is judged that the vehicle is in a constant speed running condition or in a bad road running condition, or the like), it transmits a control signal to the drive device 4, so that the illumination direction of the lamp 5 can be fixed in a predetermined direction or limited to a given range, or the response speed of the drive mechanism 4b for varying the illumination direction of the lamp 5 is slowed down to thereby be able to control the illumination direction of the lamp 5 in such a manner that it varies slowly. Here, as basic information used to judge whether the vehicle is in the acceleration or deceleration running condition or not, besides the information that is given by the vehicle posture detection device 2, as shown in Fig. 1, there is also available information which can be obtained by providing acceleration or deceleration instruction detection device 8 used to detect an acceleration or deceleration instruction or information relating to the present instruction according to the amount of pressing-down of a gas pedal, variations in the opening angle of a throttle valve or the like, or information which can be obtained by providing an engine revolution number detection device 9 used to detect the number of revolutions of an engine: that is, the information obtained by these detection devices may be transmitted to the acceleration or deceleration running condition judging device 3b. A judging method for judging whether the vehicle is in the acceleration or deceleration running condition or not will be described later below.

The drive control device 4a is used to receive signals from the correction calculating device 3a and acceleration or deceleration running condition judging device 3b and allow the drive mechanism 4b to control or change the illumination direction of the lamp 5. The control or change of the illumination direction of the lamp 5 can be achieved by inclining the entire lamp 5 or by moving part of the components of the lamp 5 such as a shade or the like, while the details of these controlling or changing methods will be given later.

At first, the judging method in the acceleration or deceleration running condition judging device 3b will be described by classifying it into the following four methods:

i) a method using the vehicle speed detection device;

ii) a method using the acceleration or deceleration instruction detection device 8;

iii) a method using the engine revolution number detection device 9; and,

iv) a method using the vehicle posture detection device 2.

Firstly, the method i) is a method which judges whether the vehicle is in the acceleration or deceleration running condition or not by detecting the running speed of the vehicle to calculate the change of the speed with time, that is, by calculating the acceleration of the vehicle. The present method i) is advantageous in that the vehicle speed detection device 7 is one of the existing facilities in the vehicle and use of the detect signal of the vehicle speed detection device 7 facilitates the judgment on the acceleration or deceleration running condition of the vehicle.

Fig. 4 shows an example of the change of the speed with time, in which the axis of abscissa expresses the time t and the axis of ordinate expresses the speed v (t) of the vehicle. In Fig. 4, a period designated by Ta expresses the acceleration period of the vehicle, a period designated by Tb expresses the deceleration period of the vehicle, a period designated by Tc expresses the constant speed period of the vehicle, and a period designated by Td expresses the bad road running period of the vehicle.

Based on the speed v obtained from the vehicle speed detection device 7, if the time differential of the speed v or an acceleration dv (t)/dt is calculated, the acceleration is given as a positive value in the acceleration period Ta, the acceleration is given as a negative value in the deceleration period Tb, and the acceleration is given as zero in the constant speed period or a small value in the bad road running period Td. Therefore, by comparing the acceleration or the absolute value thereof with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not.

Now, Fig. 5 is a flow chart which shows the flow of the acceleration or deceleration running condition judging process, that is, Fig. 5 shows the procedure of the processing to be performed by the above-mentioned acceleration or deceleration running condition judging device 3b.

At first, in Step S1, the vehicle speed v (t) is detected and, after then, in Step S2, the acceleration dv (t)/dt or the absolute value thereof is calculated. Next, in Step S3, it is checked whether the acceleration dv (t)/dt or the absolute value thereof is equal to or more than a reference value or not. If it is found that the acceleration dv (t)/dt or the absolute value thereof is less than the reference value, then the processing advances to Step S5.

In Step S4, it is judged that the vehicle is in the acceleration or deceleration running condition and, after then, the processing goes back to Step S2. Also, in Step S5, it is judged that the vehicle is not in the acceleration or deceleration running condition and, after then, the processing returns back to the first step S1.

As described above, the method i) is a method which monitors the variations in the speed of the vehicle and, therefore, when an instruction for acceleration or deceleration of the vehicle given by a driver cannot be reflected instantaneously on the speed of the vehicle, there is a fear that a time delay can occur in the judgment of the acceleration or deceleration. In this case, as shown in the method ii), as the information relating to the acceleration or deceleration instruction of the vehicle, there can be used the detect information relating to the variations in the amount of pressing-down of the accelerator pedal or relating to the variations in the amount of opening of the throttle valve.

In particular, the variations in the accelerator pedal pressing-down amount or the variations in the throttle valve opening amount is large when the vehicle is in the acceleration or deceleration running condition (which is hereinafter referred to as acceleration or deceleration time), while it is small when the vehicle is running at a constant speed or along a bad road. Therefore, by detecting a difference between the variations, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. In other words, in Fig. 5, Step S1 may be replaced by the detection of the accelerator pedal pressing-down amount or the throttle valve opening amount, the variations in these amounts may be calculated in Step S2 and, after then, the thus calculated value may be compared with the given reference value in Step S3, whereby the following processing (that is, the processing to be performed after then) can be decided.

In another method, attention is paid to variations in the state of the drive source of the vehicle, that is, as shown in above-mentioned method iii), by detecting variations in the number of revolutions of the engine, the judgment on the acceleration or deceleration running condition can be achieved.

That is, due to the fact that the variations in the number of revolutions of the engine are large in the acceleration or deceleration running condition of the vehicle, whereas the variations are small in the constant speed running condition or in the bad road running condition, by detecting a difference between the variations, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. In this case, in Fig. 5, the number of revolutions of the engine may be detected in Step S1, a variation in the number of revolutions of the engine may be calculated in Step S2 and, after then, the thus calculated value may be compared with the given reference value in Step S3, whereby the following processing can be decided.

As described above, based on the respective pieces of information that are obtained by calculating the amounts of variations with time of the vehicle speed, the speed instruction given by the driver, and the state of the drive source of the vehicle, or based on the information that is obtained by combining them with each other, the variations in the acceleration or deceleration condition of the vehicle can be detected.

The remaining method iv) is a method which can judge the acceleration or deceleration running condition of the vehicle based on the information that is obtained by the vehicle posture detection device 2. Generally, as a device for detecting variations in the vibration of a mechanism for absorbing the vibration that is given to the wheels of the vehicle from the surface of a road or for detecting the height of the axle of the vehicle, there is used height detection device such as a height sensor or the like. In the present method, based on the information that is obtained from the height detection device, the time differential of the detected level or the absolute value thereof is calculated and, after then, by comparing the resultant value with a given reference value, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not. Also, if a plurality of height detection device are arranged at several positions of the vehicle, for example, in the front and rear portions thereof and/or right and left portions thereof and the inclination angle in the pitching direction of the vehicle (so called pitch angle) is detected in accordance with the detect information that is detected by these height detection device, then the running condition of the vehicle can be confirmed to a certain degree. However, actually, there exists a state in which it is difficult to tell the acceleration or deceleration running condition of the vehicle from the bad road running condition only by means of such height detection device.

Now, Fig. 6 shows an example of the level variations in the detect signal that is output from a height sensor attached to the vehicle. In Fig. 6, the axis of abscissa expresses the time t and the axis of ordinate expresses the level V of the detect signal.

In Fig. 6, a period designated by T1 expresses a period in which the vehicle is in an acceleration or deceleration running condition, a period designated by T2 expresses a period in which the vehicle is in a constant speed running condition, and a period designated by T3 expresses a period in which the vehicle is in a bad road running condition. Fig. 6 tells that the width of the amplitude variations in the output signal of the height sensor is large in the periods T1 and T3.

That is, in order to judge whether the vehicle is in the acceleration or deceleration running condition or in the bad road running condition, it is necessary to recognize a difference between the detected level variations in the period T1 and T3. For example, attention is paid to a difference between the degrees of the variations in the detected levels and the judgment is made in accordance with the fact that the amplitude variations in the detected levels in the period T3 are heavier. However, as a method which can enhance the accuracy of the judgment, there can be pointed out a method which detects the variations in the detected levels by using the vehicle height detection device and angular velocity detection device in combination.

Now, Fig. 7 shows a method which carries out a judgment on the acceleration or deceleration running condition of the vehicle by using a height sensor and an angular velocity sensor in combination. In Fig. 7, a graphical representation shown in the upper stage thereof represents variations with time in the time difference amount (which is expressed as $d\theta/dt$) of the pitch angle of the vehicle calculated from the detect level V of the height sensor, whereas a graphical representation in the lower stage thereof represents variations with time in the output level (which is expressed as $\omega$) of the angular velocity sensor which is installed at a position above the suspension of the vehicle to detect the pitch angle. Here, in Fig. 7, a period T1 expresses a period in which the vehicle is running at a constant speed along a comparatively even road, a period T2 expresses a period in which the vehicle is running in an acceleration or deceleration condition, and a period T3 expresses a period in which the vehicle is running on a bad road, respectively.

As can be seen from Fig. 7, in the period T2, variations in $d\theta/dt$ and $\omega$ are found when the vehicle is running in the acceleration or deceleration condition, whereas variations in $d\theta/dt$ and $\omega$ are small in the period T1; in the period T3, the vibration component of $d\theta/dt$ is large, whereas large variations are not found in $\omega$; and, therefore, it can be found that $d\theta/dt$ and have no correlation between them or the relation between them is low. The reason for this is as follows: since the vibration of the suspension is detected by the height sensor in the bad road running condition of the vehicle, $d\theta/dt$ calculated from the output of the height sensor is also affected by the influence of the thus detected vibration, whereas, because the influence of the vibration on the load portion of the suspension situated above the spring is absorbed by the expansion and contraction of the suspension, the present load portion is not inclined so greatly in the pitching direction and, therefore, the vibration component relating to the load portion of the suspension situated below the spring is not reflected greatly on the output of the angular velocity sensor for detection of the pitch angle.

In this manner, when there is found a correlative variation between $d\theta/dt$ and $\omega$ , it can be judged that the vehicle is in the acceleration or deceleration running condition. In the other cases, that is, when $d\theta/dt$ and $\omega$ are small in variations, or when no correlation or only a small correlation is found, it can be judged that the vehicle is running at a constant speed or along a bad road.

Here, the number of the angular velocity sensor (in Fig. 1, included in the vehicle posture detection device 2) is not limited to one but, of course, a plurality of angular velocity sensors may be used, that is, it is also possible to obtain the information that is necessary for the angular velocity calculation based on the information from these angular velocity sensors.

As has been described above, according to the respective methods, it is possible to judge whether the vehicle is running in the acceleration condition or in the deceleration condition. Also, these methods can be applied in various manners, for example, the respective methods can be used individually, or some of them may be combined together for the enhanced accuracy of the judgment.

Next, description will be given below of the control of the direction of the illumination light of the lamp 5 to be made by the drive device 4.

The simplest method for changing the illumination pattern of the lamp 5 in a vertical plane is a method which changes the illumination angle of the lamp 5 with respect to a horizontal plane by rotating the entire lamp 5 about the rotary shaft thereof. For example, the right and left side surfaces of the lamp 5 are supported in a freely rotatable manner and the rotary shaft of the lamp 5 is rotated directly by a drive source such as a motor or the like, or, there is available a drive mechanism in which a member fixed to the lamp 5 or formed integrally with the lamp 5 is rotated by the drive device 4. As an example of such lamp, there is pointed out a lamp of a type that it employs a mechanism in which the rotational force of the motor is used as the rotational force of the lamp by a transmission mechanism using a worm and a worm wheel (for example, see Japanese Patent Publication No. Sho. 63-166672).

If it is judged by the acceleration or deceleration running condition judging device 3b that the vehicle is in the acceleration running condition or in the deceleration running condition, then the drive control device 4a rotates the entire lamp 5 within a vertical plane so that the lamp 5 can provide an illumination angle as specified by the correction calculating device 3a.

Also, if it is judged by the acceleration or deceleration running condition judging device 3b that the vehicle is not in the acceleration or deceleration running condition, then the illumination angle of the lamp 5 can be controlled by one of the following methods when the drive control device 4a receives an instruction from the acceleration or deceleration running condition judging device 3b:

1) a method for fixing the illumination angle;

2) a method for limiting the range of the illumination angle or forbidding part of the range of the illumination angle; and,

3) a method for changing the response speed or control speed of an actuator.

At first, the method 1), which is the simplest in the above-mentioned three methods, is a method which always holds the illumination angle of the lamp 5 at a constant angle when judging whether the vehicle is in the acceleration or deceleration running condition or not. That is, when the vehicle is not in the acceleration or deceleration running condition, in order to prevent the illumination light of the lamp 5 from being directed too upwardly, the lamp 5 may be held in such a condition that the illumination direction of the lamp 5 can be directed a little downwardly.

The then downwardly directed angle of illumination may be set for a value irrelevant to an illumination angle before it is judged that the vehicle is not in the acceleration or deceleration running condition, or may be set at an illumination angle just prior to the present judgment or an angle obtained by correcting the present illumination angle (for example, adjusting the present illumination angle a little downwardly), or, may be set at an average illumination angle prior to the present judgment or an angle obtained by correcting the present average illumination angle.

The method 2), which limits the range of the illumination angle, is a method which narrows the range of the illumination angle so that the allowable range of the illumination angle of the lamp 5 when it is judged that the vehicle is not in the acceleration or deceleration running condition is smaller than the allowable range of the illumination angle when it is judged that the vehicle is in the acceleration or deceleration running condition.

For example, as shown in Fig. 9, where the allowable range of the illumination angle of the lamp 5 in the other running conditions than the acceleration or deceleration running condition is expressed as θa and the allowable range of the illumination angle in the acceleration or deceleration running condition is expressed as θb, if a ratio n $(0<(1/n)<1)$ is introduced and the angle range is narrowed so that $\theta a = \theta b/n$ can be obtained, then it is possible to reduce the frequency that the illumination light of the lamp 5 provides an upward light in the other running conditions of the vehicle than the acceleration or deceleration running condition thereof.

Also, as shown in Fig. 10, by setting an upper limit on the illumination angle of the lamp 5 in the other running conditions of the vehicle than the acceleration or deceleration running condition thereof, the illumination angle of the lamp 5 can be restricted in such a manner that it is prevented from exceeding the upper limit. For example, if an upper limit θm is set on the allowable range θb of the illumination angle of the lamp in the acceleration or deceleration running condition of the vehicle so that the allowable range θa of the illumination angle of the lamp 5 is prevented from exceeding the upper limit θm, then the illumination light of the lamp 5, in the other running conditions of the vehicle than the acceleration or deceleration running condition, can be controlled such that it cannot provide an upward light.

Now, the remaining method 3) is a method which, while the previously described two methods respectively control the illumination angle itself, controls the response speed of the drive device 4 to thereby prevent the illumination angle of the lamp 5 from being changed excessively in the other running conditions of the vehicle than the acceleration or deceleration running condition.

That is, while the control on the response speed of the drive device 4 varies infinitely according to the structures of the drive device 4, by changing a voltage, a current, a control signal and the like to be supplied to an actuator forming the drive device, it is possible to slow down the posture control of the lamp 5 in the other running conditions of the vehicle than the acceleration or deceleration running condition.

For example, when the actuator incorporates therein a DC (direct current) motor, a difference between the control target position (or angle) of the actuator and the current position (or angle) thereof is detected, and a pulse signal having a duty cycle corresponding to the detected position difference is supplied to the DC motor to thereby control the position of the actuator, as shown in Fig. 11, if the characteristic of the duty cycle DT with respect to the position difference δxx is changed from the state of a relatively faster response speed shown by a broken line 10 to the state of a slow response speed shown by a solid line 11, with respect to the same position difference δxx = δxxa, the duty cycle DT in the other running conditions of the vehicle than the acceleration or deceleration running condition thereof is smaller than the duty cycle in the acceleration or deceleration running condition of the vehicle, so that the drive control on the lamp 5 by the actuator is slowed down.

Here, according to the method 3), various kinds of embodiments are possible. For example, the response speed of the drive device 4 can be changed according to the running speed of the vehicle, or can be changed according as the vehicle is in the constant running condition or in the bad road running condition. Also, of course, it is possible to use the methods 1) to 3) in combination according to the states of the vehicle (such as the running conditions thereof, variations in the posture thereof, and the like).

In the above description, by rotating the entire lamp by use of the drive device 4, the illumination direction of the lamp is changed. However, alternatively, the components of the lamp 5 may be in part controlled in position.

For example, as shown in Fig. 12, it is possible to employ a structure in which a reflector 12 is rotated within a vertical plane by the drive device 4 to thereby change the direction of the reflected light of the reflector 12. In particular, in order that the reflector can be in part supported rotatably on the body of the lamp and a screw member mounted on the other portions than the lamp body for adjusting the inclining angle of the reflector can be rotated by a motor, there can be used a transmission mechanism which includes a worm and a worm wheel (for example, see Japanese Patent Publication No. 59-195441). Or, as shown in Fig. 13, it is also possible to employ a structure in which a lens 13 is inclined by the drive device 4 to thereby change the direction of the illumination light that has passed through the lens 13 (for example, see Japanese Patent Publication No. Hei. 7-37405). Here, instead of inclining the whole of the reflector and lens, the main portions of the illumination light may also be changed to a predetermined direction by controlling the position of part of the reflector and lens.

Further, as shown in Fig. 14, a shade 14 interposed between the reflector 12 and the lens 13 in the lamp 5 may be moved by the drive device 4 so that a light and shade boundary (so called cut line) in the light distribution pattern of the lamp 5 can be changed vertically (for example, see Japanese Patent Publication No. Hei. 7-29401).

In addition, according to the method 3), other various kinds of embodiments are also possible according to the combinations of the optical components of the lamp 5. For example, if the reflector and light source, or the lens and reflector, or the lens and shade are moved together by the drive device 4, then the direction of the illumination light of the lamp 5 can be changed in the vertical direction.

As can be understood clearly from the foregoing description, according to the invention as set force in Claim 1, when it is found that the vehicle is not in the acceleration or deceleration running condition, the control device controls the illumination direction of the lamp by fixing the direction of the illumination light of the lamp in a predetermined direction, or by limiting the direction of the illumination light to a limited range, or by slowing down the response speed of the drive device, thereby being able to prevent the illumination direction of the lamp from being changed excessively and thus prevent the illumination direction of the lamp from being corrected excessively in the bad road running condition of the vehicle. This makes it possible to restrict not only a strange feeling given to the driver of the vehicle due to the sudden change of the lamp light distribution and visibility but also a dazzling feeling given to the driver of an oncoming vehicle, a pedestrian, and the like.

Also, according to the invention as set forth in Claim 2, by detecting the acceleration instruction or deceleration instruction given to the drive source of the vehicle, or by detecting the drive condition of the drive source of the vehicle, it is possible to judge whether the vehicle is in the acceleration or deceleration running condition or not, without waiting for a time delay necessary for the change of the speed of the vehicle.

Further, according to the invention as set forth in Claim 3, the detect signal relating to the vehicle posture from the vehicle posture detection device can also be used as basic information to judge whether the vehicle is in the acceleration or deceleration running condition or not.

Still further, according to the invention as set forth in Claim 4, the change with time of the inclination angle of the vehicle based on the detect signal from the height detection device is compared with the change with time of the angular velocity of the inclination angle detected by the angular velocity detection device to find a correlation in terms of time between them, and, in accordance with the high or low correlation between them, it is possible to distinguish the acceleration or deceleration running condition of the vehicle from the bad road running condition of the vehicle.

## CLAIMS

1. A vehicle lamp illumination direction control device for changing the direction of the illumination light of a lamp according to the vertical inclination of a vehicle in the advancing direction thereof, the control device comprising:

a vehicle posture detection device for detecting the posture of said vehicle during the stationary and/or moving condition thereof;

an acceleration or deceleration running condition judging device for judging whether said vehicle is in the acceleration running condition or in the deceleration running condition or not;

a drive device for directing the illumination light of said lamp in a predetermined direction; and,

a correction calculating device for transmitting to said drive device a correction signal for holding said illumination light of said lamp in a predetermined direction, in accordance with a signal received from said vehicle posture detection device,

wherein, when it is judged by said acceleration or deceleration running condition judging device that said vehicle is in the acceleration running condition or in the deceleration running condition, the direction of said lamp can be controlled by said signal transmitted from said correction calculating device to said drive device, and, when it is judged by said acceleration or deceleration running condition judging device that said vehicle is not in the acceleration running condition or in the deceleration running condition, said drive device can fix the direction of said illumination light of said lamp in a predetermined direction or can limit the allowable range of the direction of said illumination light, or the response speed of said drive device can be slowed down.

2. A vehicle lamp illumination direction control device as set forth in Claim 1, wherein said acceleration or deceleration running condition judging device detects an acceleration instruction or a deceleration instruction to the drive source of said vehicle or detects the drive state of said drive source of said vehicle, thereby being able to judge whether said vehicle is in the acceleration running condition or in the deceleration running condition or not.

3. A vehicle lamp illumination direction control device as set forth in Claim 1, wherein said acceleration or deceleration running condition judging device detects the change with time of a detect signal relating to the vehicle posture from said vehicle posture detection device, thereby being able to judge whether said vehicle is in the acceleration running condition or in the deceleration running condition or not.

4. A vehicle lamp illumination direction control device as set forth in Claim 3, further including:

a height detection device for detecting variations in the vibrations of a mechanism for absorbing the vibrations that are applied to the wheels of said vehicle from the surface of a road, or detecting the height of the axle of said vehicle; and,

an angular velocity detection device for detecting an angular velocity relating to the inclination angle of said vehicle in the advancing direction thereof,

wherein said acceleration or deceleration running condition judging device detects the change with time of said inclination angle of said vehicle in the advancing direction thereof in accordance with a detect signal from said height detection device, and compares said change with time of said vehicle inclination angle with the change with time of a detect signal from said angular velocity detection device, thereby being able to judge in accordance with high or low correlation between them whether said vehicle is in the acceleration running condition or in the deceleration running condition or not.

The Patent Office

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|---|---|---|---|
| **Application No:** | GB 9701821.2 | **Examiner:** | R E Hardy |
| **Claims searched:** | ALL | **Date of search:** | 18 April 1997 |

## Patents Act 1977
## Search Report under Section 17

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): F4R (RMC)

Int Cl (Ed.6): B60Q (1/08, 1/10, 1/105, 1/11, 1/115)

Other: Online : WPI, CLAIMS, JAPIO

**Documents considered to be relevant:**

| Category | Identity of document and relevant passage | | Relevant to claims |
|---|---|---|---|
| A | GB2053439 A | CIBIE : Whole document | 1 |
| A | EP0709240 A2 | MERCEDES-BENZ : Whole document | 1 |
| A | EP0699559 A1 | JOSIC : Whole document | 1 |
| A | EP0652134 A1 | CARELLO : Whole document | 1 |
| A | WO96/18524 A1 | ARAYA : Whole document | 1 |

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|---|---|---|---|
| X | Document indicating lack of novelty or inventive step | A | Document indicating technological background and/or state of the art. |
| Y | Document indicating lack of inventive step if combined with one or more other documents of same category. | P | Document published on or after the declared priority date but before the filing date of this invention. |
| | | E | Patent document published on or after, but with priority date earlier than, the filing date of this application. |
| & | Member of the same patent family | | |

# EXHIBIT 7

# (12) UK Patent Application (19) GB (11) 2 309 774 (13) A

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B60Q 1/115

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F4R RMC R364 R41Y R765 R78X R789
U1S S1934

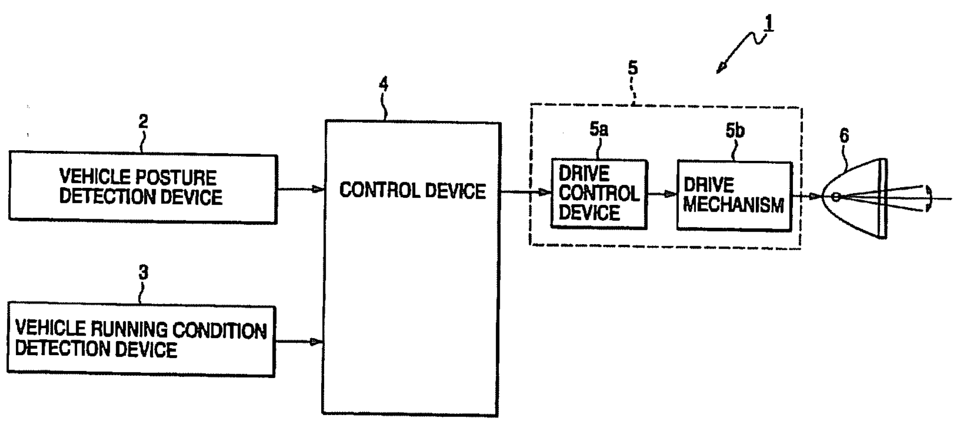
(56) Documents Cited
GB 2115929 A EP 0699559 A1 EP 0554663 A2
US 5195816 A US 4204270 A

(58) Field of Search
UK CL (Edition O ) F4R RMC
INT CL$^6$ B60Q 1/08 1/10 1/105 1/11 1/115
Online : WPI, CLAIMS, JAPIO

(54) **Controlling direction of vehicle lights**

(57) The illumination direction of lights in a vehicle is controlled by detecting vehicle posture (eg height and/or inclination) and whether the vehicle is stationary and/or has passed through a change of road gradient, and directing the illumination of the lights to a desired direction in accordance with signals received from the posture detection device. Control means effect the direction change only when the vehicle is stationary and/or has passed through a change of gradient. Reference values related to time may be used to prevent unwanted light movements due to rough road surfaces and sudden stops or starts.

*FIG. 1*

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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

*FIG. 1*

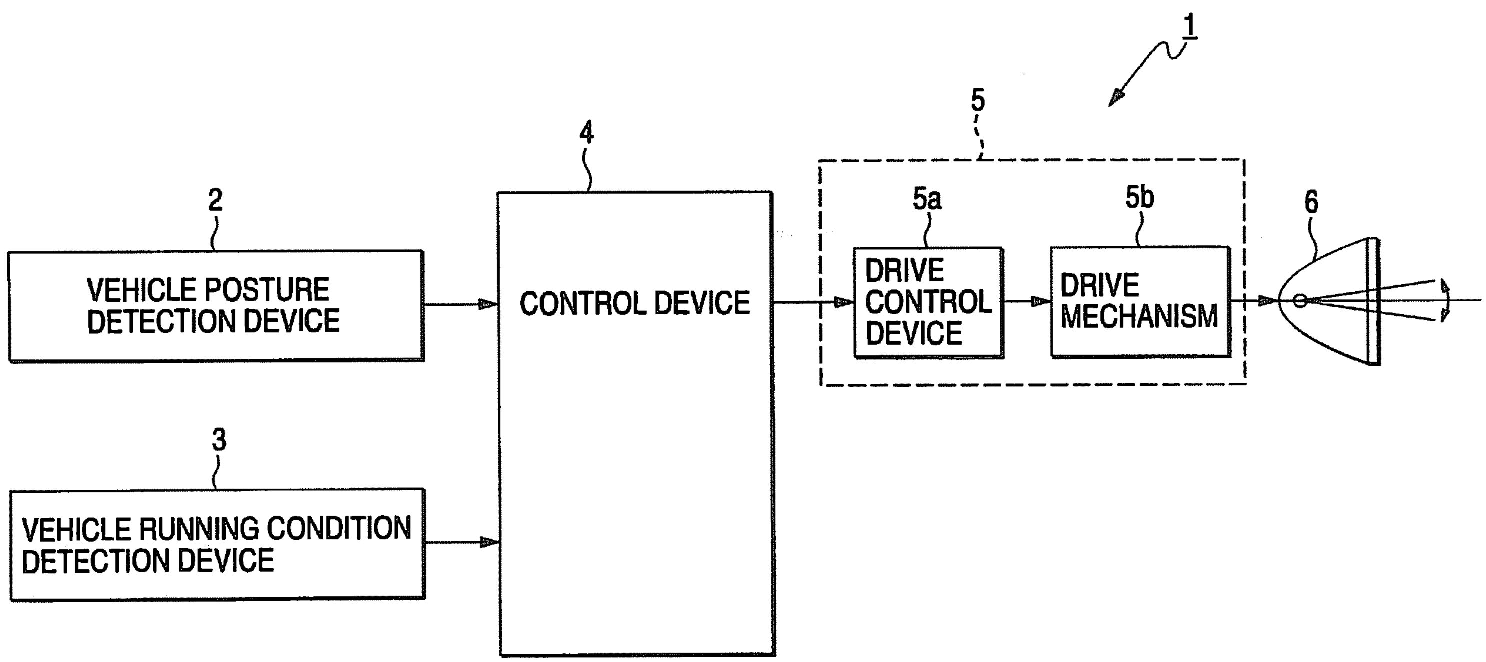

1
2
VEHICLE POSTURE DETECTION DEVICE
3
VEHICLE RUNNING CONDITION DETECTION DEVICE
4
CONTROL DEVICE
5
5a
DRIVE CONTROL DEVICE
5b
DRIVE MECHANISM
6

FIG. 2

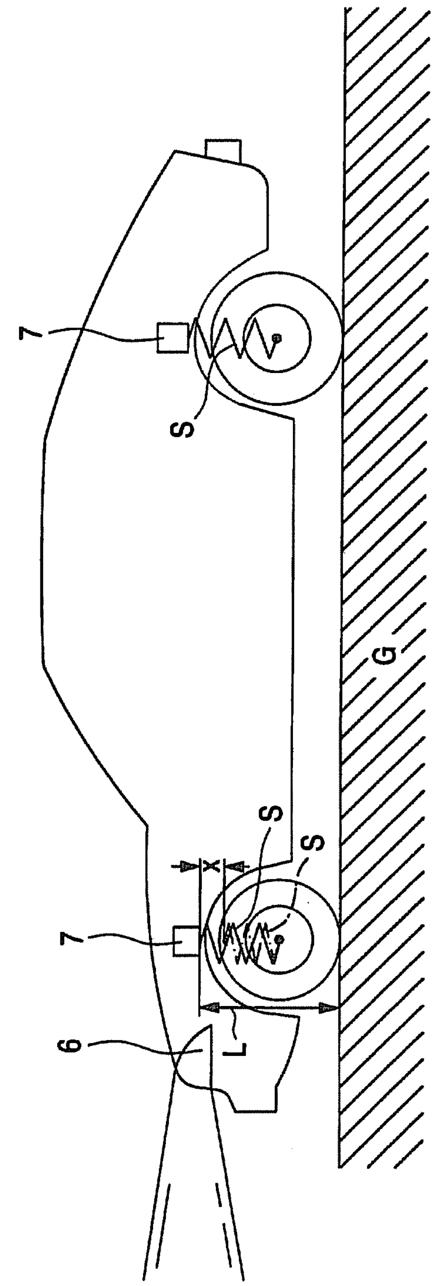


FIG. 3

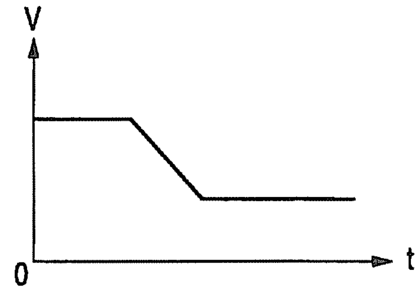



FIG. 4

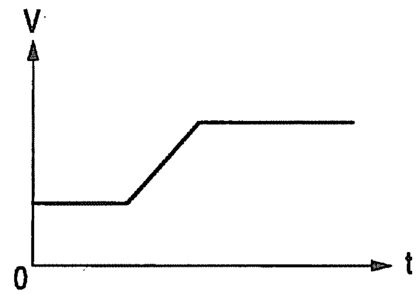



FIG. 5

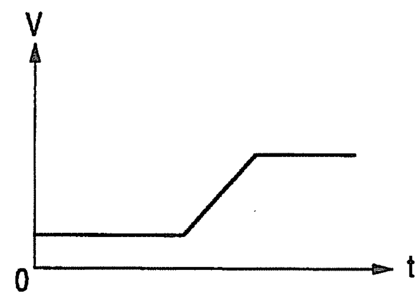



FIG. 6

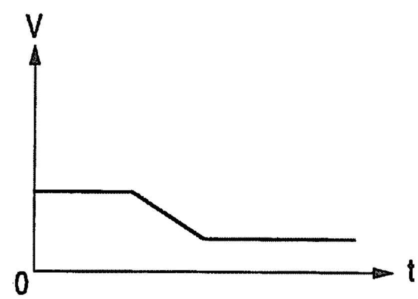


FIG. 7

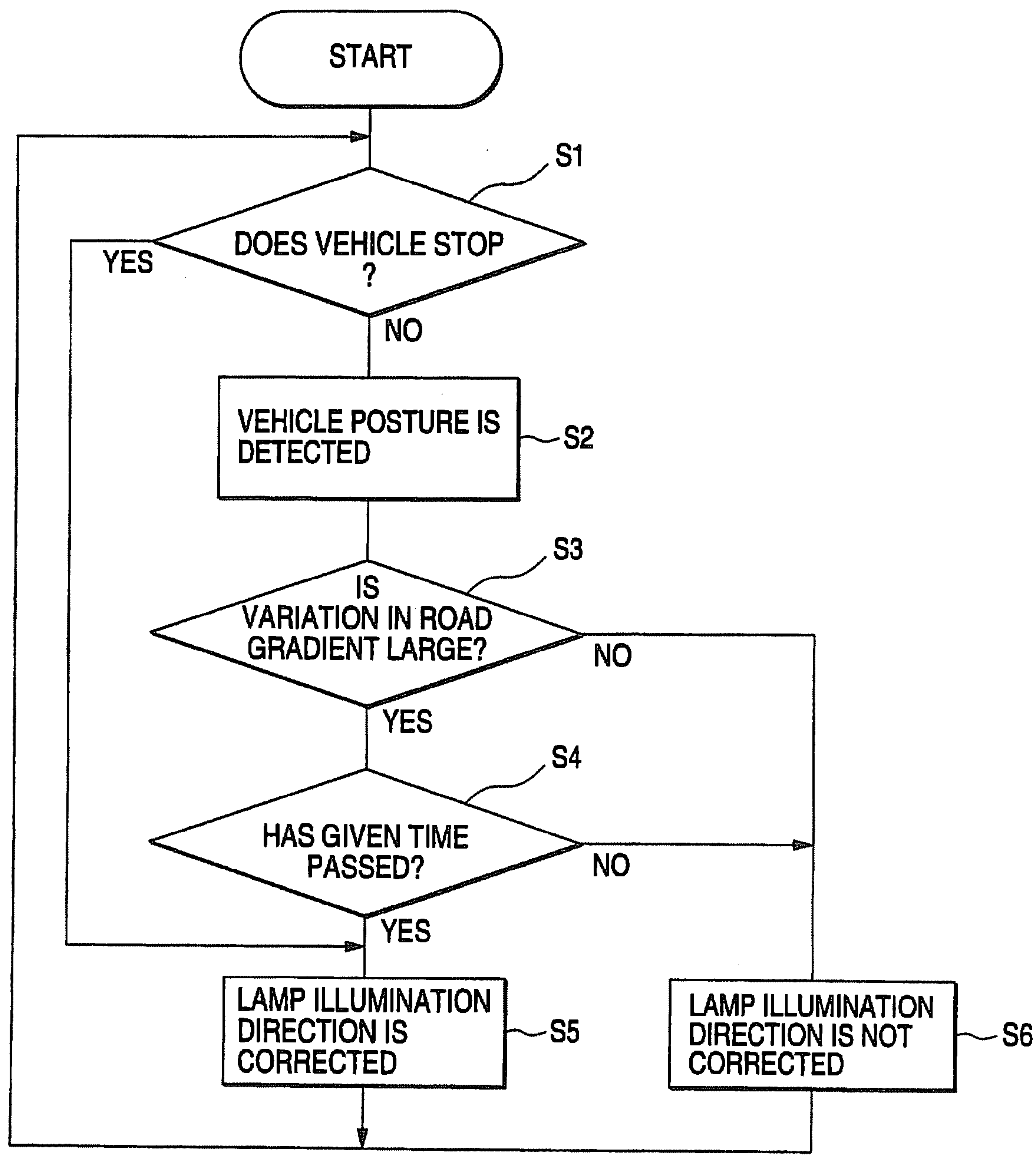
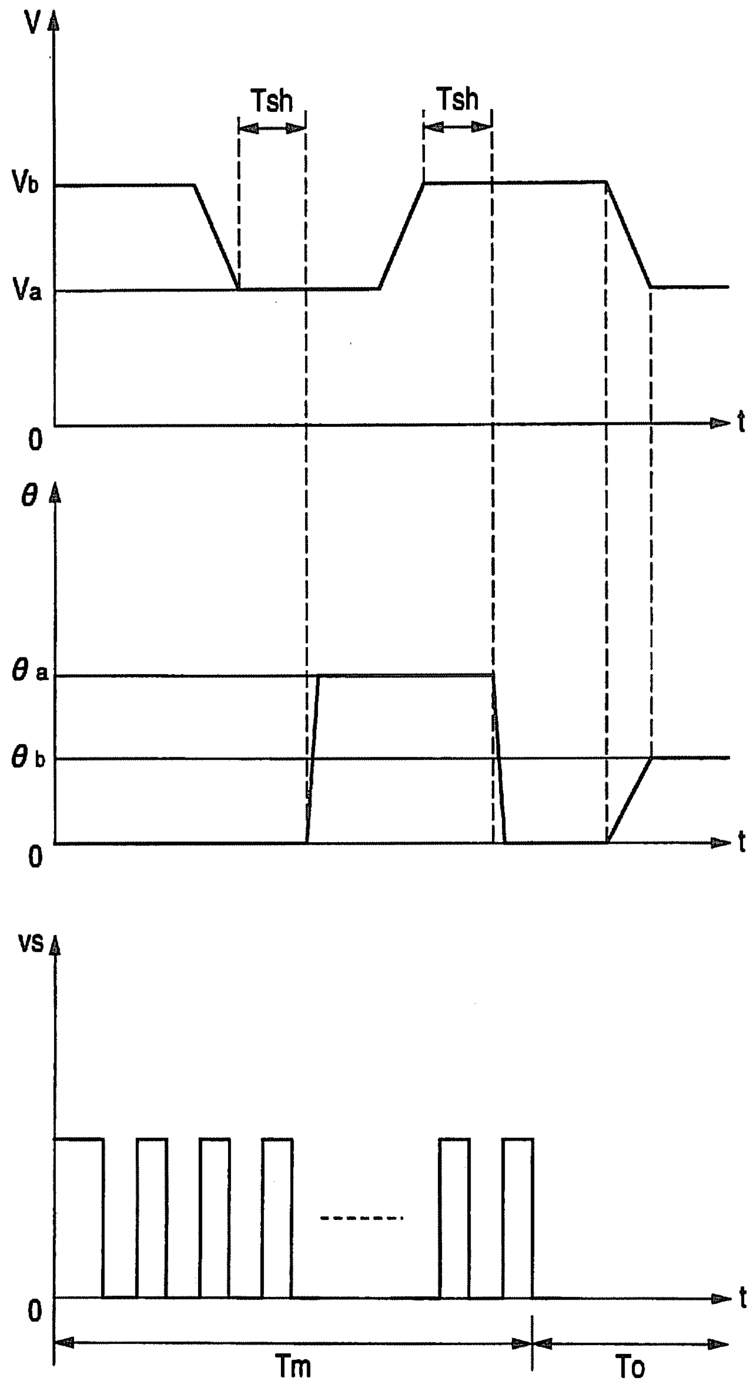
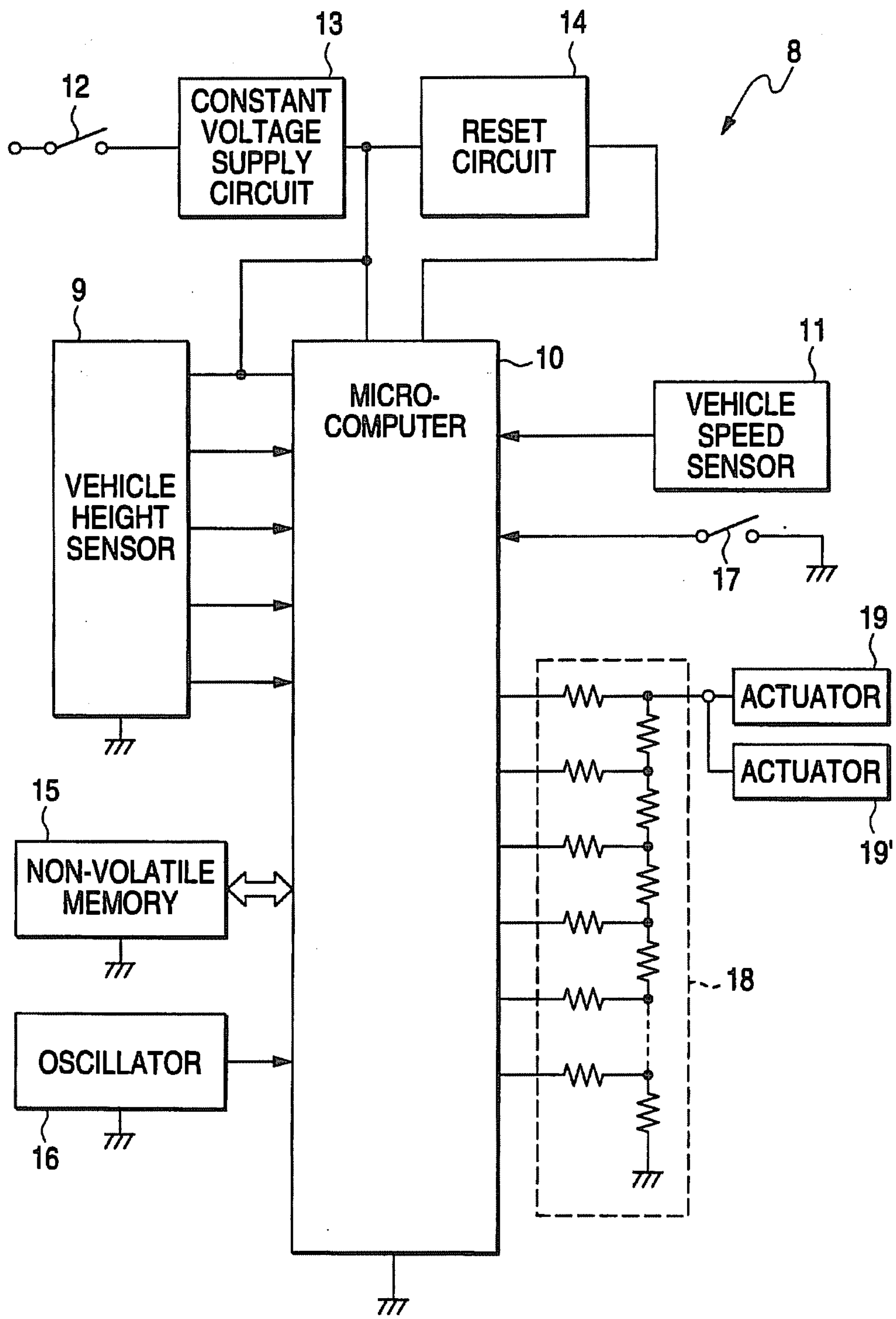

START
S1
DOES VEHICLE STOP ?
YES
NO
VEHICLE POSTURE IS DETECTED
S2
S3
IS VARIATION IN ROAD GRADIENT LARGE?
NO
YES
S4
HAS GIVEN TIME PASSED?
NO
YES
LAMP ILLUMINATION DIRECTION IS CORRECTED
S5
LAMP ILLUMINATION DIRECTION IS NOT CORRECTED
S6

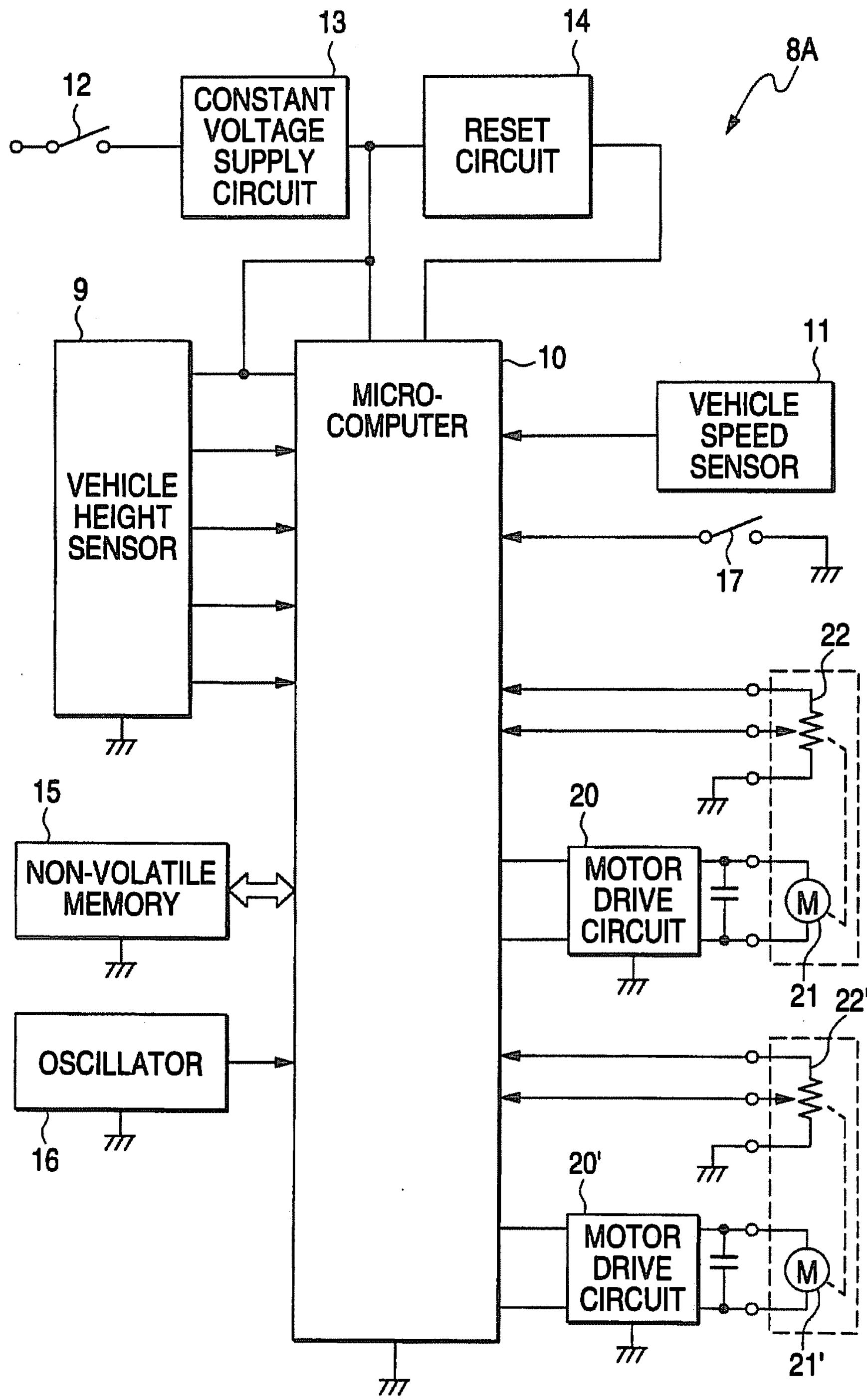
FIG. 8





13
14
12
8
CONSTANT VOLTAGE SUPPLY CIRCUIT
RESET CIRCUIT
9
11
10
MICRO-COMPUTER
VEHICLE SPEED SENSOR
VEHICLE HEIGHT SENSOR
17
19
ACTUATOR
ACTUATOR
15
19'
NON-VOLATILE MEMORY
18
OSCILLATOR
16


FIG. 9


13
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CONSTANT VOLTAGE SUPPLY CIRCUIT
RESET CIRCUIT
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11
10
MICRO-COMPUTER
VEHICLE SPEED SENSOR
VEHICLE HEIGHT SENSOR
17
22
15
20
NON-VOLATILE MEMORY
MOTOR DRIVE CIRCUIT
M
21
22'
OSCILLATOR
16
20'
MOTOR DRIVE CIRCUIT
M
21'

2309774

# A VEHICLE LAMP ILLUMINATION DIRECTION CONTROL DEVICE

The present invention relates to a vehicle lamp illumination direction control device which detects the posture of a vehicle and correctly adjust the illumination direction of a vehicle lamp so that it can be always kept in a predetermined direction.

Conventionally, there has been known a device (a so called automatic leveling device) which, even when the inclination of a vehicle body varies, is capable of automatically adjusting the illumination direction of the vehicle lamp so that the illumination direction of the vehicle lamp can be kept at a predetermined direction. The device of this type, with the conditions of occupants (such as the number of occupants, the position arrangement of the occupants, and the like) as well as the loaded conditions of loads on board the vehicle taken into consideration, corrects manually the illumination angle of the vehicle lamp with respect to the initially adjusted value of the vehicle lamp so that the illumination state of the vehicle lamp can be always kept in a desired state, thereby to control the illumination direction of the vehicle lamp to provide desired light distribution.

For example, when a load is applied to the rear portion of the vehicle, the device finds the then inclination angle of the vehicle body in the longitudinal direction thereof, and inclines the vehicle lamp downward because the illumination direction of which would be displaced upwardly of the reference direction if the posture of the vehicle lamp is left as it is, thereby adjusting the illumination direction of the vehicle lamp so that the vehicle lamp illumination direction can be always kept in the reference direction.

However, in the above-mentioned manual adjustment, there is no guarantee that the illumination direction of the lamp can be always held in the optimum condition with respect to the posture of the vehicle. Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp.

However, in the above-mentioned automatic adjustment device, since the lamp is driven with high frequency, an actuator used in a drive mechanism for driving the lamp is required to show high response property and high durability. Due to this, the adjustment device is expensive and consumes a large amount of electric power.

Therefore, in order to avoid the above inconveniences, there can be expected a device which corrects the illumination direction of the lamp only when the vehicle is standing still. However, in such device, when the vehicle stops once on a road having a gradient, the illumination of the lamp cannot be corrected until the vehicle stops again on a road having a small gradient, which raises another inconvenience. For example, when the vehicle stops on a downhill road, because the vehicle posture detect device detects that the front portion of the vehicle is lower in position, the illumination direction of the lamp is corrected to a position which is set a little upwardly of a reference position. After then, when the driver starts the vehicle while the illumination direction of the lamp remains as it is corrected upwardly, and the vehicle passes through the downhill slope and then runs into a flat road, that is, even when the vehicle runs along the flat road, the illumination direction of the lamp is still left in the upwardly corrected condition until the vehicle stops again, which can cause an increase in the glare onto an oncoming vehicle or can worsen the visibility of the driver of the present vehicle.

Accordingly, it is an object of the invention to provide a vehicle lamp illumination direction control device capable of not only reducing the cost thereof but also correctly adjusting the illumination direction of a lamp according to the stationary condition of the vehicle and the amount of variations in the gradient of the road to thereby improve the visibility thereof and guarantee the safety of the running of the vehicle.

In attaining the above object, according to the invention, there is provided a vehicle lamp illumination direction control device so structured as to change the illumination direction of a vehicle lamp according to the vertical inclination of a vehicle in the advancing direction thereof, the vehicle lamp illumination direction control device comprising:

a vehicle posture detection device for detecting the posture of the vehicle;

a vehicle running condition detection device for detecting the running conditions of the vehicle including the stationary condition thereof;

a drive device for directing the illumination light of the lamp to a desired direction; and,

control device, when it is judged in accordance with a signal from the vehicle running condition detection device that the vehicle is in the stationary condition thereof and when it is judged that the vehicle has run from a road having a small gradient into a road having a large gradient or the vehicle has run from a road having a large gradient into a road having a small gradient, for transmitting to the drive device a signal for correcting the illumination direction of the lamp in a predetermined direction in accordance with a signal from the vehicle posture detection device.

Therefore, according to the invention, only when the vehicle is found stationary and when it is found that the vehicle has run from a road having a small gradient into a road having a large gradient or the vehicle has run from a road having a large gradient into a road having a small gradient, the illumination direction of the lamp can be corrected.

In the accompanying drawings:

Fig. 1 is a block diagram of the structure of a vehicle lamp illumination direction control device according to the invention;

Fig. 2 is a schematic view of a vehicle, explaining height detection device provided in the vehicle;

Fig. 3, together with Figs. 4 to 6, is a schematic graphical representation of the amount of variations with time in the output signal of the height sensor when the vehicle runs along a road having a large gradient; and, in particular, Fig. 3 shows the variations in the output of the height sensor when the vehicle firstly runs along an uphill slope and then runs along a road having a small gradient;

Fig. 4 shows the amount of variations in the output of the height sensor when the vehicle firstly runs along a road having a small gradient and then runs along an uphill slope;

Fig. 5 shows the amount of variations in the output of the height sensor when the vehicle firstly runs along a downhill slope and then runs along a road having a small gradient;

Fig. 6 shows the amount of variations in the output of the height sensor when the vehicle firstly runs along a road having a small gradient and then runs along a downhill slope;

Fig. 7 is a flow chart of a processing for correction of the illumination direction of the lamp;

Fig. 8 is a graphical representation in which variations in the output signal levels of the height sensor, the illumination angles of the lamp, and the vehicle speeds are shown in combination;

Fig. 9 is a circuit block diagram of a first embodiment of a vehicle lamp illumination direction control device according to the invention; and,

Fig. 10 is a circuit block diagram of a second embodiment of a vehicle lamp illumination direction control device according to the invention.

Now, description will be given below of the embodiments of a vehicle lamp illumination direction control device according to the invention with reference to the accompanying drawings.

At first, Fig. 1 shows the basic structure of the present invention, in which an illumination direction control device 1 is composed of vehicle posture detection device 2, vehicle running condition detection device 3, control device 4, drive device 5 (which is composed of drive control device 5a and a drive mechanism 5b), and a lamp 6.

The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle. The two methods are both advantageous in that the existing facilities of the vehicle can be used for detection of the posture of the vehicle.

The output of the vehicle posture detection device 2 is sent to the control device 4 and is used as basic information for correction calculation of the illumination direction of the lamp 6.

The vehicle running condition detection device 3 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle.

When the control device 4 receives the detect signal of the vehicle running condition detection device 3 and finds from this detect signal that the vehicle is standing still, the control device 4, in accordance with information on the vehicle posture obtained from the vehicle posture detection device 2, transmits to the drive signal 5 a control signal for correction of the illumination direction of the lamp 6. For example, in the stationary condition of the vehicle, when the front portion of the vehicle is situated lower (or higher) than the rear portion thereof, the illumination direction of the lamp 6 is adjusted in the upward (or downward) direction so that the illumination direction can be always held substantially in the horizontal direction.

By the way, the vehicle does not always stop on a road having no gradient but, as described above, the vehicle is sometimes caused to stop on the slanting road. In this case, with use of the above-mentioned method for adjusting the illumination direction of the lamp only when the vehicle is caused to stop, the thus adjusted illumination direction of the lamp cannot be corrected until the vehicle stops next.

In view of this, the control device 4 is structured such that, based on the information from the vehicle posture detection device 2, it can detect the amount of variations in the gradient of the road and, therefore, when the road gradient varies suddenly, it can correct the illumination direction of the lamp 6.

Now, Figs. 3 to 6 are respectively explanatory views of a method for detecting the amount of variations in the road gradient when a height sensor is used as the vehicle posture detection device 2 and, in these figures, an axis of abscissa expresses the time t and an axis of ordinate expresses the output level V of the height sensor; that is, in these figures, there is shown an example of the amount of variations in the output level V with the passage of time ( by the way, for the purpose of simplified expression, the term "with the passage of time" is sometimes expressed as "with time" in this specification).

In particular, Fig. 3 shows schematically the amount of variations in the output level V when the vehicle runs first along an uphill slope and thereafter runs along a road having a small gradient. In this case, when the vehicle runs over the uphill slope, the output level V falls down suddenly.

Also, Fig. 4 shows schematically the amount of variations in the output level V when the vehicle runs first along a road having a small gradient and thereafter runs along an uphill slope. In this case, when the vehicle starts to run the uphill slope, the output level V rises up suddenly.

Fig. 5 shows schematically the amount of variations in the output level V when the vehicle runs first along a downhill slope and thereafter runs along a road having a small gradient. In this case, when the vehicle has run through the downhill road, the output level V rises up suddenly.

Fig. 6 shows schematically the amount of variations in the output level V when the vehicle runs first along a road having a small gradient and thereafter runs along a downhill slope. In this case, when the vehicle starts to run along the downhill slope, the output level V falls down suddenly.

These figures show clearly that the magnitude of the amount of variations in the road gradients is reflected on the amount of variations in the outputs of the height sensor when the vehicle runs from the road having a small gradient to the road having a large gradient or when the vehicle runs from the road having a large gradient to the road having a small gradient.

Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2. That is, according to this way of correction, when the vehicle moves from the uphill or downhill slope to the road having a small gradient, or vice versa, the illumination direction of the lamp 6 can be adjusted in a proper direction.

By the way, in the present method, the control device 4 is structured such that it can judge the amount of variations in the road gradients according to the detect information provided by the vehicle posture detection device 2, which can in turn simplify the structure of the illumination direction control device. However, the invention is not limited to this but, for example, a device for detecting the road gradients or the amounts of variations therein may be provided separately from the vehicle posture detection device 2 and the control device 4 may judge the amounts of variations in the road gradients according to the information that is detected by the separately provided detection device.

Also, in order to prevent the illumination direction of the lamp 6 from being corrected inadvertently when a sudden change in the posture of the vehicle occurs temporarily or due to the wrong operation of the lamp 6 caused by external disturbances, for example, when the vehicle makes a sudden start or a sudden stop, preferably, a threshold value with respect to time may be set in detection of the road gradient and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a threshold value with respect to the running distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a distance equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected. Also, these threshold values may be set in various manners, for example, they may be set as a constant value, or may be set as a variable which varies according to the speeds of the vehicle.

Now, Fig. 7 is a flow chart of a processing to be performed by the control device 4. At first, in Step S1, it is checked in accordance with the information from the vehicle running condition detection device 3 whether the vehicle is stopped or not. If it is found that the vehicle is stopped, then the processing advances to Step S5 and, if the vehicle is found running, then the processing advances to Step S2.

After the posture of the vehicle is detected by the vehicle posture detection device 2 in Step S2, in Step S3, it is checked from the amount of variations with time in the detect signal whether the amount of variations in the gradient of the road is large or not. If it is found that the amount of variations in the road gradients is large, then the processing advances to Step S4 and, if not, then the processing advances to Step S6.

In Step S4, it is checked whether a state in which the amount of variations of the detect signal supplied by the vehicle posture detection device 2 is equal to or more than a given reference value continues for a given period of time or longer or not. If it is found that such state continues, then the processing advances to Step S5 and, if not, then the processing goes to Step S6. Here, when a threshold value relating to the running distance of the vehicle is set instead of setting a threshold value relating to the above-mentioned continuing time, in Step S4, it may be checked whether a state in which the amount of variations in the detect signal supplied by the vehicle posture detection device 2 is equal to or more than a given reference value continues over a given running distance or not.

In Step S5, in accordance with the information from the vehicle posture detection device 2, the control device 4 transmits to the drive control device 5a a control signal which causes the illumination direction of the lamp 6 to be kept in a predetermined direction, and the illumination direction of the lamp 6 is corrected through the drive mechanism 5. After then, the processing goes back to the first step S1.

Also, in Step 6, the correction of the illumination direction of the lamp 6 is not carried out but the processing returns to the first step S1.

The correction of the illumination direction of the lamp 6 in Step S5 is carried out by the drive device 5 based on the control signal transmitted from the control device 4 and, as a method for executing such correction, there are available two methods as follows:

1) a method for inclining the entire lamp, and,
2) a method for moving the component (such as a lens, a reflector, a shade or the like) of the optical system of the lamp.

In particular, the method 1) is the simplest method that can change the illumination pattern of the lamp 6 within a vertical plane, in which the entire lamp is rotated about the rotary shaft thereof to thereby change the illumination angle of the lamp 6 with respect to a horizontal plane including the optical axis of the lamp. For example, in the method 1), there can be used a drive mechanism in which the right and left side surfaces of the lamp 6 are supported rotatably, and the rotary shaft of the lamp 6 is rotated directly by a drive source such as a motor or the like, or a member fixed to or formed integrally with the lamp 6 is rotated by the drive device 5. As an example of such lamp, there is available a lamp including a mechanism which can use the rotational force of the motor as the rotational force of the lamp through a transmission mechanism using a worm and a worm wheel (for example, see Japanese Patent Publication No. Sho. 63-166672).

Also, in the method 2), there is employed a structure in which the reflector of the lamp 6 is rotated by the drive device 5 within a vertical plane including the optical axis of the lamp to thereby change the direction of the reflected light of the reflector. For example, there is available a structure in which part of the reflector is rotatably supported on the lamp and, in order that a screw member mounted on the other part than the lamp for adjusting the inclining angle of the remaining portions of the reflector can be rotated by a motor, there is employed a transmission mechanism including a worm and a worm wheel (for example, see Japanese Patent Publication No. Sho. 59-195441); or, there is also available a structure in which the lens is inclined by the drive device 5 to thereby change the direction of the illumination light of the lamp that has passed through the present lens (for example, see Japanese Patent Publication No. Hei. 7-37405). Here, instead of inclining the whole of the reflector and lens, part of them may be controlled in position to thereby change the main portions of the illumination light in a desired direction.

Also, when a shade is interposed between the reflector and lens, the shade may be moved by the drive device 5 to thereby change a light and shade boundary in the light distribution pattern of the lamp 6 in the vertical direction (for example, see Japanese Patent Publication No. Hei. 7-29401).

Further, there are also possible other various embodiments according to the combinations of the optical components of the lamp 6; for example, the reflector and light source, the lens and reflector, or the lens and shade may be moved together by the drive device 5 to thereby change the direction of the illumination light of the lamp in the vertical direction.

In addition, in either of the method 1) or 2), of course, the illumination direction of the lamp 6 can be controlled in stages or continuously.

Now, Fig. 8 is a graphical representation in which, when the vehicle runs down along a downhill slope from a road having a small gradient and runs again for a short time along a road having a small gradient and, after then, it stops, there are shown the respective amounts of variations with time in the output level V of the height sensor, in the illumination angle θ of the lamp 6, and in the output signal vs of the vehicle speed sensor. Here, in the graph shown in the upper stage of Fig. 8 and showing the amount of variations in the output level V, reference character 「Va」 represents a detect level detected on the downhill slope and Vb represents a detect level detected on the road having a small gradient, while Tsh stands for a judgment time relating to the detection of the variations in the road gradients. Also, in the graph shown in the middle stage of Fig. 8 and showing the amount of variations in the illumination angle θ, θa expresses an illumination angle when the vehicle is running on the slanting slope, while θb expresses an illumination angle when the vehicle is standing still. Further, in the graph shown in the lower stage of Fig. 8 and showing the variations in the output signal vs, a period Tm, during which pulse trains continue, stands for a period during which the vehicle is running, whereas a period To, during which no pulse train exists, represents a period during which the vehicle is standing still.

In this example, when the vehicle runs from a road having a small gradient into a downhill slope, the amount of variations in the output level V of the height sensor is equal to or more than a reference value and such high variation amount state continues for a time equal to a judging time Ts or longer. Therefore, the illumination angle of the lamp 6 is corrected from zero to θa after the passage of a time Tsh. And, when the vehicle runs into a road having a small gradient after the vehicle has run through the downhill slope, the variation amount of the output level V of the height sensor is equal to or more than a reference value and such high variation amount state continues for a time equal to a judging time Ts or longer. Therefore, the illumination angle of the lamp 6 is corrected from θa to zero after the passage of the time Tsh. After then, if the vehicle is caused to stop in a period To, then the illumination angle of the lamp 6 is corrected according to the then posture of the vehicle. For example, when the loading condition of the vehicle is varied by unloading the cargo, the illumination angle of the lamp 6 is corrected to an angle of θb.

As described above, a threshold value (which is expressed as Ls) of the running distance can be substituted for the judging time Tsh, the illumination angle θ can be corrected when the vehicle runs continuously for a distance equal to or larger than the threshold value Ls with the detect level of the height sensor remaining higher than the reference value, or the threshold value can be caused to vary with respect to a vehicle speed vs in accordance with an equation $Ts = Ls/vs$ ($\neq 0$).

Also, in the above description, for the convenience of explanation, the number of height sensors to be provided on the vehicle is set as one. However, this is not limitative but other various embodiments are also possible, for example, some of a plurality of sensors provided in the front and rear portions and/or right and left portions of the vehicle can be selected and the detect signals of the selected sensors can be used. In particular, out of sensors respectively provided in the front and rear portions of the vehicle as well as in the right and left portions thereof, the sensors provided in the right and left direction can be selected and the average value of the selected sensors can be used; or, out of four sensors which are respectively provided in the front, rear, right and left portions of the vehicle, there can be selected a pair of sensors positioned diagonally with respect to each other in a quadrangle having four vertices respectively consisting of the positions of the four sensors (for example, a pair of a left and front sensor and a right and rear sensor, or a pair of a right and front sensor and a left and rear sensor), and only the detect signals of the thus selected pair of sensors can be used; or, there can be used only the detect signals of two sensors which are respectively positioned in the front and rear portions of the vehicle and are also positioned on the same straight line extending in the longitudinal direction of the vehicle (for example, sensors which are positioned in the front and rear portions of the vehicle on the right or left side of the vehicle).

Now, in Figs. 9 and 10, there are shown the first and second embodiments of a vehicle lamp illumination direction control device according to the invention.

In particular, Fig. 9 shows a block diagram of a vehicle lamp illumination direction control device according to the first embodiment of the invention. In the present embodiment, the vehicle posture detect member 2 is composed of four height sensors 9 which are respectively provided in the neighborhood of the front and rear as well as right and left wheels of the vehicle.

Also, the control device 4 includes a microcomputer 10 into which there are input the detect voltages of the four height sensors 9, and the output signals of a vehicle speed sensor 11 corresponding to the previously described vehicle running condition detection device 3. When a turn-on switch 12 for the lamp 6 is put into operation, a supply voltage from a constant voltage supply circuit 13 and a reset signal from a reset circuit 14 are supplied to the microcomputer 10. Also, a non-volatile memory 15 (such as an electrically erasable EEPROM, or the like) for storing control programs and data values therein) and an oscillator 16 used to generate a clock signal are additionally attached to the microcomputer 10.

And, into the microcomputer 10, there is input by switch device 17 a select signal which is used to instruct whether the above-mentioned control on the illumination direction of the lamp is to be carried out or not. The reason for such input of the select signal is as follows: that is, when a lamp is mounted on a vehicle and the illumination direction of the lamp is initially adjusted, or when the lamp is inspected, if the above-mentioned correction control on the illumination direction of the lamp is carried out, then the adjusting operation and inspection are difficult to perform. In this case, by operating the switch device 17, the illumination direction of the lamp may be set in a non-control state in which no correction control is carried out (for example, in a state in which the illumination angle of the lamp is fixed at a given angle). Here, if the detect data of the height sensors 9 in the initial adjustment time are stored in the above-mentioned memory 15, then the illumination direction of the lamp in and after the initial adjustment time can be controlled with the vehicle posture in the initial adjustment time as a reference.

A rudder resistance network 18, which corresponds to the above-mentioned drive control device 5a, is used to convert the output signal of the microcomputer 10 into an analog signal and transmits it to actuators 19 and 19′ which are disposed downstream thereof. In this case, there is employed an actuator of a current input type and the lamp or the components thereof are driven by these actuators 19 and 19′ to thereby correct the illumination direction of the lamp. Here, one actuator 19 is used to control the illumination direction of the lamp provided on the right side of the front portion of the vehicle, while the other actuator 19′ is used to the illumination direction of the lamp provided on the left side of the front portion of the vehicle.

Now, Fig. 10 shows a vehicle lamp illumination direction control device 8A according to the second embodiment of the invention, in which there are used a potentiometer and a direct current motor as the actuators thereof. Since most of the second embodiment is similar to the first embodiment, the similar portions thereof are given the same designations as the corresponding portions of the first embodiment and thus the description thereof is omitted here.

In the present embodiment, there are provided two motor drive circuits 20 and 20′ which correspond to the above-mentioned drive control device 5a and are respectively used to control the rotational movements of two motors 21 and 21′ in accordance with a control signal output from the microcomputer 10.

In this case, the drive mechanism 5 is composed of the motors 21 (21′) and potentiometers 22 (22′). For example, when a reflector disposed within the lamp is inclined in a vertical plane including the optical axis thereof to thereby change the illumination direction of the lamp, the reflector is inclined by the motors 21 and 21′ and then the inclining angle of the reflector is detected by the potentiometers 22 and 22′ (including A/D conversion and the like) and is input to the microcomputer 10. That is, the microcomputer 10 continues to transmit the control signal to the motor drive circuits 20 and 20′ until the inclining angle of the reflector detected by the potentiometers 22 and 22′ becomes a target angle.

Besides this, according to the invention, the lamp or the components thereof can be driven or controlled by use of a stepping motor to thereby correct the illumination direction of the lamp. In other words, the concrete structure of the drive device 5 can vary greatly according to the structure of the lamp.

As can be clearly understood from the foregoing description, according to the invention as set forth in Claim 1, since the illumination direction of the lamp can be corrected only when the vehicle is found standing still as well as only when it is found that the vehicle runs from a road having a small gradient into a road having a large gradient or that it runs from a road having a large gradient into a road having a small gradient, it is not necessary that the drive device have high response property and high durability, so that the cost of the vehicle lamp illumination direction control device or the consumption of power thereof cannot be increased excessively. Also, even when the vehicle is caused to stop on a road having a gradient, the amount of variations in the gradient of the road can be detected and thus, without waiting for the next stop of the vehicle, the illumination direction of the lamp can be corrected.

Also, according to the invention as set forth in Claim 2, since the control device judges the magnitude of the road gradients in accordance with the amount of variations with time in the output signal levels of the vehicle posture detection device, it is not necessary to provide exclusive device for detecting the road gradients.

Further, according to the invention as set forth in Claim 3, when a state in which the output signal level of the vehicle posture detection device is equal to or higher than a given reference value continues for a given time or running distance, it is judged that the vehicle has run from a road having a small gradient into a road having a large gradient or the vehicle has run from a road having a large gradient into a road having a small gradient. This eliminates the possibility that the illumination direction of the lamp can be corrected inadvertently when the vehicle starts or stops suddenly, thereby being able to prevent the generation of the wrong correction of the illumination direction of the lamp.

## CLAIMS

1. A vehicle lamp illumination direction control device for changing the illumination direction of a vehicle lamp according to the vertical inclination of a vehicle in the advancing direction thereof, said vehicle lamp illumination direction control device comprising:

vehicle posture detection device for detecting the posture of said vehicle;

vehicle running condition detection device for detecting the running conditions of said vehicle including the stationary condition thereof;

drive device for directing the illumination light of said lamp to a desired direction; and,

control device, when it is judged in accordance with a signal from said vehicle running condition detection device that said vehicle is in the stationary condition thereof and when it is judged that said vehicle has run from a road having a small gradient into a road having a large gradient or said vehicle has run from a road having a large gradient into a road having a small gradient, for transmitting to said drive device a signal for correcting the illumination direction of said lamp in a predetermined direction in accordance with a signal from said vehicle posture detection device.

2. A vehicle lamp illumination direction control device as set forth in Claim 1, wherein said control device can judge the magnitude of the gradients of roads in accordance with the amount of variations with time in the output signal of said vehicle posture detection device.

3. A vehicle lamp illumination direction control device as set forth in Claim 2, wherein, if a state in which the output signal of said vehicle posture detection device is

equal to or larger than a given reference value continues for a given time or running distance, then said control device judges that said vehicle has run from a road having a small gradient into a road having a large gradient or said vehicle has run from a road having a large gradient into a road having a small gradient.

The Patent Office

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**Application No:** GB 9701822.0
**Claims searched:** ALL

**Examiner:** R E Hardy
**Date of search:** 21 April 1997

## Patents Act 1977
## Search Report under Section 17

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): F4R (RMC)

Int Cl (Ed.6): B60Q (1/08, 1/10, 1/105, 1/11, 1/115)

Other: Online : WPI, CLAIMS, JAPIO

**Documents considered to be relevant:**

| Category | Identity of document and relevant passage | | Relevant to claims |
|---|---|---|---|
| A | GB2115929 A | STC : Whole document | 1 |
| A | EP0699559 A1 | JOSIC : Whole document | 1 |
| A | EP0554663 A2 | HELLA : Whole document | 1 |
| A | US5195816 A | MOSS : Whole document | 1 |
| A | US4204270 A | D'ORSAY : Whole document | 1 |

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| X | Document indicating lack of novelty or inventive step | A | Document indicating technological background and/or state of the art. |
| Y | Document indicating lack of inventive step if combined with one or more other documents of same category. | P | Document published on or after the declared priority date but before the filing date of this invention. |
| | | E | Patent document published on or after, but with priority date earlier than, the filing date of this application. |
| & | Member of the same patent family | | |

# EXHIBIT 9

⑲ BUNDESREPUBLIK DEUTSCHLAND

DEUTSCHES PATENTAMT

⑫ **Offenlegungsschrift**

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⑤④ **»Einrichtung zur automatischen Scheinwerfereinstellung bei Kraftfahrzeugen«**

Eine Einrichtung zur automatischen Scheinwerfereinstellung bei Kraftfahrzeugen besteht aus vier Sensoren, die paarweise hintereinander in Fahrtrichtung an solchen Teilen des Kraftfahrzeuges angeordnet sind, die auf Belastung ansprechen. Die Sensoren senden dann Signale aus, die über einen Analog-Multiplexer und einen Analog/Digital-Wandler in einen Mikroprozessor gelangen, der die Signale auswertet, d.h. Differenzwerte ermittelt, ferner Mittelwerte aus einer Reihe von Messungen errechnet und mit einem vorgegebenen Wert vergleicht. Beim Abweichen von diesem Wert und Überschreiten eines bestimmten Schwellwertes sendet der Mikroprozessor Signale aus, die über Digital/Analog-Wandler mit nachgeschalteten Operationsverstärkern zu Scheinwerfereinstellvorrichtungen gelangen und dort über entsprechende herkömmliche Mittel, wie z.B. Servomotoren, eine Korrektur des jeweiligen zugehörigen Scheinwerfers bewirken.
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Dr.Rl/bk
13. März 1981

## Patentansprüche

1. Einrichtung zur automatischen Korrektur der Scheinwerfereinstellung bei Kraftfahrzeugen, gekennzeichnet durch folgende Merkmale:
   - die Ausgangssignale von vier Sensoren (S1,...S4) sind einem Analog-Multiplexer (2) zugeführt, dessen Ausgang über einen Analog/Digital-Wandler (3) mit einem Mikroprozessor (4) verbunden ist,
   - vom Mikroprozessor (4) führen zwei Ausgänge (8, 8') über je einen Digital/Analog-Wandler (6,6') zu zwei Operationsverstärkern (7, 7'), an die jeweils eine Scheinwerfereinstellvorrichtung (9, 9') angeschlossen ist.

2. Einrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die vier Sensoren (S1,...S4) jeweils an vier verschiedenen, auf Belastung ansprechenden Punkten des Kraftfahrzeuges angeordnet sind.

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13. März 1981

Einrichtung zur automatischen Scheinwerfereinstellung bei Kraftfahrzeugen

Die Erfindung betrifft eine Einrichtung nach dem Oberbegriff des Anspruchs 1.

Die Einstellung der Scheinwerfer eines Kraftfahrzeuges erfolgt üblicherweise in einer Kfz-Werkstatt unter Zuhilfenahme hierfür konstruierte Geräte, wobei die eigentliche Ausrichtung von Hand vorgenommen wird. Das bedeutet, daß normalerweise eine korrekte Lage der Scheinwerfer praktisch nur beim nicht belasteten Fahrzeug gegeben ist.

Wird dieses belastet, z.B. beim PKW durch Beladung des Kofferraumes, so tritt eine Verschiebung des Lichtkegels nach oben ein. Dadurch kommt es zur häufig beobachteten Blendwirkung, trotz eingeschaltetem Fahrlicht. Eine Korrektur der Scheinwerferlage durch den Fahrer wäre erforderlich, ist jedoch nur in Ausnahmefällen ohne großen Aufwand möglich und wird selbst dann noch durch das Fehlen eines festgelegten Bezugspunktes erschwert, d.h. ohne Hilfsgeräte wird das Nachregulieren ungenau.

Der Erfindung liegt deshalb die Aufgabe zugrunde, eine Einrichtung anzugeben, die eine automatische Korrektur der Scheinwerfereinstellung auf eine festgelegte Höhe ermöglicht. Die Aufgabe wird durch die im Anspruchs 1 angegebene Erfindung gelöst. Eine zweckmäßige Ausgestaltung ist dem Anspruch 2 gekennzeichnet.

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Die Einrichtung nach der Erfindung ermöglicht die korrekte Ausleuchtung der Fahrbahn unabhängig von der Belastung des Kraftfahrzeuges, die seine Lage gegenüber dem unbeladenen Zustand ändert. Die Blendung entgegenkommender Fahrzeuge wird vermieden, der von den Lampen kommende Lichtstrahl bleibt scharf abgegrenzt.

Die Erfindung wird nun anhand der beigefügten Zeichnung, die das Blockschaltbild eines Ausführungsbeispiels zeigt, näher erläutert.

Die Bezugszeichen S1...S4 in der Figur bedeuten vier Sensoren, die über einen Analog-Multiplexer 2 an den Eingang eines Analog/Digital-Wandlers 3 angeschlossen sind, dessen Ausgang zu einem Mikroprozessor 4 führt. Dieser besitzt zwei Ausgänge 8, 8', die über zwei Digital/Analog-Wandler 6,6' mit jeweils einem nachgeschalteten Operationsverstärker 7, 7' mit zwei Scheinwerfereinstellvorrichtungen 9, 9' verbunden sind.

Die vier Sensoren sind paarweise hintereinander S1,S2/S3,S4 in Fahrtrichtung an solchen Teilen des Kraftfahrzeuges angeordnet, die bei Belastung eine Lageveränderung erfahren, also z.B. an Radaufhängungen oder an Stoßdämpfern. Die vier Sensoren können z.B. Dehnmeßstreifen sein.

Voraussetzung für den Betrieb der erfindungsgemäßen Einrichtung ist die Festlegung der Ideal- oder Soll-Lage der Scheinwerfer. Dazu werden sie mittels der üblichen Hilfsmittel genau eingestellt und die sich dabei für die einzelnen Sensoren S1...S4 ergebenden Werte im Mikroprozessor 4 gespeichert. Die Einrichtung arbeitet dann wie folgt: werden die Sensoren S1...S4 durch Belastung beeinflußt, so senden sie elektrische Signale aus, die über den Analog-

Multiplexer 2 zum Analog/Digital-Wandler 3 gelangen und von dort als Digitalsignale dem Microprozessor 4 eingegeben werden.

Die Aufnahme der elektrischen Signale, die bestimmten Meßwerten bezüglich der Scheinwerferlage entsprechen, erfolgt in festgelegten Zeitabständen von z.B. einer Minute. Zur Erfassung der jeweiligen Scheinwerferlage benötigt man n Meßwerte, wobei n eine ganze Zahl zwischen eins und unendlich sein kann. Zweckmäßigerweise wird man n so groß wählen, daß sich bei einer sinnvollen Zahl von Meßwerten ein optimaler Mittelwert ergibt. Nach jeder Messung wird ein Mittelwert $\bar{V}$ der letzten n Meßwerte nach der folgenden Formel errechnet:

$$\bar{V}_K = \frac{1}{N} \cdot \sum_{n=1}^{N} \cdot V \quad (S_K^n)$$

wobei mit K die Anzahl der Räder 1 bis 4,
N die Anzahl der in die obige Berechnung einbezogenen Meßwerte (wird experimentell ermittelt)
S das von den Sensoren kommende Signal bezeichnet ist.

Aus den Werten $\bar{V}_K$ werden Differenzen für die Sensorenpaare S1/S2 und S3/S4 ermittelt, die die Lage des Kraftfahrzeuges beschreiben. Diese Differenzwerte ergeben zwei Scheinwerfereinstellwerte. In Abhängigkeit von deren Vorzeichen werden gleichzeitig z.B. Servomotoren vor- bzw. zurückgestellt und die Scheinwerferlageregister im Mikroprozessor 4 hoch- und heruntergezählt.

Beruhen die zu den Meßwerten führenden Signale auf geringen Belastungen, wie sie z.B. durch Fahrbahnstöße entstehen, so ergibt sich im Mittel ein Differenzwert, der nur eine geringe Abweichung vom Wert der Ideallage der Scheinwerfer aufweisen, ein vorgegebener Schwellwert wird somit nicht überschritten, die Verstellung der Scheinwerfer wird nicht ausgelöst. Bei stärkerer Belastung wird der Schwellwert überschritten, der Mikroprozessor 4 sendet Signale über die Digital/Analog-Wandler 6, 6' und die Operationsverstärker 7, 7' zu den jeweiligen Scheinwerfereinstellvorrichtungen, die dann die Lage der Scheinwerfer unter Verwendung herkömmlicher Einrichtungen, wie z.B. von Schraubspindeln, die die Drehbewegung des Motors in eine Linearbewegung der Scheinwerfer umsetzen, entsprechend verändern.

6

Leerseite

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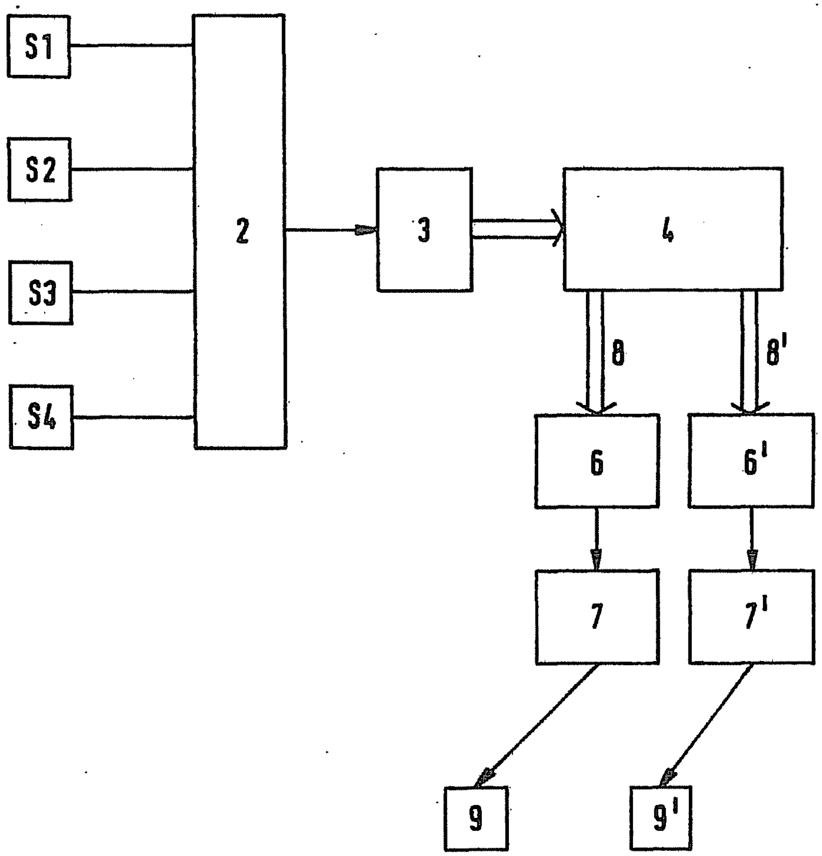

# EXHIBIT 10

# TRANSPERFECT

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I, Kevin Kelley, hereby certify that the following is, to the best of my knowledge and belief, a true and accurate translation of the following document, "DE 311 00 94 A1" from German into English.

K. Kelley
Kevin Kelley

Sworn to before me this

21st day of April, 2011

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DE 31 10 094 A1

Device for automatic headlight adjustment in motor vehicles

A device for automatic headlight adjustment in motor vehicles, which consists of four sensors that are arranged in pairs one behind the other in the direction of travel on those components of the motor vehicle that respond to loading. The sensors then transmit signals, which pass via an analog multiplexer and an analog-to-digital converter into a microprocessor that evaluates the signals, i.e. determines differential values and additionally calculates the mean values from a series of measurements and compares them with a predetermined value. In the event of deviations from this value and when a specific threshold value is exceeded, the microprocessor transmits signals, which are fed via digital-to-analog converters with operational amplifiers connected downstream to headlight adjustment equipment and bring about there a correction of the respective associated headlight using corresponding conventional means, such as, for example, servo motors.

Patent claims

1. Device for automatic headlight adjustment in motor vehicles, <u>characterized by the following properties:</u>

- the output signals of the four sensors (S1,…S4) are fed to an analog-multiplexer (2) and its output is connected with a microprocessor (4) via an analog-digital converter (3),

- from the microprocessor (4) two outputs (8, 8 ') pass through a respective digital/analog converter (6, 6') to two operational amplifiers (7, 7'), that are each coupled to a respective headlight adjustment device (9, 9').

2. The device according to claim 1, wherein 4 sensors (S1,…S4) are arranged in each case at four different vehicle points responding to the load.

Device for automatic headlight adjustment in motor vehicles

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The invention relates to a device according to the preamble of claim 1.

The installation of the headlights of a motor vehicle usually takes place in a garage with the help of the appropriate instruments, wherein the actual alignment is done manually. This means that normally the position of the headlights is correct, practically, only when vehicle is not loaded.

When the vehicle is loaded, for example, by filling up the baggage compartment of the car, a light beam is shifted upwards. This leads to the frequently observed blinding, despite the switched-on driving lights. It would require a correction of the headlight position by the driver but in only exceptional cases is it possible without much effort and is even more complicated by the lack of a fixed reference point, i.e. without auxiliary devices the readjustment is inaccurate.

The object of the invention is, therefore, to provide a device that allows automatic adjustment of the headlights to a specified level. The object of the invention is achieved by the technical teaching of patent claim 1. The advantageous embodiment is characterized by the claim 2.

The device according to the invention allows the correct illumination of the road regardless of the load of the vehicle that changes its position compared to its unloaded state. The blinding of oncoming vehicles is avoided and the light beam coming from the lights is sharply delimited.

The invention will be described in more detail with reference to the attached drawing which illustrates the block diagram of an embodiment.

In the figure, reference characters S1...S4 stand for four sensors that are connected via an analog multiplexer 2 to the input of an analog/digital converter 3, whose output leads to a microprocessor 4. The microprocessor has two outputs 8, 8' that are connected in each case with a downstream operational amplifier 7,7′ with two headlight adjustment devices 9, 9' through the two digital-analog converters 6, 6'.

The four sensors are arranged in pairs one behind the other S1, S2/S3, S4, following the driving direction on those components of the motor vehicle that experience position change by loading, e.g. on wheel suspensions or shock absorbers. The four sensors can be, for example, strain gauges.

Determination of the ideal or nominal position of the headlights is required for the operation of the device according to the invention. For this purpose, the nominal position is precisely set using the conventional instruments and the values produced by each sensor S1...S4 are saved in the microprocessor 4. The device operates then as follows: when the sensors S1...S4 are affected by loading, they transmit electrical signals that pass through the analog multiplexer 2 to the analog-digital converter 3 and from there are entered to the microprocessor 4 as digital signals.

The recording of the electrical signals that correspond to specific measured data regarding the headlight position is carried out at fixed intervals of e.g. one minute. To capture the respective headlight position n measurements are required, where n can be an integer between one and infinity. Advantageously, n can be chosen to be so large that, when there are a reasonable number of measurements, an optimal mean value appears. After each measuring, a mean value $\bar{V}$ of the last n values is calculated using the following formula:

$$\bar{V}_K = \frac{1}{N} \cdot \sum_{n=1}^{N} \cdot V \quad (S_K^n)$$

wherein K is the number of wheels 1 to 4,

N is the number of measured data included in the calculation above (to be determined experimentally)

S is the signal coming from the sensors

The differences for the sensors pairs S1/S2 and S3/S4 that describe the position of the vehicle are determined from the values of $\bar{\bar{V}}_K$. These differential values provide two headlight position values. Depending on the sign of these values, the servo motor, for example, will be put forward or reset and, simultaneously, the headlight position register in the microprocessor 4 will be counted up and down.

If the signals that lead to measured data are based on light loads such as those caused by road bumps, then it will result on average in a differential value that provides only a small deviation from the ideal headlight position value, thus the predetermined threshold value is not exceeded and the adjustment of the headlights does not occur. For heavier loads, the threshold value is exceeded, the microprocessor 4 transmits signals via the digital/analog converter 6, 6' and the operational amplifier 7, 7' to the respective headlight adjustment devices, which then change the position of the headlights accordingly using conventional tools, such as, for example, spindles, which convert the rotary motion of the motor into linear movement of the headlights.

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# EXHIBIT 11

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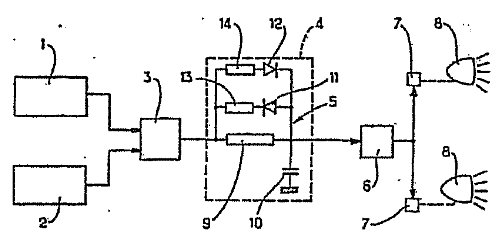
(54) **»Vorrichtung zur dynamischen Einstellung der Stellung von Scheinwerfern eines Fahrzeuges«**

Gezeigt und beschrieben wird eine Vorrichtung zur dynamischen Einstellung der Stellung von Scheinwerfern (8) eines Fahrzeuges in Abhängigkeit von der relativen Position der Räder in bezug auf die Karosserie mit zwei Fühlern (1, 2) zur Lieferung von der relativen Position entsprechenden Signalen und mit in Verbindung mit den Scheinwerfern (8) stehenden Betätigungsorganen (7), wobei die Betätigungsorgane (7) durch eine Steuervorrichtung (6) steuerbar sind und wobei die Steuervorrichtung (6) durch das Positionssignal über ein Tiefpaßfilter (4) unerwünschte Frequenzen des Positionssignales ableitbar sind. Um bei Fahrzeugen eine angenehme Nachtfahrt unter allen Fahrbedingungen und unabhängig vom Straßenzustand zu ermöglichen, weist das Filter (4) Filterelemente (11 bis 14) auf, über die eine variable Charakteristik der Frequenzabtrennung in Abhängigkeit von der Amplitude der Positionssignale der Fühler (1, 2) gewährleistet ist.
(31 29 891)

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28. Juli 1981
Sg-vR-fz

Patentansprüche:

1. Vorrichtung zur dynamischen Einstellung der Stellung von Scheinwerfern eines Fahrzeuges in Abhängigkeit von der relativen Position der Räder in Bezug auf die Karosserie, mit mindestens einem Fühler zur Lieferung eines der relativen Position entsprechenden Signales und mit in Verbindung mit den Scheinwerfern stehenden Betätigungsorganen, wobei die Betätigungsorgane durch eine Steuervorrichtung steuerbar sind und die Steuervorrichtung durch das Positionssignal über ein Tiefpaßfilter schaltbar ist und wobei über das Tiefpaßfilter unerwünschte Frequenzen des Positionssignales ableitbar sind, dadurch gekennzeichnet, daß das Filter (4;104) Filterelemente (11 bis 14; 111 bis 114) aufweist und daß über die Filterelemente (11 bis 14; 111 bis 114) eine variable Charakteristik der Frequenzabtrennung in Abhängigkeit von der Amplitude der Positionssignale der Fühler (1,2;101,102) gewährleistet ist.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß das Filter (4;104) Schwellwertelemente (11,12; 111,112) aufweist, über die mindestens eine Amplitudenschwelle ($s_1$, $s_2$) definierbar ist, für die das Filter (4;104) eine Grenzfrequenz vorbestimmt.

3. Vorrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Grenzfrequenz des Filters (4;104) für eine Amplitude über den Amplitudenschwellen ($s_1$,$s_2$) etwa 2 Hz und für eine Amplitude unter den Amplitudenschwellen ($s_1$,$s_2$) etwa 0,3 Hz beträgt.

4. Vorrichtung nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß das Filter (4;104) elektrisch ist und ein L-förmiges RC-Glied (5;105) aufweist, daß das RC-Glied (5;105) aus einem Serienwiderstand (9;109) und einem Parallelkondensator (10;110) besteht, daß dem Serienwiderstand (9;109) eine Antiparallelschaltung zweier Gleichrichter (11,12;111,112) parallel geschaltet ist und daß über die Innenwiderstände in Durchgangsrichtung die Amplitudenschwellen ($s_1$,$s_2$) festlegbar sind.

5. Vorrichtung nach einem der Ansprüche 1 bis 4, wobei über Filterelemente zwei Amplitudenschwellen festlegbar sind, die mit den Bewegungen der Karosserie in Bezug auf die Räder in Beziehung stehen, dadurch gekennzeichnet, daß die Absolutwerte der Amplitudenschwellen ($s_1$,$s_2$) unterschiedlich sind, daß nämlich

der Absolutwert der Amplitudenschwelle ($s_2$) für die durch Beschleunigungen erzeugten Bewegungen unter dem Absolutwert der Amplitudenschwelle ($s_1$) für die durch Verzögerungen erzeugten Bewegungen liegt.

6. Vorrichtung nach einem der Ansprüche 1 bis 5, dadurch gekennzeichnet, daß die Grenzfrequenz des Filters (4;104) 1 bis 2 Hz für Schwankungen des Positionssignales ($S_E$) beträgt, die die Amplitudenschwelle ($s_2$) für die Beschleunigung oder die Amplitudenschwelle ($s_1$) für die Verzögerung überschreiten und daß die Grenzfrequenz im übrigen, d.h. wenn die Schwankungen weder die eine noch die andere Amplitudenschwelle ($s_1$, $s_2$) überschreiten, 0,15 Hz beträgt.

7. Vorrichtung nach Anspruch 5 oder 6, dadurch gekennzeichnet, daß das Filter (104) elektrisch ist und ein L-förmiges RC-Glied (105) aufweist, daß das RC-Glied (105) aus einem Serienwiderstand (109) und einem Parallelkondensator (110) besteht, daß dem Serienwiderstand (109) eine Antiparallelschaltung zweier Gleichrichtereinheiten (111,112) parallel geschaltet ist und daß die Gleichrichtereinheiten (111,112) verschiedene Innenwiderstände in Durchgangsrichtung aufweisen, so daß die Amplitudenschwellen ($s_1$,$s_2$) festgelegt sind.

8. Vorrichtung nach Anspruch 7, dadurch gekennzeichnet, daß die Gleichrichtereinheiten (111, 112) jeweils mehrere voneinander verschiedene Einheitsgleichrichter aufweisen.

9. Vorrichtung nach einem der Ansprüche 1 bis 8, dadurch gekennzeichnet, daß als Gleichrichter (11,12;111,112) Dioden vorgesehen sind.

10. Vorrichtung nach einem der Ansprüche 1 bis 9, dadurch gekennzeichnet, daß die Gleichrichter (11,12;111,112) jeweils in Serie mit einem Einstellwiderstand (13,14;113,114) geschaltet sind.

Equipements Automobiles Marchal

Vorrichtung zur dynamischen Einstellung der Stellung von Scheinwerfern eines Fahrzeuges

Die Erfindung betrifft eine Vorrichtung zur dynamischen Einstellung der Stellung von Scheinwerfern eines Fahrzeuges in Abhängigkeit von der relativen Position der Räder in Bezug auf die Karosserie, mit mindestens einem Fühler zur Lieferung eines der relativen Position entsprechenden Signales und mit in Verbindung mit den Scheinwerfern stehenden Betätigungsorganen, wobei die Betätigungsorgane durch eine Steuervorrichtung steuerbar sind und die Steuervorrichtung durch das Positionssignal über ein Tiefpaßfilter schaltbar ist und wobei über das Tiefpaßfilter unerwünschte Frequenzen des Positionssignales ableitbar sind, insbesondere für ein Auto.

Man hat bereits Vorrichtungen für die Korrektur der Scheinwerferstellung eines Fahrzeuges gebaut, wobei einige statisch, einige dynamisch waren.

Die statischen Korrekturvorrichtungen haben eine relativ lange Ansprechzeit und verstellen die Scheinwerfer des Fahrzeuges abhängig von der Last und deren Verteilung zwischen Vorder- und Hinterachse. Eine solche Vorrichtung kann nicht tätig werden, wenn das Fahrzeug sich bewegt.

Es sind auch schon Vorrichtungen mit dynamischer Einstellung konstruiert worden, um eine adäquate Position der Scheinwerfer bei allen Fahrbedingungen des Fahrzeuges zu gewährleisten. Eine Vorrichtung hat Korrekturorgane in Verbindung mit den Scheinwerfern und funktioniert durch Schwerkraft (z.B. Pendel). Diese Vorrichtung hat den Nachteil, daß sie die Scheinwerfer nicht passend einstellen kann, wenn das Fahrzeug auf einem Abhang rollt.

Andere dynamische Einstellvorrichtungen haben Fühler über die die relative Position beim Schwanken oder Schaukeln von vorn nach hinten bei der Karosserie in Bezug auf die Räder feststellbar ist. Diese Fühler wirken über ein Korrekturfilter auf Betätigungsorgane, die die Position der Scheinwerfer abhängig von dem durch die Fühler gelieferten Signal ändern sollen. Einige Vorrichtungen sind hydraulisch und in diesem Fall wird die Filterung der unerwünschten Signale mit erhöhter Frequenz (insbesondere derjenigen aufgrund von Bewegungen des Fahrzeuges auf Pflaster) an den Leitungen des hydraulischen Systems vorgenommen. Wenn die Einrichtung zur Verstellung elektrisch ist, bewirkt man die Filterung durch ein elektrisches Tiefpaßfilter.

Die Störerscheinungen aufgrund des Wegezustandes und der Fahrzeugbedingungen, die eine Korrektur der Stellung der Scheinwerfer verlangen, sind zahlreich:

- Pflaster verursacht Störungen mit relativ hoher Frequenz von 5 bis 15 Hz;

- Löcher und Schwellen können Stampfschwingungen von 5 bis 10 Hz verursachen, aber diese Störungen sind relativ selten und für die Fahrweise relativ wenig hinderlich;

- plötzliche Beschleunigungen und Bremsungen bringen Schwankungen in der Grössenordnung von 1 bis 2 Hz mit sich.

Jenseits von 15 Hz sind die Schwingungen des Fahrzeuges wegen der Ansprechzeit des Auges, das diese schnellen Änderungen der Scheinwerferposition automatisch integriert, nicht hinderlich. Die weniger hohen Frequenzen zwischen 2 und 15 Hz werden in einem gewissen Umfang durch die Federung des Fahrzeuges gefiltert und gelangen daher in abgeschwächter Form an die Scheinwerfer. Jedoch bleiben diese Frequenzen auch in abgeschwächter Form lästig.

Die bisher entwickelten Einstellvorrichtungen haben den ernsten Nachteil einer Phasenverschiebung zwischen der Zeit des Schaukelns des Fahrzeuges und der Reaktion der Korrekturvorrichtung bei Erscheinungen, deren Frequenz gleich oder höher ist als die Grenzfrequenz des die Filterung bewirkenden Systems. Wenn z.B. die Grenzfrequenz 2 Hz ist, gelangen schnellere Phänomene als diejenigen aufgrund von Pflaster, obwohl sie durch die

Filterung abgeschwächt sind, trotzdem zu den Betätigungsorganen der Scheinwerfer und können so durch die Phasenverschiebung bestimmte physiologische Unbehaglichkeiten mit sich bringen. Bei Bewegungen des Fahrzeuges auf Pflaster kann die Korrektur gerade gegenphasig in Bezug auf Stampfschwingungen des Fahrzeuges eingreifen. Die Scheinwerfer sind z.B. gerade in dem Augenblick nach oben orientiert, in dem das Vorderteil der Karosserie des Fahrzeuges auch eine Bewegung nach oben ausführt.

Eine andere Unannehmlichkeit der vorhandenen Einstellvorrichtungen besteht darin, daß bei schnellen Phänomenen ihre Korrekturorgane ständig gefordert werden und so die Lebensdauer relativ gering ist.

Gemäß der Erfindung soll eine Vorrichtung zur dynamischen Einstellung der Scheinwerfer eines Fahrzeuges geschaffen werden, die die oben erwähnten Nachteile nicht besitzt und eine angenehme Nachtfahrt unter allen Fahrbedingungen und unabhängig vom Straßenzustand zulässt.

Die erfindungsgemäße Vorrichtung ist dadurch gekennzeichnet, daß das Filter Filterelemente aufweist und daß über die Filterelemente eine variable Charakteristik der Frequenzabtrennung in Abhängigkeit von der Amplitude der Positionssignale der Fühler gewährleistet ist.

Dank dieser Merkmale ist die erfindungsgemäße Vorrichtung in der Lage, eine Unterscheidung vorzunehmen zwischen den Erscheinungen, die eine Korrektur verlangen und denjenigen, bei denen eine Korrektur aufgrund der unvermeidlichen Phasenverschiebung, die es zwischen dem Störphänomen und der Korrektur der Scheinwerfer geben würde, unerwünscht ist.

Eine erste Ausführungsform der Vorrichtung ist dadurch gekennzeichnet, daß das Filter Schwellwertelemente aufweist, über die mindestens eine Amplitudenschwelle definierbar ist, für die das Filter eine Grenzfrequenz vorbestimmt. Auf diese Weise können die Merkmale des Filters mit Genauigkeit den verschiedenen Störerscheinungen angepaßt werden, die eine Verstellung der Scheinwerferposition verlangen.

Eine weitere vorteilhafte Ausführungsform ist dadurch gekennzeichnet, daß die Grenzfrequenz des Filters für eine Amplitude über den Amplitudenschwellen etwa 2 Hz und für eine Amplitude unter den Amplitudenschwellen etwa 0,3 Hz beträgt. So werden die Hochfrequenzsignale zwischen 2 und 5 Hz und mit schwacher Amplitude aufgrund einer Bewegung auf Pflaster z.B. nicht berücksichtigt und können daher auch nicht der Fahrannehmlichkeit schaden.

Eine bevorzugte Ausführungsform der Erfindung ist dadurch gekennzeichnet, daß das Filter elektrisch ist und ein L-förmiges RC-Glied aufweist, daß das RC-Glied aus einem Serienwiderstand und einem Parallelkondensator besteht, daß dem Serienwiderstand eine Antiparallelschaltung zweier Gleichrichter parallel geschaltet ist und daß über die Innenwiderstände in Durchgangsrichtung die Amplitudenschwellen festlegbar sind.

Gemäß einem anderen Merkmal sind die Gleichrichter Dioden. Vorteilhafterweise sind die Dioden in Serie mit einem Widerstand für die Einstellung der Abschaltschwelle geschaltet.

Die Ausführungsform, die beschrieben wird, hat den Vorteil, daß sie leicht an eine statische Einstellvorrichtung für die Position von Scheinwerfern eines Fahrzeuges mittels Benutzung von zwei einfachen Dioden und von zwei Widerständen angepaßt werden kann, deren Kosten nicht sehr hoch sind.

Man konnte aber beobachten, daß der absolute Wert der genannten Schwellen ausreichend hoch sein muß, um die Schwankungen mit geringer Amplitude auszuschalten, die sich z.B. ergeben, wenn das Fahrzeug auf Pflaster fährt, insbesondere bei mittleren Geschwindigkeiten. Daraus ergibt sich, daß in bestimmten Fällen Bewegungen mittlerer Amplitude aufgrund von Beschleunigungen oder Verzögerungen des Fahrzeuges nicht mehr berücksichtigt werden, und daß die Einrichtung in diesen Fällen nicht eingreift, um die Position der Scheinwerfer zu regeln. Dieser Ein-stellungsmangel bei solchen Bewegungen wird umso lästiger, je bedeutsamer Reichweite und Genauigkeit der Scheinwerfer werden.

In einer zweiten Ausführungsform beabsichtigt die Erfindung daher, eine Vorrichtung zur dynamischen Einstellung der Scheinwerfer eines Fahrzeuges abhängig von der relativen Position der Räder in Bezug auf die Karosserie zu liefern, wobei die Reaktion der Vorrichtung bei Bewegungen mit geringer Amplitude wirksam unterdrückt wird, wie z.B. Bewegungen, die mit der Fahrt über Pflaster oder Schwellen in Verbindung stehen. Die Vorrichtung soll dabei eine wirksame dynamische Einstellung bei anderen Bewegungen mit geringer oder mittlerer Amplitude gewährleisten, zumindest in den Fällen, die für das Fahren und die Sicherheit auf der Straße wichtig sind.

Die Erfindung bezieht sich daher auch auf eine zweite Ausführungsform einer Vorrichtung des obigen Typs, bei der Bestandteile zwei Amplitudenschwellen definieren, welche mit den Bewegungen der Karosserie in Bezug auf die Räder in Verbindung stehen, für deren jede das Filter eine Grenzfrequenz bestimmt. Diese Vorrichtung ist dadurch gekennzeichnet, daß die Absolutwerte der Amplitudenschwellen unterschiedlich sind, daß nämlich der Absolutwert der Amplitudenschwelle für die durch Beschleunigungen erzeugten Bewegungen unter dem Absolutwert der Amplitudenschwelle für die durch Verzögerungen erzeugten Bewegungen liegt. So wird die Schwelle in Bezug auf Signale in Verbindung mit einer Beschleunigung festgelegt auf einen ausreichend schwachen Wert, um auf geringfügige Beschleunigungen anzusprechen, die für Fahrer entgegenkommender Fahrzeuge lästig sind, während die Schwelle für Signale in Verbindung mit einer Bremsung oder Geschwindigkeitsabnahme eine sehr große Amplitude hat. Überraschenderweise hat man festgestellt, daß bei einer solchen Regelung der Werte der Schwellen ein komplettes Verschwinden der unerwünschten Reaktionen erzielt wird, die ein Schwanken hervorrufen, z.B. bei einer Fahrt über Straßenpflaster, wobei eine wirksame Einstellung der Scheinwerfer auf die durch eine noch so geringe Beschleunigung hervorgerufenen Bewegungen gewährleistet wird, was insbesondere die Sicherheit auf der Straße wesentlich erhöht.

Andererseits stellt man fest, daß die Vorrichtung bei geringen Verzögerungen keine Korrektur der Scheinwerferstellung bewirkt. Dies ist nicht lästig, weil sich in diesem Fall das Lichtbündel senkt, was keinen Nachteil für die Sicherheit auf der Straße nach sich zieht.

Gemäß einer vorteilhaften Gestaltung der zweiten Ausführungsform der Erfindung beträgt die Grenzfrequenz des Filters 1 bis 2 Hz bei einem Signal, das die Schwelle für die Beschleunigung überschreitet, oder einem Signal (mit entgegengesetztem Vorzeichen das die andere Schwelle für die Verzögerung überschreitet, während die Abschaltfrequenz 0,15 Hz beträgt, wenn das

Signal nicht gemäß seinem Vorzeichen die eine oder andere Schwelle überschreitet.

So werden die Signale zwischen 0,15 und 2 Hz mit schwachter Amplitude, die sich aus der Bewegung auf Pflaster ergeben, nicht berücksichtigt. Dagegen wird ein Beschleunigungssignal mit einer Frequenz in der Rangordnung von 1 Hz und einer Amplitude, die kaum höher ist als diejenige der Signale, die sich durch Bewegung auf dem Pflaster ergeben, berücksichtigt und es erfolgt ein Eingreifen der Stellvorrichtung für die Korrektur der Scheinwerferposition. Vorteilhafterweise ist dabei die Vorrichtung so konstruiert, daß das Filter elektrisch ist und ein L-förmiges RC-Glied aufweist, daß das RC-Glied aus einem Serienwiderstand und einem Parallelkondensator besteht, daß dem Serienwiderstand eine Antiparallelschaltung zweier Gleichrichtereinheiten parallel geschaltet ist und daß die Gleichrichtereinheiten verschiedene Innenwiderstände in Durchgangsrichtung aufweisen, so daß die Amplitudenschwellen festgelegt sind.

Der Unterschied zwischen den Innenschwellen kann z.B. erzielt werden, indem man in der einen Gleichrichtereinheit, nämlich derjenigen, die das elektrische Signal durchläßt, das mit den relativen Positionen verbunden ist, welche der Bremsung oder der Verzögerung entsprechen, eine Anzahl von Einheitsgleichrichtern anbringt, die größer ist als die der anderen Gleichrichtereinheit. Als Variante kann man Einheitsgleichrichter verwenden, z.B. Dioden, die verschiedene Innenschwellen haben. Die Gleichrichter jeder Einheit sind vorzugsweise in Serie geschaltet mit einem Einstellwiderstand.

Zum besseren Verständnis der Erfindung werden nachstehend zwei Ausführungsformen anhand der beigefügten Zeichnung beschrieben; es zeigt:

Fig. 1 ein Grundschaltbild einer Vorrichtung gemäß einer ersten Ausführungsform der Erfindung,

Fig. 2 ein Diagramm, das den Betrieb der Vorrichtung gem. Fig. 1 durch den Vergleich von zwei Kurven zeigt,

Fig. 3 ein Grundschaltbild einer Vorrichtung gemäß einer zweiten Ausführungsform der Erfindung und

Fig. 4 ein Diagramm analog demjenigen der Fig. 2 zur Darstellung des Betriebs der Vorrichtung gemäß Fig. 3.

Die in Fig. 1 dargestellte Vorrichtung hat einen ersten Fühler 1 zwischen der Vorderachse und der Karosserie des Fahrzeuges, um eine relative Bewegung zu entdecken. Ein entsprechender Fühler 2 befindet sich an der Hinterachse.

Die von den Fühlern 1,2 erzeugten Signale werden in einer Mischstufe 3 behandelt, in der ein Signal erzeugt wird, das die Schwingung oder Schaukelbewegung des Fahrzeuges im Verlauf seiner Bewegung darstellt.

Der Ausgang der Mischstufe 3 ist mit einem Tiefpaßfilter 4 verbunden, das in diesem Beispiel durch ein RC-Glied 5, das in L-Form montiert ist, gebildet wird.

Der Ausgang des Filters 4 ist mit einer Steuer- und Verstärkervorrichtung 6 verbunden, die ein Leistungssignal an Betätigungsorgane 7 abgibt, welche Bewegungen der Scheinwerfer 8 hervorrufen.

Das Filter 4 hat einen Serienwiderstand 9 und einen Parallelkondensator 10. Dem Serienwiderstand 9 sind zwei antiparallel geschaltete Dioden 11 und 12, die jeweils in Serie mit einem Einstellwiderstand 13 und 14 liegen, parallel geschaltet.

Wenn die Amplitude des Eingangssignals des Filters 4 die Amplitudenschwellen $s_1, s_2$ der Dioden 11 und 12 überschreitet, werden diese für entsprechende Signale durchgängig, so daß der Wert des Serienwiderstandes des RC-Gliedes 5 sinkt. Die Zeitkonstante RC sinkt ebenfalls und die Grenzfrequenz wird höher. Das Filter 4 bewirkt also eine Abstufung seiner Grenzfrequenz in Abhängigkeit von der Amplitude des Signals, das ihm geliefert wird.

In dem dargestellten Fall, in dem man handelsübliche Dioden 11, 12 verwendet, ist deren Innenwiderstand nicht ausreichend, um eine Grenzfrequenz von 2 Hz zu erzielen. Deshalb sind die Einstellwiderstände 13 und

14 in Serie vorgesehen.

Der Betrieb der Vorrichtung geht aus Fig. 2 hervor:

fe sei die Frequenz des Eingangssignals $S_E$ des Filters 4 und fc diejenige des Ausgangssignals $S_S$. Man sieht, daß während der Zeit A die Frequenz fe des Eingangssignals unter der Grenzfrequenz fc des Filters 4 liegt. So ist das Signal am Ausgang uneingeschränkt wiederhergestellt. Dieser Fall findet bei einer statischen Korrektur Anwendung, z.B. wenn die Belastung des Fahrzeuges geändert wird.

Während der Zeit B ist die Frequenz fe höher als die Grenzfrequenz des Filters, aber die Amplitude des Eingangssignals liegt unter den Amplitudenschwellen $s_1$, $s_2$, die von den Dioden 11 und 12 gegeben werden, so daß das Signal uneingeschränkt durch den Filter 4 gelangt. Am Ausgang wird der Mittelwert des Eingangssignals wiederhergestellt, wogegen das Hochfrequenzsignal durch das Filter 4 gelöscht wird. Dieser Fall entspricht dem Rollen auf Pflaster.

Während der Zeit C ist die Frequenz fe auch höher als die Grenzfrequenz fc, aber die Amplitude des Signals übersteigt die Amplitudenschwellen $s_1$, $s_2$, die von den Dioden 11,12 gegeben werden. Das Hochfrequenzsignal erfährt keine Phasenverschiebung, sondern es wird in der Amplitude um den Wert der Amplitudenschwellen $s_1$,$s_2$ verringert. Dieser Fall entspricht dem Rollen auf einem Weg, der in sehr schlechtem Zustand ist.

Bei D handelt es sich um brutales Bremsen auf schlechtem Weg. Sobald das Eingangssignal den Wert der Amplitudenschwellen $s_1$,$s_2$ überschreitet, findet man es am Ausgang, vermindert um den Wert der Amplitudenschwellen $s_1$,$s_2$ wieder. Wenn das Phänomen sich hinzieht, kann man mit dem Filter 4 am Ausgang einen Wert erhalten, der mit dem Eingangssignal identisch ist.

Die Grenzfrequenzen des Filters 4 können gewählt werden, z.B. für starke Amplituden mit 2 Hz, bei geringen Amplituden mit 0,3 Hz. Im letztgenannten Fall ist also die Dämpfung des Signals wichtig. Die bei höheren Frequenzen gegebene Phasenverschiebung hat keine Wirkung auf die Einstellung der Scheinwerfer.

In Fig. 3 sieht man, daß die Vorrichtung einen ersten Fühler 101 besitzt, welcher zwischen der Vorderachse und der Karosserie des Fahrzeuges montiert ist, um die relativen Bewegungen festzustellen. Ein weiterer Fühler 102 ist der Hinterachse zugeordnet. Die durch die Fühler 101,102 erzeugten Signale werden in einer Mischstufe 103 behandelt, in der ein Signal erzeugt wird, welches das Schaukeln oder Schwingen des Fahrzeuges bei seiner Bewegung darstellt. Der Ausgang der Mischstufe 103 ist mit einem Tiefpaßfilter 104 verbunden, das durch ein RC-Glied 105 in L-Form gebildet wird. Der Ausgang des Filters 104 ist mit einer Steuer- und Verstärkungseinrichtung 106 verbunden, die ein Leistungssignal an Betätigungsorgane 107 abgibt, welche die Bewegungen der Scheinwerfer 108 des Fahrzeuges hervorrufen. Das Filter 104 hat einen Serienwiderstand 109 und einen Parallelkondensator 110. Dem Serienwiderstand 109 ist eine Antiparallelschaltung zweier Diodeneinheiten 111,112 parallel geschaltet. Die eine Einheit hat zwei Dioden 111 und die andere drei Dioden 112. Jede Einheit ist in Serie mit einem Einstellwiderstand 113 bzw. 114 geschaltet.

Der Betrieb der Vorrichtung geht aus Fig. 4 hervor:

fe sei die Frequenz des Eingangssignals SE des Filters 104 und fc diejenige des Ausgangssignals SS. Man sieht, daß in der Zeit A die Frequenz des Eingangssignals fe unter der Grenzfrequenz fc des Filters 104 liegt. Daher wird das Signal uneingeschränkt am Ausgang wiederhergestellt, was die Korrektur bewirkt. Dieser Fall liegt z.B. einer einer statischen Korrektur vor, wenn die Last des Fahrzeuges geändert wird.

In der Zeit B ist die Frequenz fe höher als die Grenzfrequenz fc des Filters, aber die Hochfrequenzamplitude des Eingangssignals ist nicht nur geringer als der absolute Wert der Amplitudenschwelle $s_1$ entsprechend der

Verzögerung, sondern auch als der Wert der Amplitudenschwelle $s_2$ entsprechend der Beschleunigung, so daß das Signal uneingeschränkt den Filter 104 passiert. Am Ausgang wird nur der mittlere Wert des Eingangssignals wiederhergestellt, wogegen das Hochfrequenzsignal durch das Filter 104 eliminiert wird. Dieser Fall entspricht dem Weg auf Pflaster.

In der Zeit C, die einer leichten Beschleunigung entspricht, sieht man, daß die Amplitude des Signals $S_E$ die Amplitudenschwelle $s_2$ der Beschleunigung überschreitet. Dies übersetzt sich in eine Veränderung des Signals $S_S$ am Ausgang und infolgedessen in eine Korrektur der Scheinwerfer, die leicht gesenkt werden.

In der Zeit D, die einer leichten Verzögerung entspricht, welche eine Änderung mit fast derselben Amplitude wie bei der Beschleunigung C bewirkt, erfolgt keine Änderung des Signals $S_S$, weil die Amplitude unter der Amplitudenschwelle $s_1$ bleibt.

Erst wenn die Bremsung stärker ist, wie in der Zeit E, wobei die Amplitudenschwelle $s_1$ diesmal überschritten wird, geschieht auf der Kurve $S_S$ eine Änderung des Signals, als Antwort auf die Bremsung. Die Grenzfrequenzen des Filters 104 können gewählt werden, z.B. für starke Amplituden 1 bis 2 Hz und für schwache Amplituden 0,15 Hz.

Man kann im übrigen in vorteilhafter Weise die antiparallel geschalteten Dioden durch in Serie geschaltete Zenerdioden ersetzen.

· 22.

Leerseite

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Int. Cl.³: B60Q 1/08
Anmeldetag: 29. Juli 1981
Offenlegungstag: 9. Juni 1982

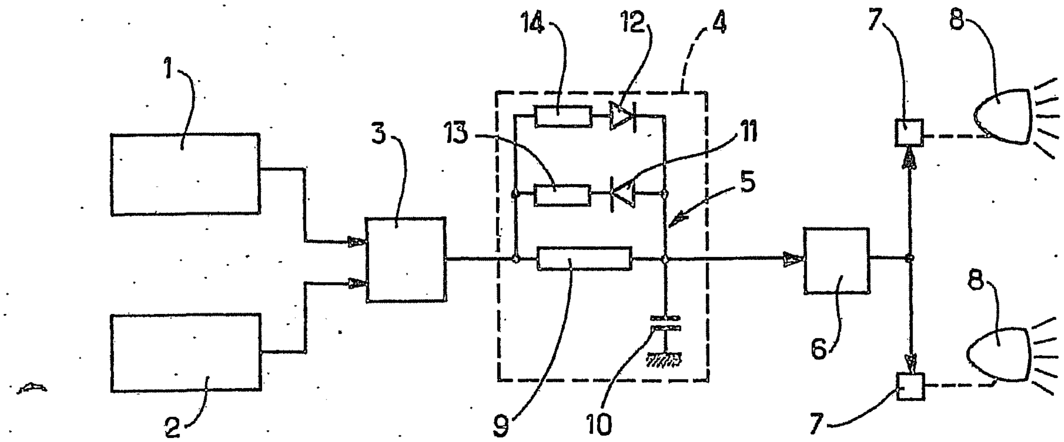


FIG. 1

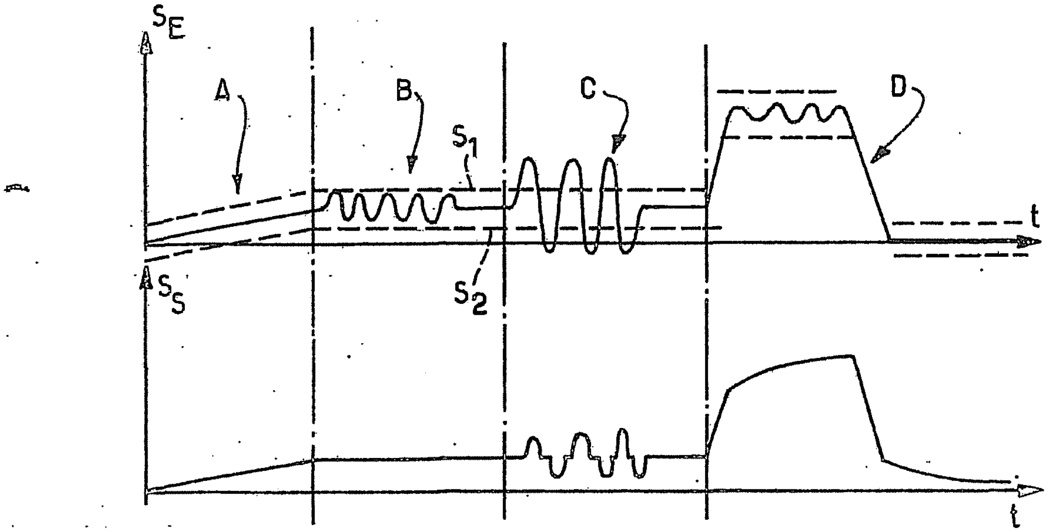


FIG. 2

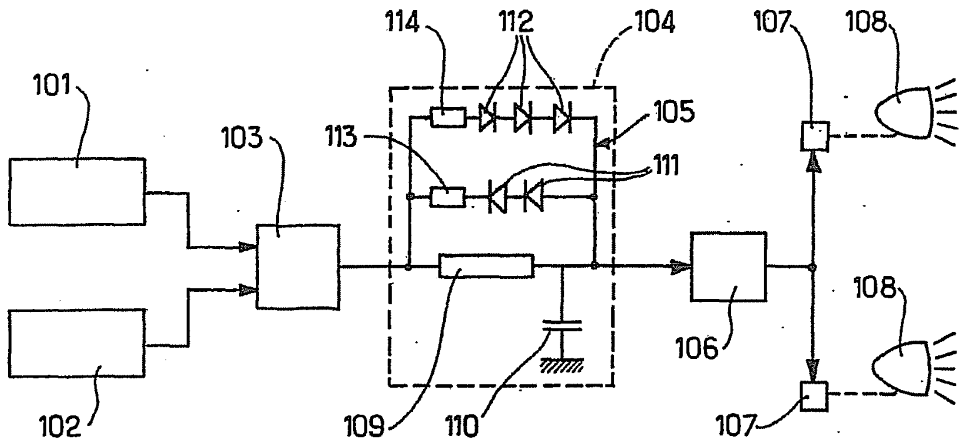
101
102
103
104
105
106
107
108
109
110
111
112
113
114

FIG. 3

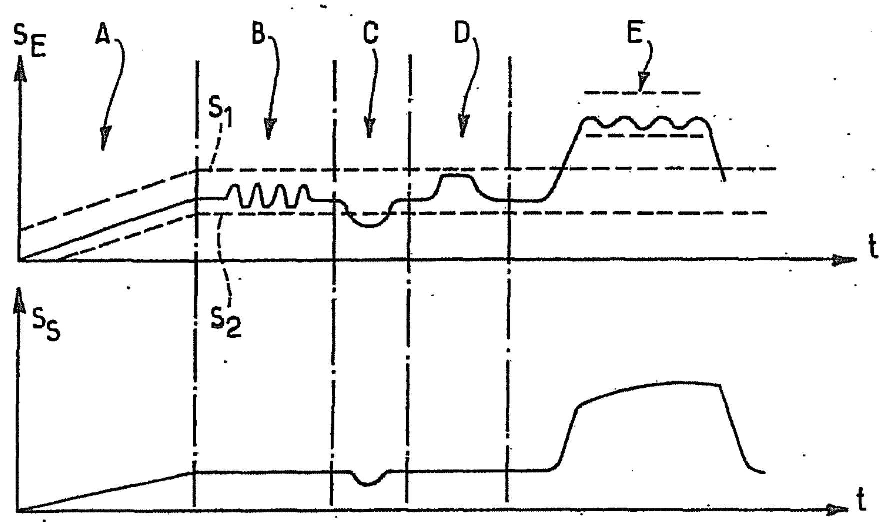
$S_E$
A
B
C
D
E
$S_1$
$S_2$
t
$S_S$
t

FIG. 4

EXHIBIT 12

**D E C L A R A T I O N**

I, Judith E. Taddeo, declare that I am well qualified as a translator of German to English and that I have carefully prepared the attached English language translation from the original document:

Offenbarungsschrift DE 31 29 891 A1 "Vorrichtung zur dynamischen Einstellung der Stellung von Scheinwerfern eines Fahrzeuges"

[Laid-Open Document DE 31 29 891 A1 "Device for Dynamically Adjusting the Position of Headlights of a Vehicle"]

filed at the German Patent Office on July 29, 1981 written in German and that the attached translation is an accurate English version of such original to the best of my knowledge and belief.

I certify under penalty of perjury that the foregoing is true and correct.

Date April 29, 2011

Signature Judith E. Taddeo

Name Judith E. Taddeo

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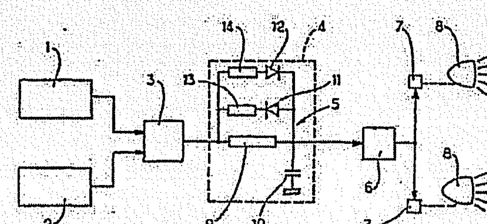
(54) **"Device for Dynamically Adjusting the Position of Headlights of a Vehicle"**

Shown and described is a device for dynamically adjusting the position of headlights (8) of a vehicle as a function of the relative position of the wheels in relation to the car body, having two sensors (1, 2) for supplying signals that correspond to the relative position, and actuating organs (7) connected to the headlights (8), the actuating organs (7) being controllable by a control device (6) and the control device (6) by the position signal via a deep-pass filter (4) undesired frequencies of the position signal removable [sic]. In order to provide pleasant night-time driving for vehicles under all driving conditions and regardless of the state of the road, the filter (4) has filter elements (11 through 14) via which a variable characteristic of the frequency separation is ensured as a function of the amplitude of the position signals from the sensors (1, 2).

(31 29 891)




DE 3129891 A1

DE 31 29 891 A1

Device for Dynamically Adjusting the Position of Headlights of a Vehicle

Shown and described is a device for dynamically adjusting the position of headlights (8) of a vehicle as a function of the relative position of the wheels in relation to the car body, having two sensors (1, 2) for supplying signals that correspond to the relative position, and actuating organs (7) connected to the headlights (8), the actuating organs (7) being controllable by a control device (6) and the control device (6) by the position signal via a deep-pass filter (4) undesired frequencies of the position signal removable [sic]. In order to provide pleasant night-time driving for vehicles under all driving conditions and regardless of the state of the road, the filter (4) has filter elements (11 through 14) via which a variable characteristic of the frequency separation is ensured as a function of the amplitude of the position signals from the sensors (1, 2).

(31 29 891)

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## Patent Claims:

1. A device for dynamically adjusting the position of headlights of a vehicle as a function of the relative position of the wheels in relation to the body, comprising at least one sensor for supplying a signal that corresponds to the relative position, and actuating organs, which are connected to the headlights, the actuating organs being controllable by a control device, and the control device being switchable by the position signal via a low-pass filter, and undesired frequencies of the position signal are able to be removed via the low-pass filter, wherein the filter (4;104) includes filter elements (11 through 14; 111 through 114), and a variable characteristic of the frequency separation as a function of the amplitude of the position signals of the sensors (1,2;101,102) is ensured via the filter elements (11 through 14; 111 through 114).

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2. The device as recited in Claim 1, wherein the filter (4;104) has threshold value elements (11;12; 111,112), via which at least one amplitude threshold ($s_1$, $s_2$) is definable, for which the filter (4;104) predefines a limit frequency.

3. The device as recited in Claim 1 or 2, wherein the limit frequency of the filter (4;104) amounts to approximately 2 Hz for an amplitude above the amplitude thresholds ($s_1$, $s_2$), and to approximately 0.3 Hz for an amplitude below the amplitude thresholds ($s_1$, $s_2$).

4. The device as recited in one of the Claims 1 through 3, wherein the filter (4;104) is electric and has an L-shaped RC element (5;105), the RC element (5;105) is made up of a series resistor (9;109) and a parallel capacitor (10;110), an antiparallel circuit of two rectifiers (11,12;111,112) is switched in parallel to the series resistor (9;109), and the amplitude thresholds ($s_1$, $s_2$) are definable via the internal resistances in the throughput direction.

5. The device as recited in one of the Claims 1 through 4, two amplitude thresholds, which are related to the movements of the body in relation to the wheels, being definable via filter elements, wherein the absolute values of the amplitude thresholds ($s_1$, $s_2$) differ in that the absolute value of the amplitude threshold ($s_2$) for the movements produced by accelerations lies below the absolute value of the amplitude threshold ($s_1$) for the movements produced by decelerations.

6. The device as recited in one of the Claims 1 through 5, wherein the limit frequency of the filter (4;104) amounts to 1 to 2 Hz for fluctuations of the position signal ($S_E$) that exceed the amplitude threshold ($s_2$) for the

acceleration or the amplitude threshold ($s_1$) for the deceleration, and in all other cases, i.e., when the fluctuations exceed neither the one nor the other amplitude threshold ($s_1$, $s_2$), the limit frequency amounts to 0.15 Hz.

7. The device as recited in Claim 5 or 6, wherein the filter (104) is electric and has an L-shaped RC element (105), the RC element (105) is made up of a series resistor (109) and a parallel capacitor (110), an antiparallel circuit of two rectifier units (111,112) is switched in parallel to the series resistor (109), and the rectifier units (111,112) have different internal resistances in the throughput direction, so that the amplitude thresholds ($s_1$, $s_2$) are defined.

8. The device as recited in Claim 7, wherein the rectifier units (111, 112) each have a plurality of standard rectifiers that differ from each other.

9. The device as recited in one of the Claims 1 through 8, wherein diodes are provided as rectifiers (11,12;111,112).

10. The device as recited in one of the Claims 1 through 9, wherein the rectifiers (11,12;111,112) are each switched in series with an adjustable resistor (13,14;113,114).

Equipements Automobiles Marchal

Device for Dynamically Adjusting the Position of Headlights of a Vehicle

The invention relates to a device for dynamically adjusting the position of headlights of a vehicle as a function of the relative position of the wheels in relation to the body, having at least one sensor for supplying a signal which corresponds to the relative position, and actuating organs, which are connected to the headlights, the actuating organs being controllable by a control device and the control device being switchable by the position signal via a low-pass filter, undesired frequencies of the position signal being able to be removed via the low-pass filter, especially for an automobile.

Devices for correcting the headlight position of a vehicle have already been built, some of them having had a static and others a dynamic design.

The static correction devices have a relatively long response time and adjust the headlights of the vehicle as a function of the load and its distribution between front and rear axles. Such a device is unable to act when the vehicle is moving.

Devices featuring a dynamic adjustment have also been built already, so as to ensure a proper position of the headlights under all driving conditions of the vehicle. A device includes correction organs connected to the headlights, and functions by gravity (e.g., pendulum). This device has the disadvantage of being unable to properly adjust the headlights when the vehicle is moving on a downhill slope.

Other dynamic adjustment devices are equipped with sensors, via which the relative position is able to be determined during forward or rearward rocking or swinging of the body in relation to the wheels. Via a correction filter, these sensors are acting on actuating organs which are meant to adjust the position of the headlights as a function of the signal supplied by the sensors. Some devices are hydraulic, and in this case the filtering of the undesired signals is implemented at an increased frequency (in particular the frequency caused by movements of the vehicles on block pavement), at the lines of the hydraulic system. If the adjustment device is an electrical device, then the filtering is implemented by an electric low-pass filter.

The interference phenomena due to the state of the road, and the vehicle conditions requiring a correction of the headlight position are numerous:

- block pavement causes interference of a relatively high frequency of 5 to 15 Hz;
- holes and thresholds may cause pitch vibrations of 5 to 10 Hz, but this type of interference is relatively rare and does not interfere significantly with the driving style;
- sudden accelerations and braking cause fluctuations on the order of magnitude of 1 to 2 Hz.

Beyond 15 Hz, the vibrations of the vehicle are not a problem due to the response time of the eye, which automatically integrates these rapid changes in the headlight position. The less pronounced frequencies between 2 and 15 Hz are filtered to a certain extent by the suspension of the vehicle and thus reach the headlights in attenuated form. However, these frequencies are a nuisance even in attenuated form.

The adjustment devices developed so far have the serious disadvantage of causing a phase shift between the rocking instant of the vehicle and the response of the correction device when phenomena arise that have a frequency that is equal to or higher than the limit frequency of the system carrying out the filtering. For example, if the limit frequency is 2 Hz, more rapid phenomena than those resulting from block pavement reach the actuating organs of the headlights despite being attenuated by the filtering and thus may cause certain uncomfortable physiological conditions due to the phase shift. In movements of the vehicle on block pavement, the correction may intervene precisely in phase opposition in relation to the pitch vibrations of the vehicle. For example, the headlights happen to be directed upward at the same moment that the front part of the vehicle body is executing an upward movement as well.

Another unpleasant effect of the existing adjustment devices is that their correction organs are constantly stressed in the presence of rapid phenomena, so that the service life is relatively short.

According to the invention, a device for the dynamic adjustment of the headlights of a vehicle is to be provided, which no longer has the aforementioned disadvantages and allows pleasant night-time driving under all driving conditions and regardless of the state of the road.

The device according to the invention is characterized by the fact that the filter includes filter elements and that a variable characteristic of the frequency separation as a function of the amplitude of the position signals of the sensors is ensured via the filter elements.

Due to these features, the device according to the invention is able to differentiate between phenomena that require correction, and those for which a correction is undesired on account of the unavoidable phase shift that would arise between the interference phenomenon and the headlight correction.

One first specific embodiment of the invention is characterized by the fact that the filter includes threshold value elements, via which at least one amplitude threshold is able to be defined, for which the filter predefines a limit frequency. This allows a precise adaptation of the features of the filter to the different interference phenomena requiring an adjustment of the headlight position.

One further advantageous specific embodiment is characterized by the fact that the limit frequency of the filter amounts to approximately 2 Hz for an amplitude above the amplitude thresholds, and to approximately 0.3 Hz for an amplitude below the amplitude thresholds. Thus, the high frequency signals between 2 and 5 Hz having a weak amplitude due to movement on block pavement, for example, are not taken into account and thus are also unable to have an adverse effect on driving comfort.

One preferred specific embodiment of the invention is characterized in that the filter is electric and includes an L-shaped RC element, the RC element is made up of a series resistor and a parallel capacitor, an antiparallel circuit of two rectifiers is switched in parallel with the series resistor, and the amplitude thresholds are specifiable via the internal resistances in the throughput direction.

According to another feature, the rectifiers are diodes. The diodes are advantageously switched in series with a resistor for adjusting the switch-off threshold.

The specific embodiment described has the advantage of being easily adaptable to a static adjustment device for the position of headlights of a vehicle, utilizing two simple diodes and two resistors, the cost of which is relatively low.

However, it became obvious that the absolute value of the mentioned thresholds must be high enough to eliminate the fluctuations having a low amplitude, which, for example, arise when the vehicle is driving on block pavement, especially at medium speeds. This has the result that movements having a medium amplitude due to accelerations or decelerations of the vehicle are no longer taken into account in certain cases, and the device no longer intervenes to regulate the position of the headlights in such instances. This lack of adjustment in the presence of such movements becomes more bothersome the more important the range and precision of the headlights become.

Therefore, in a second specific embodiment, the invention intends to provide a device for dynamically adjusting the headlights of a vehicle as a function of the relative position of the wheels in relation to the body, the response of the device in movements having a low amplitude such as movements related to driving over block pavement or thresholds, for example, being effectively suppressed. In so doing, the device is to ensure an effective dynamic adjustment at other movements having a low or medium amplitude, at least in cases where this is important for driving and for safety on the road.

The invention thus also relates to a second specific embodiment of a device of the above type, in which components define two amplitude thresholds which are related to the movements of the body in relation to the wheels, for which the filter defines a limit frequency in each case. This device is characterized by different absolute values of the amplitude thresholds; that is to say, the absolute value of the amplitude threshold for the movements caused by accelerations lies below the absolute value of the amplitude threshold for the movements caused by decelerations. For instance, the threshold with regard to signals in connection with an acceleration is specified as a low value sufficient to respond to slight accelerations which are a nuisance to drivers of oncoming vehicles, while the threshold for signals in connection with a braking operation or a decrease in speed has a very high amplitude. It came as a surprise to discover that such a control of the values of the thresholds achieves complete vanishing of the undesired reactions that provoke rocking; when driving over block pavement, for example, an effective adjustment of the headlights in response to the movements caused by even the slightest acceleration is ensured, which considerably increases road safety, in particular.

On the other hand, it is obvious that the device does not bring about a correction of the headlight position when slight decelerations take place. However, this is not a problem because the light beam is lowered in this case, which has no adverse effect on road safety.

According to one advantageous development of the second specific embodiment of the invention, the limit frequency of the filter amounts to 1 to 2 Hz for a signal that exceeds the threshold for the acceleration, or a signal (having the opposite algebraic sign that exceeds the other threshold for the deceleration, while the switch-off frequency amounts to 0.15 Hz when the signal does not exceed the one or the other threshold according to its algebraic sign.

For instance, the signals between 0.15 and 2 Hz having a weak amplitude resulting from movement on block pavement are not taken into account. On the other hand, an acceleration signal having a frequency on the order of magnitude of 1 Hz and an amplitude that is barely higher than that of the signals resulting from movement on the block pavement is taken into account, and the actuating device intervenes to correct the headlight position. The device is advantageously constructed in such a way that the filter is electric and has an L-shaped RC element, the RC element is made up of a series resistor and a parallel capacitor, an antiparallel circuit of two rectifier units is switched in parallel to the series resistor, and the rectifier units have different internal resistances in the throughput direction, so that the amplitude thresholds are specified.

For example, the difference between the internal thresholds is achievable by installing a number of standard rectifiers greater than that of the other rectifier unit in the one rectifier unit, i.e., the unit that lets through the electrical signal related to the relative positions that correspond to the braking or the deceleration. As a variant, standard rectifiers may be used, e.g., diodes having different internal thresholds. The rectifiers of each unit are preferably switched in series with an adjustable resistor.

For a better understanding of the invention, two specific embodiments are described in the following text with the aid of the appended drawing; the figures show:

Fig. 1 a basic circuit diagram of a device according to a first specific embodiment of the invention,

Fig. 2 a diagram showing the operation of the device according to Fig. 1 by comparing two curves,

Fig. 3 a basic circuit diagram of a device according to a second specific embodiment of the invention, and

Fig. 4 a diagram analogous to the diagram from Fig. 2, to illustrate the operation of the device according to Fig. 3.

The device shown in Fig. 1 has a first sensor 1 between the front axle and the body of the vehicle in order to detect a relative movement. A corresponding sensor 2 is situated on the rear axle.

The signals generated by sensors 1,2 are processed in a mixer stage 3, where a signal is generated that represents the vibration or rocking motion of the vehicle in the course of its movement.

The output of mixer stage 3 is connected to a low-pass filter 4, which in this case is formed by an RC element 5 mounted in an L-shape.

The output of filter 4 is connected to a control and amplifier device 6, which outputs a power signal to actuating organs 7, which causes headlights 8 to move.

Filter 4 has a series resistor 9 and a parallel capacitor 10. Two diodes 11 and 12 switched in antiparallel manner are switched in parallel with series resistor 9, the diodes each being connected in series with an adjustable resistor 13 and 14.

If the amplitude of the input signal of filter 4 exceeds amplitude thresholds $s_1$, $s_2$ of diodes 11 and 12, they become transmissive to corresponding signals, so that the value of the series resistor of RC element 5 drops. Time constant RC drops as well, and the limit frequency becomes higher. That is to say, filter 4 causes a gradation of its limit frequency as a function of the amplitude of the signal supplied to it.

In the case illustrated, in which commercially available diodes 11,12 are used, their internal resistance is insufficient to achieve a limit frequency of 2 Hz. This is why the series connection of adjustable resistors 13 and 14 is provided.

The operation of the device can be gathered from Fig. 2:

fe is the frequency of input signal $S_E$ of filter 4, and fc is the frequency of output signal $S_S$. It is apparent that frequency fe of the input signal lies below limit frequency fc of filter 4 during time A. In this way the signal at the output is completely restored again. This case is used in a static correction, e.g., when the loading of the vehicle is varied.

During time B, frequency fe is higher than the limit frequency of the filter, but the amplitude of the input signal lies below amplitude thresholds $s_1$, $s_2$, which are specified by diodes 11 and 12, so that the signal passes through filter 4 without restriction. At the output, the average value of the input signal is restored again, whereas the high frequency signal is deleted by filter 4. This corresponds to rolling on block pavement.

During time C, frequency fe is also higher than limit frequency fc, but the amplitude of the signal exceeds amplitude thresholds $s_1$, $s_2$ defined by diodes 11,12. The high-frequency signal undergoes no phase shift, but it is reduced in its amplitude by the value of amplitude thresholds $s_1$, $s_2$. This case corresponds to rolling on a road that is in very poor condition.

D relates to brutal braking on a poor road. As soon as the input signal exceeds the value of amplitude thresholds $s_1$,$s_2$, it can be found again at the output, reduced by the value of amplitude thresholds $s_1,s_2$. If the phenomenon drags on, a value that is identical to the input signal may be obtained at the output with the aid of filter 4.

The limit frequencies of filter 4 are selectable, e.g., 2 Hz for strong amplitudes, 0.3 Hz for low amplitudes. In the latter case, damping of the signal is therefore important. The phase shift experienced at higher frequencies has no effect on the setting of the headlights.

As can be gathered from Fig. 3, the device includes a first sensor 101, which is mounted between the front axle and the vehicle body for the purpose of detecting the relative movements. Another sensor 102 is assigned to the rear axle. The signals generated by sensors 101,102 are processed in a mixer stage 103, where a signal is generated that represents the rocking or vibration of the vehicle in the course of its movement. The output of mixer stage 103 is connected to a low-pass filter 104, which is formed by an RC element 105 in L-shape. The output of filter 104 is connected to a control and amplifier device 106, which outputs a power signal to actuating organs 107 bringing about the movements of headlights 108 of the vehicle. Filter 104 has a series resistor 109 and a parallel capacitor 110. An antiparallel circuit of two diode units 111,112 is switched in parallel to series resistor 109. One unit has two diodes 111, and the other has three diodes 112. Each unit is switched in series with an adjustable resistor 113 and 114 respectively.

The operation of the device can be gathered from Fig. 4:

fe is the frequency of input signal SE of filter 1, and fc the frequency of output signal SS. It is apparent that the frequency of input signal fe lies below limit frequency fc of filter 104 during time A. Thus, the signal is completely restored at the output, which brings about the correction.

This case exists in a static correction, for example, when the load of the vehicle is varied.

During time B, frequency fe is higher than limit frequency fc of the filter, but the high-frequency amplitude of the input signal is not only lower than the absolute value of amplitude threshold $s_1$ according to the deceleration, but also lower than the value of amplitude threshold $s_2$ according to the acceleration, so that the signal passes filter 104 without restriction. Only the average value of the input signal is restored again at the output, whereas the high-frequency signal is eliminated by filter 104. This case corresponds to rolling on block pavement.

During time C, which corresponds to a slight acceleration, it can be seen that the amplitude of signal $S_E$ exceeds amplitude threshold $s_2$ of the acceleration. This translates into a modification of signal $S_S$ at the output and thus into a correction of the headlights, which are lowered slightly.

During time D, which corresponds to a slight deceleration which causes a change having virtually the same amplitude as in acceleration C, no change takes place in signal $S_S$ because the amplitude remains below amplitude threshold $s_1$.

Only when the braking is stronger, as during time E, where amplitude threshold $s_1$ has now been exceeded, does a change in the signal occur on curve $S_S$ in response to the braking operation. The limit frequencies of filter 104 are selectable, e.g., 1 to 2 Hz for strong amplitudes, and 0.15 Hz for weak amplitudes.

It should be noted that the diodes switched in antiparallel manner may advantageously be replaced by Zener diodes switched in series.

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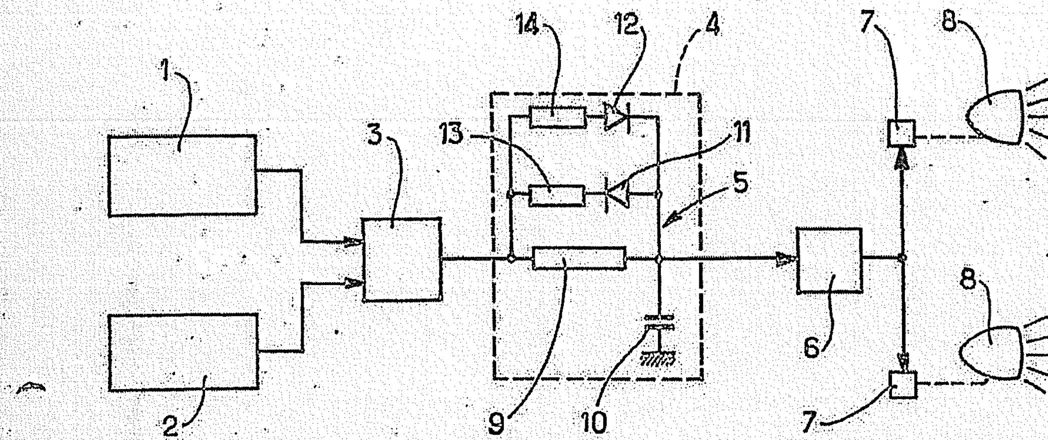


FIG. 1

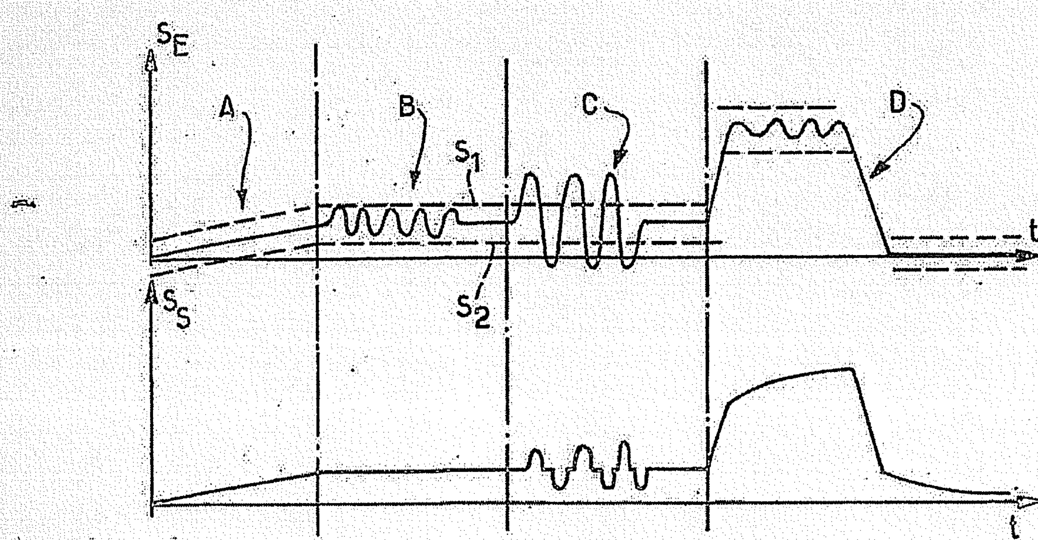


FIG. 2

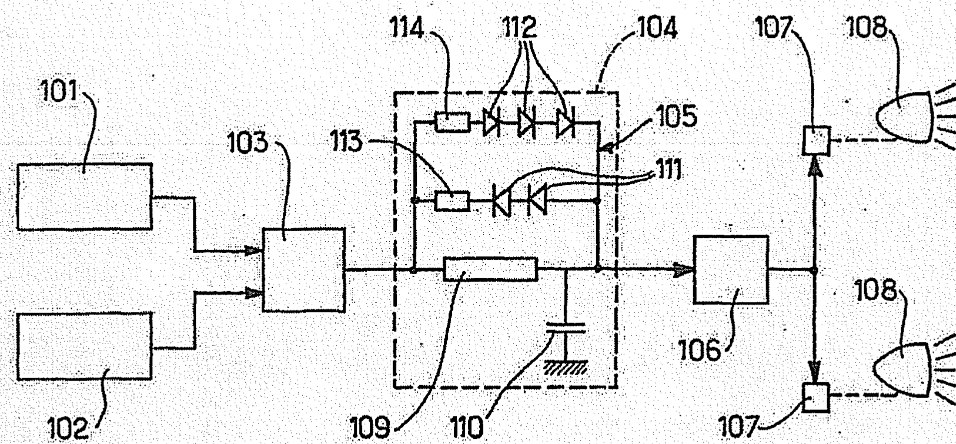
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FIG. 3

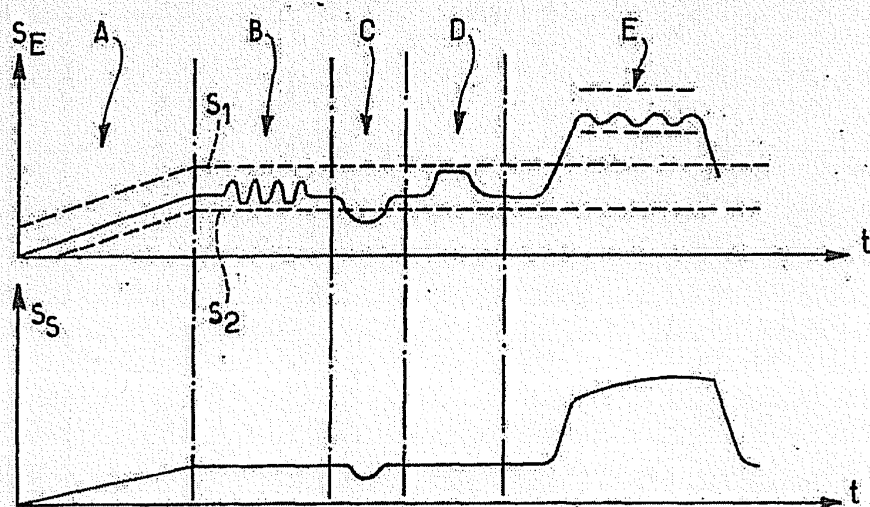
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FIG. 4

⑲ BUNDESREPUBLIK DEUTSCHLAND

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⑫ **Offenlegungsschrift**

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㊹ **»Vorrichtung zur dynamischen Einstellung der Stellung von Scheinwerfern eines Fahrzeuges«**


Gezeigt und beschrieben wird eine Vorrichtung zur dynamischen Einstellung der Stellung von Scheinwerfern (8) eines Fahrzeuges in Abhängigkeit von der relativen Position der Räder in bezug auf die Karosserie mit zwei Fühlern (1, 2) zur Lieferung von der relativen Position entsprechenden Signalen und mit in Verbindung mit den Scheinwerfern (8) stehenden Betätigungsorganen (7), wobei die Betätigungsorgane (7) durch eine Steuervorrichtung (6) steuerbar sind und wobei die Steuervorrichtung (6) durch das Positionssignal über ein Tiefpaßfilter (4) unerwünschte Frequenzen des Positionssignales ableitbar sind. Um bei Fahrzeugen eine angenehme Nachtfahrt unter allen Fahrbedingungen und unabhängig vom Straßenzustand zu ermöglichen, weist das Filter (4) Filterelemente (11 bis 14) auf, über die eine variable Charakteristik der Frequenzabtrennung in Abhängigkeit von der Amplitude der Positionssignale der Fühler (1, 2) gewährleistet ist.
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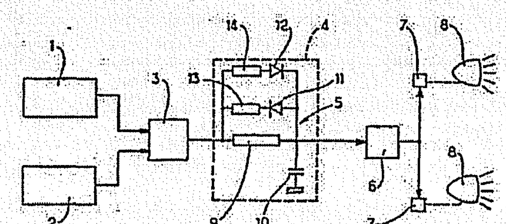


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## Patentansprüche:

1. Vorrichtung zur dynamischen Einstellung der Stellung von Scheinwerfern eines Fahrzeuges in Abhängigkeit von der relativen Position der Räder in Bezug auf die Karosserie, mit mindestens einem Fühler zur Lieferung eines der relativen Position entsprechenden Signales und mit in Verbindung mit den Scheinwerfern stehenden Betätigungsorganen, wobei die Betätigungsorgane durch eine Steuervorrichtung steuerbar sind und die Steuervorrichtung durch das Positionssignal über ein Tiefpaßfilter schaltbar ist und wobei über das Tiefpaßfilter unerwünschte Frequenzen des Positionssignales ableitbar sind, d a d u r c h g e k e n n z e i c h n e t , daß das Filter (4;104) Filterelemente (11 bis 14; 111 bis 114) aufweist und daß über die Filterelemente (11 bis 14; 111 bis 114) eine variable Charakteristik der Frequenzabtrennung in Abhängigkeit von der Amplitude der Positionssignale der Fühler (1,2;101,102) gewährleistet ist.

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2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß das Filter (4;104) Schwellwertelemente (11,12; 111,112) aufweist, über die mindestens eine Amplitudenschwelle ($s_1$, $s_2$) definierbar ist, für die das Filter (4;104) eine Grenzfrequenz vorbestimmt.

3. Vorrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Grenzfrequenz des Filters (4;104) für eine Amplitude über den Amplitudenschwellen ($s_1$,$s_2$) etwa 2 Hz und für eine Amplitude unter den Amplitudenschwellen ($s_1$,$s_2$) etwa 0,3 Hz beträgt.

4. Vorrichtung nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß das Filter (4;104) elektrisch ist und ein L-förmiges RC-Glied (5;105) aufweist, daß das RC-Glied (5;105) aus einem Serienwiderstand (9;109) und einem Parallelkondensator (10;110) besteht, daß dem Serienwiderstand (9;109) eine Antiparallelschaltung zweier Gleichrichter (11,12;111,112) parallel geschaltet ist und daß über die Innenwiderstände in Durchgangsrichtung die Amplitudenschwellen ($s_1$,$s_2$) festlegbar sind.

5. Vorrichtung nach einem der Ansprüche 1 bis 4, wobei über Filterelemente zwei Amplitudenschwellen festlegbar sind, die mit den Bewegungen der Karosserie in Bezug auf die Räder in Beziehung stehen, dadurch gekennzeichnet, daß die Absolutwerte der Amplitudenschwellen ($s_1$,$s_2$) unterschiedlich sind, daß nämlich

der Absolutwert der Amplitudenschwelle ($s_2$) für die durch Beschleunigungen erzeugten Bewegungen unter dem Absolutwert der Amplitudenschwelle ($s_1$) für die durch Verzögerungen erzeugten Bewegungen liegt.

6. Vorrichtung nach einem der Ansprüche 1 bis 5, dadurch gekennzeichnet, daß die Grenzfrequenz des Filters (4;104) 1 bis 2 Hz für Schwankungen des Positionssignales ($S_E$) beträgt, die die Amplitudenschwelle ($s_2$) für die Beschleunigung oder die Amplitudenschwelle ($s_1$) für die Verzögerung überschreiten und daß die Grenzfrequenz im übrigen, d.h. wenn die Schwankungen weder die eine noch die andere Amplitudenschwelle ($s_1$, $s_2$) überschreiten, 0,15 Hz beträgt.

7. Vorrichtung nach Anspruch 5 oder 6, dadurch gekennzeichnet, daß das Filter (104) elektrisch ist und ein L-förmiges RC-Glied (105) aufweist, daß das RC-Glied (105) aus einem Serienwiderstand (109) und einem Parallelkondensator (110) besteht, daß dem Serienwiderstand (109) eine Antiparallelschaltung zweier Gleichrichtereinheiten (111,112) parallel geschaltet ist und daß die Gleichrichtereinheiten (111,112) verschiedene Innenwiderstände in Durchgangsrichtung aufweisen, so daß die Amplitudenschwellen ($s_1$,$s_2$) festgelegt sind.

8. Vorrichtung nach Anspruch 7, dadurch gekennzeichnet, daß die Gleichrichtereinheiten (111, 112) jeweils mehrere voneinander verschiedene Einheitsgleichrichter aufweisen.

9. Vorrichtung nach einem der Ansprüche 1 bis 8, dadurch gekennzeichnet, daß als Gleichrichter (11,12;111,112) Dioden vorgesehen sind.

10. Vorrichtung nach einem der Ansprüche 1 bis 9, dadurch gekennzeichnet, daß die Gleichrichter (11,12;111,112) jeweils in Serie mit einem Einstellwiderstand (13,14;113,114) geschaltet sind.

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Vorrichtung zur dynamischen Einstellung der Stellung von Scheinwerfern eines Fahrzeuges

Die Erfindung betrifft eine Vorrichtung zur dynamischen Einstellung der Stellung von Scheinwerfern eines Fahrzeuges in Abhängigkeit von der relativen Position der Räder in Bezug auf die Karosserie, mit mindestens einem Fühler zur Lieferung eines der relativen Position entsprechenden Signales und mit in Verbindung mit den Scheinwerfern stehenden Betätigungsorganen, wobei die Betätigungsorgane durch eine Steuervorrichtung steuerbar sind und die Steuervorrichtung durch das Positionssignal über ein Tiefpaßfilter schaltbar ist und wobei über das Tiefpaßfilter unerwünschte Frequenzen des Positionssignales ableitbar sind, insbesondere für ein Auto.

Man hat bereits Vorrichtungen für die Korrektur der Scheinwerferstellung eines Fahrzeuges gebaut, wobei einige statisch, einige dynamisch waren.

Die statischen Korrekturvorrichtungen haben eine relativ lange Ansprechzeit und verstellen die Scheinwerfer des Fahrzeuges abhängig von der Last und deren Verteilung zwischen Vorder- und Hinterachse. Eine solche Vorrichtung kann nicht tätig werden, wenn das Fahrzeug sich bewegt.

Es sind auch schon Vorrichtungen mit dynamischer Einstellung konstruiert worden, um eine adäquate Position der Scheinwerfer bei allen Fahrbedingungen des Fahrzeuges zu gewährleisten. Eine Vorrichtung hat Korrekturorgane in Verbindung mit den Scheinwerfern und funktioniert durch Schwerkraft (z.B. Pendel). Diese Vorrichtung hat den Nachteil, daß sie die Scheinwerfer nicht passend einstellen kann, wenn das Fahrzeug auf einem Abhang rollt.

Andere dynamische Einstellvorrichtungen haben Fühler über die die relative Position beim Schwanken oder Schaukeln von vorn nach hinten bei der Karosserie in Bezug auf die Räder feststellbar ist. Diese Fühler wirken über ein Korrekturfilter auf Betätigungsorgane, die die Position der Scheinwerfer abhängig von dem durch die Fühler gelieferten Signal ändern sollen. Einige Vorrichtungen sind hydraulisch und in diesem Fall wird die Filterung der unerwünschten Signale mit erhöhter Frequenz (insbesondere derjenigen aufgrund von Bewegungen des Fahrzeuges auf Pflaster) an den Leitungen des hydraulischen Systems vorgenommen. Wenn die Einrichtung zur Verstellung elektrisch ist, bewirkt man die Filterung durch ein elektrisches Tiefpaßfilter.

Die Störerscheinungen aufgrund des Wegezustandes und der Fahrzeugbedingungen, die eine Korrektur der Stellung der Scheinwerfer verlangen, sind zahlreich:

- Pflaster verursacht Störungen mit relativ hoher Frequenz von 5 bis 15 Hz;

- Löcher und Schwellen können Stampfschwingungen von 5 bis 10 Hz verursachen, aber diese Störungen sind relativ selten und für die Fahrweise relativ wenig hinderlich;

- plötzliche Beschleunigungen und Bremsungen bringen Schwankungen in der Grössenordnung von 1 bis 2 Hz mit sich.

Jenseits von 15 Hz sind die Schwingungen des Fahrzeuges wegen der Ansprechzeit des Auges, das diese schnellen Änderungen der Scheinwerferposition automatisch integriert, nicht hinderlich. Die weniger hohen Frequenzen zwischen 2 und 15 Hz werden in einem gewissen Umfang durch die Federung des Fahrzeuges gefiltert und gelangen daher in abgeschwächter Form an die Scheinwerfer. Jedoch bleiben diese Frequenzen auch in abgeschwächter Form lästig.

Die bisher entwickelten Einstellvorrichtungen haben den ernsten Nachteil einer Phasenverschiebung zwischen der Zeit des Schaukelns des Fahrzeuges und der Reaktion der Korrekturvorrichtung bei Erscheinungen, deren Frequenz gleich oder höher ist als die Grenzfrequenz des die Filterung bewirkenden Systems. Wenn z.B. die Grenzfrequenz 2 Hz ist, gelangen schnellere Phänomene als diejenigen aufgrund von Pflaster, obwohl sie durch die

Filterung abgeschwächt sind, trotzdem zu den Betätigungsorganen der Scheinwerfer und können so durch die Phasenverschiebung bestimmte physiologische Unbehaglichkeiten mit sich bringen. Bei Bewegungen des Fahrzeuges auf Pflaster kann die Korrektur gerade gegenphasig in Bezug auf Stampfschwingungen des Fahrzeuges eingreifen. Die Scheinwerfer sind z.B. gerade in dem Augenblick nach oben orientiert, in dem das Vorderteil der Karosserie des Fahrzeuges auch eine Bewegung nach oben ausführt.

Eine andere Unannehmlichkeit der vorhandenen Einstellvorrichtungen besteht darin, daß bei schnellen Phänomenen ihre Korrekturorgane ständig gefordert werden und so die Lebensdauer relativ gering ist.

Gemäß der Erfindung soll eine Vorrichtung zur dynamischen Einstellung der Scheinwerfer eines Fahrzeuges geschaffen werden, die die oben erwähnten Nachteile nicht besitzt und eine angenehme Nachtfahrt unter allen Fahrbedingungen und unabhängig vom Straßenzustand zulässt.

Die erfindungsgemäße Vorrichtung ist dadurch gekennzeichnet, daß das Filter Filterelemente aufweist und daß über die Filterelemente eine variable Charakteristik der Frequenzabtrennung in Abhängigkeit von der Amplitude der Positionssignale der Fühler gewährleistet ist.

Dank dieser Merkmale ist die erfindungsgemäße Vorrichtung in der Lage, eine Unterscheidung vorzunehmen zwischen den Erscheinungen, die eine Korrektur verlangen und denjenigen, bei denen eine Korrektur aufgrund der unvermeidlichen Phasenverschiebung, die es zwischen dem Störphänomen und der Korrektur der Scheinwerfer geben würde, unerwünscht ist.

Eine erste Ausführungsform der Vorrichtung ist dadurch gekennzeichnet, daß das Filter Schwellwertelemente aufweist, über die mindestens eine Amplitudenschwelle definierbar ist, für die das Filter eine Grenzfrequenz vorbestimmt. Auf diese Weise können die Merkmale des Filters mit Genauigkeit den verschiedenen Störerscheinungen angepaßt werden, die eine Verstellung der Scheinwerferposition verlangen.

Eine weitere vorteilhafte Ausführungsform ist dadurch gekennzeichnet, daß die Grenzfrequenz des Filters für eine Amplitude über den Amplitudenschwellen etwa 2 Hz und für eine Amplitude unter den Amplitudenschwellen etwa 0,3 Hz beträgt. So werden die Hochfrequenzsignale zwischen 2 und 5 Hz und mit schwacher Amplitude aufgrund einer Bewegung auf Pflaster z.B. nicht berücksichtigt und können daher auch nicht der Fahrannehmlichkeit schaden.

Eine bevorzugte Ausführungsform der Erfindung ist dadurch gekennzeichnet, daß das Filter elektrisch ist und ein L-förmiges RC-Glied aufweist, daß das RC-Glied aus einem Serienwiderstand und einem Parallelkondensator besteht, daß dem Serienwiderstand eine Antiparallelschaltung zweier Gleichrichter parallel geschaltet ist und daß über die Innenwiderstände in Durchgangsrichtung die Amplitudenschwellen festlegbar sind.

Gemäß einem anderen Merkmal sind die Gleichrichter Dioden. Vorteilhafterweise sind die Dioden in Serie mit einem Widerstand für die Einstellung der Abschaltschwelle geschaltet.

Die Ausführungsform, die beschrieben wird, hat den Vorteil, daß sie leicht an eine statische Einstellvorrichtung für die Position von Scheinwerfern eines Fahrzeuges mittels Benutzung von zwei einfachen Dioden und von zwei Widerständen angepaßt werden kann, deren Kosten nicht sehr hoch sind.

Man konnte aber beobachten, daß der absolute Wert der genannten Schwellen ausreichend hoch sein muß, um die Schwankungen mit geringer Amplitude auszuschalten, die sich z.B. ergeben, wenn das Fahrzeug auf Pflaster fährt, insbesondere bei mittleren Geschwindigkeiten. Daraus ergibt sich, daß in bestimmten Fällen Bewegungen mittlerer Amplitude aufgrund von Beschleunigungen oder Verzögerungen des Fahrzeuges nicht mehr berücksichtigt werden, und daß die Einrichtung in diesen Fällen nicht eingreift, um die Position der Scheinwerfer zu regeln. Dieser Ein-stellungsmangel bei solchen Bewegungen wird umso lästiger, je bedeutsamer Reichweite und Genauigkeit der Scheinwerfer werden.

In einer zweiten Ausführungsform beabsichtigt die Erfindung daher, eine Vorrichtung zur dynamischen Einstellung der Scheinwerfer eines Fahrzeuges abhängig von der relativen Position der Räder in Bezug auf die Karosserie zu liefern, wobei die Reaktion der Vorrichtung bei Bewegungen mit geringer Amplitude wirksam unterdrückt wird, wie z.B. Bewegungen, die mit der Fahrt über Pflaster oder Schwellen in Verbindung stehen. Die Vorrichtung soll dabei eine wirksame dynamische Einstellung bei anderen Bewegungen mit geringer oder mittlerer Amplitude gewährleisten, zumindest in den Fällen, die für das Fahren und die Sicherheit auf der Straße wichtig sind.

Die Erfindung bezieht sich daher auch auf eine zweite Ausführungsform einer Vorrichtung des obigen Typs, bei der Bestandteile zwei Amplitudenschwellen definieren, welche mit den Bewegungen der Karosserie in Bezug auf die Räder in Verbindung stehen, für deren jede das Filter eine Grenzfrequenz bestimmt. Diese Vorrichtung ist dadurch gekennzeichnet, daß die Absolutwerte der Amplitudenschwellen unterschiedlich sind, daß nämlich der Absolutwert der Amplitudenschwelle für die durch Beschleunigungen erzeugten Bewegungen unter dem Absolutwert der Amplitudenschwelle für die durch Verzögerungen erzeugten Bewegungen liegt. So wird die Schwelle in Bezug auf Signale in Verbindung mit einer Beschleunigung festgelegt auf einen ausreichend schwachen Wert, um auf geringfügige Beschleunigungen anzusprechen, die für Fahrer entgegenkommender Fahrzeuge lästig sind, während die Schwelle für Signale in Verbindung mit einer Bremsung oder Geschwindigkeitsabnahme eine sehr große Amplitude hat. Überraschenderweise hat man festgestellt, daß bei einer solchen Regelung der Werte der Schwellen ein komplettes Verschwinden der unerwünschten Reaktionen erzielt wird, die ein Schwanken hervorrufen, z.B. bei einer Fahrt über Straßenpflaster, wobei eine wirksame Einstellung der Scheinwerfer auf die durch eine noch so geringe Beschleunigung hervorgerufenen Bewegungen gewährleistet wird, was insbesondere die Sicherheit auf der Straße wesentlich erhöht.

Andererseits stellt man fest, daß die Vorrichtung bei geringen Verzögerungen keine Korrektur der Scheinwerferstellung bewirkt. Dies ist nicht lästig, weil sich in diesem Fall das Lichtbündel senkt, was keinen Nachteil für die Sicherheit auf der Straße nach sich zieht.

Gemäß einer vorteilhaften Gestaltung der zweiten Ausführungsform der Erfindung beträgt die Grenzfrequenz des Filters 1 bis 2 Hz bei einem Signal, das die Schwelle für die Beschleunigung überschreitet, oder einem Signal (mit entgegengesetztem Vorzeichen das die andere Schwelle für die Verzögerung überschreitet, während die Abschaltfrequenz 0,15 Hz beträgt, wenn das

Signal nicht gemäß seinem Vorzeichen die eine oder andere Schwelle überschreitet.

So werden die Signale zwischen 0,15 und 2 Hz mit schwachter Amplitude, die sich aus der Bewegung auf Pflaster ergeben, nicht berücksichtigt. Dagegen wird ein Beschleunigungssignal mit einer Frequenz in der Rangordnung von 1 Hz und einer Amplitude, die kaum höher ist als diejenige der Signale, die sich durch Bewegung auf dem Pflaster ergeben, berücksichtigt und es erfolgt ein Eingreifen der Stellvorrichtung für die Korrektur der Scheinwerferposition. Vorteilhafterweise ist dabei die Vorrichtung so konstruiert, daß das Filter elektrisch ist und ein L-förmiges RC-Glied aufweist, daß das RC-Glied aus einem Serienwiderstand und einem Parallelkondensator besteht, daß dem Serienwiderstand eine Antiparallelschaltung zweier Gleichrichtereinheiten parallel geschaltet ist und daß die Gleichrichtereinheiten verschiedene Innenwiderstände in Durchgangsrichtung aufweisen, so daß die Amplitudenschwellen festgelegt sind.

Der Unterschied zwischen den Innenschwellen kann z.B. erzielt werden, indem man in der einen Gleichrichtereinheit, nämlich derjenigen, die das elektrische Signal durchläßt, das mit den relativen Positionen verbunden ist, welche der Bremsung oder der Verzögerung entsprechen, eine Anzahl von Einheitsgleichrichtern anbringt, die größer ist als die der anderen Gleichrichtereinheit. Als Variante kann man Einheitsgleichrichter verwenden, z.B. Dioden, die verschiedene Innenschwellen haben. Die Gleichrichter jeder Einheit sind vorzugsweise in Serie geschaltet mit einem Einstellwiderstand.

Zum besseren Verständnis der Erfindung werden nachstehend zwei Ausführungsformen anhand der beigefügten Zeichnung beschrieben; es zeigt:

Fig. 1 ein Grundschaltbild einer Vorrichtung gemäß einer ersten Ausführungsform der Erfindung,

Fig. 2 ein Diagramm, das den Betrieb der Vorrichtung gem. Fig. 1 durch den Vergleich von zwei Kurven zeigt,

Fig. 3 ein Grundschaltbild einer Vorrichtung gemäß einer zweiten Ausführungsform der Erfindung und

Fig. 4 ein Diagramm analog demjenigen der Fig. 2 zur Darstellung des Betriebs der Vorrichtung gemäß Fig. 3.

Die in Fig. 1 dargestellte Vorrichtung hat einen ersten Fühler 1 zwischen der Vorderachse und der Karosserie des Fahrzeuges, um eine relative Bewegung zu entdecken. Ein entsprechender Fühler 2 befindet sich an der Hinterachse.

Die von den Fühlern 1,2 erzeugten Signale werden in einer Mischstufe 3 behandelt, in der ein Signal erzeugt wird, das die Schwingung oder Schaukelbewegung des Fahrzeuges im Verlauf seiner Bewegung darstellt.

Der Ausgang der Mischstufe 3 ist mit einem Tiefpaßfilter 4 verbunden, das in diesem Beispiel durch ein RC-Glied 5, das in L-Form montiert ist, gebildet wird.

Der Ausgang des Filters 4 ist mit einer Steuer- und Verstärkervorrichtung 6 verbunden, die ein Leistungssignal an Betätigungsorgane 7 abgibt, welche Bewegungen der Scheinwerfer 8 hervorrufen.

Das Filter 4 hat einen Serienwiderstand 9 und einen Parallelkondensator 10. Dem Serienwiderstand 9 sind zwei antiparallel geschaltete Dioden 11 und 12, die jeweils in Serie mit einem Einstellwiderstand 13 und 14 liegen, parallel geschaltet.

Wenn die Amplitude des Eingangssignals des Filters 4 die Amplitudenschwellen $s_1, s_2$ der Dioden 11 und 12 überschreitet, werden diese für entsprechende Signale durchgängig, so daß der Wert des Serienwiderstandes des RC-Gliedes 5 sinkt.Die Zeitkonstante RC sinkt ebenfalls und die Grenzfrequenz wird höher. Das Filter 4 bewirkt also eine Abstufung seiner Grenzfrequenz in Abhängigkeit von der Amplitude des Signals, das ihm geliefert wird.

In dem dargestellten Fall, in dem man handelsübliche Dioden 11,12 verwendet, ist deren Innenwiderstand nicht ausreichend, um eine Grenzfrequenz von 2 Hz zu erzielen. Deshalb sind die Einstellwiderstände 13 und

14 in Serie vorgesehen.

Der Betrieb der Vorrichtung geht aus Fig. 2 hervor:

fe sei die Frequenz des Eingangssignals $S_E$ des Filters 4 und fc diejenige des Ausgangssignals $S_S$. Man sieht, daß während der Zeit A die Frequenz fe des Eingangssignals unter der Grenzfrequenz fc des Filters 4 liegt. So ist das Signal am Ausgang uneingeschränkt wiederhergestellt. Dieser Fall findet bei einer statischen Korrektur Anwendung, z.B. wenn die Belastung des Fahrzeuges geändert wird.

Während der Zeit B ist die Frequenz fe höher als die Grenzfrequenz des Filters, aber die Amplitude des Eingangssignals liegt unter den Amplitudenschwellen $s_1$, $s_2$, die von den Dioden 11 und 12 gegeben werden, so daß das Signal uneingeschränkt durch den Filter 4 gelangt. Am Ausgang wird der Mittelwert des Eingangssignals wiederhergestellt, wogegen das Hochfrequenzsignal durch das Filter 4 gelöscht wird. Dieser Fall entspricht dem Rollen auf Pflaster.

Während der Zeit C ist die Frequenz fe auch höher als die Grenzfrequenz fc, aber die Amplitude des Signals übersteigt die Amplitudenschwellen $s_1$, $s_2$, die von den Dioden 11,12 gegeben werden. Das Hochfrequenzsignal erfährt keine Phasenverschiebung, sondern es wird in der Amplitude um den Wert der Amplitudenschwellen $s_1,s_2$ verringert. Dieser Fall entspricht dem Rollen auf einem Weg, der in sehr schlechtem Zustand ist.

Bei D handelt es sich um brutales Bremsen auf schlechtem Weg. Sobald das Eingangssignal den Wert der Amplitudenschwellen $s_1,s_2$ überschreitet, findet man es am Ausgang, vermindert um den Wert der Amplitudenschwellen $s_1,s_2$ wieder. Wenn das Phänomen sich hinzieht, kann man mit dem Filter 4 am Ausgang einen Wert erhalten, der mit dem Eingangssignal identisch ist.

Die Grenzfrequenzen des Filters 4 können gewählt werden, z.B. für starke Amplituden mit 2 Hz, bei geringen Amplituden mit 0,3 Hz. Im letztgenannten Fall ist also die Dämpfung des Signals wichtig. Die bei höheren Frequenzen gegebene Phasenverschiebung hat keine Wirkung auf die Einstellung der Scheinwerfer.

In Fig. 3 sieht man, daß die Vorrichtung einen ersten Fühler 101 besitzt, welcher zwischen der Vorderachse und der Karosserie des Fahrzeuges montiert ist, um die relativen Bewegungen festzustellen. Ein weiterer Fühler 102 ist der Hinterachse zugeordnet. Die durch die Fühler 101,102 erzeugten Signale werden in einer Mischstufe 103 behandelt, in der ein Signal erzeugt wird, welches das Schaukeln oder Schwingen des Fahrzeuges bei seiner Bewegung darstellt. Der Ausgang der Mischstufe 103 ist mit einem Tiefpaßfilter 104 verbunden, das durch ein RC-Glied 105 in L-Form gebildet wird. Der Ausgang des Filters 104 ist mit einer Steuer- und Verstärkungseinrichtung 106 verbunden, die ein Leistungssignal an Betätigungsorgane 107 abgibt, welche die Bewegungen der Scheinwerfer 108 des Fahrzeuges hervorrufen. Das Filter 104 hat einen Serienwiderstand 109 und einen Parallelkondensator 110. Dem Serienwiderstand 109 ist eine Antiparallelschaltung zweier Diodeneinheiten 111,112 parallel geschaltet. Die eine Einheit hat zwei Dioden 111 und die andere drei Dioden 112. Jede Einheit ist in Serie mit einem Einstellwiderstand 113 bzw. 114 geschaltet.

Der Betrieb der Vorrichtung geht aus Fig. 4 hervor:

fe sei die Frequenz des Eingangssignals SE des Filters 104 und fc diejenige des Ausgangssignals SS. Man sieht, daß in der Zeit A die Frequenz des Eingangssignals fe unter der Grenzfrequenz fc des Filters 104 liegt. Daher wird das Signal uneingeschränkt am Ausgang wiederhergestellt, was die Korrektur bewirkt. Dieser Fall liegt z.B. einer einer statischen Korrektur vor, wenn die Last des Fahrzeuges geändert wird.

In der Zeit B ist die Frequenz fe höher als die Grenzfrequenz fc des Filters, aber die Hochfrequenzamplitude des Eingangssignals ist nicht nur geringer als der absolute Wert der Amplitudenschwelle $s_1$ entsprechend der

Verzögerung, sondern auch als der Wert der Amplitudenschwelle $s_2$ entsprechend der Beschleunigung, so daß das Signal uneingeschränkt den Filter 104 passiert. Am Ausgang wird nur der mittlere Wert des Eingangssignals wiederhergestellt, wogegen das Hochfrequenzsignal durch das Filter 104 eliminiert wird. Dieser Fall entspricht dem Weg auf Pflaster.

In der Zeit C, die einer leichten Beschleunigung entspricht, sieht man, daß die Amplitude des Signals $S_E$ die Amplitudenschwelle $s_2$ der Beschleunigung überschreitet. Dies übersetzt sich in eine Veränderung des Signals $S_S$ am Ausgang und infolgedessen in eine Korrektur der Scheinwerfer, die leicht gesenkt werden.

In der Zeit D, die einer leichten Verzögerung entspricht, welche eine Änderung mit fast derselben Amplitude wie bei der Beschleunigung C bewirkt, erfolgt keine Änderung des Signals $S_S$, weil die Amplitude unter der Amplitudenschwelle $s_1$ bleibt.

Erst wenn die Bremsung stärker ist, wie in der Zeit E, wobei die Amplitudenschwelle $s_1$ diesmal überschritten wird, geschieht auf der Kurve $S_S$ eine Änderung des Signals, als Antwort auf die Bremsung. Die Grenzfrequenzen des Filters 104 können gewählt werden, z.B. für starke Amplituden 1 bis 2 Hz und für schwache Amplituden 0,15 Hz.

29.07.81



Man kann im übrigen in vorteilhafter Weise die antiparallel geschalteten Dioden durch in Serie geschaltete Zenerdioden ersetzen.

• 21.
Leerseite

NACHGEREICHT
3129891
Nummer: 3129891
Int. Cl.³: B 60 Q 1/08
Anmeldetag: 29. Juli 1981
Offenlegungstag: 9. Juni 1982

- 23 -

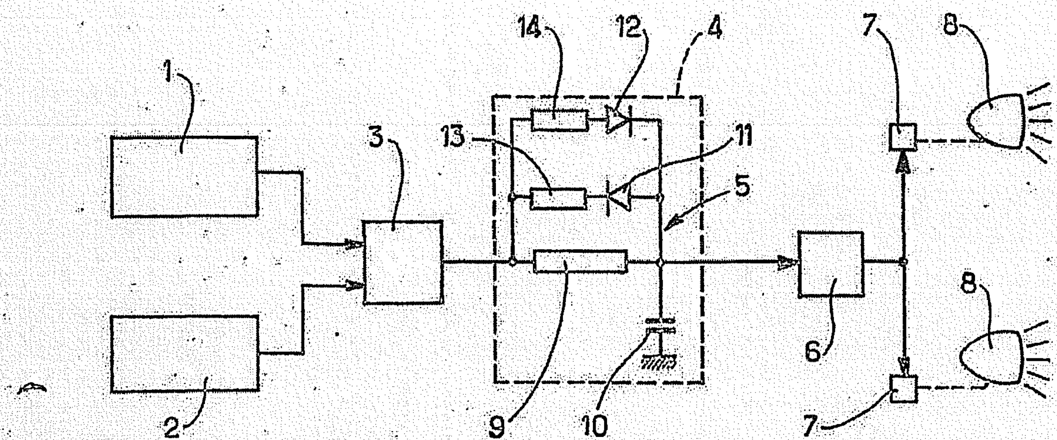


FIG. 1

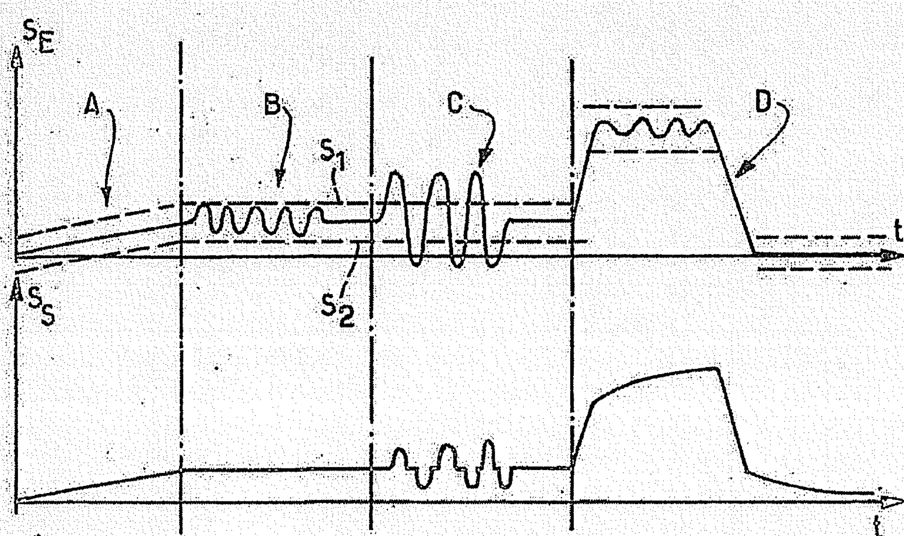


FIG. 2

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NACHGEREICHT

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- 22 -

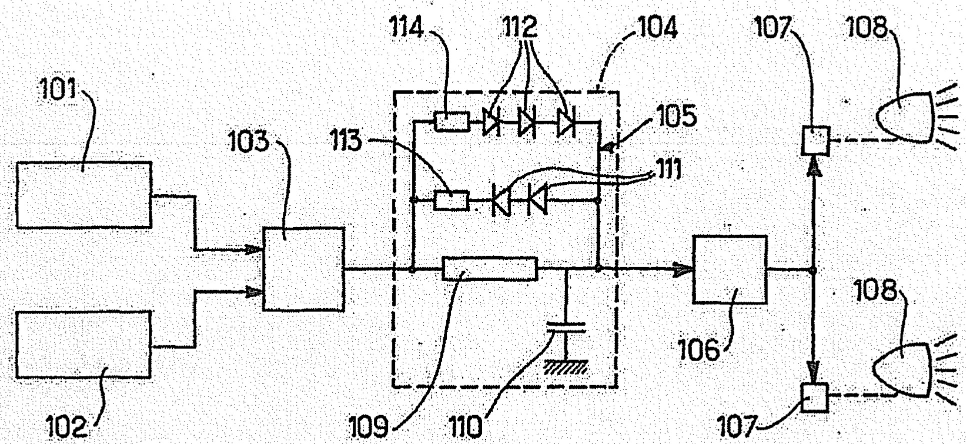


FIG. 3

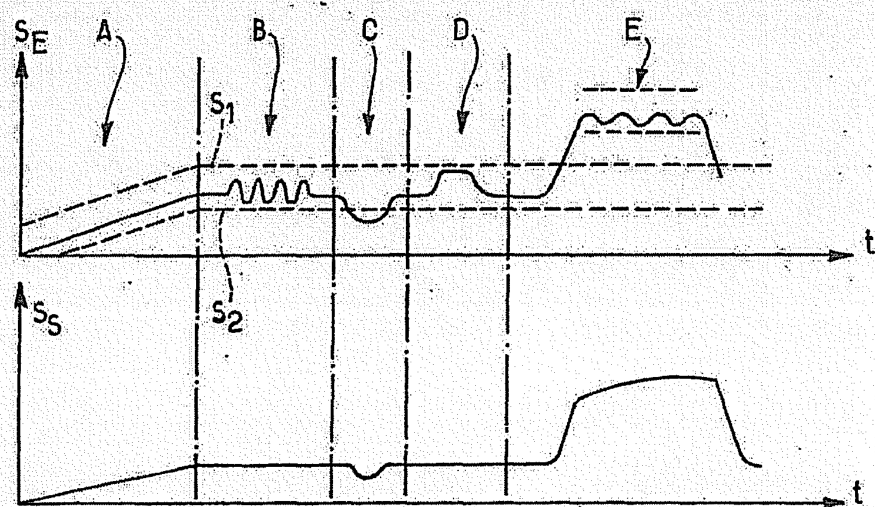


FIG. 4

# EXHIBIT 5

| **LIST OF DOCUMENTS CITED BY THIRD PARTY REQUESTER IN *INTER PARTES* REEXAMINATION** | PATENT NO.<br>7,241,034 | PATENTEE<br>James E. SMITH et al. |
|---|---|---|
| | PATENT DATE<br>July 10, 2007 | |

**U. S. PATENT DOCUMENTS**

| EXAM. INITIAL | PATENT/ PUBLICATION NUMBER | NAME | PATENT/ PUBLICATION DATE | CLASS | SUBCLASS | FILING DATE |
|---|---|---|---|---|---|---|
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**FOREIGN PATENT DOCUMENTS**

| EXAMINER INITIAL | DOCUMENT NUMBER | COUNTRY | DATE | NAME | SUBCLASS | TRANSLATION | |
|---|---|---|---|---|---|---|---|
| | | | | | | YES | NO |
| | 31 29 891 | DE | June 9, 1982 | | | X | |
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**OTHER DOCUMENTS**

| EXAMINER INITIAL | Name |
|---|---|
| | "Original Complaint for Patent Infringement," filed on March 8, 2010, *BALTHER TECHNOLOGIES, LLC, v. AM. HONDA MOTOR CO. INC., et al.*, Case No. 6:10-CR-78-LED (E.D. Tex.). |
| | "Plaintiff's Notice of Voluntary Dismissal," filed on May 17, 2010, *BALTHER TECHNOLOGIES, LLC, v. AM. HONDA MOTOR CO. INC., et al.*, Case No. 6:10-CR-78-LED (E.D. Tex.). |
| | "Order," dated May 18, 2010, *BALTHER TECHNOLOGIES, LLC, v. AM. HONDA MOTOR CO. INC., et al.*, Case No. 6:10-CR-78-LED (E.D. Tex.). |
| | Certified English-language translation of German Patent Application Publication No. 31 10 094 to Miskin et al. |
| | Certified English-language translation of German Patent Application Publication No. 31 29 891 to Leleve. |

| EXAMINER | DATE CONSIDERED |
|---|---|
| EXAMINER: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. | |

# EXHIBIT 17

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

| | | |
|---|---|---|
| In Re Patent of | : | James E. SMITH et al. |
| Patent No. | : | 7,241,034 |
| Issued | : | July 10, 2007 |
| Title | : | AUTOMATIC DIRECTIONAL CONTROL SYSTEM FOR VEHICLE HEADLIGHTS |
| Application Serial No. | : | 10/285,312 |
| Filed | : | October 31, 2002 |
| Requester | : | Volkswagen Group of America, Inc. |

**CERTIFICATE OF SERVICE**

I hereby certify that a copy of the attached "**REQUEST FOR *INTER PARTES* REEXAMINATION OF U.S. PATENT NO. 7,241,034 PURSUANT TO 37 C.F.R. § 1.915**" has been served in its entirety by first class mail on the patent owner at the following address as provided for in 37 C.F.R. § 1.33 (c):

The Caldwell Firm, LLC
PO Box 59655
Dept. SVIPGP
Dallas, TX 75229

on this 16th day of May 2011.

/Clifford A. Ulrich/
Clifford A. Ulrich
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Volkswagen Group of America, Inc.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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Alexandria, Virginia 22313-1450
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Bib Data Sheet

**CONFIRMATION NO. 1240**

| SERIAL NUMBER | FILING OR 371(c) DATE | CLASS | GROUP ART UNIT | ATTORNEY DOCKET NO. |
|---|---|---|---|---|
| 95/001,621 | 05/16/2011<br>RULE | 362 | 3992 | |

**APPLICANTS**

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KENYON & KENYON LLP, NEW YORK, NY

** CONTINUING DATA *************************

This application is a REX of 10/285,312 10/31/2002 PAT 7,241,034
which claims benefit of 60/335,409 10/31/2001
and claims benefit of 60/356,703 02/13/2002
and claims benefit of 60/369,447 04/02/2002

** FOREIGN APPLICATIONS ********************

| | STATE OR COUNTRY | SHEETS DRAWING | TOTAL CLAIMS | INDEPENDENT CLAIMS |
|---|---|---|---|---|
| Foreign Priority claimed ☐ yes ☐ no<br>35 USC 119 (a-d) conditions met ☐ yes ☐ no ☐ Met after Allowance<br>Verified and Acknowledged ______ Examiner's Signature ______ Initials | | | | |

**ADDRESS**
92045

**TITLE**

Automatic Directional Control System for Vehicle Headlights

| FILING FEE RECEIVED | FEES: Authority has been given in Paper No. ________ to charge/credit DEPOSIT ACCOUNT No. ________ for following: | ☐ All Fees<br>☐ 1.16 Fees ( Filing )<br>☐ 1.17 Fees ( Processing Ext. of time )<br>☐ 1.18 Fees ( Issue )<br>☐ Other ________<br>☐ Credit |
|---|---|---|

# Patent Assignment Abstract of Title

**Total Assignments: 4**

**Application #:** 10285312 **Filing Dt:** 10/31/2002 **Patent #:** 7241034 **Issue Dt:** 07/10/2007
**PCT #:** NONE **Publication #:** US20030107898 **Pub Dt:** 06/12/2003
**Inventors:** James E. Smith, Anthony B. McDonald
**Title:** AUTOMATIC DIRECTIONAL CONTROL SYSTEM FOR VEHICLE HEADLIGHTS

**Assignment: 1**

**Reel/Frame:** 013729 / 0559 **Received:** 02/10/2003 **Recorded:** 02/06/2003 **Mailed:** 06/13/2003 **Pages:** 3
**Conveyance:** ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).
**Assignors:** SMITH, JAMES E. **Exec Dt:** 01/31/2003
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**Assignment: 2**

**Reel/Frame:** 020540 / 0476 **Received:** 02/22/2008 **Recorded:** 02/22/2008 **Mailed:** 02/22/2008 **Pages:** 30
**Conveyance:** ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).
**Assignor:** DANA CORPORATION **Exec Dt:** 01/31/2008
**Assignee:** DANA AUTOMOTIVE SYSTEMS GROUP, LLC
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**Assignment: 3**

**Reel/Frame:** 022813 / 0432 **Received:** 06/12/2009 **Recorded:** 06/12/2009 **Mailed:** 06/12/2009 **Pages:** 2
**Conveyance:** ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).
**Assignor:** DANA AUTOMOTIVE SYSTEMS GROUP, LLC **Exec Dt:** 05/26/2009
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**Assignment: 4**

**Reel/Frame:** 024045 / 0235 **Received:** 03/08/2010 **Recorded:** 03/08/2010 **Mailed:** 03/09/2010 **Pages:** 2
**Conveyance:** ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).
**Assignor:** STRAGENT, LLC **Exec Dt:** 12/16/2009
**Assignee:** BALTHER TECHNOLOGIES, LLC
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Search Results as of: 05/20/2011 11:36 AM

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Web interface last modified: Apr. 20, 2009

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| REEXAM CONTROL NUMBER | FILING OR 371 (c) DATE | PATENT NUMBER |
|---|---|---|
| 95/001,621 | 05/16/2011 | 7241034 |

**CONFIRMATION NO. 1240**

**ASSIGNMENT NOTICE**

92045
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*OC000000047807534*

Date Mailed: 05/23/2011

## NOTICE OF ASSIGNMENT OF *INTER PARTES* REEXAMINATION REQUEST

The above-identified request for *inter partes* reexamination has been assigned to Art Unit 3992. All future correspondence in this proceeding should be identified by the control number listed above and directed to: Mail Stop Inter Partes Reexam, Commissioner for Patents, P.O. Box 1450, Alexandria VA 22313-1450.

A copy of this Notice is being sent to the latest attorney or agent of record in the patent file or, if none is of record, to all owners of record. (See 37 CFR 1.33(c).) If the addressee is not, or does not represent, the current owner, he or she is required to forward all communications regarding this proceeding to the current owner(s)

(MPEP 2222). An attorney or agent receiving this communication who does not represent the current owner(s) may wish to seek to withdraw pursuant to 37 CFR 1.36 in order to avoid receiving future communications. If the address of the current owner(s) is unknown, this communication should be returned with the request to withdraw pursuant to Section 1.36.

cc: Third Party Requester
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/kpdozier/

Legal Instruments Examiner
Central Reexamination Unit 571-272-7705; FAX No. 571-273-9900

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| REEXAM CONTROL NUMBER | FILING OR 371 (c) DATE | PATENT NUMBER |
|---|---|---|
| 95/001,621 | 05/16/2011 | 7241034 |

**CONFIRMATION NO. 1240**

KENYON & KENYON LLP
ONE BROADWAY
NEW YORK, NY 10004

**REEXAM ASSIGNMENT NOTICE**

*OC000000047807533*

Date Mailed: 05/23/2011

## NOTICE OF *INTER PARTES* REEXAMINATION REQUEST FILING DATE

Requester is hereby notified that the filing date of the request for *inter partes* reexamination is 05/16/2011, the date that the filing requirements of 37 CFR § 1.915 were received.

A decision on the request for *inter partes* reexamination will be mailed within three months from the filing date of the request for *inter partes* reexamination. (See 37 CFR 1.923.)

A copy of this Notice is being sent to the person identified by the requestor as the patent owner. Further patent owner correspondence will be with the latest attorney or agent of record in the patent file. (See 37 CFR 1.33.) Any paper filed should include a reference to the present request for *inter partes* reexamination (by Reexamination Control Number) and should be addressed to: Mail Stop Inter Partes Reexam, Commissioner for Patents, P.O. Box 1450, Alexandria VA 22313-1450.

cc: Patent Owner
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The Caldwell Firm, LLC
PO Box 59655
Dept. SVIPGP
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Legal Instruments Examiner
Central Reexamination Unit 571-272-7705; FAX No. 571-273-9900

# Litigation Search Report CRU 3999

## Reexam Control No. 95/001,621

| TO: Mark Reinhart<br>Location: CRU<br>Art Unit: 3992<br>Date: 5/23/2011 | From: Patricia Volpe<br>Location: CRU 3999<br>MDW 7C69<br>Phone: (571) 272-6825<br>Patricia.volpe@uspto.gov |
|---|---|

## Search Notes

Litigation Search for U.S. Patent Number: **7,241,034**

Status (**CLOSED**) 6:10cv78 *Balther Technologies, Llc v. American Honda Motor Co Inc et A*

1) I performed a KeyCite Search in Westlaw, which retrieves all history on the patent including any litigation.

2) I performed a search on the patent in Lexis CourtLink for any open dockets or closed cases.

3) I performed a search in Lexis in the Federal Courts and Administrative Materials databases for any cases found.

4) I performed a search in Lexis in the IP Journal and Periodicals database for any articles on the patent.

5) I performed a search in Lexis in the news databases for any articles about the patent or any articles about litigation on this patent.

Westlaw.

Date of Printing: May 23, 2011

## KEYCITE

**C US PAT 7241034 AUTOMATIC DIRECTIONAL CONTROL SYSTEM FOR VEHICLE HEADLIGHTS, Assignee: Dana Corporation (Jul 10, 2007)**

### History

### Direct History

=> 1 **AUTOMATIC DIRECTIONAL CONTROL SYSTEM FOR VEHICLE HEADLIGHTS,** US PAT 7241034, 2007 WL 1978614 (U.S. PTO Utility Jul 10, 2007) (NO. 10/285312)

### Patent Family

2 AUTOMATIC DIRECTIONAL CONTROL SYSTEM FOR A VEHICLE HEADLIGHT USES SENSOR TO GENERATE SIGNAL REPRESENTATIVE OF CONDITION OF VEHICLE, CONTROLLER RESPONSIVE TO SENSOR SIGNAL TO GENERATE OUTPUT SIGNAL AND ACTUATOR TO EFFECT, Derwent World Patents Legal 2003-543647

### Assignments

3 Action: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS). Number of Pages: 002, (DATE RECORDED: Mar 08, 2010)

4 Action: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS). Number of Pages: 002, (DATE RECORDED: Jun 12, 2009)

5 Action: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS). Number of Pages: 030, (DATE RECORDED: Feb 22, 2008)

6 Action: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS). Number of Pages: 003, (DATE RECORDED: Feb 06, 2003)

### Patent Status Files

.. Request for Re-Examination, (OG DATE: Sep 07, 2010)

.. Patent Suit(See LitAlert Entries),

### Docket Summaries

9 BALTHER TECHNOLOGIES, LLC v. AMERICAN HONDA MOTOR CO. INC. ET AL, (E.D.TEX. Mar 08, 2010) (NO. 6:10CV00078), (35 USC 271 PATENT INFRINGEMENT)

### Litigation Alert

10 Derwent LitAlert P2010-11-45 (Mar 08, 2010) Action Taken: complaint

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**Prior Art (Coverage Begins 1976)**

C 11 ADJUSTABLE HEADLIGHTS, HEADLIGHT ADJUSTING AND DIRECTION SENSING CONTROL SYSTEM AND METHOD OF ADJUSTING HEADLIGHTS, US PAT 5868488 (U.S. PTO Utility 1999)

C 12 APPARATUS AND METHOD FOR CONTROLLING LIGHT DISTRIBUTION OF HEAD-LAMP, US PAT 5660454Assignee: Toyota Jidosha Kabushiki Kaisha, (U.S. PTO Utility 1997)

C 13 APPARATUS AND METHOD FOR CONTROLLING THE LIGHT-RANGE OF MOTOR VEHICLE HEADLIGHTS, US PAT 5193894Assignee: Robert Bosch GmbH, (U.S. PTO Utility 1993)

C 14 APPARATUS FOR AUTOMATICALLY ADJUSTING AIMING OF HEADLIGHTS OF AN AUTOMOTIVE VEHICLE, US PAT 5877680Assignee: Denso Corporation, (U.S. PTO Utility 1999)

C 15 APPARATUS FOR CONTROLLING A HEADLIGHT OF A VEHICLE, US PAT 4891559Assignee: Nippondenso Soken, Inc., (U.S. PTO Utility 1990)

C 16 APPARATUS FOR REGULATING THE ILLUMINATION FIELD OF A VEHICLE HEAD-LIGHT, US PAT 6144159Assignee: Robert Bosch GmbH, (U.S. PTO Utility 2000)

C 17 ARRANGEMENT FOR AUTOMATIC HEADLIGHT ADJUSTMENT, US PAT 6231216Assignee: Dr. Ing. h.c.F. Porsche AG, (U.S. PTO Utility 2001)

C 18 AUTOMATIC LEVELING APPARATUS FOR USE WITH AUTOMOBILE HEADLAMPS, US PAT 6183118Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 2001)

C 19 AUTOMATIC LEVELING DEVICE FOR AUTOMOTIVE VEHICLE HEADLAMPS, US PAT 6305823Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 2001)

C 20 AUTOMOTIVE ILLUMINATION SYSTEM, US PAT 4943893Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 1990)

C 21 CONTINUOUSLY VARIABLE HEADLAMP CONTROL, US PAT 6281632Assignee: Gentex Corporation, (U.S. PTO Utility 2001)

C 22 CORNERING LIGHT SYSTEM FOR TWO-WHEELED VEHICLES, US PAT 4024388Assignee: Marvin H. Kleinberg, Inc., (U.S. PTO Utility 1977)

C 23 DEVICE FOR ADJUSTING THE INCLINATION OF AUTOMOBILE HEADLIGHTS, US PAT 4186428Assignee: Cibie Projecteurs, (U.S. PTO Utility 1980)

C 24 DEVICE FOR ADJUSTING THE LEVEL OF A VEHICLE HEADLIGHT, US PAT 5779342Assignee: Bayerische Motoren Werke Aktiengellschaft, (U.S. PTO Utility 1998)

C 25 DEVICE FOR ADJUSTING AN OBJECT TO ASSUME A PREDETERMINED ANGLE TO A CERTAIN PLANE, US PAT 4217631 (U.S. PTO Utility 1980)

C 26 DEVICE FOR ADJUSTING A PRESETTABLE LIGHTING LEVEL OF A HEADLIGHT IN MOTOR VEHICLES, US PAT 5785405Assignee: Bayerische Motoren Werke, (U.S. PTO Utility 1998)

C 27 DEVICE FOR CONTROLLING THE LIGHT WIDTH OF HEADLIGHTS FOR VEHICLES, US PAT 5896011Assignee: Robert Bosch GmbH, (U.S. PTO Utility 1999)

C 28 DEVICE FOR REGULATING LIGHT WIDTH OF HEADLIGHTS FOR VEHICLES, AND VEHICLE PROVIDED THEREWITH, US PAT 6142655Assignee: Robert Bosch GmbH, (U.S.

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PTO Utility 2000)

C 29 DIRECTION TURNING DEVICE FOR A HEADLIGHT OF AN AUTOMOBILE, US PAT 5550717 (U.S. PTO Utility 1996)

C 30 FOCUSING MIRROR CONTROL SYSTEM AND METHOD FOR ADJUSTING SAME, US PAT 6118113 (U.S. PTO Utility 2000)

C 31 HEAD LAMP DEVICE FOR VEHICLE, US PAT 6010237Assignee: Honda Giken Kogyo Kabushiki Kaisha, (U.S. PTO Utility 2000)

C 32 HEAD LAMP DEVICE FOR VEHICLE, US PAT 5909949Assignee: Honda Giken Kogyo Kabushiki Kaisha, (U.S. PTO Utility 1999)

C 33 HEADLAMP, US PAT 5158352Assignee: Honda Giken Kogyo Kabushiki Kaisha, (U.S. PTO Utility 1992)

C 34 HEADLAMP DRIVE AND CONTROL APPARATUS, US PAT 4583152Assignee: Aisin Seiki Kabushiki Kaisha, (U.S. PTO Utility 1986)

C 35 HEADLAMP FOR MOTOR VEHICLES WITH PROGRAMMABLE LIGHT DISTRIBUTION, US PAT 4868721 (U.S. PTO Utility 1989)

C 36 HEADLAMP POSITIONING DEVICE, US PAT 5181429Assignee: Saia AG, (U.S. PTO Utility 1993)

C 37 HEADLIGHT AIMING AND LIGHT PATTERN TESTING APPARATUS AND METHOD, US PAT 4948249Assignee: Hopkins Manufacturing Corporation, (U.S. PTO Utility 1990)

C 38 HEADLIGHT AIMING APPARATUS, US PAT 5751832Assignee: Progressive Tool & Industries Co., (U.S. PTO Utility 1998)

C 39 HEADLIGHT AIMING APPARATUS AND DISPLAY, US PAT 5164785Assignee: Hopkins Manufacturing Corporation, (U.S. PTO Utility 1992)

C 40 HEADLIGHT AIMING METHOD USING PATTERN FRAMING, US PAT 5373357Assignee: Hopkins Manufacturing Corporation, (U.S. PTO Utility 1994)

C 41 HEADLIGHT ARRANGEMENT FOR MOTOR VEHICLE, US PAT 6227691Assignee: Robert Bosch GmbH, (U.S. PTO Utility 2001)

C 42 HEADLIGHT ARRANGEMENT FOR VEHICLES, US PAT 4768135Assignee: Robert Bosch GmbH, (U.S. PTO Utility 1988)

C 43 HEADLIGHT BEAM CONTROL SYSTEM FOR MOTOR VEHICLES, US PAT 4225902 (U.S. PTO Utility 1980)

C 44 HEADLIGHT CONTROL APPARATUS FOR MOTORCYCLES, US PAT 4870545Assignee: Honda Giken Kogyo Kabushiki Kaisha, (U.S. PTO Utility 1989)

C 45 HEADLIGHT FOR VEHICLE, US PAT 4833573Assignee: Koito Seisakusho Co., Ltd., (U.S. PTO Utility 1989)

C 46 HEADLIGHT MOVING APPARATUS FOR A MOTOR VEHICLE, US PAT 5099400 (U.S. PTO Utility 1992)

C 47 HEIGHT SENSOR AND VEHICULAR HEADLIGHT BEAM AXIS LEVELING APPARATUS, US PAT 6234654Assignee: Denso Corporation, (U.S. PTO Utility 2001)

C 48 INFINITELY ADJUSTABLE LEVEL LIGHT, US PAT 3953726 (U.S. PTO Utility 1976)

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C 49 IRRADIATION DIRECTION CONTROL APPARATUS FOR VEHICULAR LAMP, US PAT 5907196Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 1999)
C 50 LIGHT DESTRIBUTION OF HEADLIGHT BEAM, US PAT 4907877 (U.S. PTO Utility 1990)
C 51 LIGHT MANAGEMENT SYSTEM FOR A VEHICLE, US PAT 5781105Assignee: Ford Motor Company, (U.S. PTO Utility 1998)
C 52 LIGHTING CONTROL FOR MOTOR VEHICLE LAMPS, US PAT 3634677Assignee: Robert Bosch Gmbh, (U.S. PTO Utility 1972)
C 53 LIGHTING DEVICE FOR A VEHICLE, US PAT 6049749Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 2000)
C 54 LIGHTING DEVICE FOR VEHICLES, US PAT 6293686Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 2001)
C 55 LIGHTING SYSTEM FOR A MOTORCYCLE, US PAT 3939339 (U.S. PTO Utility 1976)
C 56 LOAD TRIM COMPENSATING VEHICLE HEADLIGHT DEFLECTION SYSTEM, US PAT 4162424Assignee: Robert Bosch GmbH, (U.S. PTO Utility 1979)
C 57 MAGNETIC COUPLING MECHANISM FOR USE IN AN AUTOMOTIVE VEHICLE, US PAT 5977678Assignee: UT Automotive Dearborn, Inc., (U.S. PTO Utility 1999)
C 58 METHOD AND APPARATUS FOR ADJUSTING THE ORIENTATION OF VEHICLE HEADLIGHTS, US PAT 4204270Assignee: Societe pour l'Equipement de, (U.S. PTO Utility 1980)
C 59 METHOD AND APPARATUS FOR LOCATING A SPECIFIC LOCATION ON A VEHICLE HEADLAMP, US PAT 5331393Assignee: Hopkins Manufacturing Corporation, (U.S. PTO Utility 1994)
C 60 METHOD OF MEASURING AND ADJUSTING OPTICAL AXIS OF HEADLIGHT, US PAT 5392111Assignee: Honda Giken Kogyo Kabushiki Kaisha, (U.S. PTO Utility 1995)
C 61 MOTOR VEHICLE LIGHTING SYSTEM HAVING AT LEAST TWO BEND LIGHTING DRIVING LIGHTS, US PAT 6176590Assignee: Valeo Vision, (U.S. PTO Utility 2001)
C 62 MOTOR VEHICLE WITH HEADLAMP TILTING MECHANISM, US PAT 4066886Assignee: The Lucas Electrical Company Limited, (U.S. PTO Utility 1978)
C 63 MOTORCYCLE HEADLIGHT AIMING DEVICE, US PAT 5426571 (U.S. PTO Utility 1995)
C 64 MULTIPLE SENSOR INCLINATION MEASURING SYSTEM, US PAT 4549277Assignee: Brunson Instrument Company, (U.S. PTO Utility 1985)
C 65 POSITION CONTROL SYSTEM, US PAT 4310172Assignee: General Motors Corporation, (U.S. PTO Utility 1982)
C 66 ROAD SURFACE-SENSITIVE BEAM PATTERN LEVELING SYSTEM FOR A VEHICLE HEADLAMP, US PAT 4868720Assignee: Koito Seisakusho Co., Ltd., (U.S. PTO Utility 1989)
C 67 SIDELIGHTING ARRANGEMENT AND METHOD, US PAT 5428512 (U.S. PTO Utility 1995)
C 68 STEPPER MOTOR SHAFT POSITION SENSOR, US PAT 4791343Assignee: Allied-Signal Inc., (U.S. PTO Utility 1988)
C 69 SUPPORT FRAME FOR HEADLIGHT AIMING APPARATUS, US PAT 5920386Assignee: Progressive Tool & Industries Co., (U.S. PTO Utility 1999)
C 70 SWITCHING CONTROL SYSTEM FOR AUTOMATICALLY TURNING HEADLIGHTS OFF

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AND ON AT INTERSECTIONS, US PAT 6097156 (U.S. PTO Utility 2000)

C 71 SYSTEM FOR AUTOMATICALLY ADJUSTING OPTICAL AXIS DIRECTION OF VEHICLE HEADLIGHT, US PAT 6193398Assignee: DENSO Corporation, (U.S. PTO Utility 2001)

C 72 SYSTEM FOR SELF-ALIGNING VEHICLE HEADLAMPS, US PAT 5633710Assignee: EGS Inc., (U.S. PTO Utility 1997)

C 73 TILTING DEVICE OF VEHICLE HEADLIGHT, US PAT 4916587Assignee: Koito Seisakusho Co., Ltd., (U.S. PTO Utility 1990)

C 74 VARIABLE DISTRIBUTION TYPE AUTOMOTIVE HEADLAMP, US PAT 5060120Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 1991)

C 75 VEHICLE CORNERING LAMP SYSTEM, US PAT 5526242Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 1996)

C 76 VEHICLE CORNERING LAMP SYSTEM, US PAT 4908560Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 1990)

C 77 VEHICLE HEADLIGHT AIMING APPARATUS, US PAT 5485265Assignee: Hopkins Manufacturing Corporation, (U.S. PTO Utility 1996)

C 78 VEHICLE HEADLIGHT WITH ADJUSTING MEANS FOR DIFFERENT TRAFFIC CONDITIONS, US PAT 5938319Assignee: Robert Bosch GmbH, (U.S. PTO Utility 1999)

C 79 VEHICULAR CORNERING LAMP SYSTEM, US PAT 5404278Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 1995)

C 80 VEHICULAR HEADLAMP PRODUCING LOW BEAM HAVING CUT LINE CONTROLLED IN ACCORDANCE WITH CONDITION OF CURVED ROAD, US PAT 5707129Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 1998)

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## US District Court Civil Docket

### U.S. District - Texas Eastern
### (Tyler)

## 6:10cv78

## Balther Technologies, Llc v. American Honda Motor Co Inc et A

**This case was retrieved from the court on Tuesday, May 17, 2011**

| | | | |
|---|---|---|---|
| **Date Filed:** | **03/08/2010** | **Class Code:** | **CLOSED** |
| **Assigned To:** | **Judge Leonard Davis** | **Closed:** | **Yes** |
| **Referred To:** | | **Statute:** | **35:271** |
| **Nature of suit:** | **Patent (830)** | **Jury Demand:** | **Plaintiff** |
| **Cause:** | **Patent Infringement** | **Demand Amount:** | **$0** |
| **Lead Docket:** | **None** | **NOS Description:** | **Patent** |
| **Other Docket:** | **None** | | |
| **Jurisdiction:** | **Federal Question** | | |

| Litigants | Attorneys |
|---|---|
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American Honda Motor Co Inc
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Honda Motor Company, Ltd
Defendant

Bmw of North America, Llc
Defendant

Bmw AG
Defendant

Chrysler Group Llc
Defendant

Ferrari North America, Inc
Defendant

Ferrari Spa
Defendant

General Motors, Llc
Defendant

Hyundai Motor America
Defendant

Hyundai Motor Company
Defendant

Jaguar Land Rover North America, Llc

Defendant

Jaguar Cars Limited
Defendant

Maserati North America Inc
Defendant

Maserati Spa
Defendant

Mercedes-Benz USA, Llc
Defendant

Daimler North America Corporation
Defendant

Daimler AG
Defendant

Mazda Motor of North America, Inc
Defendant

Mazda Motor Corp
Defendant

Mitsubishi Motors North America, Inc
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Nissan North America, Inc
Defendant

Nissan Motor Co, Ltd
Defendant

Porsche Cars North America, Inc
Defendant

Dr Ing Hc.F Porsche AG
Defendant

Saab Cars North America, Inc
Defendant

Toyota Motor North America, Inc
Defendant

Toyota Motor Sales, USA, Inc
Defendant

Toyota Motor Corp
Defendant

Volkswagen Group of America, Inc
Defendant

Automobili Lamborghini Spa
Defendant

Audi AG
Defendant

Volkswagen AG
Defendant

Ford Motor Company
Defendant

Volvo Cars of North America, Llc
Defendant

Volvo Car Corp
Defendant

| Date | # | Proceeding Text |
|---|---|---|
| 03/08/2010 | 1 | COMPLAINT for Patent Infringement against all defendants ( Filing fee $ 350 receipt number 0540000000002387982.), filed by Balther Technologies, LLC. (Attachments: # 1 Exhibit A, # 2 Civil Cover Sheet)(Albritton, Eric) (Entered: 03/08/2010) |
| 03/08/2010 | -- | Judge Leonard Davis added. (mll, ) (Entered: 03/08/2010) |
| 03/08/2010 | 2 | Notice of Filing of Patent/Trademark Form (AO 120). AO 120 mailed to the Director of the U.S. Patent and Trademark Office. (Albritton, Eric) (Entered: 03/08/2010) |
| 03/09/2010 | 3 | NOTICE of Attorney Appearance by Thomas John Ward, Jr on behalf of Balther Technologies, LLC (Ward, Thomas) (Entered: 03/09/2010) |
| 03/09/2010 | 4 | NOTICE of Attorney Appearance by Jack Wesley Hill on behalf of Balther Technologies, LLC (Hill, Jack) (Entered: 03/09/2010) |
| 03/09/2010 | 5 | NOTICE of Attorney Appearance by Adam A Biggs on behalf of Balther Technologies, LLC (Biggs, Adam) (Entered: 03/09/2010) |
| 03/09/2010 | 6 | NOTICE of Attorney Appearance by Debra Rochelle Coleman on behalf of Balther Technologies, LLC (Coleman, Debra) (Entered: 03/09/2010) |
| 03/09/2010 | 7 | NOTICE of Attorney Appearance by Matthew Clay Harris on behalf of Balther Technologies, LLC (Harris, Matthew) (Entered: 03/09/2010) |
| 03/10/2010 | 8 | NOTICE of Attorney Appearance by J Mike Amerson on behalf of Balther Technologies, LLC (Amerson, J) (Entered: 03/10/2010) |
| 03/10/2010 | 9 | NOTICE of Attorney Appearance by Matthew Richard Rodgers on behalf of Balther Technologies, LLC (Rodgers, Matthew) (Entered: 03/10/2010) |
| 03/10/2010 | 10 | NOTICE of Attorney Appearance by Michael Aaron Benefield on behalf of Balther Technologies, LLC (Benefield, Michael) (Entered: 03/10/2010) |
| 03/10/2010 | 11 | NOTICE of Attorney Appearance by David Wynne Morehan on behalf of Balther Technologies, LLC (Morehan, David) (Entered: 03/10/2010) |
| 03/10/2010 | 12 | NOTICE of Attorney Appearance by Danny Lloyd Williams on behalf of Balther Technologies, LLC (Williams, Danny) (Entered: 03/10/2010) |
| 03/10/2010 | 13 | NOTICE of Attorney Appearance by Jaison Chorikavumkal John on behalf of Balther Technologies, LLC (John, Jaison) (Entered: 03/10/2010) |
| 03/10/2010 | 14 | NOTICE of Attorney Appearance by Christopher Needham Cravey on behalf of Balther Technologies, LLC (Cravey, Christopher) (Entered: 03/10/2010) |
| 04/26/2010 | 15 | ORDER that plaintiff file a notice that the case is ready for scheduling conference when all of the defendants have either answered or filed a motion to transfer or dismiss. The notice shall be filed within five days of the last remaining defendant's answer or motion. Signed by Judge |

| | | |
|---|---|---|
| | | Leonard Davis on 04/26/10. cc:attys 4-27-10(mll, ) (Entered: 04/27/2010) |
| 04/28/2010 | 16 | E-GOV SEALED SUMMONS Issued as to American Honda Motor Co. Inc., BMW of North America, LLC, Chrysler Group LLC, Daimler North America Corporation, Ferrari North America, Inc., Ford Motor Company, General Motors, LLC, Hyundai Motor America, Jaguar Land Rover North America, LLC, Maserati North America Inc, Mazda Motor of North America, Inc., Mercedes-Benz USA, LLC, Mitsubishi Motors North America, Inc., Nissan North America, Inc., Porsche Cars North America, Inc., SAAB Cars North America, Inc., Toyota Motor North America, Inc., Toyota Motor Sales, U.S.A., Inc., Volkswagen Group of America, Inc., Volvo Cars of North America, LLC., and emailed to pltf for service. (mll, ) (Entered: 04/28/2010) |
| 05/17/2010 | 17 | NOTICE of Voluntary Dismissal by Balther Technologies, LLC (Attachments: # 1 Text of Proposed Order)(Albritton, Eric) (Entered: 05/17/2010) |
| 05/18/2010 | 18 | ORDER DISMISSING CASE. This civil action is dismissed without prejudice. Pltf and defts shall bear their own costs, expenses and legal fees. Signed by Judge Leonard Davis on 05/18/10. cc:attys 5-18-10(mll, ) (Entered: 05/18/2010) |
| 05/18/2010 | 19 | Agreed MOTION for Extension of Time to File Answer re 1 Complaint by Mitsubishi Motors Corp., Mitsubishi Motors North America, Inc.. (Attachments: # 1 Text of Proposed Order)(Smith, Michael) (Entered: 05/18/2010) |
| 05/19/2010 | 20 | NOTICE by Mitsubishi Motors Corp., Mitsubishi Motors North America, Inc. re 19 Agreed MOTION for Extension of Time to File Answer re 1 Complaint (Notice of Withdrawal of Agreed MOTION for Extension of Time to File Answer) (Smith, Michael) (Entered: 05/19/2010) |

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UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT

**7241034**

Get Drawing Sheet 1 of 7
Access PDF of Official Patent *
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Link to Claims Section

June 12, 2003

Automatic directional control system for vehicle headlights

**REEXAM-LITIGATE:**

Reexamination requested July 10, 2010 by PATENT OWNER, Reexamination No. 90/011,011 (O.G. September 7, 2010) Ex. Gp.: 3992 July 10, 2010

NOTICE OF LITIGATION

Balther Technologies, LLC v. American Honda Motor Co Inc et al, Filed March 8, 2010, D.C. E.D. Texas, Doc. No. 6:10cv78

**APPL-NO:** 285312 (10)

**FILED-DATE:** October 31, 2002

**GRANTED-DATE:** July 10, 2007

**ASSIGNEE-PRE-ISSUE:**
February 6, 2003 - ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS)., DANA CORPORATION 4500 DORR STREET TOLEDO OHIO 43615, Reel and Frame Number: 013729/0559

**ASSIGNEE-AT-ISSUE:**
Dana Corporation, Toledo, OHIO, United States of America (US), United States company or corporation (02)

**ASSIGNEE-AFTER-ISSUE:**
February 22, 2008 - ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS)., DANA AUTOMOTIVE SYSTEMS GROUP, LLC 4500 DORR STREET TOLEDO OHIO 43615, 4500 DORR STREET, TOLEDO, OHIO, UNITED STATES OF AMERICA (US), 43615, Reel and Frame Number: 020540/0476
June 12, 2009 - ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS)., STRAGENT, LLC 211 W. TYLER, SUITE C LONGVIEW TEXAS 75601, 211 W. TYLER, SUITE C, LONGVIEW, TEXAS, UNITED STATES OF AMERICA (US), 75601, Reel and Frame Number: 022813/0432
March 8, 2010 - ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS)., BALTHER TECHNOLOGIES, LLC, SUITE C-4, 211 W. TYLER, LONGVIEW, TEXAS, UNITED STATES OF AMERICA (US), 75601, Reel and Frame Number: 024045/0235

**PRIM-EXMR:** Alavi, Ali

**CORE TERMS:** headlight, directional, controller, adjustment, sensed, algorithm, sensor, actuator, steering, control system, road, suspension, responsive, automatic, feedback, orientation, beam, aiming, height, generating, electrical, input output device, plane, stored, automatically, optical, pitch, calibration, accomplish, angular

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1. Ohio Inventors Develop Vehicle Headlights Directional Control System, US Fed News, July 12, 2007 Thursday 2:12 AM EST, , 310 words, US Fed News, Alexandria, Va.

2. OLD FREE PRESS A RARE FIND, London Free Press (Ontario, Canada), July 24, 2000, Monday,, Final EDITION, NEWS,, Pg. A4, 295 words, JOE PARASKEVAS, FREE PRESS REPORTER

3. NEW GRASS STAYS GREEN WHEN IT'S DRY, The Augusta Chronicle (Georgia), July 21, 2000, Friday,, ALL EDITIONS, HOMESTEAD,, Pg. C12,, 368 words

Source: **Legal > / . . . / > News, All (English, Full Text)**
Terms: **7241034 or 7,241,034** (Edit Search | Suggest Terms for My Search)
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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 95/001,621 | 05/16/2011 | 7,241,034 | | 1240 |

92045 7590 06/23/2011

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| EXAMINER | |
|---|---|
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| ART UNIT | PAPER NUMBER |
| | |

DATE MAILED: 06/23/2011

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CENTRAL REEXAMINATION UNIT

# Transmittal of Communication to Third Party Requester *Inter Partes* Reexamination

REEXAMINATION CONTROL NUMBER 95/001,621.

PATENT NUMBER 7,241,034.

TECHNOLOGY CENTER 3900.

ART UNIT 3992.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above-identified reexamination proceeding. 37 CFR 1.903.

Prior to the filing of a Notice of Appeal, each time the patent owner responds to this communication, the third party requester of the *inter partes* reexamination may once file written comments within a period of 30 days from the date of service of the patent owner's response. This 30-day time period is statutory (35 U.S.C. 314(b)(2)), and, as such, it cannot be extended. See also 37 CFR 1.947.

If an *ex parte* reexamination has been merged with the *inter partes* reexamination, no responsive submission by any *ex parte* third party requester is permitted.

**All correspondence** relating to this inter partes reexamination proceeding should be directed to the **Central Reexamination Unit** at the mail, FAX, or hand-carry addresses given at the end of the communication enclosed with this transmittal.

PTOL-2070 (Rev.07-04)

| ***ORDER GRANTING/DENYING REQUEST FOR* INTER PARTES *REEXAMINATION*** | **Control No.**<br>95/001,621 | **Patent Under Reexamination**<br>7,241,034 | |
|---|---|---|---|
| | **Examiner**<br>MY-TRANG TON | **Art Unit**<br>3992 | |

***-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address. --***

The request for *inter partes* reexamination has been considered. Identification of the claims, the references relied on, and the rationale supporting the determination are attached.

Attachment(s): ☐ PTO-892 ☒ PTO/SB/08 ☐Other: _____

1. ☒ The request for *inter partes* reexamination is GRANTED.

   ☐ An Office action is attached with this order.

   ☒ An Office action will follow in due course.

2. ☐ The request for *inter partes* reexamination is DENIED.

This decision is not appealable. 35 U.S.C. 312(c). Requester may seek review of a denial by petition to the Director of the USPTO within ONE MONTH from the mailing date hereof. 37 CFR 1.927. EXTENSIONS OF TIME ONLY UNDER 37 CFR 1.183. In due course, a refund under 37 CFR 1.26(c) will be made to requester.

**All correspondence** relating to this *inter partes* reexamination proceeding should be directed to the **Central Reexamination Unit** at the mail, FAX, or hand-carry addresses given at the end of this Order.

# DECISION GRANTING *INTER PARTES* EXAMINATION

## Summary

Reexamination has been requested for claims 1-5 of U.S. Patent No. 7,241,034 ("the '034 patent") to Smith, entitled "AUTOMATIC DIRECTIONAL CONTROL SYSTEM FOR VEHICLE HEADLIGHTS".

The '034 patent is currently assigned to Dana Corporation.

A substantial new question of patentability (SNQ) affecting claims 1-5 of the '034 patent is raised by the present request for inter partes reexamination filed ("the Request").

An Office action on the merits does not accompany this order for *inter partes* reexamination. An Office action on the merits will be provided in due course. Patent owner is reminded that no proposed amendment may be made in this proceeding until after the first Office action on the merits. 37 CFR 1.939(b).

***References Relied Upon in the Request***

Pages 9-10 of the Request identify the following documents as providing teachings relevant to claims 1-5 of the '034 patent:

1. United Kingdom Patent Application Publication No. 2309773 by Uchida (hereinafter "Uchida").
2. United Kingdom Patent Application Publication No. 2309774 by Takahashi (hereinafter "Takahashi").
3. U.S. Patent No. 5,182,460 by Hussman (hereinafter "Hussman").
4. German Patent Application Publication No. 3110094 by Miskin et al (hereinafter "Miskin et al.").
5. German Patent Application Publication No. 3129891 by Leleve (hereinafter "Leleve").
6. U.S. Patent No. 6,305,823 by Toda et al (hereinafter "Toda et al.").
7. U.S. Patent No. 6,193,398 by Okuchi et al (hereinafter "Okuchi et al.").
8. U.S. Patent No. 5,909,949 by Gotoh (hereinafter "Gotoh").
9. U.S. Patent No. 4,954,933 by Wassen et al (hereinafter "Wassen et al.").

## Issues Raised by Requester

The Requester asserts that the cited references raise substantial new questions of patentability when interpreted in the following manner:

1. Claims 1, 2, 4, and 5 are anticipated by Uchida under 35 U.S.C. § 102(b).
2. Claims 1, 2, 4, and 5 are anticipated by Takahashi under 35 U.S.C. § 102(b).
3. Claims 1, 2, 4, and 5 are anticipated by Hussman under 35 U.S.C. § 102(b).
4. Claims 1 and 5 are anticipated by Miskin et al. under 35 U.S.C. § 102(b).
5. Claims 1 and 5 are anticipated by Leleve under 35 U.S.C. § 102(b).
6. Claims 1, 2, 4, and 5 are unpatentable over the combination of Toda et al. and Uchida under 35 U.S.C. § 103(a).
7. Claims 1, 2, 4, and 5 are unpatentable over the combination of Toda et al. and Takahashi under 35 U.S.C. § 103(a).
8. Claims 1, 2, 4, and 5 are unpatentable over the combination of Toda et al. and Hussman under 35 U.S.C. § 103(a).
9. Claims 1, 2, 4, and 5 are unpatentable over the combination of Toda et al. and Miskin et al. under 35 U.S.C. § 103(a).

10. Claims 1, 2, 4, and 5 are unpatentable over the combination of Toda et al. and Leleve under 35 U.S.C. § 103(a).

11. Claims 1, 2, 4, and 5 are unpatentable over the combination of Okuchi et al. and Uchida under 35 U.S.C. § 103(a).

12. Claims 1, 2, 4, and 5 are unpatentable over the combination of Okuchi et al. and Takahashi under 35 U.S.C. § 103(a).

13. Claims 1, 2, 4, and 5 are unpatentable over the combination of Okuchi et al. and Hussman under 35 U.S.C. § 103(a).

14. Claims 1, 2, 4, and 5 are unpatentable over the combination of Okuchi et al. and Miskin et al. under 35 U.S.C. § 103(a).

15. Claims 1, 2, 4, and 5 are unpatentable over the combination of Okuchi et al. and Leleve under 35 U.S.C. § 103(a).

16. Claims 1 to 5 are unpatentable over the combination of Gotoh and Uchida under 35 U.S.C. § 103(a).

17. Claims 1 to 5 are unpatentable over the combination of Gotoh and Takahashi under 35 U.S.C. § 103(a).

18. Claims 1 to 5 are unpatentable over the combination of Gotoh and Hussman under 35 U.S.C. § 103(a).

19. Claims 1, 2, 3, and 5 are unpatentable over the combination of Gotoh and Miskin et al. under 35 U.S.C. § 103(a).

20. Claims 1 to 5 are unpatentable over the combination of Gotoh and Leleve under 35 U.S.C. § 103(a).

21. Proposed claims 1, 2, 4 to 6, 9 to 13, 20, 22, 24, 25, 37, 38, 41, 42, 44 and 45 are anticipated by Uchida under 35 U.S.C. § 102(b).

22. Proposed claims 1, 2,4-6, 9-11, 17, 18, 20, 21, 22, 24, 25, 28, 33, 34, 37, 38, 41, 42, 44 and 45 are anticipated by Takahashi under 35 U.S.C. § 102(b).

23. Proposed claims 1, 2, 4-6, 9, 10, 37, 38, 41, 42, 44 and 45 are anticipated by Hussman Under 35 U.S.C. § 102(b).

24. Proposed claims 1, 2, 4-6, 9-13, 17, 18, 20-22, 24, 25, 28, 29, 36-42, 44 and 45 are unpatentable over the combination of Toda et al. and Uchida under 35 U.S.C. § 103(a).

25. Proposed claims 1, 2, 4-6, 9-13, 17, 18, 20-22, 24, 25, 28, 29, 33, 34, 36-42, 44 and 45 are unpatentable over the combination of Toda et al. and Takahashi under 35 U.S.C. § 103(a).

26. Proposed claims 1, 2, 4-6, 9-13, 17, 18, 20-22, 24, 25, 28, 29, 36-42, 44 and 45 are unpatentable over the combination of Toda et al. and Hussman under 35 U.S.C. § 103(a).

27. Proposed claims 1, 2, 4-6, 9-13, 15-18, 20-22, 24, 25, 28, 29, 33, 35, 37-42, 44 and 45 are unpatentable over the combination of Okuchi et al. and Uchida under 35 U.S.C. § 103(a).

28. Proposed claims 1, 2, 4-6, 9-13, 15-18, 20-22, 24, 25, 28, 29, 33-35, 37-42, 44 and 45 are unpatentable over the combination of Okuchi et al.

and Takahashi under 35 U.S.C. § 103(a).

29. Proposed claims 1, 2, 4-6, 9-13, 15-18, 20-22, 25, 28, 29, 33, 35, 37-42, 44 and 45 are unpatentable over the combination of Okuchi et al. and Hussman under 35 U.S.C. § 103(a).

30. Proposed claims 1-13, 20, 22, 24-26, 28, 29, 37, 38 and 41 to 45 are unpatentable over the combination of Gotoh and Uchida under 35 U.S.C. § 103(a).

31. Proposed claims 1-12, 14, 16-18, 20-22, 24-26, 28, 29, 33, 34, 37, 38 and 41-45 are unpatentable over the combination of Gotoh and Takahashi under 35 U.S.C. § 103(a).

32. Proposed claims 1-13, 24, 26, 28, 29, 37, 38 and 41-45 are unpatentable over the combination of Gotoh and Hussman under 35 U.S.C. § 103(a).

33. Proposed claims 17, 19, 21, 23, 26 and 30-32 are unpatentable in view of the combination of Uchida and the admitted prior art described in the '034 patent specification under 35 U.S.C. § 103(a).

34. Proposed claims 19, 23, 26 and 30-32 are unpatentable in view of the combination of Takahashi and the admitted Prior Art described in the '034 Patent specification under 35 U.S.C. § 103(a).

35. Proposed claims 17-21, 23-26 and 30-32 are unpatentable in view of the combination of Hussman and the admitted Prior Art described in the '034 Patent specification under 35 U.S.C. § 103(a).

36. Proposed claim 27 is unpatentable over the combination of Uchida and Wassen et al. under 35 U.S.C. § 103(a).

37. Proposed claim 27 is unpatentable over the combination of Takahashi and Wassen et al. under 35 U.S.C. § 103(a).

38. Proposed Claim 27 is unpatentable over the combination of Hussman and Wassen et al. under 35 U.S.C. § 103(a).

*** Regarding issues 21-38: Since the Ex Parte Reexamination (90/011,011) of the '034 patent is still pending, the amendment (filed 2/16/2011) is not officially in effect yet in the '034 patent. According to 35 USC 312, an SNQ is raised for "**any claim of the patent**", so at this time the Examiner only addresses the patented claims in this Inter parte Reexamination (95/001,621) of the '034 patent. The Requester can discuss the new and amended claims in the Request; however, only the Requester's assertions regarding SNQs in issues 1-20 for patented claims are evaluated herein. Issues 21-38 will not be evaluated until the Inter Parte and Ex Parte are merged. The Patent Owner will have to put the same amended/new claims in the Inter Parte case, and those amended and new claims in the merged case will be evaluated. See MPEP 2643 and 2640(II)(A).

The patent claims in effect at the time of the determination will be the basis for deciding whether a substantial new question of patentability has been raised (37 CFR 1.923). See MPEP § 2643. Amendments which (A) have been filed in a copending reexamination proceeding in which the reexamination certificate has not been issued, or (B) have been submitted in a reissue application on which no reissue patent has been issued, will not be considered or commented upon when deciding a request for reexamination.

**Therefore, this request will be decided on the wording of the patent claims in effect at the present time (without any proposed amendments). The decision on the request will be made on the basis of the patent claims as though the proposed amendment had not been presented.**

Summary:

1/ It is agreed issues 1-2, 4-7, 9-12, 14-17 and 19-20 raise SNQs as to claims 1-5 of the '034 patent.

2/ Issues 3, 8, 13 and 18 are found not to raise SNQ as to claims 1-5 of the '034 patent.

3/ Issues 21-38 will not be evaluated at this time.

**Prosecution History**

The description of the prosecution history included on pages 3-7 of the request is accepted and is incorporated herein by reference. It is accepted that the Examiner of record issued non-final Office action on 12/23/2003 including: rejected claims 1-2, 4-8, 10-13 under 35 U.S.C. 102(e) as being anticipated by Toda et al (U.S. Pat. No 6,305,823); rejected claims 1-2, 4-8, 10-13 under 35 U.S.C. 102(e) as being anticipated by Okuchi et al (U.S. Pat. No 6,193,398); and rejected claims 1-3 and 9 under 35 U.S.C. 102(b) as being anticipated by Gotoh (US Pat. No 5,909,949).

The Patent Owner complied with such requirements by submitting an amendment on 3/25/2004 which amendment to claims 1 and 7 and canceled claim 6. Thus, in this amendment claims 1-5 and 7-13 were pending. Of these, claims 1 and 7 were independent claims.

In response to the amendment, the Examiner of record issued a final Office action on 6/15/2004 including rejected claims 1-2, 4-5, 7-8, 10-13 under 35 U.S.C. 102(e) as being anticipated by Toda et al (U.S. Pat. No 6,305,823); rejected claims 1-2, 4-5, 7-8, 10-13 under 35 U.S.C. 102(e) as being anticipated by Okuchi et al (U.S. Pat. No 6,193,398) and rejected claims

1-3 and 9 under 35 U.S.C. 102(b) as being anticipated by Gotoh (US Pat. No 5,909,949).

The Patent Owner submitted Notice of Appeal on 9/17/2004 and a request for reconsideration on 12/28/2004. The Patent Owner noted in the remark that for claim 1: "*None of the art of record is believed to show or suggest a controller that is responsive to the sensor signal for generating an output signal only when the sensor signal changes by more than a predetermined amount*" and claim 7: "*None of the art of record is believed to show or suggest a controller that is responsive to a rate of change of the sensor signal for generating the output signal*".

In response, the Examiner of record issued an Advisor Action on 12/28/2004 indicated that "*The prior art of record including Toda et al in particular reads on independent claims 1 and 7. Regarding claims 1 and 7, Toda discloses an automatic leveling device for vehicle headlamps including a sensor (speed sensor12 and height sensor 14 fig. 1), a controller (CPU 16), an actuator (motor driver 18, and 20). Therefore, Toda meets the limitation of claims 1 and 7 and thus rejection of claims 1-5, and 7-13 are maintained*".

Notice of Abandonment mailed out 2/22/2005.

RCE was filed on 2/28/2005 after personal interview held on 2/26/2005 (noted in preliminary remark 02/28/2005).

In response to the RCE, the Examiner of record issued a non-final Office action on 4/14/2005 including rejected claims 1-2, 4-5, 7-8, 10-13 under 35 U.S.C. 102(e) as being anticipated by Toda et al (U.S. Pat. No 6,305,823); rejected claims 1-2, 4-5, 7-8, 10-13 under 35 U.S.C. 102(e) as being anticipated by Okuchi et al (U.S. Pat. No 6,193,398); and rejected claims 1-3 and 9 under 35 U.S.C. 102(b) as being anticipated by Gotoh (US Pat. No 5,909,949).

The Patent Owner complied with such requirements by submitting remarks on 7/18/2005 with argument stating that *"In independent Claim 1, the claimed controller is responsive to a sensor signal for generating an output signal when the sensor signal changes by more than a predetermined amount"* and *"In independent Claim 7, the claimed controller is responsive to a rate of change of the sensor signal for generating the output signal"*

In response to the remarks, the Examiner of record issued a final Office action on 10/5/2005 including rejected claims 1-2, 4-5, 7-8, 10-13 under 35 U.S.C. 102(e) as being anticipated by Toda et al (U.S. Pat. No 6,305,823); rejected claims 1-2, 4-5, 7-8, 10-13 under 35 U.S.C. 102(e) as being anticipated by Okuchi et al (U.S. Pat. No 6,193,398) and rejected claims 1-3 and 9 under 35 U.S.C. 102(b) as being anticipated by Gotoh (US Pat. No 5,909,949).

The Patent Owner complied with such requirement by submitting a notice of Appeal filed 1/9/2006.

In response, a pre-Appeal brief conference has been held on 2/3/2006 and a panel from the pre-appeal conference has determined that forwarded rejected claims 1-13 to Board of Patent Appeals and Interferences.

The examiner of record issued notice of abandonment mailed out 4/6/2006.

In response to the notice of abandonment, Patent Owner filed request for withdrawal of holding of abandonment filed on 7/11/2006.

RCE was filed on 8/9/2006 including previously presented claims 1-5, 7-13 and added claim 14. Thus, in the RCE claims 1-5 and 7-14 were pending. Of these, claims 1, 7 and 14 were independent claims.

The decision for withdrawal of holding of abandonment was granted and the Notice of Abandonment was vacated on 9/29/2006.

In response to the RCE, the Examiner of record issued a non final Office action on 10/6/2006 including rejected claims 1-2, 4-5, 7-8, 10-14 under 35 U.S.C. 102(e) as being anticipated by Toda et al (U.S. Pat. No 6,305,823); rejected claims 1-2, 4-5, 7-8, 10-14 under 35 U.S.C. 102(e) as being anticipated by Okuchi et al (U.S. Pat. No 6,193,398) and rejected claims 1-3 and 9 under 35 U.S.C. 102(b) as being anticipated by Gotoh (US Pat. No 5,909,949).

The Patent Owner complied with such requirement by submitting remarks on 1/10/2007 and argued that "*Independent Claim 1 recites that the controller is responsive to the sensor signal for generating an output signal only when the sensor signal changes by more than a predetermined amount. Independent Claim 14 recites that the controller is responsive to the sensor signal for generating an output signal only when the sensor signal changes by more than a predetermined minimum threshold amount to prevent the actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition. The cited references fail to disclose either of these features*" and "*claim 7 recites that the controller is responsive to a rate of change of the sensor signal for generating the output signal. The Toda et al. and the Okuchi et al. references fail to disclose this feature*".

A personal interview held on 1/31/2007. The Examiner of record noted in the interview summary stating "*We discussed independent claims 1, 7, and 14. We agreed that claim 14 is allowable over the prior art of record because of the specific limitation of "a predetermined minimum threshold amount to prevent the actuator from being operated continuously or duly in response to relatively small variations in the sensed operating speed"*.

On the same day, the Patent Owner submitted an amendment including canceled claims 1, 6-13 and amended claims 2-5 to depend from claim 14. Thus, in this amendment claims 2-5 and 14 were pending. Of these, claim 14 was independent claim.

Notice of allowance was mailed on 4/19/2007 with a statement of reasons for allowance: "*applicant's amendment and accompanying remarks has persuaded the examiner to place this application in condition for allowance.*"

Claims 2-5 and 14 were renumbered, the same numbering that appears in the base patent.

Thus, it appears from the Examiner's Statement of Reasons for allowance included in the base patent prosecution history that at the time of allowance, claims 2-5 and 14 were perceived as including at least the limitation "*a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition*" (the remark 1/10/2007) and the base patent issued for that reason.

In summary, a reference or combination of references teaching "*a controller .... a predetermined minimum threshold amount to prevent said actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition*" or equivalents thereof will be accepted as raising an SNQ and any reference or combination that provides a portion of the critical limitations that is not cumulative to the teachings of record will also be accepted as raising an SNQ.

The above SNQ is based in part on patents and/or printed publications already cited/considered in an earlier concluded examination of the patent being reexamined. On November 2, 2002, Public Law 107-273 was enacted. Title III, Subtitle A, Section 13105, part (a) of the Act revised the reexamination statute by adding the following new last sentence to 35 U.S.C. 303(a) and 312(a):

> "The existence of a substantial new question of patentability is not precluded by the fact that a patent or printed publication was previously cited by or to the Office or considered by the Office."

For any reexamination ordered on or after November 2, 2002, the effective date of the statutory revision, reliance on previously cited/considered art, i.e., "old art," does not necessarily preclude the existence of a substantial new question of patentability (SNQ) that is based exclusively on that old art. Rather, determinations on whether a SNQ exists in such an instance shall be based upon a fact-specific inquiry done on a case-by-case basis.

In the present instance, there exists a SNQ based in part on Gotoh, Okuchi and Toda. A discussion of the specifics now follows:

With regard to Gotoh, Okuchi and Toda, which were the subject of extensive written discussion on the record of the base application, it is clear that the request presents theirs teachings in a new light. Gotoh, Okuchi and Toda are now presented in the request in combination with Uchida, Takahashi, Hussman, Miskin and Leleve. Insofar as these references were previously not of record; Gotoh, Okuchi and Toda are not presented in a manner that conflicts with a finding from the prosecution history but instead is presented in a new light. See *Ex parte Chicago Rawhide Mfg.* Co., 223 USPQ 351 (Bd. Pat. App. & Inter. 1984).

**Analysis**

Issue 1: The request indicates that Requester considers claims 1, 2, 4 and 5 are rejected under 35 U.S.C. § 102(b) as being anticipated by Uchida.

It is agreed that the consideration of Uchida raises a substantial new question of patentability for claims 1, 2, 4 and 5 of the '034 patent. As presented in the detailed explanation in the request, pp. 16-17, a reasonable examiner would consider Uchida important in making a decision as to the patentability of claims 1, 2, 4 and 5 of the '034 patent.

Uchida appears to teach a vehicle lamp illumination directional control device which detects the posture of a vehicle and adjusts the illumination direction of a vehicle lamp so that the illumination direction can always be kept in a predetermined direction including a controller (3) that is responsive to the sensor signal for generating an output signal only when the sensor signal changes by more than **a predetermined minimum threshold amount to prevent the actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition** (page 4, lines 16-27, page 10, line 26 to page 11, line 6).

Sine this teaching is directly related to subject matter considered as the basis for allowability of the patent claim, a reasonable examiner would consider this teaching important in determining the patentability of claim 1. More particularly, the item matching in the claim chart, pages 1-6 offered by Requester is deemed plausible to the degree that further consideration is warranted.

There is a substantial likehood that a reasonable examiner would consider this teaching important in deciding whether or not claim 1 is patentable. The prosecution history of the base application does not indicate that Uchida was included for consideration by the examiner in charge of the base application. Accordingly, such teaching is not cumulative to any written discussion on the record of the teachings of the prior art, was not previously considered nor addressed during a prior examination and the same question of patentability was not the subject of a final holding of invalidity by Federal Courts.

Because dependent claims 2, 4 and 5 carry all of the limitations of the independent claim 1 from which its stem, by raising a substantial new question of patentability with regard to independent claim 1, the reference implicitly raises a substantial new question of patentability for claims 2, 4 and 5.

Issue 2: The request indicates that Requester considers claims 1, 2, 4 and 5 are rejected under 35 U.S.C. § 102(b) as being anticipated by Takahashi.

It is agreed that the consideration of Takahashi raises a substantial new question of patentability for claims 1, 2, 4 and 5 of the '034 patent. As presented in the detailed explanation in the request, pp. 17-19, a reasonable examiner would consider Takahashi important in making a decision as to the patentability of claims 1, 2, 4 and 5 of the '034 patent.

Takahashi appears to teach a vehicle lamp illumination direction control device which detects the posture of a vehicle and correctly adjusts the illumination direction of a vehicle lamp to maintain it in a predetermined direction including a controller (4) that is responsive to the sensor signal for generating an output signal only when the sensor signal changes by more than **a predetermined minimum threshold amount to prevent the actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition** (page 9, line 16 – page 10, line 3; page 10, line 20 to page 11, line 11).

Sine this teaching is directly related to subject matter considered as the basis for allowability of the patent claim, a reasonable examiner would consider this teaching important in determining the patentability of claim 1. More particularly, the item matching in the claim chart, pages 7-12 offered by Requester is deemed plausible to the degree that further consideration is warranted.

There is a substantial likehood that a reasonable examiner would consider this teaching important in deciding whether or not claim 1 is patentable. The prosecution history of the base application does not indicate that Takahashi was included for consideration by the examiner in charge of the base application. Accordingly, such teaching is not cumulative to any written discussion on the record of the teachings of the prior art, was not previously considered nor addressed during a prior examination and the same question of patentability was not the subject of a final holding of invalidity by Federal Courts.

Because dependent claims 2, 4 and 5 carry all of the limitations of the independent claim 1 from which its stem, by raising a substantial new question of patentability with regard to independent claim 1, the reference implicitly raises a substantial new question of patentability for claims 2, 4 and 5.

Issue 3: The request indicates that Requester considers claims 1, 2, 4 and 5 are rejected under 35 U.S.C. § 102(b) as being anticipated by Hussman.

It is not agreed that the consideration of Hussman raises a substantial new question of patentability for claims 1, 2, 4 and 5 of the '034 patent.

As pointed out on page 20 of the request, and the claim chart, pages 13-14, the requester indicates that Hussman teaches a controller that is responsive to the sensor signal for performing the recited functions at col. 3, lines 30-39 and lines 49-61; col. 4, lines 6-12 and col. 6, lines 51-64.

However, these paragraphs do not teach the limitation "**a controller that is responsive to the sensor signal for generating an output signal only when the sensor signal changes by more than a predetermined minimum threshold amount to prevent the actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition**" as recited in claim 1.

Hussman merely teaches:

> "The curve-recognition device K is electrically conductively coupled with the switchover device SE and thereby couples the third filter F3 electrically conductively with the regulator R if a difference signal other than zero is fed to it from the subtractor SU. When no difference signal from the subtractor SU is present, the curve-recognition device K switches the switchover device SE so that the first filter FI is coupled to the regulator R" (col. 3, lines 30-39)

> "At the coupling between the switchover device SE and the regulator R, a matching device AE is, here for example, arranged which, upon a switchover by the switchover device SE, adjusts the various nominal values to one another so that discontinuities or jumps in the adjustment and regulation of the illumination range are avoided". (col. 4, lines 6-12)

There is no evidence presented that Hussman teaches a controller would include the same function as called for in claim 1. Thus, Hussman does not teach a key element of claim 1. As such, a reasonable examiner would not consider Hussman important in deciding whether or not the claims are patentable.

Because claims 2, 4 and 5 depend from claim 1, thus, Hussman also fails to raise SNQ to claims 2, 4 and 5.

Issue 4: The request indicates that Requester considers claims 1 and 5 are rejected under 35 U.S.C. § 102(b) as being anticipated by Miskin.

It is agreed that the consideration of Miskin raises a substantial new question of patentability for claims 1 and 5 of the '034 patent. As presented in the detailed explanation in the request, p. 21, a reasonable examiner would consider Miskin important in making a decision as to the patentability of claims 1 and 5 of the '034 patent.

Miskin appears to teach a device for adjusting vehicle headlights automatically including a controller (2-4) that is responsive to the sensor signal (S1-S4) for generating an output signal only when the sensor signal changes by more than **a predetermined minimum threshold amount to prevent the actuator from being operated continuously or unduly frequently in**

**response to relatively small variations in the sensed operating condition** (page 5)

Sine this teaching is directly related to subject matter considered as the basis for allowability of the patent claim, a reasonable examiner would consider this teaching important in determining the patentability of claim 1. More particularly, the item matching in the claim chart, pages 17-19 offered by Requester is deemed plausible to the degree that further consideration is warranted.

There is a substantial likehood that a reasonable examiner would consider this teaching important in deciding whether or not claim 1 is patentable. The prosecution history of the base application does not indicate that Miskin was included for consideration by the examiner in charge of the base application. Accordingly, such teaching is not cumulative to any written discussion on the record of the teachings of the prior art, was not previously considered nor addressed during a prior examination and the same question of patentability was not the subject of a final holding of invalidity by Federal Courts.

Because dependent claim 5 carries all of the limitations of the independent claim 1 from which its stem, by raising a substantial new question of patentability with regard to independent claim 1, the reference implicitly raises a substantial new question of patentability for claim 5.

Issue 5: The request indicates that Requester considers claims 1 and 5 are rejected under 35 U.S.C. § 102(b) as being anticipated by Leleve.

It is agreed that the consideration of Leleve raises a substantial new question of patentability for claims 1 and 5 of the '034 patent. As presented in the detailed explanation in the request, p. 22, a reasonable examiner would consider Leleve important in making a decision as to the patentability of claims 1 and 5 of the '034 patent.

Leleve appears to teach a device for the dynamic adjustment of the headlights of a vehicle including a controller (3, 4, 6) that is responsive to the sensor signal (1-2) for generating an output signal only when the sensor signal changes by more than **a predetermined minimum threshold amount to prevent the actuator from being operated continuously or unduly frequently in response to relatively small variations in the sensed operating condition** (Fig. 2).

Sine this teaching is directly related to subject matter considered as the basis for allowability of the patent claim, a reasonable examiner would consider this teaching important in determining the patentability of claim 1. More particularly, the item matching in the claim chart, pages 20-21 offered by Requester is deemed plausible to the degree that further consideration is warranted.

There is a substantial likehood that a reasonable examiner would consider this teaching important in deciding whether or not claim 1 is patentable. The prosecution history of the base application does not indicate that Leleve was included for consideration by the examiner in charge of the base application. Accordingly, such teaching is not cumulative to any written discussion on the record of the teachings of the prior art, was not previously considered nor addressed during a prior examination and the same question of patentability was not the subject of a final holding of invalidity by Federal Courts.

Because dependent claim 5 carries all of the limitations of the independent claim 1 from which its stem, by raising a substantial new question of patentability with regard to independent claim 1, the reference implicitly raises a substantial new question of patentability for claim 5.

Issues 6, 11 and 16: The request indicates that Requester considers that claims 1, 2, 4 and 5 are unpatentable under 35 USC 103(a) over Toda in view of Uchida (issue 6); or over Okuchi in view of Uchida (issue 11); or over Gotoh in view of Uchida (claims 1-5 in issue 16).

We have already found Uchida proposed in issue 1 above raises SNQ regarding claims 1, 2, 4 and 5 of the '034 patent, and as a result, Uchida with any plausible combination of valid prior art references (i.e, Toda, Okuchi and

Gotoh) implicitly raise a substantial new question of patentability for claims 1-5.

The teachings of the above combinations are not cumulative to any written discussion on the record of the teachings of the prior art, were not previously considered nor addressed during a prior examination, and the same question was not the subject of a final holding of invalidity in the Federal Courts.

<u>Issues 7, 12 and 17</u>: The request indicates that Requester considers that claims 1, 2, 4 and 5 are unpatentable under 35 USC 103(a) over Toda in view of Takahashi (issue 7); or over Okuchi in view of Takahashi (issue 12); or over Gotoh in view of Takahashi (claims 1-5 in issue 17).

We have already found Takahashi proposed in issue 2 above raises SNQ regarding claims 1, 2, 4 and 5 of the '034 patent, and as a result, Takahashi with any plausible combination of valid prior art references (i.e, Toda, Okuchi and Gotoh) implicitly raise a substantial new question of patentability for claims 1-5.

The teachings of the above combinations are not cumulative to any written discussion on the record of the teachings of the prior art, were not previously considered nor addressed during a prior examination, and the same question was not the subject of a final holding of invalidity in the Federal Courts.

Issues 8, 13 and 18: The request indicates that Requester considers that claims 1, 2, 4 and 5 are unpatentable under 35 USC 103(a) over Toda in view of Hussman (issue 8); or over Okuchi in view of Hussman (issue 13); or over Gotoh in view of Hussman (claims 1-5 in issue 18).

It is not agreed that consideration of Toda in view of Hussman (issue 8), Okuchi in view of Hussman (issue 13) or Gotoh in view of Hussman (issue 18) raise a substantial new question of patentability with regard to claims 1-5 of the '034 patent. More particularly, without the additional teachings of Hussman, Toda or Okuchi or Gotoh is not presented in a different light than it was presented in the prosecution history. Moreover, as indicated above issue 3, Hussman does not include the teachings identified "a controller ... in response to relatively small variations in the sensed operating condition" as having the significance of an SNQ.

Neither Toda (or Okuchi or Gotoh) nor Hussman teaches a key element of claim 1. As such, a reasonable examiner would not consider their combination important in deciding whether or not the claims are patentable.

Issues 9, 14 and 19: The request indicates that Requester considers that claims 1, 2, 4 and 5 are unpatentable under 35 USC 103(a) over Toda in view of Miskin (issue 9); or over Okuchi in view of Miskin (issue 14); or over Gotoh in view of Miskin (issue 19).

We have already found Miskin proposed in issue 4 above raises SNQ regarding claims 1 and 5 of the '034 patent, and as a result, Miskin with any plausible combination of valid prior art references (i.e, Toda, Okuchi and Gotoh) implicitly raise a substantial new question of patentability for claims 1, 2, 4 and 5.

The teachings of the above combinations are not cumulative to any written discussion on the record of the teachings of the prior art, were not previously considered nor addressed during a prior examination, and the same question was not the subject of a final holding of invalidity in the Federal Courts.

Issues 10, 15 and 20: The request indicates that Requester considers that claims 1, 2, 4 and 5 are unpatentable under 35 USC 103(a) over Toda in view of Leleve (issue 10); or over Okuchi in view of Leleve (issue 15); or over Gotoh in view of Leleve (for claims 1-5 in issue 17).

We have already found Leleve proposed in issue 5 above raises SNQ regarding claims 1 and 5 of the '034 patent, and as a result, Leleve with any plausible combination of valid prior art references (i.e, Toda, Okuchi and Gotoh) implicitly raise a substantial new question of patentability for claims 1-5.

The teachings of the above combinations are not cumulative to any written discussion on the record of the teachings of the prior art, were not previously considered nor addressed during a prior examination, and the same question was not the subject of a final holding of invalidity in the Federal Courts.

## Information Disclosure Statement

The Information Disclosure Statement filed 5/16/11 is acknowledged. As current Central Reexamination Unit policy is that court documents are not prior art as such and are not to be listed on an IDS. It have been lined through. It is noted the court documents have been read and considered, and any duty to disclose such documents is deemed satisfied.

## Conclusion

Extensions of time under 37 CFR 1.136(a) will not be permitted in inter partes reexamination proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to the patent owner in a reexamination proceeding. Additionally, 35 U.S.C. 314(c) requires that inter partes reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.937). Patent owner extensions of time in inter partes reexamination proceedings are provided for in 37 CFR 1.956. Extensions of time are not available for third party requester comments, because a comment period of 30 days from service of patent owner's response is set by statute. 35 U.S.C. 314(b)(3).

The patent owner is reminded of the continuing responsibility under 37 CFR 1.985(a), to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving the patent undergoing reexamination throughout the course of this reexamination proceeding. The third party requester is also reminded of the ability to similarly inform the Office of any such activity or proceeding throughout the course of this reexamination proceeding. See MPEP § 2686 and 2686.04.

NOTICE RE PATENT OWNER'S CORRESPONDENCE ADDRESS

Effective May 16, 2007, 37 CFR 1.33(c) has been revised to provide that:

The patent owner's correspondence address for all communications in an *ex parte* reexamination or an *inter partes* reexamination is designated as the correspondence address of the patent.

> *Revisions and Technical Corrections Affecting Requirements for Ex Parte and Inter Partes Reexamination*, 72 FR 18892 (April 16, 2007)(Final Rule)

**The correspondence address for any pending reexamination proceeding not having the same correspondence address as that of the patent is, by way of this revision to 37 CFR 1.33(c), automatically changed to that of the patent file as of the effective date.**

This change is effective for any reexamination proceeding which is pending before the Office as of May 16, 2007, including the present reexamination proceeding, and to any reexamination proceeding which is filed after that date.

Parties are to take this change into account when filing papers, and direct communications accordingly.

In the event the patent owner's correspondence address listed in the papers (record) for the present proceeding is different from the correspondence address of the patent, it is strongly encouraged that the patent owner affirmatively file a Notification of Change of Correspondence Address in the reexamination proceeding and/or the patent (depending on which address patent owner desires), to conform the address of the proceeding with that of the patent and to clarify the record as to which address should be used for correspondence.

After the filing of a request for reexamination by a third party requester, any document filed by either the patent owner or the third party requester must be served on the other party (or parties where two or more third party requester proceedings are merged) in the reexamination proceeding in the manner provided in 37 CFR 1.248. See 37 CFR 1.903.

All correspondence relating to this *inter partes* reexamination proceeding should be directed:

By Mail to: Mail Stop *Inter Partes* Reexam
Attn: Central Reexamination Unit
Commissioner for Patents United States Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

By FAX to: (571).273-9900
Central Reexamination Unit

By hand: Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Registered users of EFS-Web may alternatively submit such correspondence via the electronic filing system EFS-Web, at https://sportal.uspto.gov/authenticate/authenticateuserlocalepf.html. EFS-Web offers the benefit of quick submission to the particular area of the Office that needs to act on the correspondence. Also, EFS-Web submissions are "soft scanned" (i.e., electronically uploaded) directly into the official file for the reexamination proceeding, which offers parties the opportunity to review the content of their submissions after the "soft scanning" process is complete.

Any inquiry concerning this communication or earlier communications from the examiner, or as to the status of this proceeding, should be directed to the Central Reexamination Unit at telephone number (571) 272-7705.

Signed:

/My-Trang N. Ton/
Primary Examiner, CRU 3992

/Margaret Rubin/
Primary Examiner, CRU 3992

MARK J. REINHART
SPRE-AU 3992
CENTRAL REEXAMINATION UNIT

| **LIST OF DOCUMENTS CITED BY THIRD PARTY REQUESTER IN *INTER PARTES* REEXAMINATION** | PATENT NO. 7,241,034 | PATENTEE James E. SMITH et al. |
|---|---|---|
| | PATENT DATE July 10, 2007 | |

**U. S. PATENT DOCUMENTS**

| EXAM. INITIAL | PATENT/ PUBLICATION NUMBER | NAME | PATENT/ PUBLICATION DATE | CLASS | SUBCLASS | FILING DATE |
|---|---|---|---|---|---|---|
| /M.T./ | 4,954,933 | Wassen et al. | September 4, 1990 | | | |
| /M.T./ | 5,182,460 | Hussman | January 26, 1993 | | | |
| /M.T./ | 5,909,949 | Gotoh | June 8, 1999 | | | |
| /M.T./ | 6,193,398 | Okuchi et al. | February 27, 2001 | | | |
| /M.T./ | 6,305,823 | Toda et al. | October 23, 2001 | | | |

**FOREIGN PATENT DOCUMENTS**

| EXAMINER INITIAL | DOCUMENT NUMBER | COUNTRY | DATE | NAME | SUBCLASS | TRANSLATION | |
|---|---|---|---|---|---|---|---|
| | | | | | | YES | NO |
| /M.T./ | 31 29 891 | DE | June 9, 1982 | | | X | |
| /M.T./ | 31 10 094 | DE | September 30, 1982 | | | X | |
| /M.T./ | 2 309 773 | GB | August 6, 1997 | | | | X |
| /M.T./ | 2 309 774 | GB | August 6, 1997 | | | | X |

**OTHER DOCUMENTS**

| EXAMINER INITIAL | Name |
|---|---|
| | ~~"Original Complaint for Patent Infringement," filed on March 8, 2010, *BALTHER TECHNOLOGIES, LLC. v. AM. HONDA MOTOR CO. INC., et al.*, Case No. 6:10-CR-78-LED (E.D. Tex.).~~ |
| | ~~"Plaintiff's Notice of Voluntary Dismissal," filed on May 17, 2010, *BALTHER TECHNOLOGIES, LLC. v. AM. HONDA MOTOR CO. INC., et al.*, Case No. 6:10-CR-78-LED (E.D. Tex.).~~ |
| | ~~"Order," dated May 18, 2010, *BALTHER TECHNOLOGIES, LLC. v. AM. HONDA MOTOR CO. INC., et al.*, Case No. 6:10-CR-78-LED (E.D. Tex.).~~ |
| /M.T./ | Certified English-language translation of German Patent Application Publication No. 31 10 094 to Miskin et al. |
| /M.T./ | Certified English-language translation of German Patent Application Publication No. 31 29 891 to Leleve. |

| EXAMINER /My Trang Ton/ (06/15/2011) | DATE CONSIDERED (06/15/2011) |
|---|---|
| EXAMINER: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. | |

| **Search Notes** | **Application/Control No.** | **Applicant(s)/Patent under Reexamination** | |
|---|---|---|---|
| | 95/001,621 | 7,241,034 | |
| | **Examiner** | **Art Unit** | |
| | MY-TRANG TON | 3992 | |

**SEARCHED**

| Class | Subclass | Date | Examiner |
|---|---|---|---|
| n/a | - | 6/9/2011 | MT |
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**SEARCH NOTES (INCLUDING SEARCH STRATEGY)**

| | DATE | EXMR |
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| n'a | 6/9/2011 | MT |
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**INTERFERENCE SEARCHED**

| Class | Subclass | Date | Examiner |
|---|---|---|---|
| n/a | - | 6/9/2011 | MT |
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| *Reexamination* | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 95/001,621 | 7,241,034 |
| | **Certificate Date** | **Certificate Number** |
| | | |

| **Requester** **Correspondence Address:** ☐ **Patent Owner** ☒ **Third Party** |
|---|
| KENYON & KENYON LLP<br>One Broadway<br>New York, N.Y. 10004 |

| **LITIGATION REVIEW** ☒ | **mt**<br>(examiner initials) | **6/9/11**<br>(date) |
|---|---|---|
| Case Name | | Director Initials |
| U.S. District - Texas Eastern (Tyler)<br>6:10CV78<br>Balther Technologies, Llc v. American Honda Motor Co Inc et A | | ML for JC |
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| **COPENDING OFFICE PROCEEDINGS** | |
|---|---|
| **TYPE OF PROCEEDING** | **NUMBER** |
| 1. 90/011,011 | |
| 2. | |
| 3. | |
| 4. | |

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 95/001,621 ✓ 90/011011 | 05/16/2011 | 7,241,034 | | 1240 |

92045 7590 02/23/2012

The Caldwell Firm, LLC
PO Box 59655
Dept. SVIPGP
Dallas, TX 75229

| EXAMINER | |
|---|---|
| | |

| ART UNIT | PAPER NUMBER |
|---|---|
| | |

DATE MAILED: 02/23/2012

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
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Alexandria, VA 22313-1450
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**DO NOT USE IN PALM PRINTER**

THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS

Date: 2-23-12

KENYON & KENYON LLP
ONE BROADWAY
NEW YORK, NY 10004

**Transmittal of Communication to Third Party Requester**
**Inter Partes Reexamination**

REEXAMINATION CONTROL NO. : 95001621 + 90/011011
PATENT NO. : 7241034
TECHNOLOGY CENTER : 3999
ART UNIT : 3992

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified Reexamination proceeding. 37 CFR 1.903.

Prior to the filing of a Notice of Appeal, each time the patent owner responds to this communication, the third party requester of the inter partes reexamination may once file written comments within a period of 30 days from the date of service of the patent owner's response. This 30-day time period is statutory (35 U.S.C. 314(b)(2)), and, as such, it cannot be extended. See also 37 CFR 1.947.

If an ex parte reexamination has been merged with the inter partes reexamination, no responsive submission by any ex parte third party requester is permitted.

All correspondence relating to this inter partes reexamination proceeding should be directed to the Central Reexamination Unit at the mail, FAX, or hand-carry addresses given at the end of the communication enclosed with this transmittal.

PTOL-2070(Rev.07-04)

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

The Caldwell Firm, LLC (For Patent Owner)
PO Box 59655
Dept. SVIPGP
Dallas TX 75229

Kenyon & Kenyon LLP (For the '1621 Requester)
One Broadway
New York, NY 10004

*In re* Smith *et al.*
*Ex Parte* Reexamination Proceeding
Control No.: 90/011,011
Filed: July 10, 2010
For: U.S. Patent No. 7,241,034

*In re* Smith *et al.*
*Inter Partes* Reexamination Proceeding
Control No.: 95/001,621
Filed: May 16, 2011
For: U.S. Patent No.: 7,241,034

: **DECISION**
: ***SUA SPONTE***
: **TO MERGE**
: **REEXAMINATION**
: **PROCEEDINGS**

The above-captioned reexamination proceedings are before the Office of Patent Legal Administration for *sua sponte* consideration on merging the above proceedings.

*Ex parte* reexamination proceeding No. 90/011,011 and *inter partes* reexamination proceeding No. 95/001,621 **are merged** into a single proceeding.

## BACKGROUND

1. On July 10, 2007, United States Patent Number 7,241,034 ("the '034 patent") issued to Smith *et al.* with 5 claims.

2. On July 10, 2010, patent owner filed a request for *ex parte* reexamination of claims 1 and 3 of the '034 patent, which was assigned control number 90/011,011 ("the '11011 proceeding").[1]

3. On August 12, 2010, *ex parte* reexamination of claims 1 and 3 of the '034 patent was granted in the '11011 reexamination proceeding.

4. On October 12, 2010, the time period for submission of a patent owner's statement under 37 CFR 1.530(b) expired.

[1] Patent owner originally deposited a request on May 25, 2010 that was found incomplete by the Office and was subsequently supplemented until found sufficient to grant a filing date of July 10, 2010.

5. On January 12, 2011, the Office issued a non-final rejection in the '11011 proceeding.

6. On January 18, 2011, patent owner timely filed an informal/non-responsive amendment after an Office action.

7. On February 16, 2011, patent owner timely filed a substitute amendment, which amended claims 1-5 and added new claims 6-45.

8. On May 16, 2011, a request for *inter partes* reexamination of claims 1-5 of the '034 patent was filed by a third party requester, which was assigned Reexamination Control No. 95/001,621 ("the '1621 proceeding"). The request identified Volkswagen Group of America, Inc. ("the 1621 requester") as the real party in interest.

9. On June 23, 2011, *inter partes* reexamination of claims 1-5 of the '034 patent was granted in the '1621 proceeding.

10. On January 18, 2012, the Office issued a Notice of Defective Paper in the '11011 proceeding requesting correction of the February 16, 2011 substitute amendment.

11. On February 2, 2012, patent owner timely filed a second substitute amendment, which amended claims 1-5 and added new claims 6-41.

12. To date, no Office action has issued in the '1621 proceeding.

**DECISION**

**I. MERGER OF PROCEEDINGS**

Reexamination has been ordered in the above-captioned two proceedings for overlapping claims of the same patent. One of the proceedings (the '11011 proceeding) is an *ex parte* proceeding. The other proceeding (the '1621 proceeding) is an *inter partes* proceeding. Both proceedings are still pending, and have not been terminated. The time period for filing a patent owner statement under 37 CFR 1.530 in the *ex parte* proceeding has expired. Therefore, consideration of merger is ripe at this point in time.

MPEP 2686.01 points out:

> Where a second request for reexamination is filed and reexamination is ordered, and a first reexamination proceeding is pending, the proceedings will be merged where the Office (in its discretion) deems it appropriate to do so, to facilitate the orderly handling of the proceedings. However, a decision not to merge is within the sole discretion of the Office to facilitate/carry out the statutory mandate of 35 U.S.C. 314(c) to conduct reexamination proceedings with "special dispatch."

In this instance, based upon the record as a whole, it is found, based on the facts as they exist at present, that merger of the proceedings should facilitate the orderly handling of the proceedings with special dispatch. Accordingly, the 90/011,011 and 95/001,621 proceedings **are hereby merged**. The merged proceeding will be conducted in accordance with the guidelines and requirements that follow.

## II. THE SAME CLAIMS MUST BE MAINTAINED IN BOTH PROCEEDINGS

Patent owner is required to maintain the same claims (and specification) in both files throughout the merged proceeding. An amendment accompanied the patent owner's statement in the '11011 *ex parte* reexamination proceeding. Originally issued claims 1-5 have all been amended and new claims 6-41 have been added in the '11011 *ex parte* proceeding, while the claims in the '1621 *inter partes* proceeding have not been so amended. Thus, the claims are not currently the same in both proceeding files. An Office action requiring an amendment placing the claims of both proceedings in identical form is being issued concurrently with this decision. Patent owner must respond to the Office action in accordance with the procedure provided in 37 CFR 1.111. The *inter partes* third party requester will then have an opportunity to comment on patent owner's response in accordance with the procedures in 37 CFR 1.947.

The patent owner is required to maintain the same claims (and specification) in both files *throughout the merged proceeding*.

## III. CONDUCT OF MERGED PROCEEDING

### A. Governing regulations for the merged proceeding:

The present decision merges an *ex parte* reexamination proceeding with an *inter partes* reexamination proceeding. Pursuant to 37 CFR 1.989(b), the merged proceeding is governed by 37 CFR 1.902 through 1.997.

### B. *Inter partes* Third Party Requester Participation:

### 1. Comment rights:

The *inter partes* requester can comment pursuant to 35 U.S.C. 314(b)(2).[2] First, an *inter partes* requester's right to comment is contingent upon the patent owner responding to, or commenting on, an Office action. Second, the *inter partes* requester's right to comment is limited to issues raised in either the Office action or the patent owner's response to the action. Finally, the *inter partes* requester's comments must be submitted within 30 days from the date of service of the patent owner's response. An *inter partes* requester does not have a right to comment on any issue raised outside the confines of the statute, e.g. issues raised in a previous Office action (but

[2] Each time that the patent owner files a response to an action on the merits from the Patent and Trademark Office, the *inter partes* third-party requester shall have one opportunity to file written comments addressing issues raised by the action of the Office or the patent owner's response thereto, if those written comments are received by the Office within 30 days after the date of service of the patent owner's response.

not raised in the most recent Office action or response) or the request and comments from the *ex parte* requester. The *inter partes* requester's comments must be submitted within the statutory time period of 30 days from date of service of the patent owner's response.

**2. Appeal Rights:**

A discussion of third party requester's appeal rights can be found in section G below.

**C. Papers mailed/filed:**

All papers mailed by the Office throughout the merged proceeding will take the form of a single action which applies to both proceedings. All papers issued by the Office, or filed by the patent owner and the third party requester, will contain the identifying data for both files and will be physically entered in each reexamination file. All papers filed by the patent owner and the third party requester must consist of a single paper, **filed in duplicate**, each bearing a signature and identifying data for both files, for entry into each file.

All papers filed by the patent owner and the third party requesters should be directed:

by Mail to: Attn: Mail Stop "*Inter Partes* Reexam"
Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

by FAX to: (571) 273-9900
Central Reexamination Unit

by Hand to: Customer Service Window
Attn: Central Reexamination Unit
Randolph Building, Lobby Level
401 Dulany Street
Alexandria, VA 22314

by EFS: Registered users may submit papers via the electronic filing system EFS-Web, at:

https:// efs.uspto.gov/efile/myportal/efs-registered.

The patent owner and the *inter partes* requester are reminded that every paper filed (including papers filed *via* facsimile transmission) in the merged proceeding subsequent to this decision must be served on the other party, and every paper filed must reflect that such paper was served on the other party in the merged proceeding, pursuant to 37 CFR 1.903. All papers are to be addressed to the Central Reexamination Unit as provided above.

**D. Amendments:**

The filing of any amendments to the drawings, specification or claims must comply with 37 CFR 1.943, which incorporates the provisions of 37 CFR 1.530, and the guidelines of MPEP § 2666.01, which in turn references the guidelines of MPEP § 2250.

37 CFR 1.121 does not apply to amendments in reexamination. Accordingly, clean copies of the amended claims are not required and are not to be submitted; rather amendments are to be presented via markings pursuant to paragraph 37 CFR 1.530(f), except that a claim should be canceled by a statement canceling the claim, without presentation of the text of the claim.

Pursuant to 37 CFR 1.530(i), all amendments must be made relative to the patent specification, including the claims, and drawings, which are in effect as of the date of filing the request for reexamination. *Amendments are not to be made relative to previous amendments.* Thus, for all amendments, all words not appearing in the patent are always underlined, and only words being deleted from the patent appear in brackets.

**E. Fees**:

Where a paper is filed that requires payment of a fee (*e.g.*, petition fee, excess claims fee, extension of time fee, appeal fee, brief fee, oral hearing fee), only a single fee need be paid. For example, only one fee need be paid for any patent owner's appellant brief (or that of the *inter partes* reexamination requester) which may be filed, even though the brief relates to merged multiple proceedings, and copies must be filed (as pointed out above) for each file in the merged proceeding.

**F. Citation of Patents and Printed Publications:**

Upon return of the present merged proceeding to the examiner, the examiner will review the files to ensure that each file contains identical citations of prior patents and printed publications, and will cite such documents as are necessary as part of the next action in order to place the files in that condition.

**G. Appeal Procedure Reminders for *Inter Partes* Reexamination**

The *inter partes* reexamination procedures for taking appeal, and for participating in the patent owner's appeal, are explained in MPEP §§ 2674 through 2675 and 2678 through 2683.

With respect to a patent owner's notice of appeal, the appeal must only be taken from the rejection(s) of the claims in the Right of Appeal Notice (RAN) that the *patent owner* proposes to contest, and must identify each claim rejected by examiner that the patent owner intends to contest.

With respect to a third party requester's notice of appeal, the appeal must only be taken from the finding(s) of patentability of claims in the RAN that the *third party requester* proposes to contest. As set forth in MPEP § 2674, the third party requester must identify in the notice of appeal each rejection *that was previously proposed by third party requester* that the third party requester intends to contest and each rejection made and later withdrawn by the examiner that the third party requester intends to contest. It is not sufficient to merely appeal from the allowance of a claim (i.e., the examiner's finding of a claim patentable); the third party requester must identify each previously proposed rejection to be contested.

No new ground of rejection can be proposed by a third party requester appellant, unless such ground was withdrawn by the examiner during the prosecution of the proceeding, and the third party requester has not yet had an opportunity to propose it as a third party requester proposed ground of rejection. See 37 CFR 41.67(c)(1)(vi) as to the proposed rejections that a requester can challenge in the appellant brief.

## CONCLUSION

1. *Ex parte* Reexamination Control No. 90/011,011 and *inter partes* Reexamination Control No. 95/001,621 are **merged into a single proceeding**, to be conducted in accordance with the procedure set forth above in Part III of this decision.

2. The examiner should not issue any further Office action for the present merged proceeding until after the earlier of: (a) the submission of the required response to the concurrently mailed Office action (see II above) to place the same amendment in all proceedings and requesters' comments on that response, or (b) the expiration of the time for filing the required response and any comments requesters elect to file.

3. Any questions concerning this communication should be directed to Joseph F. Weiss, Jr., Legal Advisor, at 571-272-7759.

Pinchus M. Laufer
Senior Legal Advisor
Office of Patent Legal Administration

February 17, 2012

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 95/001,621 + 90/011011 | 05/16/2011 | 7,241,034 | | 1240 |

92045 7590 02/23/2012
The Caldwell Firm, LLC
PO Box 59655
Dept. SVIPGP
Dallas, TX 75229

| EXAMINER | |
|---|---|
| TON, MY TRANG | |
| **ART UNIT** | **PAPER NUMBER** |
| 3992 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 02/23/2012 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
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(THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS)

KENYON & KENYON LLP

One Broadway

New York, N.Y. 10004

# Transmittal of Communication to Third Party Requester
# *Inter Partes* Reexamination

REEXAMINATION CONTROL NUMBER 95/001,621. + 90/011011

PATENT NUMBER 7,241,034.

TECHNOLOGY CENTER 3900.

ART UNIT 3992.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above-identified reexamination proceeding. 37 CFR 1.903.

Prior to the filing of a Notice of Appeal, each time the patent owner responds to this communication, the third party requester of the *inter partes* reexamination may once file written comments within a period of 30 days from the date of service of the patent owner's response. This 30-day time period is statutory (35 U.S.C. 314(b)(2)), and, as such, it cannot be extended. See also 37 CFR 1.947.

If an *ex parte* reexamination has been merged with the *inter partes* reexamination, no responsive submission by any *ex parte* third party requester is permitted.

**All correspondence** relating to this inter partes reexamination proceeding should be directed to the **Central Reexamination Unit** at the mail, FAX, or hand-carry addresses given at the end of the communication enclosed with this transmittal.

PTOL-2070 (Rev.07-04)

| ***OFFICE ACTION IN* INTER PARTES *REEXAMINATION*** | **Control No.**<br>95/001,621 | **Patent Under Reexamination**<br>7,241,034 |
|---|---|---|
| | **Examiner**<br>MY-TRANG TON | **Art Unit**<br>3992 |

***-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address. --***

Responsive to the communication(s) filed by:
Patent Owner on 02 February, 2012
Third Party(ies) on 16 May, 2011

**RESPONSE TIMES ARE SET TO EXPIRE AS FOLLOWS:**

*For Patent Owner's Response:*
1 MONTH(S) from the mailing date of this action. 37 CFR 1.945. EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.956.
*For Third Party Requester's Comments on the Patent Owner Response:*
30 DAYS from the date of service of any patent owner's response. 37 CFR 1.947. NO EXTENSIONS OF TIME ARE PERMITTED. 35 U.S.C. 314(b)(2).

**All correspondence** relating to this inter partes reexamination proceeding should be directed to the **Central Reexamination Unit** at the mail, FAX, or hand-carry addresses given at the end of this Office action.

This action is not an Action Closing Prosecution under 37 CFR 1.949, nor is it a Right of Appeal Notice under 37 CFR 1.953.

**PART I. THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:**

1.☐ Notice of References Cited by Examiner, PTO-892
2.☐ Information Disclosure Citation, PTO/SB/08
3.☐ _____

**PART II. SUMMARY OF ACTION:**

1a. ☒ Claims 1-41 are subject to reexamination.
1b. ☐ Claims _____ are not subject to reexamination.
2. ☐ Claims _____ have been canceled.
3. ☐ Claims _____ are confirmed. [Unamended patent claims]
4. ☐ Claims _____ are patentable. [Amended or new claims]
5. ☒ Claims 1-41 are rejected.
6. ☐ Claims _____ are objected to.
7. ☐ The drawings filed on _____ ☐ are acceptable ☐ are not acceptable.
8. ☐ The drawing correction request filed on _____ is: ☐ approved. ☐ disapproved.
9. ☐ Acknowledgment is made of the claim for priority under 35 U.S.C. 119 (a)-(d). The certified copy has: ☐ been received. ☐ not been received. ☐ been filed in Application/Control No 95001621.
10. ☐ Other _____

## DETAILED OFFICE ACTION

This proceeding is a merger of 90/011,011 and 95/001,621.

### I. MERGED REEXAMINATION PROCEEDINGS

Per the accompanying Decision *Sua Sponte* to Merge Reexamination Proceedings, Patent Owner is required to maintain the same claims (and specification) in both ***ex parte*** reexamination proceeding **90/011,011** ("the '11,011 proceeding") and ***inter partes*** reexamination proceeding **95/001,621** ("the '1621 proceeding").

### II. STATUS OF CLAIMS

1. The '11,011 proceeding:

The status of the claims with respect to the '11,011 proceeding is as follows: The amendment filed 2/2/2012 has been entered. Claims 1-41 were maintained; claim 1-5 were amended; and claims 6-41 were newly added. Claims 1-41 are therefore pending.

2. The '1621 proceeding:

The status of the claims with respect to the '1621 proceeding is as follows: Per the Order Granting Request, mailed on 6/23/2011, claims 1-5 will be reexamined. Claims 1-5 are therefore pending.

3. The Merged Reexamination Proceedings:

As set forth above, **Patent Owner is required to maintain identical amendments in the merged reexamination files for a Merged Reexamination Proceeding**. This requirement has not been satisfied.

## III. RELEVANT STATUTES - CLAIM REJECTIONS

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-41 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite because it is unclear which version of these claims is pending in the merged proceeding.

The version of claims in the '11,011 proceeding contains an amendment of claims 1-5 and the addition of claims 6-41, whereas the version of claims in the '1621 proceeding contains only the original claims 1-5. Patent Owner is required to maintain identical amendments in the merged reexamination files for purposes of the merged proceeding. Thus, the status of claims with respect to the Merged Reexamination Proceedings is unclear.

**Patent owner is required to file an amendment putting the same claims in both proceedings to overcome the rejection discussed above.** Patent owner is given **one month** to provide the required amendment in accordance with the procedures in MPEP 2250. Within **30 days** from the date of service of the patent owner's response, the '1,621 inter partes requester may once file written comments in accordance with 37 CFR 1.947. The '1621 requester's comments may include proposed rejections for any claims amended with respect to the claims currently of record in the '1621 proceeding. Once the parties have filed responses or the time period for filing such responses has expired, the examiner will issue an Office action on the merits.

## IV. EXTENSIONS OF TIME

Extensions of time under 37 CFR 1.136(a) will **not** be permitted in these proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 314(c) requires that *inter partes* reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.937). Patent owner extensions of time in *inter partes* reexamination proceedings are provided for in 37 CFR 1.956. Extensions of time are not available for third party requester comments, because a comment period of 30 days from service of patent owner's response is set by statute. 35 USC 314(b)(3).

## V. SERVICE OF PAPERS

Any paper filed by either the patent owner or the third party requester must be served on the other party in the reexamination proceeding in the manner provided by 37 CFR 1.248. See 37 CFR 1.903 and MPEP 2666.06.

## VI. CORRESPONDENCE AND INQUIRY AS TO OFFICE ACTIONS

All correspondence related to this inter partes reexamination proceeding should be directed as follows:

By EFS: Registered users may submit via the electronic filing system EFS-Web, at https://efs.uspto.gov/efile/myportal/efs-registered

By Mail to: Mail Stop *Inter Partes* Reexam
Central Reexamination Unit
Commissioner for Patents
United States Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

By FAX to: (571) 273-9900
Central Reexamination Unit

By hand: Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Any inquiry concerning this communication should be directed to the Central Reexamination Unit at telephone number (571) 272-7705.

/My-Trang Nu Ton/
Primary Examiner
CRU - Art Unit 3992

Conferees:
/Margaret Rubin/
Primary Examiner CRU 3992

MARK J. REINHART
CRU SPE-AU 3992

**PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

| | |
|---|---|
| In re application of: | ) |
| | ) |
| 7,241,034 | ) Art Unit: 3992 |
| | ) |
| Applications No. 95/001,621 & 90/011,011 | ) Examiner: MY-TRANG N. TON |
| | ) |
| Filed: 05/16/2011 | ) Atty. Docket No.: |
| | ) SVIPGP109RE |
| For: AUTOMATIC DIRECTIONAL CONTROL SYSTEM FOR VEHICLE HEADLIGHTS | ) Date: 03/23/2012 |
| | ) |

**AMENDMENT D**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Examiner:

In response to the Office Action mailed 2/23/2012, the notice of Merger of Proceedings mailed 2/23/2012, the Office Action mailed 1/12/2011 ("Office Action"), and as a substitute for the Responses filed 1/18/2011, 2/16/2011, and 02/02/2012 in the 90/011,011 proceeding, please enter the following amendments believed to place the Claims in condition for allowance.

AMENDMENTS TO THE CLAIMS

Amended claims follow:

1. (Currently Amended) An automatic directional control system for a vehicle headlight, comprising:

[[a]]two or more sensors that [[is]]are each adapted to generate a signal that is representative of at least one of a plurality of sensed conditions of [[the]]a vehicle, said sensed conditions including at least[[es]] ~~one or more of road speed,~~ steering angle[[,]] and pitch~~, and suspension height~~ of the vehicle;

a controller that is responsive to said two or more sensor signals for generating [[an]]at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent [[said]]at least one first one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in the sensed ~~operating~~ conditions; and

[[an]]said two or more actuators [[that is]]each being adapted to be connected to the headlight to effect movement thereof in accordance with said at least one output signal.

2. (Currently Amended) The automatic directional control system defined in claim 1, wherein at least one of said two or more sensors further generate[[s]] a signal that is representative of the road speed of the vehicle.

3. (Currently Amended) The automatic directional control system defined in claim 1, wherein at least one of said two or more sensors further generates a signal that is representative of [[the]]a rate of change of steering angle of the vehicle.

4. (Currently Amended) The automatic directional control system defined in claim 1, wherein at least one of said two or more sensors further generates a signal that is representative of [[the]]a rate of change of pitch of the vehicle.

5. (Currently Amended) The automatic directional control system defined in claim 1, wherein at least one of said two or more sensors further generates a signal that is representative of the suspension height of the vehicle.

6. (New) The automatic directional control system defined in claim 1, wherein said two or more sensors include a first sensor and a second sensor.

7. (New) The automatic directional control system defined in claim 6, wherein said first sensor is adapted to generate a signal that is representative of a condition including the steering angle of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle.

8. (New) The automatic directional control system defined in claim 6, wherein said first sensor is physically separate from said second sensor.

9. (New) The automatic directional control system defined in claim 1, further comprising one or more additional sensors for sensing one or more of a rate of change of road speed of the vehicle, a rate of change of steering angle of the vehicle, a rate of change of pitch of the vehicle, a suspension height, or a rate of change of suspension height of the vehicle.

10. (New) The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors generate a signal that is representative of the rate of change of road speed of the vehicle.

11. (New) The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors generate a signal that is representative of the rate of change of steering angle of the vehicle.

12. (New) The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors generate a signal that is representative of the rate of change of pitch of the vehicle.

13. (New) The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors generate a signal that is representative of a suspension height of the vehicle.

14. (New) The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured to include the first actuator connected to the headlight to effect movement thereof in a first direction and a second actuator connected to the headlight to effect movement thereof in a second direction different form the first direction.

15. (New) The automatic directional control system defined in claim 1, wherein the two or more actuators include the first actuator that is adapted to be connected to the headlight to effect movement thereof in a vertical direction.

16. (New) The automatic directional control system defined in claim 15, wherein the two or more actuators include a second actuator that is adapted to be connected to the headlight to effect movement thereof in a horizontal direction.

17. (New) The automatic directional control system defined in claim 1, wherein the two or more actuators include an electronically controlled mechanical actuator.

18. (New) The automatic directional control system defined in claim 1, wherein the two or more actuators include a step motor.

19. (New) The automatic directional control system defined in claim 1, wherein the two or more actuators include a servo motor.

20. (New) The automatic directional control system defined in claim 1, wherein the two or more actuators include a microstepping motor capable of being operated in fractional step increments.

21. (New) The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted both up and down relative to a horizontal reference position and left and right relative to a vertical reference position.

22. (New) The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that, while in a calibration mode, a directional orientation at which a beam of light projects therefrom is capable of being adjusted relative to the vehicle by manual operation of the two or more actuators.

23. (New) The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the controller includes a microprocessor.

24. (New) The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the controller includes a programmable electronic controller.

25. (New) The automatic directional control system defined in claim 1, wherein the automatic directional control system further includes at least one position feedback sensor capable of providing a position feedback signal associated with at least one of the two or more actuators.

26. (New) The automatic directional control system defined in claim 25, wherein the at least one position feedback sensor includes a Hall Effect sensor.

27. (New) The automatic directional control system defined in claim 25, wherein the at least one position feedback sensor includes an optical interrupter.

28. (New) The automatic directional control system defined in claim 1, wherein the automatic directional control system further includes memory.

29. (New) The automatic directional control system defined in claim 28, wherein the memory includes non-volatile memory.

30. (New) The automatic directional control system defined in claim 28, wherein the memory is configured to store a predetermined reference position associated with the headlight.

31. (New) The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by sensing a front and a rear suspension height of the vehicle.

32. (New) The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by a pitch sensor.

33. (New) The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the controller is programmed to be responsive to changes in the suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle.

34. (New) The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the controller is programmed to be responsive to changes in the suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle, thereby ignoring frequency changes in the suspension height of the vehicle that are a result of bumps in a road.

35. (New) The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the predetermined minimum threshold amount functions as a filter to minimize undesirable operation of at least one of the two or more actuators.

36. (New) The automatic directional control system defined in claim 1, wherein said controller is configured to be responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one of the two or more actuators from being operated continuously in response to relatively small variations in the sensed conditions.

37. (New) The automatic directional control system defined in claim 1, wherein said controller is configured to be responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one of the two or more actuators from being operated unduly frequently in response to relatively small variations in the sensed conditions.

38. (New) The automatic directional control system defined in claim 1, wherein said controller is further responsive to said two or more sensor signals to automatically activate one or more vehicle lights that are different than the headlight.

39. (New) The automatic directional control system defined in claim 38, wherein said one or more vehicle lights that are different than the headlight include one or more lights for illuminating a road in front of the vehicle during a turn.

40. (New) The automatic directional control system defined in claim 1, wherein said controller is further responsive to a steering angle in excess of a predetermined magnitude for automatically activating one or more vehicle lights that are different than the headlight.

41. (New) The automatic directional control system defined in claim 1, wherein said controller is further responsive to a steering angle in excess of a predetermined magnitude for automatically activating one or more vehicle lights that are different than the headlight to extend an angular range of a road surface.

REMARKS

As noted in the 6/23/2011 Office Communication for the Inter Partes Reexamination Proceeding number 95/001,621, which has now been merged with the current matter, Examiner has agreed with the Requestor that Requestor's issues 1-2, 4-7, 9-12, 14-17 and 19-20 raise substantial new questions of patentability as to claims 1-5 of the '034 patent.

Specifically, the Examiner agrees that:

Claims 1, 2, 4, and 5 are anticipated by Uchida (United Kingdom Patent Application Publication No. 2309773) under 35 U.S.C. §102(b);

Claims 1, 2, 4, and 5 are anticipated by Takahashi (United Kingdom Patent Application Publication No. 2309774) under 35 U.S.C. §102(b);

Claims 1 and 5 are anticipated by Miskin et al. (German Patent Application Publication No. 3110094) under 35 U.S.C. §102(b);

Claims 1 and 5 are anticipated by Leleve (German Patent Application Publication No. 3129891) under 35 U.S.C. §102(b);

Claims 1, 2, 4, and 5 are unpatentable over the combination of Toda et al. (U.S. Patent No. 6,305,823) and Uchida under 35 U.S.C. § 103(a);

Claims 1, 2, 4, and 5 are unpatentable over the combination of Toda et al. and Takahashi under 35 U.S.C. § 103(a);

Claims 1, 2, 4, and 5 are unpatentable over the combination of Toda et al. and Miskin et al. under 35 U.S.C. § 103(a);

Claims 1, 2, 4, and 5 are unpatentable over the combination of Toda et al. and Leleve under 35 U.S.C. § 103(a);

Claims 1, 2, 4, and 5 are unpatentable over the combination of Okuchi et al. (U.S. Patent No.6,193,398) and Uchida under 35 U.S.C. § 103(a);

Claims 1, 2, 4, and 5 are unpatentable over the combination of Okuchi et al. and Takahashi under 35 U.S.C. § 103(a);

Claims 1, 2, 4, and 5 are unpatentable over the combination of Okuchi et al. and Miskin et al. under 35 U.S.C. § 103(a);

Claims 1, 2, 4, and 5 are unpatentable over the combination of Okuchi et al. and Leleve under 35 U.S.C. § 103(a);

Claims 1 to 5 are unpatentable over the combination of Gotoh (U.S. Patent No. 5,909,949) and Uchida under 35 U.S.C. § 103(a);

Claims 1 to 5 are unpatentable over the combination of Gotoh and Takahashi under 35 U.S.C. § 103(a);

Claims 1, 2, 3, and 5 are unpatentable over the combination of Gotoh and Miskin et al. under 35 U.S.C. § 103(a); and

Claims 1 to 5 are unpatentable over the combination of Gotoh and Leleve under 35 U.S.C. § 103(a).

Applicant has amended Claim 1 to overcome such rejections, as follows:

1. (Currently Amended) An automatic directional control system for a vehicle headlight, comprising:

[[a]]two or more sensors that [[is]]are each adapted to generate a signal that is representative of at least one of a plurality of sensed conditions of [[the]]a vehicle, said sensed conditions including at least[[es]] ~~one or more of road speed,~~ steering angle[[,]] and pitch~~, and suspension height~~ of the vehicle;

a controller that is responsive to said two or more sensor signals for generating [[an]]at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent [[said]]at least one first one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in the sensed ~~operating~~ conditions; and

[[an]]said two or more actuators [[that is]]each being adapted to be connected to the headlight to effect movement thereof in accordance with said at least one output signal.

Applicant respectfully asserts that the references as relied on by the Examiner fail to teach "**two or more sensors** that are each adapted to generate a signal that is representative of at least one of a plurality of sensed conditions of a vehicle, said sensed conditions including at least **<u>steering angle and pitch of the vehicle</u>**" (emphasis added), as claimed by Applicant. Further, applicant respectfully asserts that the references as relied on by the Examiner fail to teach "**<u>two or more actuators</u>** each being adapted to be connected to the headlight to effect movement thereof in accordance with said at least one output signal" (emphasis added), as claimed by Applicant.

Applicant respectfully notes that a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. Of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Moreover, the identical invention must be shown in as complete detail as contained in the claim. *Richardson v. Suzuki Motor Co.*868 F.2d 1226, 1236, 9USPQ2d 1913, 1920 (Fed. Cir. 1989). Additionally, the elements must be arranged as required by the claim.

This criterion has simply not been met by the above reference, as noted above.

Further, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck,*947 F.2d 488, 20 USPQ2d 1438 (Fed.Cir.1991).

Applicant respectfully asserts that at least the first and third elements of the *prima facie* case of obviousness have not been met, since it would be *unobvious* to combine the references, and the prior art references, as relied upon by the Examiner, fail to teach or suggest <u>all</u> of the claim limitations.

Finally, Applicant brings to the Examiner's attention the subject matter of new Claims 6-41, which Applicant adds for full consideration. Claims 6-41 depend from and further limit Claim 1. Accordingly, Applicant respectfully submits that new Claims 6-41 are allowable for at least the same reasons that Claim 1 is in condition for allowance, as described above. Support for the amendments to Claim 1, as well as for the newly added dependent claims may be found (by way of example), in Table 1.

**Table 1**

| |
|---|
| Claim 1 – e.g., see Abstract; Col. 2, lines 7-17; and Figure 1. |
| Claim 2 – e.g., see Col. 2, line 10. |
| Claim 3 – e.g., see Col. 2, lines 11-12. |
| Claim 4 – e.g., see Col. 2, line 12. |
| Claim 5 – e.g., see Col. 2, line 11. |
| Claim 6 – e.g., see items 15 and 16 of Figure 1. |
| Claim 7 - e.g., see Abstract; Col. 2, lines 7-17; Col. 3, line 58 - Col. 4, line 2; and Figure 1. |
| Claim 8 – e.g., see items 15 and 16 of Figure 1. |
| Claim 9 - e.g., see Col. 3, line 58 - Col. 4, line 2. |
| Claim 10 - e.g., see Col. 3, line 58 - Col. 4, line 2. |
| Claim 11 - e.g., see Col. 3, line 58 - Col. 4, line 2. |
| Claim 12 - e.g., see Col. 3, line 58 - Col. 4, line 2. |
| Claim 13 - e.g., see Col. 3, line 58 - Col. 4, line 2. |
| Claim 14 - e.g., see Figure 1 and Col. 3, lines 26-29. |
| Claim 15 - e.g., see Figure 1 and Col. 3, lines 26-29. |
| Claim 16 - e.g., see Figure 1 and Col. 3, lines 26-29. |
| Claim 17 - e.g., see Col. 3, lines 28-31. |
| Claim 18 - e.g., see Col. 3, lines 28-31. |
| Claim 19 - e.g., see Col. 3, lines 28-31. |
| Claim 20 - e.g., see Col. 3, lines 31-37. |
| Claim 21 - e.g., see Col. 3, lines 28-31. |
| Claim 22 – e.g., see Figure 2, Col. 5, lines 25-29. |

Claim 23 – e.g., see Col. 3, lines 53-58.

Claim 24 – e.g., see Col. 3, lines 53-58.

Claim 25 – e.g., see Col. 4, lines 7-30.

Claim 26 - e.g., see Col. 4, line 26.

Claim 27 – e.g., see Col. 4, lines 35-36.

Claim 28 – e.g., see Col. 8, lines 8-11.

Claim 29 – e.g., see Col. 8, line 16.

Claim 30 – e.g., see Col. 6, lines 18-21.

Claim 31 – e.g., see Col. 7, lines 1-4.

Claim 32 – e.g., see Col. 7, lines 1-4.

Claim 33 – e.g., see Col. 9, lines 33-42.

Claim 34 – e.g., see Col. 9, lines 33-42.

Claim 35 – e.g., see Col 9, lines 46-56.

Claim 36 – e.g., see Col 9, lines 22-27.

Claim 37 – e.g., see Col 9, lines 22-27.

Claim 38 – e.g., see Col 12, lines 27-39.

Claim 39 – e.g., see Col 12, lines 27-39.

Claim 40 – e.g., see Col 12, lines 27-39.

Claim 41 – e.g., see Col 12, lines 27-39.

Of course, the above citations are merely examples of the above claim language and should not be construed as limiting in any manner.

Applicant respectfully requests a Notice of Allowance of Claims 1-41, or a proper prior art showing of all of Applicant's claim limitations, in combination with the remaining claim elements.

Applicant believes no fees are due. In the event any other fees are due, the Commissioner is authorized to charge any additional fees or credit any overpayment to Deposit Account No. 50-4964 (Order No. SVIPGP109RE).

Should the Examiner deem that any further amendment is desirable to place this application in condition for allowance, Applicant invites the Examiner to telephone the undersigned attorney at the number listed below.

Respectfully submitted,

Dated: 23 March 2012

The Caldwell Firm, LLC
PO Box 59655
Dallas, Texas 75229-0655
Telephone: (972) 243-4523
pcaldwell@thecaldwellfirm.com

Patrick E. Caldwell, Esq.
Reg. No. 44,580

I hereby certify that a true and complete copy of the forgoing Amendment D has been served on Third Party Requestor by mailing said copy on 23 Mar 2012, via First Class Mail, postage prepaid to:

Kenyon & Kenyon, LLP
One Broadway
New York, NY 10004

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 12385790 |
| **Application Number:** | 95001621 |
| **International Application Number:** | |
| **Confirmation Number:** | 1240 |
| **Title of Invention:** | Automatic Directional Control System for Vehicle Headlights |
| **First Named Inventor/Applicant Name:** | 7,241,034 |
| **Customer Number:** | 92045 |
| **Filer:** | Patrick Edgar Caldwell |
| **Filer Authorized By:** | |
| **Attorney Docket Number:** | |
| **Receipt Date:** | 23-MAR-2012 |
| **Filing Date:** | 16-MAY-2011 |
| **Time Stamp:** | 20:11:39 |
| **Application Type:** | inter partes reexam |

## Payment information:

| | |
|---|---|
| Submitted with Payment | no |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | Amendment/Req. Reconsideration-After Non-Final Reject | SVIPGP109RE_Amndt_D_vF_23-Mar-2012.pdf | 73813<br>590de5886a892744a0d31ddf727ab5b829249d6d | no | 14 |

**Warnings:**

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**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**<u>National Stage of an International Application under 35 U.S.C. 371</u>**
**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**<u>New International Application Filed with the USPTO as a Receiving Office</u>**
**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 95/001,621 -90/011011 | 05/16/2011 | 7,241,034 | | 1240 |

92045 7590 03/29/2012

The Caldwell Firm, LLC
PO Box 59655
Dept. SVIPGP
Dallas, TX 75229

| EXAMINER |
|---|
| |

| ART UNIT | PAPER NUMBER |
|---|---|
| | |

DATE MAILED: 03/29/2012

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

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THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS

Date: 3-29-12

KENYON & KENYON LLP
ONE BROADWAY
NEW YORK, NY 10004

**Transmittal of Communication to Third Party Requester**
**Inter Partes Reexamination**

REEXAMINATION CONTROL NO. : 95001621 → 90/011011
PATENT NO. : 7241034
TECHNOLOGY CENTER : 3999
ART UNIT : 3992

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified Reexamination proceeding. 37 CFR 1.903.

Prior to the filing of a Notice of Appeal, each time the patent owner responds to this communication, the third party requester of the inter partes reexamination may once file written comments within a period of 30 days from the date of service of the patent owner's response. This 30-day time period is statutory (35 U.S.C. 314(b)(2)), and, as such, it cannot be extended. See also 37 CFR 1.947.

If an ex parte reexamination has been merged with the inter partes reexamination, no responsive submission by any ex parte third party requester is permitted.

All correspondence relating to this inter partes reexamination proceeding should be directed to the Central Reexamination Unit at the mail, FAX, or hand-carry addresses given at the end of the communication enclosed with this transmittal.

PTOL-2070(Rev.07-04)

| NOTICE RE DEFECTIVE PAPER IN INTER PARTES REEXAMINATION | Control No. | Patent Under Reexamination |
|---|---|---|
| | 95/001,621; 90/011,011 | 7,241,034 |
| | Examiner | Art Unit |
| | MY-TRANG TON | 3992 |

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address.* --

1. ☒ No proof of service is included with the paper filed by ☒ patent owner ☐ requester on 23 March, 2012. 37 CFR 1.248 and 1.903. Proof of service is required within a time period of 30-days or one month from the date of this letter, whichever is longer. Failure to serve the paper may result in the paper being refused consideration. If the failure to comply with this requirement results in a patent owner failure to file a timely and appropriate response to any Office action, the prosecution of the reexamination proceeding will be terminated under 37 CFR 1.957(b) or limited under 37 CFR 1.957(c) (as is appropriate for the case).

2. ☐ The paper filed on _____ by the ☐ patent owner ☐ requester is unsigned. A duplicate paper or ratification, properly signed, is required within a time period of 30-days or one month from the date of this letter, whichever is longer. Failure to comply with this requirement will result in the paper not being considered. If the failure to comply results in a patent owner failure to file a timely and appropriate response to any Office action, the prosecution of the reexamination proceeding will be terminated under 37 CFR 1.957(b) or limited under 37 CFR 1.957(c) (as is appropriate for the case).

3. ☐ The paper filed on _____ by the ☐ patent owner ☐ requester is signed by _____ who is not of record. A ratification or a new power of attorney with a ratification, or a duplicate paper signed by a person of record, is required within a time period of 30-days or one month from the date of this letter, whichever is longer. Failure to comply with this requirement will result in the paper not being considered. If the failure to comply results in a patent owner failure to file a timely and appropriate response to any Office action, the prosecution of the reexamination proceeding will be terminated under 37 CFR 1.957(b) or limited under 37 CFR 1.957(c) (as is appropriate for the case).

4. ☒ The amendment filed by patent owner on 23 March, 2012, does not comply with 37 CFR 1.530. Patent owner is given a time period of 30-days or one month from the date of this letter, whichever is longer, to correct this informality, or the prosecution of the reexamination proceeding will be terminated under 37 CFR 1.957(b) or limited under 37 CFR 1.957(c) (as is appropriate for the case). The amendment will not be entered, although the argument the rein will be considered as it applies to the proceeding without the amendment should the prosecution be limited under 37 CFR 1.957(c).

5. ☐ The amendment filed by patent owner on _____, does not comply with 37 CFR ☐1.20(c)(3) and/or ☐1.20(c)(4), as to excess claim fees. Patent owner is given a time period of 30-days or one month from the date of this letter, whichever is longer, to correct this fee deficiency, or the prosecution of the reexamination proceeding will be terminated under 37 CFR 1.957(b) or limited under 37 CFR 1.957(c) (as is appropriate for the case), to effect the "abandonment" set forth in 37 CFR 1.20(c)(5).

6. ☐ Other: _____

**NOTE:** PATENT OWNER EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.956. NO EXTENSION OF TIME IS PERMITTED FOR THIRD PARTY REQUESTER. 35 U.S.C. § 314(b)(2).

**All correspondence** relating to this *inter partes* reexamination proceeding should be directed to the **Central Reexamination Unit** at the mail, FAX, or hand-carry addresses given at the end of this Office action.

**Defective Amendments**

This proceeding is a merger of 90/011,011 and 95/001,621.

The amendment filed 3/23/2012 proposes amendments to the last Office action mailed out 2/23/2012 that do not comply with 37 CFR 1.530(d)-(j), which sets forth the manner of making amendments in reexamination proceedings. A supplemental paper correctly proposing amendments in the present reexamination proceeding is required.

1/ The amendment filed 3/23/2012 is improper because strikeout and double brackets used for deleted text. Each patent claim proposed to be changed and each proposed added claim must include markings pursuant to paragraph (f) as indicated below.

*37 CFR 1.530. Statement by patent owner in ex parte reexamination; amendment by patent owner in ex parte or inter partes reexamination; inventorship change in ex parte or inter partes reexamination.*

*(f) Changes shown by markings.* Any changes relative to the patent being reexamined which are made to the specification, including the claims, must include the following markings:

(1) The matter to be omitted by the reexamination proceeding must be enclosed in brackets;

and

(2) The matter to be added by the reexamination proceeding must be underlined.

(E)Canceled claim(s) or paragraph(s) which are part of the patent are surrounded by brackets (i.e., a bracket placed at the beginning and end of each canceled claim or paragraph of the patent). They are <u>not</u> lined through;

2/ The indication for the certificate of service at the end of the remarks (page 14) filed on 3/23/2012 is not adequate. 37 CFR 1.248. Rule 1.248 part (b) requires that a statement signed by the agent or attorney including the date and manner of service. The Patent Owner provides the date and manner of service but it isn't signed. The signature provided above is for the remarks rather than below the indication for the certificate of service. After the filing of a request for reexamination by a third party requester, any document filed by either the patent owner or the third party requester must be served on the other party (or parties where two or more third party requester proceedings are merged) in the reexamination proceeding in the manner provided in 37 CFR 1.248.

37 CFR 1.903. Service of papers on parties in inter partes reexamination.

The patent owner and the third party requester will be sent copies of Office actions issued during the inter partes reexamination proceeding. After filing of a request for inter partes reexamination by a third party requester, any document filed by either the patent owner or the third party requester must be served on every other party in the reexamination proceeding in the manner provided in § 1.248. Any document must reflect service or the document may be refused consideration by the Office. The failure of the patent owner or the third party requester to serve documents may result in their being refused consideration.

(b) Papers filed in the Patent and Trademark Office which are required to be served shall contain proof of service. Proof of service may appear on or be affixed to papers filed. Proof of service shall include the date and manner of service. In the case of personal service, proof of service shall also include the name of any person served, certified by the person who made service. Proof of service may be made by:

(1) An acknowledgement of service by or on behalf of the person served or

(2) A statement signed by the attorney or agent containing the information required by this section.

A shortened statutory period for response to this letter is set to expire ONE MONTH or THIRTY DAYS, whichever is longer, from the mailing date of this letter. If patent owner fails to timely correct this informality, the amendment will be held not to be an appropriate response, prosecution of the present reexamination proceeding will be terminated, and a reexamination certificate will issue. 37 CFR 1.550(d).

Therefore, the amendment filed 3/23/2012 will not be entered.

All correspondence relating to this inter partes reexamination proceeding should be directed:

By Mail to:
Mail Stop lnterPartes Reexam
Attn: Central Reexamination Unit
Commissioner for Patents
United States Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

By FAX to:
(571) 273-9900
Central Reexamination Unit

By hand:

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401 Dulany Street
Alexandria, VA 22314

Registered users of EFS-Web may alternatively submit such correspondence via the electronic filing system EFS-Web, at https://sportal.uspto.gov/authenticate/authenticateuserlocalepf.html. EFS-Web offers the benefit of quick submission to the particular area of the Office that needs to act on the correspondence. Also, EFS- Web submissions are "soft scanned" (i.e., electronically uploaded) directly into the official file for the reexamination proceeding, which offers parties the opportunity to review the content of their submissions after the "soft scanning." processing complete.

Any inquiry concerning this communication or earlier communications from the examiner, or as to the status of this proceeding, should be directed to the Central Reexamination Unit at telephone number (571) 272- 7705.

/My-Trang N. Ton/
Primary Examiner, CRU 3992

Conferees:
/Margaret Rubin/
Primary Examiner CRU 3992

ANDREW J. FISCHER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER ~~3600~~ 3900

**PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

| | |
|---|---|
| In re application of: | ) |
| | ) |
| 7,241,034 | ) Art Unit: 3992 |
| | ) |
| Applications No. 95/001,621 & 90/011,011 | ) Examiner: MY-TRANG N. TON |
| | ) |
| Filed: 05/16/2011 | ) Atty. Docket No.: |
| | ) SVIPGP109RE |
| For: AUTOMATIC DIRECTIONAL CONTROL | ) |
| SYSTEM FOR VEHICLE | ) Date: 04/27/2012 |
| HEADLIGHTS | ) |
| | ) |

**AMENDMENT D2**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Examiner:

In response to the Office Action mailed 2/23/2012, the notice of Merger of Proceedings mailed 2/23/2012, the Office Action mailed 1/12/2011 ("Office Action"), and as a substitute for the Responses filed 1/18/2011, 2/16/2011, and 02/02/2012 in the 90/011,011 proceeding, and further in response to the Notice of Defective Paper mailed 03/29/2012, please enter the following amendments believed to place the Claims in condition for allowance.

AMENDMENTS TO THE CLAIMS

Amended claims follow:

1. (Currently Amended) An automatic directional control system for a vehicle headlight, comprising:

[a]two or more sensors that [is]are each adapted to generate a signal that is representative of at least one of a plurality of sensed conditions of [the]a vehicle, said sensed conditions including at least[es one or more of road speed, ]steering angle[,] and pitch[, and suspension height ]of the vehicle;

a controller that is responsive to said two or more sensor signals for generating [an]at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent [said]at least one first one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in the sensed [operating ]conditions; and

[an]said two or more actuators [that is]each being adapted to be connected to the headlight to effect movement thereof in accordance with said at least one output signal.

2. (Currently Amended) The automatic directional control system defined in claim 1, wherein at least one of said two or more sensors further generate[s] a signal that is representative of the road speed of the vehicle.

3. (Currently Amended) The automatic directional control system defined in claim 1, wherein at least one of said two or more sensors further generates a signal that is representative of [the]a rate of change of steering angle of the vehicle.

4. (Currently Amended) The automatic directional control system defined in claim 1, wherein at least one of said two or more sensors further generates a signal that is representative of [the]a rate of change of pitch of the vehicle.

5. (Currently Amended) The automatic directional control system defined in claim 1, wherein at least one of said two or more sensors further generates a signal that is representative of the suspension height of the vehicle.

6. (New) The automatic directional control system defined in claim 1, wherein said two or more sensors include a first sensor and a second sensor.

7. (New) The automatic directional control system defined in claim 6, wherein said first sensor is adapted to generate a signal that is representative of a condition including the steering angle of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle.

8. (New) The automatic directional control system defined in claim 6, wherein said first sensor is physically separate from said second sensor.

9. (New) The automatic directional control system defined in claim 1, further comprising one or more additional sensors for sensing one or more of a rate of change of road speed of the vehicle, a rate of change of steering angle of the vehicle, a rate of change of pitch of the vehicle, a suspension height, or a rate of change of suspension height of the vehicle.

10. (New) The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors generate a signal that is representative of the rate of change of road speed of the vehicle.

11. (New) The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors generate a signal that is representative of the rate of change of steering angle of the vehicle.

12. (New) The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors generate a signal that is representative of the rate of change of pitch of the vehicle.

13. (New) The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors generate a signal that is representative of a suspension height of the vehicle.

14. (New) The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured to include the first actuator connected to the headlight to effect movement thereof in a first direction and a second actuator connected to the headlight to effect movement thereof in a second direction different form the first direction.

15. (New) The automatic directional control system defined in claim 1, wherein the two or more actuators include the first actuator that is adapted to be connected to the headlight to effect movement thereof in a vertical direction.

16. (New) The automatic directional control system defined in claim 15, wherein the two or more actuators include a second actuator that is adapted to be connected to the headlight to effect movement thereof in a horizontal direction.

17. (New) The automatic directional control system defined in claim 1, wherein the two or more actuators include an electronically controlled mechanical actuator.

18. (New) The automatic directional control system defined in claim 1, wherein the two or more actuators include a step motor.

19. (New) The automatic directional control system defined in claim 1, wherein the two or more actuators include a servo motor.

20. (New) The automatic directional control system defined in claim 1, wherein the two or more actuators include a microstepping motor capable of being operated in fractional step increments.

21. (New) The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted both up and down relative to a horizontal reference position and left and right relative to a vertical reference position.

22. (New) The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that, while in a calibration mode, a directional orientation at which a beam of light projects therefrom is capable of being adjusted relative to the vehicle by manual operation of the two or more actuators.

23. (New) The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the controller includes a microprocessor.

24. (New) The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the controller includes a programmable electronic controller.

25. (New) The automatic directional control system defined in claim 1, wherein the automatic directional control system further includes at least one position feedback sensor capable of providing a position feedback signal associated with at least one of the two or more actuators.

26. (New) The automatic directional control system defined in claim 25, wherein the at least one position feedback sensor includes a Hall Effect sensor.

27. (New) The automatic directional control system defined in claim 25, wherein the at least one position feedback sensor includes an optical interrupter.

28. (New) The automatic directional control system defined in claim 1, wherein the automatic directional control system further includes memory.

29. (New) The automatic directional control system defined in claim 28, wherein the memory includes non-volatile memory.

30. (New) The automatic directional control system defined in claim 28, wherein the memory is configured to store a predetermined reference position associated with the headlight.

31. (New) The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by sensing a front and a rear suspension height of the vehicle.

32. (New) The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by a pitch sensor.

33. (New) The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the controller is programmed to be responsive to changes in the suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle.

34. (New) The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the controller is programmed to be responsive to changes in the suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle, thereby ignoring frequency changes in the suspension height of the vehicle that are a result of bumps in a road.

35. (New) The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the predetermined minimum threshold amount functions as a filter to minimize undesirable operation of at least one of the two or more actuators.

36. (New) The automatic directional control system defined in claim 1, wherein said controller is configured to be responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one of the two or more actuators from being operated continuously in response to relatively small variations in the sensed conditions.

37. (New) The automatic directional control system defined in claim 1, wherein said controller is configured to be responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one of the two or more actuators from being operated unduly frequently in response to relatively small variations in the sensed conditions.

38. (New) The automatic directional control system defined in claim 1, wherein said controller is further responsive to said two or more sensor signals to automatically activate one or more vehicle lights that are different than the headlight.

39. (New) The automatic directional control system defined in claim 38, wherein said one or more vehicle lights that are different than the headlight include one or more lights for illuminating a road in front of the vehicle during a turn.

40. (New) The automatic directional control system defined in claim 1, wherein said controller is further responsive to a steering angle in excess of a predetermined magnitude for automatically activating one or more vehicle lights that are different than the headlight.

41. (New) The automatic directional control system defined in claim 1, wherein said controller is further responsive to a steering angle in excess of a predetermined magnitude for automatically activating one or more vehicle lights that are different than the headlight to extend an angular range of a road surface.

REMARKS

As noted in the 6/23/2011 Office Communication for the Inter Partes Reexamination Proceeding number 95/001,621, which has now been merged with the current matter, Examiner has agreed with the Requestor that Requestor's issues 1-2, 4-7, 9-12, 14-17 and 19-20 raise substantial new questions of patentability as to claims 1-5 of the '034 patent.

Specifically, the Examiner agrees that:

Claims 1, 2, 4, and 5 are anticipated by Uchida (United Kingdom Patent Application Publication No. 2309773) under 35 U.S.C. §102(b);

Claims 1, 2, 4, and 5 are anticipated by Takahashi (United Kingdom Patent Application Publication No. 2309774) under 35 U.S.C. §102(b);

Claims 1 and 5 are anticipated by Miskin et al. (German Patent Application Publication No. 3110094) under 35 U.S.C. §102(b);

Claims 1 and 5 are anticipated by Leleve (German Patent Application Publication No. 3129891) under 35 U.S.C. §102(b);

Claims 1, 2, 4, and 5 are unpatentable over the combination of Toda et al. (U.S. Patent No. 6,305,823) and Uchida under 35 U.S.C. § 103(a);

Claims 1, 2, 4, and 5 are unpatentable over the combination of Toda et al. and Takahashi under 35 U.S.C. § 103(a);

Claims 1, 2, 4, and 5 are unpatentable over the combination of Toda et al. and Miskin et al. under 35 U.S.C. § 103(a);

Claims 1, 2, 4, and 5 are unpatentable over the combination of Toda et al. and Leleve under 35 U.S.C. § 103(a);

Claims 1, 2, 4, and 5 are unpatentable over the combination of Okuchi et al. (U.S. Patent No.6,193,398) and Uchida under 35 U.S.C. § 103(a);

Claims 1, 2, 4, and 5 are unpatentable over the combination of Okuchi et al. and Takahashi under 35 U.S.C. § 103(a);

Claims 1, 2, 4, and 5 are unpatentable over the combination of Okuchi et al. and Miskin et al. under 35 U.S.C. § 103(a);

Claims 1, 2, 4, and 5 are unpatentable over the combination of Okuchi et al. and Leleve under 35 U.S.C. § 103(a);

Claims 1 to 5 are unpatentable over the combination of Gotoh (U.S. Patent No. 5,909,949) and Uchida under 35 U.S.C. § 103(a);

Claims 1 to 5 are unpatentable over the combination of Gotoh and Takahashi under 35 U.S.C. § 103(a);

Claims 1, 2, 3, and 5 are unpatentable over the combination of Gotoh and Miskin et al. under 35 U.S.C. § 103(a); and

Claims 1 to 5 are unpatentable over the combination of Gotoh and Leleve under 35 U.S.C. § 103(a).

Applicant has amended Claim 1 to overcome such rejections, as follows:

1. (Currently Amended) An automatic directional control system for a vehicle headlight, comprising:

[a]two or more sensors that [is]are each adapted to generate a signal that is representative of at least one of a plurality of sensed conditions of [the]a vehicle, said sensed conditions including at least[es one or more of road speed, ]steering angle[,] and pitch[, and suspension height ]of the vehicle;

a controller that is responsive to said two or more sensor signals for generating [an]at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent [said]at least one first one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in the sensed [operating ]conditions; and

[an]said two or more actuators [that is]each being adapted to be connected to the headlight to effect movement thereof in accordance with said at least one output signal.

Applicant respectfully asserts that the references as relied on by the Examiner fail to teach "**two or more sensors** that are each adapted to generate a signal that is representative of at least one of a plurality of sensed conditions of a vehicle, said sensed conditions including at least **steering angle and pitch of the vehicle**" (emphasis added), as claimed by Applicant. Further, applicant respectfully asserts that the references as relied on by the Examiner fail to teach "**two or more actuators** each being adapted to be connected to the headlight to effect movement thereof in accordance with said at least one output signal" (emphasis added), as claimed by Applicant.

Applicant respectfully notes that a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. Of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Moreover, the identical invention must be shown in as complete detail as contained in the claim. *Richardson v. Suzuki Motor Co.*868 F.2d 1226, 1236, 9USPQ2d 1913, 1920 (Fed. Cir. 1989). Additionally, the elements must be arranged as required by the claim.

This criterion has simply not been met by the above reference, as noted above.

Further, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck,*947 F.2d 488, 20 USPQ2d 1438 (Fed.Cir.1991).

Applicant respectfully asserts that at least the first and third elements of the *prima facie* case of obviousness have not been met, since it would be *unobvious* to combine the references, and the prior art references, as relied upon by the Examiner, fail to teach or suggest all of the claim limitations.

Finally, Applicant brings to the Examiner's attention the subject matter of new Claims 6-41, which Applicant adds for full consideration. Claims 6-41 depend from and further limit Claim 1. Accordingly, Applicant respectfully submits that new Claims 6-41 are allowable for at least the same reasons that Claim 1 is in condition for allowance, as described above. Support for the amendments to Claim 1, as well as for the newly added dependent claims may be found (by way of example), in Table 1.

**Table 1**

| |
|---|
| Claim 1 – e.g., see Abstract; Col. 2, lines 7-17; and Figure 1. |
| Claim 2 – e.g., see Col. 2, line 10. |
| Claim 3 – e.g., see Col. 2, lines 11-12. |
| Claim 4 – e.g., see Col. 2, line 12. |
| Claim 5 – e.g., see Col. 2, line 11. |
| Claim 6 – e.g., see items 15 and 16 of Figure 1. |
| Claim 7 - e.g., see Abstract; Col. 2, lines 7-17; Col. 3, line 58 - Col. 4, line 2; and Figure 1. |
| Claim 8 – e.g., see items 15 and 16 of Figure 1. |
| Claim 9 - e.g., see Col. 3, line 58 - Col. 4, line 2. |
| Claim 10 - e.g., see Col. 3, line 58 - Col. 4, line 2. |
| Claim 11 - e.g., see Col. 3, line 58 - Col. 4, line 2. |
| Claim 12 - e.g., see Col. 3, line 58 - Col. 4, line 2. |
| Claim 13 - e.g., see Col. 3, line 58 - Col. 4, line 2. |
| Claim 14 - e.g., see Figure 1 and Col. 3, lines 26-29. |
| Claim 15 - e.g., see Figure 1 and Col. 3, lines 26-29. |
| Claim 16 - e.g., see Figure 1 and Col. 3, lines 26-29. |
| Claim 17 - e.g., see Col. 3, lines 28-31. |
| Claim 18 - e.g., see Col. 3, lines 28-31. |
| Claim 19 - e.g., see Col. 3, lines 28-31. |
| Claim 20 - e.g., see Col. 3, lines 31-37. |
| Claim 21 - e.g., see Col. 3, lines 28-31. |
| Claim 22 – e.g., see Figure 2, Col. 5, lines 25-29. |

Claim 23 – e.g., see Col. 3, lines 53-58.

Claim 24 – e.g., see Col. 3, lines 53-58.

Claim 25 – e.g., see Col. 4, lines 7-30.

Claim 26 - e.g., see Col. 4, line 26.

Claim 27 – e.g., see Col. 4, lines 35-36.

Claim 28 – e.g., see Col. 8, lines 8-11.

Claim 29 – e.g., see Col. 8, line 16.

Claim 30 – e.g., see Col. 6, lines 18-21.

Claim 31 – e.g., see Col. 7, lines 1-4.

Claim 32 – e.g., see Col. 7, lines 1-4.

Claim 33 – e.g., see Col. 9, lines 33-42.

Claim 34 – e.g., see Col. 9, lines 33-42.

Claim 35 – e.g., see Col 9, lines 46-56.

Claim 36 – e.g., see Col 9, lines 22-27.

Claim 37 – e.g., see Col 9, lines 22-27.

Claim 38 – e.g., see Col 12, lines 27-39.

Claim 39 – e.g., see Col 12, lines 27-39.

Claim 40 – e.g., see Col 12, lines 27-39.

Claim 41 – e.g., see Col 12, lines 27-39.

Of course, the above citations are merely examples of the above claim language and should not be construed as limiting in any manner.

Applicant respectfully requests a Notice of Allowance of Claims 1-41, or a proper prior art showing of <u>all</u> of Applicant's claim limitations, in combination with the remaining claim elements.

Applicant believes no fees are due. In the event any other fees are due, the Commissioner is authorized to charge any additional fees or credit any overpayment to Deposit Account No. 50-4964 (Order No. SVIPGP109RE).

Should the Examiner deem that any further amendment is desirable to place this application in condition for allowance, Applicant invites the Examiner to telephone the undersigned attorney at the number listed below.

Additionally, the undersigned hereby certifies that a true and complete copy of the forgoing Amendment D2 has been served on Third Party Requestor by mailing said copy on 27 Apr 2012 (and Amendment D, mailed 23 Mar 2012), via First Class Mail, postage prepaid to:

Kenyon & Kenyon, LLP
One Broadway
New York, NY 10004

Respectfully submitted,

Patrick E. Caldwell, Esq.
Reg. No. 44,580

Dated: 27 April 2012

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# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 12654561 |
| **Application Number:** | 95001621 |
| **International Application Number:** | |
| **Confirmation Number:** | 1240 |
| **Title of Invention:** | Automatic Directional Control System for Vehicle Headlights |
| **First Named Inventor/Applicant Name:** | 7,241,034 |
| **Customer Number:** | 92045 |
| **Filer:** | Patrick Edgar Caldwell |
| **Filer Authorized By:** | |
| **Attorney Docket Number:** | SVIPGP109RE |
| **Receipt Date:** | 27-APR-2012 |
| **Filing Date:** | 16-MAY-2011 |
| **Time Stamp:** | 19:13:55 |
| **Application Type:** | inter partes reexam |

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## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | Amendment/Req. Reconsideration-After Non-Final Reject | SVIPGP109RE_Amndt_D2_vF_04-27-2012.pdf | 73821<br>1dc6cb784822fca0d5dfa9e88bbd5178dd513561 | no | 14 |

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# Litigation Search Report CRU 3999

## Reexam Control No. 90/011,011

| | |
|---|---|
| **TO: My Trang Ton**<br>**Location: CRU**<br>**Art Unit: 3992**<br>**Date: 5/21/2012**<br>**Merged: 95/001,621** | **From: Patricia Volpe**<br>**Location: CRU 3999**<br>**MDE 5D30**<br>**Phone: (571) 272-6825**<br>**Patricia.volpe@uspto.gov** |

## Search Notes

Litigation search for U.S. Patent Number: **7,241,034**

Status (**CLOSED**) 6:10cv78 Balther *Technologies, Llc v. American Honda Motor Co Inc et A*

1) I performed a KeyCit Search in Westlaw, which retrieves all history on the patent including any litigation.

2) I performed a search on the patent in Lexis CourtLink for any open dockets or closed cases.

3) I performed a search in Lexis in the Federal Courts and Administrative Materials databases for any cases found.

4) I performed a search in Lexis in the IP Journal and Periodicals database for any articles on the patent.

5) I performed a search in Lexis in the news databases for any articles about the patent or any articles about litigation on this patent.

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Westlaw.

Date of Printing: May 21, 2012

# KEYCITE

**C US PAT 7241034 AUTOMATIC DIRECTIONAL CONTROL SYSTEM FOR VEHICLE HEADLIGHTS, Assignee: Dana Corporation (Jul 10, 2007)**

## History

### Direct History

=> 1 **AUTOMATIC DIRECTIONAL CONTROL SYSTEM FOR VEHICLE HEADLIGHTS,** US PAT 7241034, 2007 WL 1978614 (U.S. PTO Utility Jul 10, 2007)

### Patent Family

2 AUTOMATIC DIRECTIONAL CONTROL SYSTEM FOR A VEHICLE HEADLIGHT USES SENSOR TO GENERATE SIGNAL REPRESENTATIVE OF CONDITION OF VEHICLE, CONTROLLER RESPONSIVE TO SENSOR SIGNAL TO GENERATE OUTPUT SIGNAL AND ACTUATOR TO EFFECT HEADLIGHT MOVEMENT, Derwent World Patents Legal 2003-543647

### Assignments

3 Action: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS). Number of Pages: 002, (DATE RECORDED: Mar 08, 2010)

4 Action: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS). Number of Pages: 002, (DATE RECORDED: Jun 12, 2009)

5 Action: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS). Number of Pages: 030, (DATE RECORDED: Feb 22, 2008)

6 Action: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS). Number of Pages: 003, (DATE RECORDED: Feb 06, 2003)

### Patent Status Files

.. Request for Re-Examination, (OG DATE: Jun 29, 2011)

.. Request for Re-Examination, (OG DATE: Sep 07, 2010)

.. Patent Suit(See LitAlert Entries),

### Docket Summaries

10 BALTHER TECHNOLOGIES, LLC v. AMERICAN HONDA MOTOR CO. INC. ET AL, (E.D.TEX. Mar 08, 2010) (NO. 6:10CV00078), (35 USC 271 PATENT INFRINGEMENT)

### Litigation Alert

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11 Derwent LitAlert P2010-11-45 (Mar 08, 2010) Action Taken: complaint

**Prior Art (Coverage Begins 1976)**

C 12 ADJUSTABLE HEADLIGHTS, HEADLIGHT ADJUSTING AND DIRECTION SENSING CONTROL SYSTEM AND METHOD OF ADJUSTING HEADLIGHTS, US PAT 5868488 (U.S. PTO Utility 1999)

C 13 APPARATUS AND METHOD FOR CONTROLLING LIGHT DISTRIBUTION OF HEAD-LAMP, US PAT 5660454Assignee: Toyota Jidosha Kabushiki Kaisha, (U.S. PTO Utility 1997)

C 14 APPARATUS AND METHOD FOR CONTROLLING THE LIGHT-RANGE OF MOTOR VEHICLE HEADLIGHTS, US PAT 5193894Assignee: Robert Bosch GmbH, (U.S. PTO Utility 1993)

C 15 APPARATUS FOR AUTOMATICALLY ADJUSTING AIMING OF HEADLIGHTS OF AN AUTOMOTIVE VEHICLE, US PAT 5877680Assignee: Denso Corporation; Toyota Jidosha Kabushiki Kaisha, (U.S. PTO Utility 1999)

C 16 APPARATUS FOR CONTROLLING A HEADLIGHT OF A VEHICLE, US PAT 4891559Assignee: Nippondenso Soken, Inc.; Nippondenso Co., Ltd., (U.S. PTO Utility 1990)

C 17 APPARATUS FOR REGULATING THE ILLUMINATION FIELD OF A VEHICLE HEAD-LIGHT, US PAT 6144159Assignee: Robert Bosch GmbH, (U.S. PTO Utility 2000)

C 18 ARRANGEMENT FOR AUTOMATIC HEADLIGHT ADJUSTMENT, US PAT 6231216Assignee: Dr. Ing. h.c.F. Porsche AG, (U.S. PTO Utility 2001)

C 19 AUTOMATIC LEVELING APPARATUS FOR USE WITH AUTOMOBILE HEADLAMPS, US PAT 6183118Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 2001)

C 20 AUTOMATIC LEVELING DEVICE FOR AUTOMOTIVE VEHICLE HEADLAMPS, US PAT 6305823Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 2001)

C 21 AUTOMOTIVE ILLUMINATION SYSTEM, US PAT 4943893Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 1990)

C 22 CONTINUOUSLY VARIABLE HEADLAMP CONTROL, US PAT 6281632Assignee: Gentex Corporation, (U.S. PTO Utility 2001)

C 23 CORNERING LIGHT SYSTEM FOR TWO-WHEELED VEHICLES, US PAT 4024388Assignee: Marvin H. Kleinberg, Inc.; Richard Morganstern Inc.; Scholnick, Seymour A., (U.S. PTO Utility 1977)

C 24 DEVICE FOR ADJUSTING THE INCLINATION OF AUTOMOBILE HEADLIGHTS, US PAT 4186428Assignee: Cibie Projecteurs, (U.S. PTO Utility 1980)

C 25 DEVICE FOR ADJUSTING THE LEVEL OF A VEHICLE HEADLIGHT, US PAT 5779342Assignee: Bayerische Motoren Werke Aktiengellschaft, (U.S. PTO Utility 1998)

C 26 DEVICE FOR ADJUSTING AN OBJECT TO ASSUME A PREDETERMINED ANGLE TO A CERTAIN PLANE, US PAT 4217631 (U.S. PTO Utility 1980)

C 27 DEVICE FOR ADJUSTING A PRESETTABLE LIGHTING LEVEL OF A HEADLIGHT IN MOTOR VEHICLES, US PAT 5785405Assignee: Bayerische Motoren Werke, (U.S. PTO Utility 1998)

C 28 DEVICE FOR CONTROLLING THE LIGHT WIDTH OF HEADLIGHTS FOR VEHICLES, US

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PAT 5896011Assignee: Robert Bosch GmbH, (U.S. PTO Utility 1999)

C 29 DEVICE FOR REGULATING LIGHT WIDTH OF HEADLIGHTS FOR VEHICLES, AND VEHICLE PROVIDED THEREWITH, US PAT 6142655Assignee: Robert Bosch GmbH, (U.S. PTO Utility 2000)

C 30 DIRECTION TURNING DEVICE FOR A HEADLIGHT OF AN AUTOMOBILE, US PAT 5550717 (U.S. PTO Utility 1996)

C 31 FOCUSING MIRROR CONTROL SYSTEM AND METHOD FOR ADJUSTING SAME, US PAT 6118113 (U.S. PTO Utility 2000)

C 32 HEAD LAMP DEVICE FOR VEHICLE, US PAT 6010237Assignee: Honda Giken Kogyo Kabushiki Kaisha, (U.S. PTO Utility 2000)

C 33 HEAD LAMP DEVICE FOR VEHICLE, US PAT 5909949Assignee: Honda Giken Kogyo Kabushiki Kaisha, (U.S. PTO Utility 1999)

C 34 HEADLAMP, US PAT 5158352Assignee: Honda Giken Kogyo Kabushiki Kaisha, (U.S. PTO Utility 1992)

C 35 HEADLAMP DRIVE AND CONTROL APPARATUS, US PAT 4583152Assignee: Aisin Seiki Kabushiki Kaisha, (U.S. PTO Utility 1986)

C 36 HEADLAMP FOR MOTOR VEHICLES WITH PROGRAMMABLE LIGHT DISTRIBUTION, US PAT 4868721 (U.S. PTO Utility 1989)

C 37 HEADLAMP POSITIONING DEVICE, US PAT 5181429Assignee: Saia AG, (U.S. PTO Utility 1993)

C 38 HEADLIGHT AIMING AND LIGHT PATTERN TESTING APPARATUS AND METHOD, US PAT 4948249Assignee: Hopkins Manufacturing Corporation, (U.S. PTO Utility 1990)

C 39 HEADLIGHT AIMING APPARATUS, US PAT 5751832Assignee: Progressive Tool & Industries Co.; Panter Master Controls, Inc., (U.S. PTO Utility 1998)

C 40 HEADLIGHT AIMING APPARATUS AND DISPLAY, US PAT 5164785Assignee: Hopkins Manufacturing Corporation, (U.S. PTO Utility 1992)

C 41 HEADLIGHT AIMING METHOD USING PATTERN FRAMING, US PAT 5373357Assignee: Hopkins Manufacturing Corporation, (U.S. PTO Utility 1994)

C 42 HEADLIGHT ARRANGEMENT FOR MOTOR VEHICLE, US PAT 6227691Assignee: Robert Bosch GmbH, (U.S. PTO Utility 2001)

C 43 HEADLIGHT ARRANGEMENT FOR VEHICLES, US PAT 4768135Assignee: Robert Bosch GmbH, (U.S. PTO Utility 1988)

C 44 HEADLIGHT BEAM CONTROL SYSTEM FOR MOTOR VEHICLES, US PAT 4225902 (U.S. PTO Utility 1980)

C 45 HEADLIGHT CONTROL APPARATUS FOR MOTORCYCLES, US PAT 4870545Assignee: Honda Giken Kogyo Kabushiki Kaisha, (U.S. PTO Utility 1989)

C 46 HEADLIGHT FOR VEHICLE, US PAT 4833573Assignee: Koito Seisakusho Co., Ltd., (U.S. PTO Utility 1989)

C 47 HEADLIGHT MOVING APPARATUS FOR A MOTOR VEHICLE, US PAT 5099400 (U.S. PTO Utility 1992)

C 48 HEIGHT SENSOR AND VEHICULAR HEADLIGHT BEAM AXIS LEVELING APPARATUS,

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US PAT 6234654Assignee: Denso Corporation, (U.S. PTO Utility 2001)

C 49 INFINITELY ADJUSTABLE LEVEL LIGHT, US PAT 3953726 (U.S. PTO Utility 1976)

C 50 IRRADIATION DIRECTION CONTROL APPARATUS FOR VEHICULAR LAMP, US PAT 5907196Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 1999)

C 51 LIGHT DESTRIBUTION OF HEADLIGHT BEAM, US PAT 4907877 (U.S. PTO Utility 1990)

C 52 LIGHT MANAGEMENT SYSTEM FOR A VEHICLE, US PAT 5781105Assignee: Ford Motor Company, (U.S. PTO Utility 1998)

C 53 LIGHTING CONTROL FOR MOTOR VEHICLE LAMPS, US PAT 3634677Assignee: ROBERT BOSCH GMBH, (U.S. PTO Utility 1972)

C 54 LIGHTING DEVICE FOR A VEHICLE, US PAT 6049749Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 2000)

C 55 LIGHTING DEVICE FOR VEHICLES, US PAT 6293686Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 2001)

C 56 LIGHTING SYSTEM FOR A MOTORCYCLE, US PAT 3939339 (U.S. PTO Utility 1976)

C 57 LOAD TRIM COMPENSATING VEHICLE HEADLIGHT DEFLECTION SYSTEM, US PAT 4162424Assignee: Robert Bosch GmbH, (U.S. PTO Utility 1979)

C 58 MAGNETIC COUPLING MECHANISM FOR USE IN AN AUTOMOTIVE VEHICLE, US PAT 5977678Assignee: UT Automotive Dearborn, Inc., (U.S. PTO Utility 1999)

C 59 METHOD AND APPARATUS FOR ADJUSTING THE ORIENTATION OF VEHICLE HEAD-LIGHTS, US PAT 4204270Assignee: Societe pour l'Equipement de, (U.S. PTO Utility 1980)

C 60 METHOD AND APPARATUS FOR LOCATING A SPECIFIC LOCATION ON A VEHICLE HEADLAMP, US PAT 5331393Assignee: Hopkins Manufacturing Corporation, (U.S. PTO Utility 1994)

C 61 METHOD OF MEASURING AND ADJUSTING OPTICAL AXIS OF HEADLIGHT, US PAT 5392111Assignee: Honda Giken Kogyo Kabushiki Kaisha, (U.S. PTO Utility 1995)

C 62 MOTOR VEHICLE LIGHTING SYSTEM HAVING AT LEAST TWO BEND LIGHTING DRIVING LIGHTS, US PAT 6176590Assignee: Valeo Vision, (U.S. PTO Utility 2001)

C 63 MOTOR VEHICLE WITH HEADLAMP TILTING MECHANISM, US PAT 4066886Assignee: The Lucas Electrical Company Limited, (U.S. PTO Utility 1978)

C 64 MOTORCYCLE HEADLIGHT AIMING DEVICE, US PAT 5426571 (U.S. PTO Utility 1995)

C 65 MULTIPLE SENSOR INCLINATION MEASURING SYSTEM, US PAT 4549277Assignee: Brunson Instrument Company, (U.S. PTO Utility 1985)

C 66 POSITION CONTROL SYSTEM, US PAT 4310172Assignee: General Motors Corporation, (U.S. PTO Utility 1982)

C 67 ROAD SURFACE-SENSITIVE BEAM PATTERN LEVELING SYSTEM FOR A VEHICLE HEADLAMP, US PAT 4868720Assignee: Koito Seisakusho Co., Ltd., (U.S. PTO Utility 1989)

C 68 SIDELIGHTING ARRANGEMENT AND METHOD, US PAT 5428512 (U.S. PTO Utility 1995)

C 69 STEPPER MOTOR SHAFT POSITION SENSOR, US PAT 4791343Assignee: Allied-Signal Inc., (U.S. PTO Utility 1988)

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C 70 SUPPORT FRAME FOR HEADLIGHT AIMING APPARATUS, US PAT 5920386Assignee: Panter Master Controls, Inc.; Progressive Tool & Industries Co., (U.S. PTO Utility 1999)

C 71 SWITCHING CONTROL SYSTEM FOR AUTOMATICALLY TURNING HEADLIGHTS OFF AND ON AT INTERSECTIONS, US PAT 6097156 (U.S. PTO Utility 2000)

C 72 SYSTEM FOR AUTOMATICALLY ADJUSTING OPTICAL AXIS DIRECTION OF VEHICLE HEADLIGHT, US PAT 6193398Assignee: DENSO Corporation, (U.S. PTO Utility 2001)

C 73 SYSTEM FOR SELF-ALIGNING VEHICLE HEADLAMPS, US PAT 5633710Assignee: EGS Inc., (U.S. PTO Utility 1997)

C 74 TILTING DEVICE OF VEHICLE HEADLIGHT, US PAT 4916587Assignee: Koito Seisakusho Co., Ltd., (U.S. PTO Utility 1990)

C 75 VARIABLE DISTRIBUTION TYPE AUTOMOTIVE HEADLAMP, US PAT 5060120Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 1991)

C 76 VEHICLE CORNERING LAMP SYSTEM, US PAT 5526242Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 1996)

C 77 VEHICLE CORNERING LAMP SYSTEM, US PAT 4908560Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 1990)

C 78 VEHICLE HEADLIGHT AIMING APPARATUS, US PAT 5485265Assignee: Hopkins Manufacturing Corporation, (U.S. PTO Utility 1996)

C 79 VEHICLE HEADLIGHT WITH ADJUSTING MEANS FOR DIFFERENT TRAFFIC CONDITIONS, US PAT 5938319Assignee: Robert Bosch GmbH, (U.S. PTO Utility 1999)

C 80 VEHICULAR CORNERING LAMP SYSTEM, US PAT 5404278Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 1995)

C 81 VEHICULAR HEADLAMP PRODUCING LOW BEAM HAVING CUT LINE CONTROLLED IN ACCORDANCE WITH CONDITION OF CURVED ROAD, US PAT 5707129Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 1998)

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## US District Court Civil Docket

**U.S. District - Texas Eastern**
**(Tyler)**

## 6:10cv78

## Balther Technologies, Llc v. American Honda Motor Co Inc et A

**This case was retrieved from the court on Thursday, March 29, 2012**

| | | | |
|---|---|---|---|
| **Date Filed:** | **03/08/2010** | **Class Code:** | **CLOSED** |
| **Assigned To:** | **Judge Leonard Davis** | **Closed:** | **Yes** |
| **Referred To:** | | **Statute:** | **35:271** |
| **Nature of suit:** | **Patent (830)** | **Jury Demand:** | **Plaintiff** |
| **Cause:** | **Patent Infringement** | **Demand Amount:** | **$0** |
| **Lead Docket:** | **None** | **NOS Description:** | **Patent** |
| **Other Docket:** | **None** | | |
| **Jurisdiction:** | **Federal Question** | | |

| **Litigants** | **Attorneys** |
|---|---|
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Email: JW@WSFIRM.COM

American Honda Motor Co Inc
Defendant

Honda Motor Company, Ltd
Defendant

Bmw of North America, Llc
Defendant

Bmw AG
Defendant

Chrysler Group Llc
Defendant

Ferrari North America, Inc
Defendant

Ferrari Spa
Defendant

General Motors, Llc
Defendant

Hyundai Motor America
Defendant

Hyundai Motor Company
Defendant

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Jaguar Land Rover North America, Llc
Defendant

Jaguar Cars Limited
Defendant

Maserati North America Inc
Defendant

Maserati Spa
Defendant

Mercedes-Benz USA, Llc
Defendant

Daimler North America Corporation
Defendant

Daimler AG
Defendant

Mazda Motor of North America, Inc
Defendant

Mazda Motor Corp
Defendant

Mitsubishi Motors North America, Inc
Defendant

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Nissan North America, Inc
Defendant

Nissan Motor Co, Ltd
Defendant

Porsche Cars North America, Inc
Defendant

Dr Ing Hc.F Porsche AG
Defendant

Saab Cars North America, Inc
Defendant

Toyota Motor North America, Inc
Defendant

Toyota Motor Sales, USA, Inc

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Defendant

Toyota Motor Corp
Defendant

Volkswagen Group of America, Inc
Defendant

Automobili Lamborghini Spa
Defendant

Audi AG
Defendant

Volkswagen AG
Defendant

Ford Motor Company
Defendant

Volvo Cars of North America, Llc
Defendant

Volvo Car Corp
Defendant

| Date | # | Proceeding Text | Source |
|---|---|---|---|
| 03/08/2010 | 1 | COMPLAINT for Patent Infringement against all defendants ( Filing fee $ 350 receipt number 0540000000002387982.), filed by Balther Technologies, LLC. (Attachments: # 1 Exhibit A, # 2 Civil Cover Sheet)(Albritton, Eric) (Entered: 03/08/2010) | |
| 03/08/2010 | -- | Judge Leonard Davis added. (mll, ) (Entered: 03/08/2010) | |
| 03/08/2010 | 2 | Notice of Filing of Patent/Trademark Form (AO 120). AO 120 mailed to the Director of the U.S. Patent and Trademark Office. (Albritton, Eric) (Entered: 03/08/2010) | |
| 03/09/2010 | 3 | NOTICE of Attorney Appearance by Thomas John Ward, Jr on behalf of Balther Technologies, LLC (Ward, Thomas) (Entered: 03/09/2010) | |
| 03/09/2010 | 4 | NOTICE of Attorney Appearance by Jack Wesley Hill on behalf of Balther Technologies, LLC (Hill, Jack) (Entered: 03/09/2010) | |
| 03/09/2010 | 5 | NOTICE of Attorney Appearance by Adam A Biggs on behalf of Balther Technologies, LLC (Biggs, Adam) (Entered: 03/09/2010) | |
| 03/09/2010 | 6 | NOTICE of Attorney Appearance by Debra Rochelle Coleman on behalf of Balther Technologies, LLC (Coleman, Debra) (Entered: 03/09/2010) | |
| 03/09/2010 | 7 | NOTICE of Attorney Appearance by Matthew Clay Harris on behalf of Balther Technologies, LLC (Harris, Matthew) (Entered: 03/09/2010) | |
| 03/10/2010 | 8 | NOTICE of Attorney Appearance by J Mike Amerson on behalf of Balther Technologies, LLC (Amerson, J) (Entered: 03/10/2010) | |
| 03/10/2010 | 9 | NOTICE of Attorney Appearance by Matthew Richard Rodgers on behalf of Balther Technologies, LLC (Rodgers, Matthew) (Entered: 03/10/2010) | |
| 03/10/2010 | 10 | NOTICE of Attorney Appearance by Michael Aaron Benefield on behalf of Balther Technologies, LLC (Benefield, Michael) (Entered: 03/10/2010) | |
| 03/10/2010 | 11 | NOTICE of Attorney Appearance by David Wynne Morehan on behalf of Balther Technologies, LLC (Morehan, David) (Entered: 03/10/2010) | |
| 03/10/2010 | 12 | NOTICE of Attorney Appearance by Danny Lloyd Williams on behalf of Balther Technologies, LLC (Williams, Danny) (Entered: 03/10/2010) | |
| 03/10/2010 | 13 | NOTICE of Attorney Appearance by Jaison Chorikavumkal John on behalf of Balther Technologies, LLC (John, Jaison) (Entered: 03/10/2010) | |
| 03/10/2010 | 14 | NOTICE of Attorney Appearance by Christopher Needham Cravey on behalf of Balther Technologies, LLC (Cravey, Christopher) (Entered: 03/10/2010) | |
| 04/26/2010 | 15 | ORDER that plaintiff file a notice that the case is ready for scheduling conference when all of the defendants have either answered or filed a motion to transfer or dismiss. The | |

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| | | |
|---|---|---|
| | | notice shall be filed within five days of the last remaining defendant's answer or motion. Signed by Judge Leonard Davis on 04/26/10. cc:attys 4-27-10(mll, ) (Entered: 04/27/2010) |
| 04/28/2010 | 16 | E-GOV SEALED SUMMONS Issued as to American Honda Motor Co. Inc., BMW of North America, LLC, Chrysler Group LLC, Daimler North America Corporation, Ferrari North America, Inc., Ford Motor Company, General Motors, LLC, Hyundai Motor America, Jaguar Land Rover North America, LLC, Maserati North America Inc, Mazda Motor of North America, Inc., Mercedes-Benz USA, LLC, Mitsubishi Motors North America, Inc., Nissan North America, Inc., Porsche Cars North America, Inc., SAAB Cars North America, Inc., Toyota Motor North America, Inc., Toyota Motor Sales, U.S.A., Inc., Volkswagen Group of America, Inc., Volvo Cars of North America, LLC., and emailed to pltf for service. (mll, ) (Entered: 04/28/2010) |
| 05/17/2010 | 17 | NOTICE of Voluntary Dismissal by Balther Technologies, LLC (Attachments: # 1 Text of Proposed Order)(Albritton, Eric) (Entered: 05/17/2010) |
| 05/18/2010 | 18 | ORDER DISMISSING CASE. This civil action is dismissed without prejudice. Pltf and defts shall bear their own costs, expenses and legal fees. Signed by Judge Leonard Davis on 05/18/10. cc:attys 5-18-10(mll, ) (Entered: 05/18/2010) |
| 05/18/2010 | 19 | Agreed MOTION for Extension of Time to File Answer re 1 Complaint by Mitsubishi Motors Corp., Mitsubishi Motors North America, Inc.. (Attachments: # 1 Text of Proposed Order) (Smith, Michael) (Entered: 05/18/2010) |
| 05/19/2010 | 20 | NOTICE by Mitsubishi Motors Corp., Mitsubishi Motors North America, Inc. re 19 Agreed MOTION for Extension of Time to File Answer re 1 Complaint (Notice of Withdrawal of Agreed MOTION for Extension of Time to File Answer) (Smith, Michael) (Entered: 05/19/2010) |

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UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT

**7241034**

Get Drawing Sheet 1 of 7
Access PDF of Official Patent *
Order Patent File History / Wrapper from REEDFAX®
Link to Claims Section

June 12, 2003

Automatic directional control system for vehicle headlights

**REEXAM-LITIGATE:**

Reexamination requested July 10, 2010 by PATENT OWNER, Reexamination No. 90/011,011 (O.G. September 7, 2010) Ex. Gp.: 3992 July 10, 2010

Reexamination requested May 16, 2011 by Volkswagen Group of America, Inc.; (Att'y Is: Clifford A. Ulrich, Kenyon & Kenyon, LLP., New York, NY), Reexamination No. 95/001,621 (O.G. June 28, 2011) Ex. Gp.: 3992 May 16, 2011

NOTICE OF LITIGATION

Balther Technologies, LLC v. American Honda Motor Co Inc et al, Filed March 8, 2010, D.C. E.D. Texas, Doc. No. 6:10cv78

**INVENTOR:** Smith, James E. - Berkey, OHIO, United States of America (US), United States of America (US) ; McDonald, Anthony B. - Perrysburg, OHIO, United States of America (US), United States of America (US)

**APPL-NO:** 285312 (10)

**FILED-DATE:** October 31, 2002

**GRANTED-DATE:** July 10, 2007

**ASSIGNEE-PRE-ISSUE:**
February 6, 2003 - ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS)., DANA CORPORATION 4500 DORR STREET TOLEDO OHIO 43615, Reel and Frame Number: 013729/0559

**ASSIGNEE-AT-ISSUE:**
Dana Corporation, Toledo, OHIO, United States of America (US), United States company or corporation (02)

**ASSIGNEE-AFTER-ISSUE:**
February 22, 2008 - ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS)., DANA AUTOMOTIVE SYSTEMS GROUP, LLC 4500 DORR STREET TOLEDO OHIO 43615, 4500 DORR STREET, TOLEDO, OHIO, UNITED STATES OF AMERICA (US), 43615, Reel and Frame Number: 020540/0476
June 12, 2009 - ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).,

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STRAGENT, LLC 211 W. TYLER, SUITE C LONGVIEW TEXAS 75601, 211 W. TYLER, SUITE C, LONGVIEW, TEXAS, UNITED STATES OF AMERICA (US), 75601, Reel and Frame Number: 022813/0432
March 8, 2010 - ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS)., BALTHER TECHNOLOGIES, LLC, SUITE C-4, 211 W. TYLER, LONGVIEW, TEXAS, UNITED STATES OF AMERICA (US), 75601, Reel and Frame Number: 024045/0235

**LEGAL-STATUS:**

February 6, 2003 - ASSIGNMENT
February 22, 2008 - ASSIGNMENT
February 22, 2008 - ASSIGNMENT
February 22, 2008 - ASSIGNMENT
June 12, 2009 - ASSIGNMENT
March 8, 2010 - ASSIGNMENT
September 7, 2010 - REQUEST FOR REEXAMINATION FILED
January 10, 2011 - FEE PAYMENT

**PRIM-EXMR:** Alavi, Ali

**CORE TERMS:** headlight, directional, controller, adjustment, sensed, algorithm, sensor, actuator, steering, minus, control system, road, suspension, responsive, automatic, feedback, orientation, beam, aiming, height, generating, electrical, input output device, plane, stored, automatically, optical, pitch, calibration, accomplish

**ENGLISH-ABST:**

A structure and method for operating a directional control system for vehicle headlights that is capable of altering the directional aiming angles of the headlights to account for changes in the operating conditions of the vehicle. One or more operating condition sensors may be provided that generate signals that are representative of a condition of the vehicle, such as road speed, steering angle, pitch, suspension height, rate of change of road speed, rate of change of steering angle, rate of change of pitch, and rate of change of suspension height of the vehicle. A controller is responsive to the sensor signal for generating an output signal. An actuator is adapted to be connected to the headlight to effect movement thereof in accordance with the output signal. The controller can include a table that relates values of sensed operating condition to values of the output signal. The controller is responsive to the sensor signal for looking up the output signal in the table.

**NO-OF-CLAIMS:** 5

Source: **Legal > / . . . / > Utility, Design and Plant Patents** [i]
Terms: **patno=7241034** (Suggest Terms for My Search)
View: Custom
Segments: Abst, Appl-no, Assignee, Cert-correction, Date, Exmr, Inventor, Legal-status, Lit-reex, No-of-claims, Patno, Reexam-litigate, Ref-patno, Reissue, Rel-patno, Title
Date/Time: Monday, May 21, 2012 - 1:28 PM EDT

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Patent Law Practice Center

May 31, 2011 Tuesday 10:11 AM EST

**LENGTH:** 2671 words

**HEADLINE:** Reexamination Requests Filed Weeks of 5/16/11 And 5/23/11

**BYLINE:** Stefanie Levine

**BODY:**

... in litigation in the Middle District of North Carolina over that patent and four others.

The following inter partes requests were filed:

(1) 95/001,621 (electronically filed) " U.S. Patent No. **7,241,034** entitled AUTOMATIC DIRECTIONAL CONTROL SYSTEM FOR VEHICLE HEADLIGHTS and owned by Dana Corporation. Filed May 16, 2011, by Volkswagen Group of America.

(2) 95/001,622 (electronically filed) ...

Source: **Combined Source Set 3 [i] - News, Most Recent Two Years (English, Full Text)**
Terms: **7241034 or 7,241,034** (Suggest Terms for My Search)
View: KWIC
Date/Time: Monday, May 21, 2012 - 1:29 PM EDT

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May 31, 2011 Tuesday 10:11 AM EST

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**HEADLINE:** Reexamination Requests Filed Weeks of 5/16/11 And 5/23/11

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(1) 95/001,621 (electronically filed) " U.S. Patent No. **7,241,034** entitled AUTOMATIC DIRECTIONAL CONTROL SYSTEM FOR VEHICLE HEADLIGHTS and owned by Dana Corporation. Filed May 16, 2011, by Volkswagen Group of America.

(2) 95/001,622 (electronically filed) ...

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Terms: **7241034 or 7,241,034** (Suggest Terms for My Search)
View: KWIC
Date/Time: Monday, May 21, 2012 - 1:29 PM EDT

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United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 95/001,621 →90/011011 | 05/16/2011 | 7,241,034 | SVIPGP109RE | 1240 |

92045 7590 06/29/2012
The Caldwell Firm, LLC
PO Box 59655
Dept. SVIPGP
Dallas, TX 75229

| EXAMINER | |
|---|---|
| TON, MY TRANG | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 3992 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 06/29/2012 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

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Commissioner for Patents
United States Patent and Trademark Office
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Alexandria, VA 22313-1450
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(THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS)

Kenyon & Kenyon, LLP

One Broadway

New York, NY 10004

## Transmittal of Communication to Third Party Requester
## *Inter Partes* Reexamination

REEXAMINATION CONTROL NUMBER 95/001,621. + 90/011,011

PATENT NUMBER 7,241,034.

TECHNOLOGY CENTER 3900.

ART UNIT 3992.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above-identified reexamination proceeding. 37 CFR 1.903.

Prior to the filing of a Notice of Appeal, each time the patent owner responds to this communication, the third party requester of the *inter partes* reexamination may once file written comments within a period of 30 days from the date of service of the patent owner's response. This 30-day time period is statutory (35 U.S.C. 314(b)(2)), and, as such, it cannot be extended. See also 37 CFR 1.947.

If an *ex parte* reexamination has been merged with the *inter partes* reexamination, no responsive submission by any *ex parte* third party requester is permitted.

**All correspondence** relating to this inter partes reexamination proceeding should be directed to the **Central Reexamination Unit** at the mail, FAX, or hand-carry addresses given at the end of the communication enclosed with this transmittal.

PTOL-2070 (Rev.07-04)

| ***OFFICE ACTION IN* INTER PARTES *REEXAMINATION*** | Control No. | Patent Under Reexamination |
|---|---|---|
| | 95/001,621 , 90/011,011 | 7,241,034 |
| | Examiner | Art Unit |
| | MY-TRANG TON | 3992 |

***-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address. --***

Responsive to the communication(s) filed by:
Patent Owner on 27 April, 2012
Third Party(ies) on _____

**RESPONSE TIMES ARE SET TO EXPIRE AS FOLLOWS:**

*For Patent Owner's Response*:
2 MONTH(S) from the mailing date of this action. 37 CFR 1.945. EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.956.
*For Third Party Requester's Comments on the Patent Owner Response:*
30 DAYS from the date of service of any patent owner's response. 37 CFR 1.947. NO EXTENSIONS OF TIME ARE PERMITTED. 35 U.S.C. 314(b)(2).

**All correspondence** relating to this inter partes reexamination proceeding should be directed to the **Central Reexamination Unit** at the mail, FAX, or hand-carry addresses given at the end of this Office action.

This action is not an Action Closing Prosecution under 37 CFR 1.949, nor is it a Right of Appeal Notice under 37 CFR 1.953.

**PART I. THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:**

1.☐ Notice of References Cited by Examiner, PTO-892
2.☐ Information Disclosure Citation, PTO/SB/08
3.☐ _____

**PART II. SUMMARY OF ACTION:**

1a. ☒ Claims 1-41 are subject to reexamination.
1b. ☐ Claims _____ are not subject to reexamination.
2. ☐ Claims _____ have been canceled.
3. ☐ Claims _____ are confirmed. [Unamended patent claims]
4. ☐ Claims _____ are patentable. [Amended or new claims]
5. ☒ Claims 1,2,4-6,8-10 and 12-37 are rejected.
6. ☒ Claims 3,7,11 and 38-41 are objected to.
7. ☐ The drawings filed on _____ ☐ are acceptable ☐ are not acceptable.
8. ☐ The drawing correction request filed on _____ is: ☐ approved. ☐ disapproved.
9. ☐ Acknowledgment is made of the claim for priority under 35 U.S.C. 119 (a)-(d). The certified copy has: ☐ been received. ☐ not been received. ☐ been filed in Application/Control No 95001621.
10. ☐ Other _____

**INTER PARTES REEXAMINATION OFFICE ACTION**

This is an inter*parte* reexamination of United States Patent No. 7,241,034 ("the '034 patent"). This proceeding is a merger of 90/011,011 and 95/001,621.

Patent Owner's proposed Amendment and remarks filed on 4/27/2012 have been fully considered. Thus, all subsequent reexamination prosecution and examination will be on the basis of the claims as amended in the proposed amendment. **It is noted that although the Office actions will treat proposed amendments as though they have been entered, the proposed amendments will not be effective until the reexamination certificate is issued.**

This action responds to Patent Owner's Amendment of 4/27/2012.

**Status of the claims**

The following is the status of the claims with respect to the proposed Amendment:

With respect to proposed amendment, Claims 1-41 are pending. Of these, claim 1 is independent claim.

Claims 1-5 are amended.

Claims 6-41 are newly added.

Thus, claims 1-41 are reexamined in this proceeding.

***References Relied Upon in the Request***

For EP 90/011,011:

U.S. Patent 4,733,333 issued to Shibata (hereinafter "Shibata")

For IP 95/001,621:

1. United Kingdom Patent Application Publication No. 2309773 by Uchida (hereinafter "Uchida").
2. United Kingdom Patent Application Publication No. 2309774 by Takahashi (hereinafter "Takahashi").
3. U.S. Patent No. 5,182,460 by Hussman (hereinafter "Hussman").

4. German Patent Application Publication No. 3110094 by Miskin et al (hereinafter "Miskin et al.").

5. German Patent Application Publication No. 3129891 by Leleve (hereinafter "Leleve").

6. U.S. Patent No. 6,305,823 by Toda et al (hereinafter "Toda et al.").

7. U.S. Patent No. 6,193,398 by Okuchi et al (hereinafter "Okuchi et al.").

8. U.S. Patent No. 5,909,949 by Gotoh (hereinafter "Gotoh").

9. U.S. Patent No. 4,954,933 by Wassen et al (hereinafter "Wassen et al.").

**Issues Raised**

For EP 90/011,011:

Claims 1 and 3 are anticipated under 35 U.S.C. § 102(b) by Shibata.

For IP 95/001,621:

1. Claims 1, 2, 4, and 5 are anticipated by Uchida under 35 U.S.C. § 102(b).

2. Claims 1, 2, 4, and 5 are anticipated by Takahashi under 35 U.S.C. § 102(b).

3. Claims 1, 2, 4, and 5 are anticipated by Hussman under 35 U.S.C. § 102(b).

4. Claims 1 and 5 are anticipated by Miskin et al. under 35 U.S.C. § 102(b).

5. Claims 1 and 5 are anticipated by Leleve under 35 U.S.C. § 102(b).

6. Claims 1, 2, 4, and 5 are unpatentable over the combination of Toda et al. and Uchida under 35 U.S.C. § 103(a).

7. Claims 1, 2, 4, and 5 are unpatentable over the combination of Toda et al. and Takahashi under 35 U.S.C. § 103(a).

8. Claims 1, 2, 4, and 5 are unpatentable over the combination of Toda et al. and Hussman under 35 U.S.C. § 103(a).

9. Claims 1, 2, 4, and 5 are unpatentable over the combination of Toda et al. and Miskin et al. under 35 U.S.C. § 103(a).

10. Claims 1, 2, 4, and 5 are unpatentable over the combination of Toda et al. and Leleve under 35 U.S.C. § 103(a).

11. Claims 1, 2, 4, and 5 are unpatentable over the combination of Okuchi et al. and Uchida under 35 U.S.C. § 103(a).

12. Claims 1, 2, 4, and 5 are unpatentable over the combination of Okuchi et al. and Takahashi under 35 U.S.C. § 103(a).

13. Claims 1, 2, 4, and 5 are unpatentable over the combination of Okuchi et al. and Hussman under 35 U.S.C. § 103(a).

14. Claims 1, 2, 4, and 5 are unpatentable over the combination of Okuchi et al. and Miskin et al. under 35 U.S.C. § 103(a).

15. Claims 1, 2, 4, and 5 are unpatentable over the combination of Okuchi et al. and Leleve under 35 U.S.C. § 103(a).

16. Claims 1 to 5 are unpatentable over the combination of Gotoh and Uchida under 35 U.S.C. § 103(a).

17. Claims 1 to 5 are unpatentable over the combination of Gotoh and Takahashi under 35 U.S.C. § 103(a).

18. Claims 1 to 5 are unpatentable over the combination of Gotoh and Hussman under 35 U.S.C. § 103(a).

19. Claims 1, 2, 3, and 5 are unpatentable over the combination of Gotoh and Miskin et al. under 35 U.S.C. § 103(a).

20. Claims 1 to 5 are unpatentable over the combination of Gotoh and Leleve under 35 U.S.C. § 103(a).

21. Proposed claims 1, 2, 4 to 6, 9 to 13, 20, 22, 24, 25, 37, 38, 41, 42, 44 and 45 are anticipated by Uchida under 35 U.S.C. § 102(b).

22. Proposed claims 1, 2,4-6, 9-11, 17, 18, 20, 21, 22, 24, 25, 28, 33, 34, 37, 38, 41, 42, 44 and 45 are anticipated by Takahashi under 35 U.S.C. § 102(b).

23. Proposed claims 1, 2, 4-6, 9, 10, 37, 38, 41, 42, 44 and 45 are anticipated by Hussman under 35 U.S.C. § 102(b).

24. Proposed claims 1, 2, 4-6, 9-13, 17, 18, 20-22, 24, 25, 28, 29, 36-

42, 44 and 45 are unpatentable over the combination of Toda et al. and Uchida under 35 U.S.C. § 103(a).

25. Proposed claims 1, 2, 4-6, 9-13, 17, 18, 20-22, 24, 25, 28, 29, 33, 34, 36-42, 44 and 45 are unpatentable over the combination of Toda et al. and Takahashi under 35 U.S.C. § 103(a).

26. Proposed claims 1, 2, 4-6, 9-13, 17, 18, 20-22, 24, 25, 28, 29, 36-42, 44 and 45 are unpatentable over the combination of Toda et al. and Hussman under 35 U.S.C. § 103(a).

27. Proposed claims 1, 2, 4-6, 9-13, 15-18, 20-22, 24, 25, 28, 29, 33, 35, 37-42, 44 and 45 are unpatentable over the combination of Okuchi et al. and Uchida under 35 U.S.C. § 103(a).

28. Proposed claims 1, 2, 4-6, 9-13, 15-18, 20-22, 24, 25, 28, 29, 33-35, 37-42, 44 and 45 are unpatentable over the combination of Okuchi et al. and Takahashi under 35 U.S.C. § 103(a).

29. Proposed claims 1, 2, 4-6, 9-13, 15-18, 20-22, 25, 28, 29, 33, 35, 37-42, 44 and 45 are unpatentable over the combination of Okuchi et al. and Hussman under 35 U.S.C. § 103(a).

30. Proposed claims 1-13, 20, 22, 24-26, 28, 29, 37, 38 and 41 to 45 are unpatentable over the combination of Gotoh and Uchida under 35 U.S.C. § 103(a).

31. Proposed claims 1-12, 14, 16-18, 20-22, 24-26, 28, 29, 33, 34, 37,

38 and 41-45 are unpatentable over the combination of Gotoh and Takahashi under 35 U.S.C. § 103(a).

32. Proposed claims 1-13, 24, 26, 28, 29, 37, 38 and 41-45 are unpatentable over the combination of Gotoh and Hussman under 35 U.S.C. § 103(a).

33. Proposed claims 17, 19, 21, 23, 26 and 30-32 are unpatentable in view of the combination of Uchida and the admitted prior art described in the '034 patent specification under 35 U.S.C. § 103(a).

34. Proposed claims 19, 23, 26 and 30-32 are unpatentable in view of the combination of Takahashi and the admitted Prior Art described in the '034 Patent specification under 35 U.S.C. § 103(a).

35. Proposed claims 17-21, 23-26 and 30-32 are unpatentable in view of the combination of Hussman and the admitted Prior Art described in the '034 Patent specification under 35 U.S.C. § 103(a).

36. Proposed claim 27 is unpatentable over the combination of Uchida and Wassen et al. under 35 U.S.C. § 103(a).

37. Proposed claim 27 is unpatentable over the combination of Takahashi and Wassen et al. under 35 U.S.C. § 103(a).

38. Proposed Claim 27 is unpatentable over the combination of Hussman and Wassen et al. under 35 U.S.C. § 103(a).

*** It is noted that the proposed grounds of rejections in Issues 3, 8, 13 and 18 that were found not to raise a SNQ in the Order will not be discussed further.

*** As explained in the Order of 6/23/2011, it was agreed that Issues 1-2, 4-7, 9-12, 14-17 and 19-20 raised an SNQ for the original claims 1-5 under reexamination. However, this Office action is based on claims 1-5 under reexamination as amended on 4/27/2012 and new claims 6-41 that accompanied the amendment (see MPEP 2221). Thus, Issues 1-2, 4-7, 9-12, 14-17 and 19-20 raised for the original claims 1-5 will not be evaluated.

*** Issues 21-38 raised for amended claims 1-5 and newly added claims 6-41 will be evaluated below.

**Status of Previous Rejection in EP 90/011,011**

The following rejection was previously made by the Office:

Claims 1 and 3 was previous rejected under 35 U.S.C. § 102(b) as being anticipated by Shibata.

This rejection **is withdrawn**.

Amended claim 1 now required: "*two or more sensors ... including two or more of road speed, steering angle, pitch, and suspension height of the vehicle*" *and "a controller ... in response to relatively small variations in the sensed conditions" in combination with "**two or more actuators** each being adapted to be connected to the headlight to effect movement thereof in accordance with said at least one output signal*". These features are not taught by Shibata. Shibata, is not seen to teach the amendatory subject matter of independent claim 1.

Claim 3 is dependent claim and therefore is distinguishable from Shibata at least the same reasons as its respective independent base claim 1, and add further claim limitation of its own.

Accordingly, the previous rejection of claims 1 and 3 under 35 U.S.C. § 102(b) as being anticipated by Shibata are withdrawn.

**Rejections proposed in IP 95/001, 621**

Within the scope of this reexamination proceeding, the request proposes the rejections in issues 21-38 for amended claims 1-5 and newly added claims 6-41 are discussed below.

## Analysis

**<u>Issue 21</u>**: The proposed rejection of claims 1, 2, 4-6, 9-13, 20, 22, 24, 25, 37, 38, 41, 42, 44 and 45 are anticipated by Uchida under 35 U.S.C. § 102(b) (Request at pages 48-50).

1/ As noted above, this Office action is based on claims 1-5 under reexamination as amended on 4/27/2012 and newly added claims 6-41 that accompanied the amendment (see MPEP 2221). In the amendment filed 4/27/2012, there are no claims 42, 44 and 45.

2/ The rejection of claims 1, 2, 4-6, 9-13, 20, 22, 24, 25, 37, 38, 41 as anticipated by Uchida under 35 U.S.C § 102(b) were proposed by the requester in the request for reexamination, pages 48-50 and claim chart, pages 156-172, is **NOT ADOPTED**.

It is not agreed that consideration of Uchida presented a reasonable rejection with respect to the amended claims 1-41 of the '034 patent. This rejection will not be applied against these claims for the following reason:

Independent claim 1 now required:

"two or more sensors that are each adapted to generate a signal that is representative of at least one of a plurality of sensed conditions of a vehicle, said sensed conditions including at least steering angle and pitch of the vehicle;

a controller that is responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one first one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in the sensed conditions; and

> said two or more actuators each being adapted to be connected to the headlight to effect movement thereof in accordance with said at least one output signal".

While Uchida does teach in Fig. 1 two or more sensors (i.e, 2, 7) that are each adapted to generate a signal (output of 2, 7) that is representative of at least one of a plurality of sensed conditions of a vehicle (page 9, lines 13-23), the sensed conditions including at least steering angle and pitch of the vehicle (page 6, lines 9-15; page 9, lines 28-33; page 12, line 27- page 13, line 15); and a controller (3) that is responsive to the two or more sensor signals (the output of 2, 7) for generating at least one output signal (output of 3a, 3b). However, Uchida Fig. 1 only shows one actuator (4) connected to the headlight (5) to effect movement thereof in accordance with the output signal (the output of 3a, 3b). Thus, the proposed rejection of claim 1 fails to persuasively show any teaching of Uchida corresponding to the feature of "***two or more actuators* that each being adapted to be connected to the headlight** *to effect movement thereof in accordance with said at least one output signal*" of claim 1. Therefore, the reference put forth in the request, Uchida, is not seen to teach the amendatory subject matter of independent claim 1.

Claims 2, 4-6, 9-13, 20, 22, 24, 25, 37, 38, 41 depend upon claim 1. Since the proposed rejection for claim 1 was not adopted; therefore, the proposed rejection for dependent claims 2, 4-6, 9-13, 20, 22, 24, 25, 37, 38, 41 are also not adopted.

**Issue 22:** The proposed rejection of claims 1, 2, 4-6, 9-11, 17, 18, 20-22, 24, 25, 28, 33, 34, 37, 38, 41, 42, 44 and 45 are anticipated by Takahashi under 35 U.S.C. § 102(b) (Request at pages 50-52 and claim chart, pages 173-192).

1/ As noted above, this Office action is based on claims 1-5 under reexamination as amended on 4/27/2012 and newly added claims 6-41 that accompanied the amendment (see MPEP 2221). In the amendment filed 4/27/2012, there are no claims 42, 44 and 45.

2/ The rejection of claims 1, 2, 4-6, 8, 15, 17-19, 23-24, 28-29, 31-32, 35-37 (the number of claims as of the Amendment filed 4/27/2012) as anticipated by Takahashi under 35 U.S.C § 102(b) were proposed by the requester in the request for reexamination, pages 50-52 and claim chart, pages 173-192, is **ADOPTED with modifications to the rationale in support thereof**.

Claims 1, 2, 4-6, 8, 15, 17-19, 23-24, 28-29, 31-32, 35-37 are rejected under 35 U.S.C. § 102(b) as being anticipated by Takahashi.

Regarding claim 1: Takahashi discloses an automatic directional control system (1, Fig. 1) for a vehicle headlight (6), comprising:

> "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp." (page 2, lines 6-13)

two or more sensors (2, 3) that are each adapted to generate a signal (output of 2 and 3) that is representative of at least one of a plurality of sensed conditions of a vehicle, said sensed conditions including at least steering angle and pitch of the vehicle;

> "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." (page 5, line 30 to page 6, line 9)

> "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle." (page 6, lines 16-25)

a controller (4) that is responsive to said two or more sensor signals (output of 2 and 3) for generating at least one output signal (output of 4) only when said at least one of the two or_more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one first one of two or more actuators (19, 19’, Fig. 9) from being operated continuously or unduly frequently in response to relatively small variations in the sensed conditions; and

> "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2." (page 8, lines 26-32)

> "Also, in order to prevent the illumination direction of the lamp 6 from being corrected inadvertently when a sudden change in the posture of the vehicle occurs temporarily or due to the wrong operation of the lamp 6 caused by external disturbances, for example, when the vehicle makes a sudden start or a sudden stop, preferably, a threshold value with respect to time may be set in detection of the road gradient and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a threshold value with respect to the running distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a distance equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected." (page 9, lines 16-34)

said two or more actuators (19, 19', Fig. 9) each being adapted to be connected to the headlight (6) to effect movement thereof in accordance with said at least one output signal (the output signal of 4).

> "A rudder resistance network 18, which corresponds to the above-mentioned drive control device 5a, is used to convert the output signal of the microcomputer 10 into an analog signal and transmits it to actuators 19 and 19' which are disposed downstream thereof." (page 16, line 31 to page 17, line 1)

Regarding claim 2: The automatic directional control system defined in claim 1, wherein at least one of said two or more sensors (2 and 3) further generate a signal that is representative of the road speed of the vehicle.

> "The vehicle running condition detection device 4 is used to detect the running conditions of the vehicle (including the stopping or stationary condition thereof), while the detect signal of the

vehicle running condition detection device 3 is transmitted to the control device 4. As the vehicle running condition detection device 3, for example, there can be used vehicle speed detection device which is one of the existing facilities of the vehicle. Also, every kind of information can be used, provided that it can be used to detect the running conditions of the vehicle." (page 6, lines 16-25)

Regarding claim 4: The automatic directional control system defined in claim 1, wherein at least one of said two or more sensors (2 and 3) further generates a signal that is representative of a rate of change of pitch of the vehicle.

"Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp." (page 2, lines 6-13)

Regarding claim 5: The automatic directional control system defined in claim 1, wherein at least one of said two or more sensors (2 and 3) further generates a signal that is representative of the suspension height of the vehicle.

"Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp." (page 2, lines 6-13)

"The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." (page 5, line 30 to page 6, line 9)

Regarding claim 6: The automatic directional control system defined in claim 1, wherein said two or more sensors include a first sensor (2) and a second sensor (3).

Regarding claim 8: The automatic directional control system defined in claim 6, wherein said first sensor (2) is physically separate from said second sensor (3).

Regarding claim 15: The automatic directional control system defined in claim 1, wherein the two or more actuators (19, 19') include the first actuator (19) that is adapted to be connected to the headlight to effect movement thereof in a vertical direction.

> "In particular, the method l) is the simplest method that can change the illumination pattern of the lamp 6 within a vertical plane, in which the entire lamp is rotated about the rotary shaft thereof to thereby change the illumination angle of the lamp 6 with respect to a horizontal plane including the optical axis of the lamp. For example, in the method 1), there can be used a drive mechanism in which the right and left side surfaces of the lamp 6 are supported rotatably, and the rotary shaft of the lamp 6 is rotated directly by a drive source such as a motor or the like, or a member fixed to or formed integrally with the lamp 6 is rotated by the drive device 5." (page 11, lines 21 to 32)

Regarding claim 17: The automatic directional control system defined in claim 1, wherein the two or more actuators (19, 19') include an electronically controlled mechanical actuator.

"A rudder resistance network 18, which corresponds to the above-mentioned drive control device 5a, is used to convert the output signal of the microcomputer 10 into an analog signal and transmits it to actuators 19 and 19' which are disposed downstream thereof." (page 16, line 31 to page 17, line 1)

"As an example of such lamp, there is available a lamp including a mechanism which can use the rotational force of the motor as the rotational force of the lam through a transmission mechanism using a worm and worm wheel (for example, see Japanese Patent Publication No. Hei. 63-166672)." (page 11, line 32 to page 12, line 3)

Regarding claim 18: The automatic directional control system defined in claim 1, wherein the two or more actuators (19, 19', Fig. 9) include a step motor.

"Besides this, according to the invention, the lamp or the component thereof can be driven or controlled by use of a stepping motor to thereby correct the illumination direction of the lamp." (page 18, lines 5-8)

Regarding claim 19: The automatic directional control system defined in claim 1, wherein the two or more actuators (19, 19', Fig. 9) include a servo motor.

"A rudder resistance network 18, which corresponds to the above-mentioned drive control device 5a, is used to convert the output signal of the microcomputer 10 into an analog signal and transmits it to actuators 19 and 19' which are disposed downstream thereof." (page 16, line 31 to page 17, line 1)
"As an example of such lamp, there is available a lamp including a mechanism which can use the rotational force of the motor as the rotational force of the lam through a transmission mechanism using a worm and worm wheel (for example, see Japanese Patent Publication No. Hei. 63-166672)." (page 11, line 32 to page 12, line 3)

Regarding claim 23: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the controller includes a microprocessor (10, Fig. 9).

> "When a turn-on switch 12 for the lamp 6 is put into operation, a supply voltage from a constant voltage supply circuit 13 and a reset signal from a reset circuit 14 are supplied to the microcomputer 10." (page 16, lines 1-4)

Regarding claim 24. The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the controller includes a programmable electronic controller (10).

Regarding claim 28: The automatic directional control system defined in claim 1, wherein the automatic directional control system further includes memory (15, Fig. 9).

> "Also, a non-volatile memory 15 (such as an electrically erasable EEPROM, or the like) for storing control programs and data values therein) [sic] and an oscillator 16 used to generate a clock signal are additionally attached to the microcomputer 10." (page 16, lines 5-9)

Regarding claim 29: The automatic directional control system defined in claim 28, wherein the memory includes non-volatile memory (15, Fig. 9).

> "Also, a non-volatile memory 15 (such as an electrically erasable EEPROM, or the like) for storing control programs and data values therein) [sic] and an oscillator 16 used to generate a clock signal are additionally attached to the microcomputer 10." (page 16, lines 5-9)

Regarding claim 31: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by sensing a front and a rear suspension height of the vehicle.

> "The vehicle posture detection device 2 is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." (page 5, line 30 to page 6, line 9)

Regarding claim 32. The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by a pitch sensor.

> "Therefore, there is conventionally known a device which includes a device for detecting the posture of the vehicle by detecting the inclination and height of a vehicle body, and calculates the amount of variations in the inclination of the vehicle based on the information that is obtained by the detect device, thereby being able to adjust automatically the illumination direction of the lamp." (page 2, lines 6-13)

> "The vehicle posture detection device is used to detect the posture of a vehicle (including the vertical inclination of the vehicle in the advancing direction thereof). For example, when there is used height detection device 7 which detects the height of the body of the vehicle, as shown in Fig. 2, there are available a method which measures a distance L between the height detection device 7 and a road surface G by use of detect waves such as ultrasonic waves, laser beams or the like, and a method in which the height detection device 7 detects the expansion and contraction amount x of a suspension S in order to detect the amount of variations in the vertical position of the axle of the vehicle." (page 5, line 30 to page 6, line 9)

Regarding claim 35: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such

that the predetermined minimum threshold amount functions as a filter to minimize undesirable operation of at least one of the two or more actuators.

> "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2." (page 8, lines 26-32)

> "Also, in order to prevent the illumination direction of the lamp 6 from being corrected inadvertently when a sudden change in the posture of the vehicle occurs temporarily or due to the wrong operation of the lamp 6 caused by external disturbances, for example, when the vehicle makes a sudden start or a sudden stop, preferably, a threshold value with respect to time may be set in detection of the road gradient and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a threshold value with respect to the running distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a distance equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected." (page 9, lines 16-34)

Regarding claim 36: The automatic directional control system defined in claim 1, wherein said controller (4) is configured to be responsive to said two or more sensor signals (2 and 3) for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one of the two or more actuators (19, 19', Fig. 9) from being operated continuously in response to relatively small variations in the sensed conditions.

> "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2." (page 8, lines 26-32)

> "Also, in order to prevent the illumination direction of the lamp 6 from being corrected inadvertently when a sudden change in the posture of the vehicle occurs temporarily or due to the wrong operation of the lamp 6 caused by external disturbances, for example, when

> the vehicle makes a sudden start or a sudden stop, preferably, a threshold value with respect to time may be set in detection of the road gradient and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a threshold value with respect to the running distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a distance equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected." (page 9, lines 16-34)

Regarding claim 37: The automatic directional control system defined in claim 1, wherein said controller (4) is configured to be responsive to said two or more sensor signals (2 and 3) for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one of the two or more actuators from being operated unduly frequently in response to relatively small variations in the sensed conditions.

> "Therefore, when the amount of variations with time of the detect signal of the vehicle posture detect signal 2 is equal to or larger than a reference value, it may be judged that the gradient of the road has varied, and the illumination direction of the lamp 6 may be corrected in accordance with the detect signal of the vehicle posture detection device 2." (page 8, lines 26 to 32)

> "Also, in order to prevent the illumination direction of the lamp 6 from being corrected inadvertently when a sudden change in the posture of the vehicle occurs temporarily or due to the wrong operation of the lamp 6 caused by external disturbances, for example, when the vehicle makes a sudden start or a sudden stop, preferably, a threshold value with respect to time may be set in detection of the road gradient and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a time equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected; or, a threshold value with respect to the running distance of the vehicle may be set and, only when the amount of variations in the detect signal of the vehicle posture detection device 2 exceeds a given reference value and such excessive state continues for a distance equal to or more than the threshold value, the illumination direction of the lamp 6 may be corrected." (page 9, lines 16 to 34)

**Issue 23**: The proposed rejection of claims 1, 2, 4-6, 9, 10, 37, 38, 41, 42, 44 and 45 are anticipated by Hussman Under 35 U.S.C. § 102(b) (Request at pages 52-53, and claim chart, pages 193-202).

1/ As noted above, this Office action is based on claims 1-5 under reexamination as amended on 4/27/2012 and newly added claims 6-41 that accompanied the amendment (see MPEP 2221). In the amendment filed 4/27/2012, there are no claims 42, 44 and 45.

2/ The rejection of claims 1, 2, 4-6, 9, 10, 37, 38, 41 as anticipated by Hussman under 35 U.S.C § 102(b) were proposed by the requester in the request for reexamination, pages 52-53 and claim chart, pages 193-202, is **NOT ADOPTED**.

It is not agreed that consideration of Toda in view of Hussman presented a reasonable rejection with respect to the amended claims 1-41 of the '034 patent. This rejection will not be applied against these claims for the following reason:

As pointed out on pages 52-53 of the request, and the claim chart, pages 193-202, the requester indicates that Hussman teaches a controller that is responsive to the sensor signal for performing the recited functions at col. 3, lines 30-39 and lines 49-61; col. 4, lines 6-12 and col. 6, lines 51-64.

However, these paragraphs do not teach the limitation "a controller that is **responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one first one of two or more actuators from being operated**

**continuously or unduly frequently in response to relatively small variations in the sensed conditions**" as recited in amended claim 1.

Hussman merely teaches:

> "The curve-recognition device K is electrically conductively coupled with the switchover device SE and thereby couples the third filter F3 electrically conductively with the regulator R if a difference signal other than zero is fed to it from the subtractor SU. When no difference signal from the subtractor SU is present, the curve-recognition device K switches the switchover device SE so that the first filter FI is coupled to the regulator R". (col. 3, lines 30-39)

> "At the coupling between the switchover device SE and the regulator R, a matching device AE is, here for example, arranged which, upon a switchover by the switchover device SE, adjusts the various nominal values to one another so that discontinuities or jumps in the adjustment and regulation of the illumination range are avoided". (col. 4, lines 6-12)

There is no evidence presented in these paragraphs that Hussman teaches a controller would include the same function as called for in claim 1. Thus, Hussman does not teach a key element of claim 1. The proposed rejection of amended claim 1 fails to persuasively show any teaching of Hussman corresponding to the feature of "the controller that is **responsive to said two or more sensor signals for generating at least one output signal**

**only when said at least one of the two or more sensor signals <u>changes by more than a predetermined minimum threshold amount to prevent at least one first one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in the sensed conditions</u>"** of claim 1. Moreover, the independent claim 1 now required: "**two or more actuators** each being adapted to be connected to the headlight to effect movement thereof in accordance with said at least one output signal". However, Hussman only shows one actuator (R). Hence, the reference put forth in the request, Hussman, is not seen to teach the amendatory subject matter of independent claim 1.

Claims 2, 4-6, 9, 10, 37, 38, 41 depend upon claim 1. Since the proposed rejection for claim 1 was not adopted; therefore, the proposed rejection for dependent claims 2, 4-6, 9, 10, 37, 38 and 41 are also not adopted.

**Issue 24:** The proposed rejection of claims 1, 2, 4-6, 9-13, 17, 18, 20-22, 24, 25, 28, 29, 36-42, 44 and 45 are unpatentable over the combination of Toda et al. and Uchida under 35 U.S.C. § 103(a) (Request at pages 53-56, and claim chart, pages 203-237).

1/ As noted above, this Office action is based on claims 1-5 under reexamination as amended on 4/27/2012 and newly added claims 6-41 that accompanied the amendment (see MPEP 2221). In the amendment filed 4/27/2012, there are no claims 44 and 45.

2/ The rejection of claims 1, 2, 4-6, 8-9, 12, 14, 15, 17-19, 23-25, 31-37 as unpatentable over Toda in view of Uchida under 35 U.S.C § 103(a) were proposed by the requester in the request for reexamination, pages 53-56 and claim chart, pages 203-237, is **ADOPTED with modifications to the rationale in support thereof**.

Claims 1, 2, 4-6, 8-9, 12, 14, 15, 17-19, 23-25, 31-37 are rejected under 35 U.S.C § 103(a) as being unpatentable over Toda in view of Uchida.

Regarding claim 1: Toda discloses an automatic directional control system (Fig. 1) for a vehicle headlight (1L, 1R) comprising:

two or more sensors (12, 14) that are each adapted to generate a signal (output of 12 and 14) that is representative of at least one of a plurality of sensed conditions of a vehicle, said sensed conditions including at least steering angle and pitch of the vehicle;

> "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit." (col. 3, lines 11 to 18)

a controller (CPU 16) that is responsive to said two or more sensor signals (output of 12 and 14) for generating at least one output signal (output of CPU 16);

> "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit." (col. 3, lines 11 to 18)

and two or more_actuators (17L, 17R) each being adapted to be connected to the headlight (1L, 1R) to effect movement thereof in accordance with said at least one output signal (the output signal of CPU 16).

> "The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 1 OR) which includes an actuator main body and a motor driver 18 (18L, 18R).
>
> The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit." (col. 3, lines 7-18)

However, Toda does not specifically disclose "*only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one first one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in the sensed conditions*" as required in claim 1.

Uchida teaches a vehicle lamp illumination directional control device which detects both the posture and speed of a vehicle and adjusts the illumination direction of a vehicle lamp so that the illumination direction can always be kept in a predetermined direction (page 1, lines 3-7). Uchida discloses that signals to the drive means are over-ridden when acceleration is not above a given threshold, such as when the vehicle is running over a rough road, to prevent excessive adjustment of the illumination direction.

It would have been obvious to one of ordinary skill in the art to have utilized the teachings of Uchida in Toda's automatic leveling device as a mere application of a known technique to a known device ready for improvement to yield predictable results. One of ordinary skill in the art would readily predict that the device would function to prevent excessive adjustment of the illumination direction, and, thus, the combination would function predictably.

Regarding claim 2: The automatic directional control system defined in claim 1, wherein at least one of said two or more sensors (12, 14) further generate a signal that is representative of the road speed of the vehicle.

> "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit." (col. 3, lines 11-18)

Regarding claim 4: The automatic directional control system defined in claim 1, wherein at least one of said two or more sensors (12 and 14) further generates a signal that is representative of a rate of change of pitch of the vehicle.

> "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit." (col. 3, lines 11-18)

Regarding claim 5: The automatic directional control system defined in claim 1, wherein at least one of said two or more sensors (12 and 14) further generates a signal that is representative of the suspension height of the vehicle.

> "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit." (col. 3, lines 11 to 18)

Regarding claim 6: The automatic directional control system defined in claim 1, wherein said two or more sensors include a first sensor (12) and a second sensor (14).

Regarding claim 8: The automatic directional control system defined in claim 6, wherein said first sensor (12) is physically separate from said second sensor (14).

Regarding claim 9: The automatic directional control system defined in claim 1, further comprising one or more additional sensors (20L, 20R) for sensing one or more of a rate of change of road speed of the vehicle, a rate of change of steering angle of the vehicle, a rate of change of pitch of the vehicle, a suspension height, or a rate of change of suspension height of the vehicle.

> "In the actuator failure judgment control step 130, as will be described later, the control unit 16 determines based on signals from the actuator failure detection sensors 20 (20L, 20R) whether or not there is a failure of driving of the motors 10 (10L, 10R). If no failure is detected, move to step 108 where the control unit 16 outputs signals to the motor drivers 18 (18L, 18R) so as to drive the motors 10 (10L, 10R) a magnitude corresponding to the pitch angle $0_a$ when the vehicle is at halt, and then return to step 100. This simultaneously levels the left and right headlamps 1 (1L, 1R)" (col. 5, lines 1-5)
>
> First, in step 132, a signal from the actuator failure detection sensor 20R is compared with an allowable value set in advance, and from this it is determined whether or not the leveling motor 10R of the fight-hand side headlamp 1R fails. If NO (no failure), move to step 136, where a signal from the actuator failure detection sensor 18L is compared with an allowable value set in advance, and from this it is determined whether or not the leveling motor 10L of the left-hand side headlamp 10L fails. If NO (no failure) then move to step 108, where the control circuit 16 outputs signals to the motor drivers 18R, 18L so as to control the motors 10R, 10L based on the pitch angle 01 when the vehicle is at a halt calculated in step 106 and stored in the RAM (or the pitch angle 02 at the time of stable running operated in step 128 and stored in the RAM), then returning to step 100. Thus, in a case where neither of the leveling motors 10L, 10R of the left and right headlamps is failing, the left and right headlamps are simultaneously leveled. In

addition, in a case where the driving of the motors 10L, 10R is controlled based on the pitch angle 02 at the time of stable running, as is previously described, a flag is set. (col. 6, lines 30-51)

Regarding claim 12: The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors (20L, 20R) generate a signal that is representative of the rate of change of pitch of the vehicle.

"In the actuator failure judgment control step 130, as will be described later, the control unit 16 determines based on signals from the actuator failure detection sensors 20 (20L, 20R) whether or not there is a failure of driving of the motors 10 (10L, 10R). If no failure is detected, move to step 108 where the control unit 16 outputs signals to the motor drivers 18 (18L, 18R) so as to drive the motors 10 (10L, 10R) a magnitude corresponding to the pitch angle $0_a$ when the vehicle is at halt, and then return to step 100. This simultaneously levels the left and right headlamps 1 (1L, 1R)" (col. 5, lines 1-5)

First, in step 132, a signal from the actuator failure detection sensor 20R is compared with an allowable value set in advance, and from this it is determined whether or not the leveling motor 10R of the fight-hand side headlamp 1R fails. If NO (no failure), move to step 136, where a signal from the actuator failure detection sensor 18L is compared with an allowable value set in advance, and from this it is determined whether or not the leveling motor 10L of the left-hand side headlamp 10L fails. If NO (no failure) then move to step 108, where the control circuit 16 outputs signals to the motor drivers 18R, 18L so as to control the motors 10R, 10L based on the pitch angle 01 when the vehicle is at a halt calculated in step 106 and stored in the RAM (or the pitch angle 02 at the time of stable running operated in step 128 and stored in the RAM), then returning to step 100. Thus, in a case where neither of the leveling motors 10L, 10R of the left and right headlamps is failing, the left and right headlamps are simultaneously leveled. In addition, in a case where the driving of the motors 10L, 10R is controlled based on the pitch angle 02 at the time of stable running, as is previously described, a flag is set. (col. 6, lines 30-51)

Regarding claim 14: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured to include the first actuator (17L) connected to the headlight to effect movement thereof in a first direction and a second actuator (17R) connected to the headlight to effect movement thereof in a second direction different form the first direction.

Regarding claim 15: The automatic directional control system defined in claim 1, wherein the two or more actuators (17L, 17R) include the first actuator (19) that is adapted to be connected to the headlight to effect movement thereof in a vertical direction.

"In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and fight headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 1 OR) which includes an actuator main body and a motor driver 18 (18L, 18R)." (col. 2, line 65 to col. 3, line 10)

Regarding claim 17: The automatic directional control system defined in claim 1, wherein the two or more actuators (17L, 17R) include an electronically controlled mechanical actuator.

"In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and fight headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 1 OR) which includes an actuator main body and a motor driver 18 (18L, 18R)." (col. 2, line 65 to col. 3, line 10)

"The CPU 16 calculates vehicle speed depending on data from sensors 12 and calculates vehicle height depending on data from sensors 14, judges whether the headlamps are switched on or off, and output to motor drivers 18 (18L, 18R) a control signal for driving the motors 10 (10L, 10R) a magnitude corresponding to operating pitch angle data. A timer 13 is also connected to the CPU 16." (col. 3, lines 18 to 24)

Regarding claim 18: The automatic directional control system defined in claim 1, wherein the two or more actuators (17L, 17R) include a step motor.

"In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and fight headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 1 OR) which includes an actuator main body and a motor driver 18 (18L, 18R)." (col. 2, line 65 to col. 3, line 10)

Regarding claim 19: The automatic directional control system defined in claim 1, wherein the two or more actuators (17L, 17R) include a servo motor.

"In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and fight headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 1 OR) which includes an actuator main body and a motor driver 18 (18L, 18R)." (col. 2, line 65 to col. 3, line 10)

"The CPU 16 calculates vehicle speed depending on data from sensors 12 and calculates vehicle height depending on data from sensors 14, judges whether the headlamps are switched on or off, and output to motor drivers 18 (18L, 18R) a control signal for driving the motors 10 (10L, 10R) a magnitude corresponding to operating pitch angle data. A timer 13 is also connected to the CPU 16." (col. 3, lines 18-24)

Regarding claim 23: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the controller includes a microprocessor (CPU 16).

> "The CPU 16 calculates vehicle speed depending on data from sensors 12 and calculates vehicle height depending on data from sensors 14, judges whether the headlamps are switched on or off, and output to motor drivers 18 (18L, 18R) a control signal for driving the motors 10 (10L, 10R) a magnitude corresponding to operating pitch angle data. A timer 13 is also connected to the CPU 16." (col. 3, lines 18 to 24)

Regarding claim 24. The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the controller includes a programmable electronic controller (CPU 16).

> The CPU 16 calculates vehicle speed depending on data from sensors 12 and calculates vehicle height depending on data from sensors 14, judges whether the headlamps are switched on or off, and output to motor drivers 18 (18L, 18R) a control signal for driving the motors 10 (10L, 10R) a magnitude corresponding to operating pitch angle data. A timer 13 is also connected to the CPU 16." (col. 3, lines 18 to 24)

Regarding claim 25: The automatic directional control system defined in claim 1, wherein the automatic directional control system further includes at least one position feedback sensor (20L, 20R) capable of providing a position feedback signal (feedback from 10 to 16) associated with at least one of the two or more actuators (17L, 17R).

Regarding claim 31: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by sensing a front and a rear suspension height of the vehicle.

> "When a two-sensor system is used in which vehicle height sensors are provided on both the front and rear wheels, the vehicle pitch angle is obtained from displacement distances of the vehicle height at the front and rear of the vehicle and a wheel base of the vehicle, or a distance between front and rear axles of the vehicle." (col. 3, lines 48 to 53)

Regarding claim 32. The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by a pitch sensor.

> "When a two-sensor system is used in which vehicle height sensors are provided on both the front and rear wheels, the vehicle pitch angle is obtained from displacement distances of the vehicle height at the front and rear of the vehicle and a wheel base of the vehicle, or a distance between front and rear axles of the vehicle." (col. 3, lines 48 to 53)

Regarding claim 33: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the controller is programmed to be responsive to changes in the suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle.

> "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is

> caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." (col. 4, lines 1-25)

Regarding claim 34: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the controller is programmed to be responsive to changes in the suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle, thereby ignoring frequency changes in the suspension height of the vehicle that are a result of bumps in a road.

> "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." (col. 4, lines 1 to 25)

Regarding claim 35: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the predetermined minimum threshold amount functions as a filter to minimize undesirable operation of at least one of the two or more actuators.

> "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." (col. 4, lines 1- 25)

Regarding claim 36: The automatic directional control system defined in claim 1, wherein said controller (CPU16) is configured to be responsive to said two or more sensor signals (the output of 12 and 14) for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one of the two or more actuators (17L, 17R) from being operated continuously in response to relatively small variations in the sensed conditions (Toda in combination with Uchida: Uchida teaches that the vehicle is judged to be in acceleration or deceleration running condition by determining if a calculated value of acceleration is more or less than a reference value. Page 10, line 26 to page 11, line 6 ).

Regarding claim 37: The automatic directional control system defined in claim 1, wherein said controller (4) is configured to be responsive to said two or more sensor signals (2 and 3) for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one of the two or more actuators from being operated unduly frequently in response to relatively small variations in the sensed conditions (Toda in combination with Uchida: Uchida teaches that the vehicle is judged to be in acceleration or deceleration running condition by determining if a calculated value of acceleration is more or less than a reference value. Page 10, line 26 to page 11, line 6 ).

**Issue 25:** The proposed rejection of claims 1, 2, 4-6, 9-13, 17, 18, 20-22, 24, 25, 28, 29, 33, 34, 36-42, 44 and 45 are unpatentable over the combination of Toda et al. and Takahashi under 35 U.S.C. § 103(a) (Request at pages 56-58, and claim chart, pages 238-272).

1/ As noted above, this Office action is based on claims 1-5 under reexamination as amended on 4/27/2012 and newly added claims 6-41 that accompanied the amendment (see MPEP 2221). In the amendment filed 4/27/2012, there are no claims 42, 44 and 45.

2/ The rejection of claims 1, 2, 4-6, 8-9, 12, 14, 15, 17-19, 23-25, 28-29, 31-37 as unpatentable over Toda in view of Takahashi under 35 U.S.C § 103(a) were proposed by the requester in the request for reexamination, pages 56-58 and claim chart, pages 238-272, is **ADOPTED with modifications to the rationale in support thereof**.

Claims 1, 2, 4-6, 8-9, 12, 14, 15, 17-19, 23-25, 28-29, 31-37 are rejected under 35 U.S.C § 103(a) as unpatentable over Toda in view of Takahashi.

Regarding claim 1: Toda discloses an automatic directional control system (Fig. 1) for a vehicle headlight (1L, 1R) comprising:

two or more sensors (12, 14) that are each adapted to generate a signal (output of 12 and 14) that is representative of at least one of a plurality of sensed conditions of a vehicle, said sensed conditions including at least steering angle and pitch of the vehicle;

> "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit." (col. 3, lines 11 to 18)

a controller (CPU 16) that is responsive to said two or more sensor signals (output of 12 and 14) for generating at least one output signal (output of CPU 16);

> "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit." (col. 3, lines 11 to 18)

and two or more actuators (17L, 17R) each being adapted to be connected to the headlight (1L, 1R) to effect movement thereof in accordance with said at least one output signal (the output signal of CPU 16).

> "The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 1 OR) which includes an actuator main body and a motor driver 18 (18L, 18R).
>
> The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit." (col. 3, lines 7-18)

However, Toda does not specifically disclose "*only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one first one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in the sensed conditions*" as required in claim 1.

Takahashi teaches a threshold value with respect to vehicle posture prevents the adjustment of the illumination direction when the vehicle makes sudden stops or starts. A threshold value with respect to time may be set in detection of the road gradient, and only when the amount of variations in the detection signal of the vehicle posture exceed a given reference value and such excessive state continues for a time longer than the set threshold time will the illumination direction be adjusted (page 9, line 16 to page 10, line 3).

It would have been obvious to one of ordinary skill in the art to have utilized the teachings of Takahashi in Toda's automatic leveling device as a mere application of a known technique to a known device ready for improvement to yield predictable results. One of ordinary skill in the art would readily predict that the device would function to prevent the adjustment of the illumination direction when the vehicle makes sudden stops or starts, and, thus, the combination would function predictably.

Regarding claim 2: The automatic directional control system defined in claim 1, wherein at least one of said two or more sensors (12, 14) further generate a signal that is representative of the road speed of the vehicle.

> "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit." (col. 3, lines 11-18)

Regarding claim 4: The automatic directional control system defined in claim 1, wherein at least one of said two or more sensors (12 and 14) further generates a signal that is representative of a rate of change of pitch of the vehicle.

> "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit." (col. 3, lines 11-18)

Regarding claim 5: The automatic directional control system defined in claim 1, wherein at least one of said two or more sensors (12 and 14) further generates a signal that is representative of the suspension height of the vehicle.

> "The headlamp automatic leveling device includes the actuators 17 (17L, 17R) for tilt adjusting respective optical axes L of the headlamps 1 (1L, 1R) vertically, actuator failure detection sensors 20 (20L, 20R), a headlamp switch-on switch 11, vehicle speed sensors 12 as a vehicle speed detection means for detecting the speed of a vehicle, vehicle height sensors 14 constituting a part of a vehicle pitch angle detection means, a CPU 16 as a control unit." (col. 3, lines 11-18)

Regarding claim 6: The automatic directional control system defined in claim 1, wherein said two or more sensors include a first sensor (12) and a second sensor (14).

Regarding claim 8: The automatic directional control system defined in claim 6, wherein said first sensor (12) is physically separate from said second sensor (14).

Regarding claim 9: The automatic directional control system defined in claim 1, further comprising one or more additional sensors (20L, 20R) for sensing one or more of a rate of change of road speed of the vehicle, a rate of change of steering angle of the vehicle, a rate of change of pitch of the vehicle, a suspension height, or a rate of change of suspension height of the vehicle.

> "In the actuator failure judgment control step 130, as will be described later, the control unit 16 determines based on signals from the actuator failure detection sensors 20 (20L, 20R) whether or not there is a failure of driving of the motors 10 (10L, 10R). If no failure is detected, move to step 108 where the control unit 16 outputs signals to the motor drivers 18 (18L, 18R) so as to drive the motors 10 (10L, 10R) a magnitude corresponding to the pitch angle $0_a$ when the vehicle is at halt, and then return to step 100. This simultaneously levels the left and right headlamps 1 (1L, 1R)" (col. 5, lines 1-5)
>
> First, in step 132, a signal from the actuator failure detection sensor 20R is compared with an allowable value set in advance, and from this it is determined whether or not the leveling motor 10R of the fight-hand side headlamp 1R fails. If NO (no failure), move to step 136, where a signal from the actuator failure detection sensor 18L is compared with an allowable value set in advance, and from this it is determined whether or not the leveling motor 10L of the left-hand side headlamp 10L fails. If NO (no failure) then move to step 108, where the control circuit 16 outputs signals to the motor drivers 18R, 18L so as to control the motors 10R, 10L based on the pitch angle 01 when the vehicle is at a halt calculated in step 106 and stored in the RAM (or the pitch angle 02 at the time of stable running operated in step 128 and stored in the RAM), then returning to step 100. Thus, in a case where neither of the leveling motors 10L, 10R of the left and right headlamps is failing, the left and right headlamps are simultaneously leveled. In

> addition, in a case where the driving of the motors 10L, 10R is controlled based on the pitch angle 02 at the time of stable running, as is previously described, a flag is set. (col. 6, lines 30-51)

Regarding claim 12: The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors (20L, 20R) generate a signal that is representative of the rate of change of pitch of the vehicle.

> "In the actuator failure judgment control step 130, as will be described later, the control unit 16 determines based on signals from the actuator failure detection sensors 20 (20L, 20R) whether or not there is a failure of driving of the motors 10 (10L, 10R). If no failure is detected, move to step 108 where the control unit 16 outputs signals to the motor drivers 18 (18L, 18R) so as to drive the motors 10 (10L, 10R) a magnitude corresponding to the pitch angle $0_a$ when the vehicle is at halt, and then return to step 100. This simultaneously levels the left and right headlamps 1 (1L, 1R)" (col. 5, lines 1-5)

> First, in step 132, a signal from the actuator failure detection sensor 20R is compared with an allowable value set in advance, and from this it is determined whether or not the leveling motor 10R of the fight-hand side headlamp 1R fails. If NO (no failure), move to step 136, where a signal from the actuator failure detection sensor 18L is compared with an allowable value set in advance, and from this it is determined whether or not the leveling motor 10L of the left-hand side headlamp 10L fails. If NO (no failure) then move to step 108, where the control circuit 16 outputs signals to the motor drivers 18R, 18L so as to control the motors 10R, 10L based on the pitch angle 01 when the vehicle is at a halt calculated in step 106 and stored in the RAM (or the pitch angle 02 at the time of stable running operated in step 128 and stored in the RAM), then returning to step 100. Thus, in a case where neither of the leveling motors 10L, 10R of the left and right headlamps is failing, the left and right headlamps are simultaneously leveled. In addition, in a case where the driving of the motors 10L, 10R is controlled based on the pitch angle 02 at the time of stable running, as is previously described, a flag is set. (col. 6, lines 30-51)

Regarding claim 14: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured to include the first actuator (17L) connected to the headlight to effect movement thereof in a first direction and a second actuator (17R) connected to the headlight to effect movement thereof in a second direction different form the first direction.

Regarding claim 15: The automatic directional control system defined in claim 1, wherein the two or more actuators (17L, 17R) include the first actuator (19) that is adapted to be connected to the headlight to effect movement thereof in a vertical direction.

> "In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and fight headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 1 OR) which includes an actuator main body and a motor driver 18 (18L, 18R)." (col. 2, line 65 to col. 3, line 10)

Regarding claim 17: The automatic directional control system defined in claim 1, wherein the two or more actuators (17L, 17R) include an electronically controlled mechanical actuator.

> "In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and fight headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 1 OR) which includes an actuator main body and a motor driver 18 (18L, 18R)." (col. 2, line 65 to col. 3, line 10)

> "The CPU 16 calculates vehicle speed depending on data from sensors 12 and calculates vehicle height depending on data from sensors 14, judges whether the headlamps are switched on or off, and output to motor drivers 18 (18L, 18R) a control signal for driving the motors 10 (10L, 10R) a

> magnitude corresponding to operating pitch angle data. A timer 13 is also connected to the CPU 16." (col. 3, lines 18-24)

Regarding claim 18: The automatic directional control system defined in claim 1, wherein the two or more actuators (17L, 17R) include a step motor.

> "In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and fight headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 1 OR) which includes an actuator main body and a motor driver 18 (18L, 18R)." (col. 2; line 65 to col. 3, line 10)

Regarding claim 19: The automatic directional control system defined in claim 1, wherein the two or more actuators (17L, 17R) include a servo motor.

> "In FIG. 1, reference number 1 (1L, 1R) denotes a pair of left and fight headlamps for an automotive vehicle, the headlights having the same construction. A front lens 4 is mounted in the front opening of a lamp body, so that a lamp space S is provided. In the lamp space S, a parabolic reflector 5 having a bulb 6 as a light source securely inserted therein is supported in such a manner as to be tilted around a horizontal tilt shaft 7 (in FIG. 1, a shaft normal relative to the surface of paper) and the parabolic reflectors 5 are then constructed so as to be tilt adjusted by actuators 17 (17L, 17R), respectively. The actuators 17 (17L, 17R) each comprise a stepping motor 10 (10L, 1 OR) which includes an actuator main body and a motor driver 18 (18L, 18R)." (col. 2, line 65 to col. 3, line 10)
>
> "The CPU 16 calculates vehicle speed depending on data from sensors 12 and calculates vehicle height depending on data from sensors 14, judges whether the headlamps are switched on or off, and output to motor drivers 18 (18L, 18R) a control signal for driving the motors 10 (10L, 10R) a magnitude corresponding to operating pitch angle data. A timer 13 is also connected to the CPU 16." (col. 3, lines 18-24)

Regarding claim 23: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the controller includes a microprocessor (CPU 16).

> "The CPU 16 calculates vehicle speed depending on data from sensors 12 and calculates vehicle height depending on data from sensors 14, judges whether the headlamps are switched on or off, and output to motor drivers 18 (18L, 18R) a control signal for driving the motors 10 (10L, 10R) a magnitude corresponding to operating pitch angle data. A timer 13 is also connected to the CPU 16." (col. 3, lines 18-24)

Regarding claim 24. The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the controller includes a programmable electronic controller (CPU 16).

> The CPU 16 calculates vehicle speed depending on data from sensors 12 and calculates vehicle height depending on data from sensors 14, judges whether the headlamps are switched on or off, and output to motor drivers 18 (18L, 18R) a control signal for driving the motors 10 (10L, 10R) a magnitude corresponding to operating pitch angle data. A timer 13 is also connected to the CPU 16." (col. 3, lines 18-24)

Regarding claim 25: The automatic directional control system defined in claim 1, wherein the automatic directional control system further includes at least one position feedback sensor (20L, 20R) capable of providing a position feedback signal (feedback from 10 to 16) associated with at least one of the two or more actuators (17L, 17R).

Regarding claim 28: The automatic directional control system defined in claim 1, wherein the automatic directional control system further includes memory (Takahashi, 15, Fig. 9).

> "Also, a non-volatile memory 15 (such as an electrically erasable EEPROM, or the like) for storing control programs and data values therein) [sic] and an oscillator 16 used to generate a clock signal are additionally attached to the microcomputer 10." (page 16, lines 5-9)

Regarding claim 29: The automatic directional control system defined in claim 28, wherein the memory includes non-volatile memory (Takahashi, 15, Fig. 9).

> "Also, a non-volatile memory 15 (such as an electrically erasable EEPROM, or the like) for storing control programs and data values therein) [sic] and an oscillator 16 used to generate a clock signal are additionally attached to the microcomputer 10." (page 16, lines 5-9)

Regarding claim 31: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by sensing a front and a rear suspension height of the vehicle.

> "When a two-sensor system is used in which vehicle height sensors are provided on both the front and rear wheels, the vehicle pitch angle is obtained from displacement distances of the vehicle height at the front and rear of the vehicle and a wheel base of the vehicle, or a distance between front and rear axles of the vehicle." (col. 3, lines 48-53)

Regarding claim 32. The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by a pitch sensor.

> "When a two-sensor system is used in which vehicle height sensors are provided on both the front and rear wheels, the vehicle pitch angle is obtained from displacement distances of the vehicle height at the front and rear of the vehicle and a wheel base of the vehicle, or a distance between front and rear axles of the vehicle." (col. 3, lines 48-53)

Regarding claim 33: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the controller is programmed to be responsive to changes in the suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle.

> "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." (col. 4, lines 1-25)

Regarding claim 34: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such

that the controller is programmed to be responsive to changes in the suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle, thereby ignoring frequency changes in the suspension height of the vehicle that are a result of bumps in a road.

> "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." (col. 4, lines 1-25)

Regarding claim 35: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the predetermined minimum threshold amount functions as a filter to minimize undesirable operation of at least one of the two or more actuators.

> "But while the vehicle is running, in order to eliminate disturbance, the CPU 16 is constructed so as to calculate a pitch angle of the vehicle only on condition that the vehicle speed is equal to or higher than a reference value, the acceleration is equal to or lower than a reference value, and this state (in which the vehicle speed is equal to or higher than the reference value and the acceleration is equal to lower than the reference value) continues for a predetermined period of time or longer. For example, when a vehicle is running on a rough road in which disturbance is caused by irregularities on the road surface or the like, the vehicle cannot run at a speed of 30 km/h or higher, and in order to eliminate an abrupt acceleration causing the vehicle posture to be changed, it is proper to limit the acceleration to 0.5 m/s2 or lower. Therefore, an abrupt detection

> of an abnormal value and any influence from the detection of an abnormal value are impeded by permitting calculation of a pitch angle of the vehicle to occur only on condition that the state in which the vehicle speed is equal to or higher than 30 km/h and the acceleration is equal to or lower than 0.5 m/s2 continues for three seconds or longer. In addition, the CPU 16 determines whether the lighting switch is switched on or off, and it outputs a signal to the motor drivers 18 (18L, 18R) to drive the motors 10 (10L, 10R) only when the lighting switch is switched on." (col. 4, lines 1-25)

Regarding claim 36: The automatic directional control system defined in claim 1, wherein said controller (CPU16) is configured to be responsive to said two or more sensor signals (the output of 12 and 14) for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one of the two or more actuators (17L, 17R) from being operated continuously in response to relatively small variations in the sensed conditions (Takahashi teaches the threshold value with respect to vehicle posture prevents the adjustment of the illumination direction when the vehicle makes sudden stops or starts. The threshold value with respect to time may be set in detection of the road gradient, and only when the amount of variations in the detection signal of the vehicle posture exceed a given reference value and such excessive state continues for a time longer than the set threshold time will the illumination direction be adjusted (page 9, line 16 to page 10, line 3)).

Regarding claim 37: The automatic directional control system defined in claim 1, wherein said controller (4) is configured to be responsive to said two or more sensor signals (2 and 3) for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one of the two or more actuators from being operated unduly frequently in response to relatively small variations in the sensed conditions (Takahashi teaches the threshold value with respect to vehicle posture prevents the adjustment of the illumination direction when the vehicle makes sudden stops or starts. The threshold value with respect to time may be set in detection of the road gradient, and only when the amount of variations in the detection signal of the vehicle posture exceed a given reference value and such excessive state continues for a time longer than the set threshold time will the illumination direction be adjusted (page 9, line 16 to page 10, line 3)).

**Issue 26**: The proposed rejection of claims 1, 2, 4-6, 9-13, 17, 18, 20-22, 24, 25, 28, 29, 36-42, 44 and 45 are unpatentable over the combination of Toda and Hussman Under 35 U.S.C. § 103(a) (Request at pages 58-61, and claim chart, pages 273-302).

1/ As noted above, this Office action is based on claims 1-5 under reexamination as amended on 4/27/2012 and newly added claims 6-41 that accompanied the amendment (see MPEP 2221). In the amendment filed 4/27/2012, there are no claims 42, 44 and 45.

2/ The rejection of claims 1, 2, 4-6, 9-13, 17, 18, 20-22, 24, 25, 28, 29, 36-41 as unpatentable over the combination of Toda and Hussman under 35 U.S.C. § 103(a) were proposed by the requester in the request for reexamination, pages 58-61 and claim chart, pages 273-302, is **NOT ADOPTED**.

It is not agreed that consideration of Toda in view of Hussman presented a reasonable rejection with respect to the amended claims 1-41 of the '034 patent. This rejection will not be applied against these claims for the following reason: Particularly, without the additional teachings of Hussman, Toda is not presented in a different light than it was presented in the prosecution history. As indicated above issue 23, Hussman does not specifically include the teachings identified "a controller ... *only when said at least one of the two or more sensor signals changes by more than* ***a predetermined minimum threshold amount to prevent at least one first one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in the sensed conditions***" as having the significance of the reasonable likelihood of prevailing with respect to the amended claim 1.

Since Toda does not clearly suggest "... *only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one first one of two or more actuators from* *being operated continuously or unduly frequently in response to relatively small variations in the sensed conditions"*, and Hussman which is relied upon as the secondary reference for the teaching, does not also clearly demonstrate the details of "*...only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one first one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in the sensed conditions"*. Neither Toda nor Hussman teaches a key element of claim 1.

Hussman only teaches:

"The curve-recognition device K is electrically conductively coupled with the switchover device SE and thereby couples the third filter F3 electrically conductively with the regulator R if a difference signal other than zero is fed to it from the subtractor SU. When no difference signal from the subtractor SU is present, the curve-recognition device K switches the switchover device SE so that the first filter FI is coupled to the regulator R". (col. 3, lines 30-39)

"At the coupling between the switchover device SE and the regulator R, a matching device AE is, here for example, arranged which, upon a switchover by the switchover device SE, adjusts the various nominal values to one another so that discontinuities or jumps in the adjustment and regulation of the illumination range are avoided". (col. 4, lines 6-12)

Therefore, the combination of Toda in view of Hussman do not result the lacking limitation "*... only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one first one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in the* *sensed conditions"* as called for in claim 1. Thus, the rejection based on Toda in view of Hussman for claim 1 is not adopted.

Claims 2, 4-6, 9-13, 17, 18, 20-22, 24, 25, 28, 29, 36-41 depend upon claim 1. Since the proposed rejection for claim 1 was not adopted; therefore, the proposed rejection for dependent claims 2, 4-6, 9-13, 17, 18, 20-22, 24, 25, 28, 29, 36-41 are also not adopted.

**Issue 27**: The proposed rejection of claims 1, 2, 4-6, 9-13, 15-18, 20-22, 24, 25, 28, 29, 33, 35, 37-42, 44 and 45 are unpatentable over the combination of Okuchi et al. and Uchida under 35 U.S.C. § 103(a) (Request at pages 61-63, and claim chart, pages 303-344).

1/ As noted above, this Office action is based on claims 1-5 under reexamination as amended on 4/27/2012 and newly added claims 6-41 that accompanied the amendment (see MPEP 2221). In the amendment filed 4/27/2012, there are no claims 42, 44 and 45.

2/ The rejection of claims 1, 2, 4-6, 8-10, 12-15, 17-19, 23-24, 28-37 are unpatentable over the combination of Okuchi et al. and Uchida under 35 U.S.C. § 103(a) were proposed by the requester in the request for reexamination, pages 61-63, and claim chart, pages 303-344, is **ADOPTED with modifications to the rationale in support thereof**.

Claims 1, 2, 4-6, 8-10, 12-15, 17-19, 23-24, 28-37 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Okuchi et al. and Uchida.

Regarding claim 1: Okuchi discloses an automatic directional control system (Fig. 1) for a vehicle headlight (30L, 30R) comprising:

> "In a vehicle headlight optical axis automatic adjusting system, a pitch angle in the longitudinal direction of a vehicle is calculated from a signal of a height sensor." (Abstract)

two or more sensors (11F, 11R) that are each adapted to generate a signal (output of 11F, 11R) that is representative of at least one of a plurality of sensed conditions of a vehicle, said sensed conditions including at least steering angle and pitch of the vehicle;

> "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20." , (col. 4, line 58 to col. 5, line 8)

a controller (20) that is responsive to said two or more sensor signals (output of 11F, 11R) for generating at least one output signal (output of 20);

and two or more actuators (35L, 35R) each being adapted to be connected to the headlight (30L, 30R) to effect movement thereof in accordance with said at least one output signal (the output signal of 20).

However, Okuchi does not specifically disclose "*only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one first one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in the sensed conditions*" as required in claim 1.

Uchida teaches a vehicle lamp illumination directional control device which detects both the posture and speed of a vehicle and adjusts the illumination direction of a vehicle lamp so that the illumination direction can always be kept in a predetermined direction (page 1, lines 3-7). Uchida discloses that signals to the drive means are over-ridden when acceleration is not above a given threshold, such as when the vehicle is running over a rough road, to prevent excessive adjustment of the illumination direction.

It would have been obvious to one of ordinary skill in the art to have utilized the teachings of Uchida in Okuchi's automatic adjusting system as a mere application of a known technique to a known device ready for improvement to yield predictable results. One of ordinary skill in the art would readily predict that the device would function to detect both the posture and speed of a vehicle and adjusts the illumination direction of a vehicle lamp so that the illumination direction can always be kept in a predetermined direction, and, thus, the combination would function predictably.

Regarding claim 2: The automatic directional control system defined in claim 1, wherein at least one of said two or more sensors (11F, 11R) further generate a signal that is representative of the road speed of the vehicle.

> "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20." (col. 4, line 58 to col. 5, line 8)

> "FIG. 20 is a timing diagram showing a transition state of the rear height value measured by the height sensor 11 according to a change in the vehicle speed [km/h] when the vehicle changes from the state where the vehicle is stopped on a flat place, an acceleration mode, and to a constant speed driving mode". (col. 15, lines 16-21)

Regarding claim 4: The automatic directional control system defined in claim 1, wherein at least one of said two or more sensors (11F, 11R) further generates a signal that is representative of a rate of change of pitch of the vehicle.

> "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided

between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20." (col. 4, line 58 to col. 5, line 8)

"On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle." (col. 6, lines 6 to 14)

Regarding claim 5: The automatic directional control system defined in claim 1, wherein at least one of said two or more sensors (11F, 11R) further generates a signal that is representative of the suspension height of the vehicle.

"Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20." (col. 4, line 58 to col. 5, line 8)

"FIG. 19 is a timing diagram showing a transition state of a displacement [mm] in each of the rear height value measured by the height sensor 11 according to a change in the vehicle speed [km], a measured front height based on the measured rear height, and a measured front height for comparison. The vehicle speed changes in accordance with the order of a state where the vehicle is stopped riding on a block or the like, acceleration, constant speed driving, deceleration, and a state where the vehicle is stopped on a flat place.

In FIG. 19, in the initial vehicle stop mode, a state where the rear suspension contracts when the vehicle is stopped riding on a block or the like is sensed and the measured rear height is obtained. After that, the front height value is calculated based on the displacement in the measured rear height, so that the measured front height includes an error and is largely deviated from the actual measured front height. An error accordingly occurs in calculation of the pitch angle of the vehicle body. When the optical axis direction of the headlight 30 is adjusted based on the pitch angle, the direction is deviated from a proper angle and glare may be given to an oncoming vehicle or the like." (col. 14, line 61 to col. 15, line 3)

Regarding claim 6: The automatic directional control system defined in claim 1, wherein said two or more sensors include a first sensor (11F) and a second sensor (11R).

Regarding claim 8: The automatic directional control system defined in claim 6, wherein said first sensor (11F) is physically separate from said second sensor (11R).

Regarding claim 9: The automatic directional control system defined in claim 1, further comprising one or more additional sensors (12, 13, 14) for sensing one or more of a rate of change of road speed of the vehicle, a rate of change of steering angle of the vehicle, a rate of change of pitch of the vehicle, a suspension height, or a rate of change of suspension height of the vehicle.

'The various sensor signals from the wheel speed sensor 12 and the like are used for determining the mode of the vehicle, such as stop mode, acceleration mode, deceleration mode, and constant speed mode" (col. 5, lines 20-23).

"The various sensor signals from the vehicle speed sensor 12, the right-wheel speed sensor 13, the left-wheel speed sensor 14, and the like are used to determine a driving mode of the vehicle such as stop mode, acceleration or deceleration mode, and constant speed driving (stable driving) mode, and to determine whether the vehicle is in a tuning state or not." (col. 15, lines 49-55)

Regarding claim 10: The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors (12, 13, 14, Fig. 18) generate a signal that is representative of the rate of change of road speed of the vehicle.

> 'The various sensor signals from the wheel speed sensor 12 and the like are used for determining the mode of the vehicle, such as stop mode, acceleration mode, deceleration mode, and constant speed mode" (col. 5, lines 20-23).
>
> "The various sensor signals from the vehicle speed sensor 12, the right-wheel speed sensor 13, the left-wheel speed sensor 14, and the like are used to determine a driving mode of the vehicle such as stop mode, acceleration or deceleration mode, and constant speed driving (stable driving) mode, and to determine whether the vehicle is in a tuning state or not." (col. 15, lines 49-55)

Regarding claim 12: The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors (12, 13, 14) generate a signal that is representative of the rate of change of pitch of the vehicle.

> 'The various sensor signals from the wheel speed sensor 12 and the like are used for determining the mode of the vehicle, such as stop mode, acceleration mode, deceleration mode, and constant speed mode" (col. 5, lines 20-23).
>
> "The various sensor signals from the vehicle speed sensor 12, the right-wheel speed sensor 13, the left-wheel speed sensor 14, and the like are used to determine a driving mode of the vehicle such as stop mode, acceleration or deceleration mode, and constant speed driving (stable driving) mode, and to determine whether the vehicle is in a tuning state or not." (col. 15, lines 49-55)

Regarding claim 13: The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors (12, 13, 14) generate a signal that is representative of a suspension height of the vehicle.

'The various sensor signals from the wheel speed sensor 12 and the like are used for determining the mode of the vehicle, such as stop mode, acceleration mode, deceleration mode, and constant speed mode" (col. 5, lines 20-23).

"The various sensor signals from the vehicle speed sensor 12, the right-wheel speed sensor 13, the left-wheel speed sensor 14, and the like are used to determine a driving mode of the vehicle such as stop mode, acceleration or deceleration mode, and constant speed driving (stable driving) mode, and to determine whether the vehicle is in a tuning state or not." (col. 15, lines 49-55)

Regarding claim 14: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured to include the first actuator (35L) connected to the headlight to effect movement thereof in a first direction and a second actuator (35R) connected to the headlight to effect movement thereof in a second direction different form the first direction.

Regarding claim 15: The automatic directional control system defined in claim 1, wherein the two or more actuators (35L, 35R) include the first actuator (35L) that is adapted to be connected to the headlight to effect movement thereof in a vertical direction.

"As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a
DC motor for driving the movable member 34 in the directions shown by the double-headed arrow.
The movable member 34 is driven in the back and forth directions by the actuator 35L (35R) so that the reflector 32 is vertically inclined about the end of the supporting member 33 as a fulcrum only by an actuator driving angle (target optical axis direction adjusting angle) ϑa which will be described hereinlater, thereby adjusting the optical axis direction of the headlight 30L (30R). The optical axis direction of the headlight 30L (30R) is initially set on the assumption that one driver is on the vehicle." ( col. 5, lines 24-40)

Regarding claim 17: The automatic directional control system defined in claim 1, wherein the two or more actuators (35L, 35R) include an electronically controlled mechanical actuator.

> "The ECU 20 is a logical operating circuit comprising a CPU 21 as a known central processing unit, a ROM 22 in which control programs are stored, a RAM 23 for storing various data, a B/U (back-up) RAM 24, an input/output circuit 25, and a bus line 26 connecting these elements." (col. 5, lines 11 to 15)
>
> "As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a DC motor for driving the movable member 34 in the directions shown by the double-headed arrow." (col. 5, lines 24 to 33)

Regarding claim 18: The automatic directional control system defined in claim 1, wherein the two or more actuators (35L, 35R) include a step motor.

> "The ECU 20 is a logical operating circuit comprising a CPU 21 as a known central processing unit, a ROM 22 in which control programs are stored, a RAM 23 for storing various data, a B/U (back-up) RAM 24, an input/output circuit 25, and a bus line 26 connecting these elements." (col. 5, lines 11 to 15)
>
> "As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a DC motor for driving the movable member 34 in the directions shown by the double-headed arrow." (col. 5, lines 24 to 33)

Regarding claim 19: The automatic directional control system defined in claim 1, wherein the two or more actuators (35L, 35R) include a servo motor.

> " "The ECU 20 is a logical operating circuit comprising a CPU 21 as a known central processing unit, a ROM 22 in which control programs are stored, a RAM 23 for storing various data, a B/U (back-up) RAM 24, an input/output circuit 25, and a bus line 26 connecting these elements." (col. 5, lines 11-15)

> "As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a DC motor for driving the movable member 34 in the directions shown by the double-headed arrow." (col. 5, lines 24-33)

Regarding claim 23: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the controller (20) includes a microprocessor (CPU 21).

> "The ECU 20 is a logical operating circuit comprising a CPU 21 as a known central processing unit, a ROM 22 in which control programs are stored, a RAM 23 for storing various data, a B/U (back-up) RAM 24, an input/output circuit 25, and a bus line 26 connecting these elements." (col. 5, lines 11 – 15)

Regarding claim 24. The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the controller (20) includes a programmable electronic controller.

> "The ECU 20 is a logical operating circuit comprising a CPU 21 as a known central processing unit, a ROM 22 in which control programs are stored, a RAM 23 for storing various data, a B/U (back-up) RAM 24, an input/output circuit 25, and a bus line 26 connecting these elements." (col. 5, lines 11 – 15)

Regarding claim 28: The automatic directional control system defined in claim 1, wherein the automatic directional control system (20) further includes memory (EEPROM 29, Fig. 8).

"In this embodiment, as shown by a dotted line in FIG. 8, a non-volatile rewritable memory such as an EEPROM 29 is provided as a storing medium in which the system error ' information is stored in advance and the EEPROM 29 is housed in the ECU 20. The EEPROM 29 may be externally connected to the ECU 20." (col. 12, lines 12-18)

Regarding claim 29: The automatic directional control system defined in claim 28, wherein the memory includes non-volatile memory (EEPROM 29, Fig. 8).

"In this embodiment, as shown by a dotted line in FIG. 8, a non-volatile rewritable memory such as an EEPROM 29 is provided as a storing medium in which the system error ' information is stored in advance and the EEPROM 29 is housed in the ECU 20. The EEPROM 29 may be externally connected to the ECU 20." (col. 12, lines 12-18)

Regarding claim 30: The automatic directional control system defined in claim 28, wherein the memory (EEPROM 29, Fig. 8) is configured to store predetermined reference position associated with the headlight.

"In this embodiment, as shown by a dotted line in FIG. 8, a non-volatile rewritable memory such as an EEPROM 29 is provided as a storing medium in which the system error ' information is stored in advance and the EEPROM 29 is housed in the ECU 20. The EEPROM 29 may be externally connected to the ECU 20. The system error information denotes factors exerting influence on the calculation of the inclination angle, such as an installation error of the vehicle 0 height sensor 11 to the vehicle, an error of spring constants of the front and rear suspensions, a weight error due to variation in the specifications of the vehicle, a positional error of the center of. gravity, and the like. The control routine shown in FIG. 14 is repeatedly executed every 5 predetermined time by the CPU 21." (col. 12, lines 12-26)

Regarding claim 31: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such

that the pitch of the vehicle is capable of being determined by sensing a front and a rear suspension height of the vehicle.

> "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20." (col. 4, line 58 to col. 5, line 8)

Regarding claim 32. The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by a pitch sensor.

> "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20." (col. 4, line 58 to col. 5, line 8)

> In the diagram of FIG. 3, the filter A corresponding to the stop mode is used when the vehicle speed V is lower than a few km/h (for example, 2 [kin/hi). When the vehicle is stopped, a large change in the pitch angle due to loading, unloading, or the like is expected. No filtering or very weak filtering is therefore performed so that the actuator is 5 allowed to respond quickly to the change in the pitch angle.
> On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [kin/hi) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as -,-2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak

filtering is performed so that the actuator is allowed to respond quickly to the chance in the pitch angle." (col. 5, line 66- col. 6, line 14)

Regarding claim 33: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the controller (20) is programmed to be responsive to changes in the suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle.

"When the vehicle speed V is equal to or higher than a few km/h (such as 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong filtering is performed so as to remove high frequency components of a vibration at the time of driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding." (col. 6, lines 29-38)

"In the diagram of FIG. 3, the filter A corresponding to the stop mode is used when the vehicle speed V is lower than a few km/h (for example, 2 [kin/hi). When the vehicle is stopped, a large change in the pitch angle due to loading, unloading, or the like is expected. No filtering or very weak filtering is therefore performed so that the actuator is 5 allowed to respond quickly to the change in the pitch angle.
On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [kin/hi) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as -,-2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle." (col. 5, line 66- col. 6, line 14)

Regarding claim 34: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the controller (20) is programmed to be responsive to changes in the suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle, thereby ignoring frequency changes in the suspension height of the vehicle that are a result of bumps in a road.

> "When the vehicle speed V is equal to or higher than a few km/h (such as 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong filtering is performed so as to remove high frequency components of a vibration at the time of driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding." (col. 6, lines 29-38)

> "In the diagram of FIG. 3, the filter A corresponding to the stop mode is used when the vehicle speed V is lower than a few km/h (for example, 2 [kin/hi). When the vehicle is stopped, a large change in the pitch angle due to loading, unloading, or the like is expected. No filtering or very weak filtering is therefore performed so that the actuator is 5 allowed to respond quickly to the change in the pitch angle.
> On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [kin/hi) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as -,-2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle." (col. 5, line 66- col. 6, line 14)

Regarding claim 35: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the predetermined minimum threshold amount functions as a filter to minimize undesirable operation of at least one of the two or more actuators.

> "When the vehicle speed V is equal to or higher than a few km/h (such as 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong filtering is performed so as to remove high frequency components of a vibration at the time of driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding." (col. 6, lines 29-38)

Regarding claim 36: The automatic directional control system defined in claim 1, wherein said controller (20) is configured to be responsive to said two or more sensor signals (11F, 11R ) for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one of the two or more actuators (35L, 35R) from being operated continuously in response to relatively small variations in the sensed conditions (Uchida teaches adjusting the illumination direction of a vehicle lamp so that the illumination direction can always be kept in a predetermined direction (page 1, lines 3-7) and the signals to the drive means are over-ridden when acceleration is not above a given threshold, such as when the vehicle is running over a rough road, to prevent excessive adjustment of the illumination direction).

Regarding claim 37: The automatic directional control system defined in claim 1, wherein said controller (20) is configured to be responsive to said two or more sensor signals (11F, 11R) for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one of the two or more actuators from being operated unduly frequently in response to relatively small variations in the sensed conditions (Uchida teaches adjusting the illumination direction of a vehicle lamp so that the illumination direction can always be kept in a predetermined direction (page 1, lines 3-7) and the signals to the drive means are over-ridden when acceleration is not above a given threshold, such as when the vehicle is running over a rough road, to prevent excessive adjustment of the illumination direction).

**Issue 28**: The proposed rejection of claims 1, 2, 4-6, 9-13, 15-18, 20-22, 24, 25, 28, 29, 33-35, 37-42, 44 and 45 are unpatentable over the combination of Okuchi et al. and Takahashi under 35 U.S.C. § 103(a) (Request at pages 63-66, and claim chart, pages 345-387).

1/ As noted above, this Office action is based on claims 1-5 under reexamination as amended on 4/27/2012 and newly added claims 6-41 that accompanied the amendment (see MPEP 2221). In the amendment filed 4/27/2012, there are no claims 42, 44 and 45.

2/ The rejection of claims 1, 2, 4-6, 8-10, 12-15, 17-19, 23-24, 28-37 are unpatentable over the combination of Okuchi et al. and Takahashi under 35 U.S.C. § 103(a) were proposed by the requester in the request for reexamination, pages 63-66, and claim chart, pages 345-387, is **ADOPTED with modifications to the rationale in support thereof**.

Claims 1, 2, 4-6, 8-10, 12-15, 17-19, 23-24, 28-37 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Okuchi et al. and Takahashi.

Regarding claim 1: Okuchi discloses an automatic directional control system (Fig. 1) for a vehicle headlight (30L, 30R) comprising:

"In a vehicle headlight optical axis automatic adjusting system, a pitch angle in the longitudinal direction of a vehicle is calculated from a signal of a height sensor." (Abstract)

two or more sensors (11F, 11R) that are each adapted to generate a signal (output of 11F, 11R) that is representative of at least one of a plurality of sensed conditions of a vehicle, said sensed conditions including at least steering angle and pitch of the vehicle;

"Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20." , (col. 4, line 58 to col. 5, line 8)

a controller (20) that is responsive to said two or more sensor signals (output of 11F, 11R) for generating at least one output signal (output of 20);

and two or more_actuators (35L, 35R) each being adapted to be connected to the headlight (30L, 30R) to effect movement thereof in accordance with said at least one output signal (the output signal of 20).

However, Okuchi does not specifically disclose "*only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one first one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in the sensed conditions*" as required in claim 1.

Takahashi teaches a threshold value with respect to vehicle posture prevents the adjustment of the illumination direction when the vehicle makes sudden stops or starts. A threshold value with respect to time may be set in detection of the road gradient, and only when the amount of variations in the detection signal of the vehicle posture exceed a given reference value and such excessive state continues for a time longer than the set threshold time will the illumination direction be adjusted (page 9, line 16 to page 10, line 3).

It would have been obvious to one of ordinary skill in the art to have utilized the teachings of Takahashi in Okuchi's automatic adjusting system as a mere application of a known technique to a known device ready for improvement to yield predictable results. One of ordinary skill in the art would readily predict that the device would function to prevent the adjustment of the illumination direction when the vehicle makes sudden stops or starts, and, thus, the combination would function predictably.

Regarding claim 2: The automatic directional control system defined in claim 1, wherein at least one of said two or more sensors (11F, 11R) further generate a signal that is representative of the road speed of the vehicle.

> "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20." (col. 4, line 58 to col. 5, line 8)
>
> "FIG. 20 is a timing diagram showing a transition state of the rear height value measured by the height sensor 11 according to a change in the vehicle speed [km/h] when the vehicle changes from the state where the vehicle is stopped on a flat place, an acceleration mode, and to a constant speed driving mode". (col. 15, lines 16-21)

Regarding claim 4: The automatic directional control system defined in claim 1, wherein at least one of said two or more sensors (11F, 11R) further generates a signal that is representative of a rate of change of pitch of the vehicle.

> "Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided

between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20." (col. 4, line 58 to col. 5, line 8)

"On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as +/- 2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle." (col. 6, lines 6 to 14)

Regarding claim 5: The automatic directional control system defined in claim 1, wherein at least one of said two or more sensors (11F, 11R) further generates a signal that is representative of the suspension height of the vehicle.

"Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20." (col. 4, line 58 to col. 5, line 8)

"FIG. 19 is a timing diagram showing a transition state of a displacement [mm] in each of the rear height value measured by the height sensor 11 according to a change in the vehicle speed [km], a measured front height based on the measured rear height, and a measured front height for comparison. The vehicle speed changes in accordance with the order of a state where the vehicle is stopped riding on a block or the like, acceleration, constant speed driving, deceleration, and a state where the vehicle is stopped on a flat place.

In FIG. 19, in the initial vehicle stop mode, a state where the rear suspension contracts when the vehicle is stopped riding on a block or the like is sensed and the measured rear height is obtained. After that, the front height value is calculated based on the displacement in the measured rear height, so that the measured front height includes an error and is largely deviated

> from the actual measured front height. An error accordingly occurs in calculation of the pitch angle of the vehicle body. When the optical axis direction of the headlight 30 is adjusted based on the pitch angle, the direction is deviated from a proper angle and glare may be given to an oncoming vehicle or the like." (col. 14, line 61 to col. 15, line 3)

Regarding claim 6: The automatic directional control system defined in claim 1, wherein said two or more sensors include a first sensor (11F) and a second sensor (11R).

Regarding claim 8: The automatic directional control system defined in claim 6, wherein said first sensor (11F) is physically separate from said second sensor (11R).

Regarding claim 9: The automatic directional control system defined in claim 1, further comprising one or more additional sensors (12, 13, 14) for sensing one or more of a rate of change of road speed of the vehicle, a rate of change of steering angle of the vehicle, a rate of change of pitch of the vehicle, a suspension height, or a rate of change of suspension height of the vehicle.

> 'The various sensor signals from the wheel speed sensor 12 and the like are used for determining the mode of the vehicle, such as stop mode, acceleration mode, deceleration mode, and constant speed mode" (col. 5, lines 20-23).

> "The various sensor signals from the vehicle speed sensor 12, the right-wheel speed sensor 13, the left-wheel speed sensor 14, and the like are used to determine a driving mode of the vehicle such as stop mode, acceleration or deceleration mode, and constant speed driving (stable driving) mode, and to determine whether the vehicle is in a tuning state or not." (col. 15, lines 49-55)

Regarding claim 10: The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors (12, 13, 14, Fig. 18) generate a signal that is representative of the rate of change of road speed of the vehicle.

> 'The various sensor signals from the wheel speed sensor 12 and the like are used for determining the mode of the vehicle, such as stop mode, acceleration mode, deceleration mode, and constant speed mode" (col. 5, lines 20-23).
>
> "The various sensor signals from the vehicle speed sensor 12, the right-wheel speed sensor 13, the left-wheel speed sensor 14, and the like are used to determine a driving mode of the vehicle such as stop mode, acceleration or deceleration mode, and constant speed driving (stable driving) mode, and to determine whether the vehicle is in a tuning state or not." (col. 15, lines 49-55)

Regarding claim 12: The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors (12, 13, 14) generate a signal that is representative of the rate of change of pitch of the vehicle.

> 'The various sensor signals from the wheel speed sensor 12 and the like are used for determining the mode of the vehicle, such as stop mode, acceleration mode, deceleration mode, and constant speed mode" (col. 5, lines 20-23).
>
> "The various sensor signals from the vehicle speed sensor 12, the right-wheel speed sensor 13, the left-wheel speed sensor 14, and the like are used to determine a driving mode of the vehicle such as stop mode, acceleration or deceleration mode, and constant speed driving (stable driving) mode, and to determine whether the vehicle is in a tuning state or not." (col. 15, lines 49-55)

Regarding claim 13: The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors (12, 13, 14) generate a signal that is representative of a suspension height of the vehicle.

'The various sensor signals from the wheel speed sensor 12 and the like are used for determining the mode of the vehicle, such as stop mode, acceleration mode, deceleration mode, and constant speed mode" (col. 5, lines 20-23).

"The various sensor signals from the vehicle speed sensor 12, the right-wheel speed sensor 13, the left-wheel speed sensor 14, and the like are used to determine a driving mode of the vehicle such as stop mode, acceleration or deceleration mode, and constant speed driving (stable driving) mode, and to determine whether the vehicle is in a tuning state or not." (col. 15, lines 49-55)

Regarding claim 14: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured to include the first actuator (35L) connected to the headlight to effect movement thereof in a first direction and a second actuator (35R) connected to the headlight to effect movement thereof in a second direction different form the first direction.

Regarding claim 15: The automatic directional control system defined in claim 1, wherein the two or more actuators (35L, 35R) include the first actuator (35L) that is adapted to be connected to the headlight to effect movement thereof in a vertical direction.

"As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a
DC motor for driving the movable member 34 in the directions shown by the double-headed arrow.
The movable member 34 is driven in the back and forth directions by the actuator 35L (35R) so that the reflector 32 is vertically inclined about the end of the supporting member 33 as a fulcrum only by an actuator driving angle (target optical axis direction adjusting angle) θa which will be described hereinlater, thereby adjusting the optical axis direction of the headlight 30L (30R). The optical axis direction of the headlight 30L (30R) is initially set on the assumption that one driver is on the vehicle." ( col. 5, lines 24-40)

Regarding claim 17: The automatic directional control system defined in claim 1, wherein the two or more actuators (35L, 35R) include an electronically controlled mechanical actuator.

> "The ECU 20 is a logical operating circuit comprising a CPU 21 as a known central processing unit, a ROM 22 in which control programs are stored, a RAM 23 for storing various data, a B/U (back-up) RAM 24, an input/output circuit 25, and a bus line 26 connecting these elements." (col. 5, lines 11 to 15)
>
> "As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a DC motor for driving the movable member 34 in the directions shown by the double-headed arrow." (col. 5, lines 24 to 33)

Regarding claim 18: The automatic directional control system defined in claim 1, wherein the two or more actuators (35L, 35R) include a step motor.

> "The ECU 20 is a logical operating circuit comprising a CPU 21 as a known central processing unit, a ROM 22 in which control programs are stored, a RAM 23 for storing various data, a B/U (back-up) RAM 24, an input/output circuit 25, and a bus line 26 connecting these elements." (col. 5, lines 11 to 15)
>
> "As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a DC motor for driving the movable member 34 in the directions shown by the double-headed arrow." (col. 5, lines 24 to 33)

Regarding claim 19: The automatic directional control system defined in claim 1, wherein the two or more actuators (35L, 35R) include a servo motor.

> " "The ECU 20 is a logical operating circuit comprising a CPU 21 as a known central processing unit, a ROM 22 in which control programs are stored, a RAM 23 for storing various data, a B/U (back-up) RAM 24, an input/output circuit 25, and a bus line 26 connecting these elements." (col. 5, lines 11 to 15)

> "As shown in FIG. 2, the headlight 30L (30R) includes a lamp 31, a reflector 32 for fixing the lamp 31, a supporting member 33 of a rod shape for supporting the reflector 32 swingably in the directions shown by the arc arrow, a movable member 34 having also a rod shape, for supporting the reflector 32, and the actuator 35L (35R) such as a stepping motor or a DC motor for driving the movable member 34 in the directions shown by the double-headed arrow." (col. 5, lines 24 to 33)

Regarding claim 23: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the controller (20) includes a microprocessor (CPU 21).

> "The ECU 20 is a logical operating circuit comprising a CPU 21 as a known central processing unit, a ROM 22 in which control programs are stored, a RAM 23 for storing various data, a B/U (back-up) RAM 24, an input/output circuit 25, and a bus line 26 connecting these elements." (col. 5, lines 11 – 15)

Regarding claim 24. The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the controller (20) includes a programmable electronic controller (21-24).

> "The ECU 20 is a logical operating circuit comprising a CPU 21 as a known central processing unit, a ROM 22 in which control programs are stored, a RAM 23 for storing various data, a B/U (back-up) RAM 24, an input/output circuit 25, and a bus line 26 connecting these elements." (col. 5, lines 11 – 15)

Regarding claim 28: The automatic directional control system defined in claim 1, wherein the automatic directional control system (20) further includes memory (EEPROM 29, Fig. 8).

> "In this embodiment, as shown by a dotted line in FIG. 8, a non-volatile rewritable memory such as an EEPROM 29 is provided as a storing medium in which the system error ' information is stored in advance and the EEPROM 29 is housed in the ECU 20. The EEPROM 29 may be externally connected to the ECU 20." (col. 12, lines 12-18)

Regarding claim 29: The automatic directional control system defined in claim 28, wherein the memory includes non-volatile memory (EEPROM 29, Fig. 8).

> "In this embodiment, as shown by a dotted line in FIG. 8, a non-volatile rewritable memory such as an EEPROM 29 is provided as a storing medium in which the system error ' information is stored in advance and the EEPROM 29 is housed in the ECU 20. The EEPROM 29 may be externally connected to the ECU 20." (col. 12, lines 12-18)

Regarding claim 30: The automatic directional control system defined in claim 28, wherein the memory (EEPROM 29, Fig. 8) is configured to store predetermined reference position associated with the headlight.

> "In this embodiment, as shown by a dotted line in FIG. 8, a non-volatile rewritable memory such as an EEPROM 29 is provided as a storing medium in which the system error ' information is stored in advance and the EEPROM 29 is housed in the ECU 20. The EEPROM 29 may be externally connected to the ECU 20. The system error information denotes factors exerting influence on the calculation of the inclination angle, such as an installation error of the vehicle height sensor 11 to the vehicle, an error of spring constants of the front and rear suspensions, a weight error due to variation in the specifications of the vehicle, a positional error of the center of gravity, and the like. The control routine shown in FIG. 14 is repeatedly executed every predetermined time by the CPU 21." (col. 12, lines 12-26)

Regarding claim 31: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such

that the pitch of the vehicle is capable of being determined by sensing a front and a rear suspension height of the vehicle.

"Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20." (col. 4, line 58 to col. 5, line 8)

Regarding claim 32. The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by a pitch sensor.

"Referring first to Fig. 1, a front (front-wheel) height sensor 11F is attached to a front suspension provided between a front axle and a vehicle chassis on a driver's seat side or a front passenger seat side. A rear (rear-wheel) height sensor 11R is attached to a rear suspension provided between the rear axle and the vehicle chassis on the driver's seat side or the rear passenger seat side. A front height value (a displacement of the vehicle height on the front wheel side) HF and a rear height value (a displacement of the vehicle height on the rear wheel side) HR as relative displacements (displacements of the vehicle height) between the respective axles on the front and rear wheel sides and the vehicle chassis supplied from the height sensors 11F and 11R, and various sensor signals of wheel speed pulses and the like from a wheel speed sensor 12 which is mounted as a vehicle speed sensor on the vehicle side and is used for known TRC and ABS controls and the like are supplied to an ECU (Electronic Control Unit) 20." (col. 4, line 58 to col. 5, line 8)

In the diagram of FIG. 3, the filter A corresponding to the stop mode is used when the vehicle speed V is lower than a few km/h (for example, 2 [kin/hi). When the vehicle is stopped, a large change in the pitch angle due to loading, unloading, or the like is expected. No filtering or very weak filtering is therefore performed so that the actuator is 5 allowed to respond quickly to the change in the pitch angle.
On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [kin/hi) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as -,-2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak

> filtering is performed so that the actuator is allowed to respond quickly to the chance in the pitch angle." (col. 5, line 66- col. 6, line 14)

Regarding claim 33: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the controller (20) is programmed to be responsive to changes in the suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle..

> "When the vehicle speed V is equal to or higher than a few km/h (such as 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong filtering is performed so as to remove high frequency components of a vibration at the time of driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding." (col. 6, lines 29-38)

> "In the diagram of FIG. 3, the filter A corresponding to the stop mode is used when the vehicle speed V is lower than a few km/h (for example, 2 [kin/hi). When the vehicle is stopped, a large change in the pitch angle due to loading, unloading, or the like is expected. No filtering or very weak filtering is therefore performed so that the actuator is 5 allowed to respond quickly to the change in the pitch angle.
> On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [kin/hi) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as -,-2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle." (col. 5, line 66- col. 6, line 14)

Regarding claim 34: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the controller (20) is programmed to be responsive to changes in the suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle, thereby ignoring frequency changes in the suspension height of the vehicle that are a result of bumps in a road.

> "When the vehicle speed V is equal to or higher than a few km/h (such as 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong filtering is performed so as to remove high frequency components of a vibration at the time of driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding." (col. 6, lines 29-38)

> "In the diagram of FIG. 3, the filter A corresponding to the stop mode is used when the vehicle speed V is lower than a few km/h (for example, 2 [kin/hi). When the vehicle is stopped, a large change in the pitch angle due to loading, unloading, or the like is expected. No filtering or very weak filtering is therefore performed so that the actuator is 5 allowed to respond quickly to the change in the pitch angle.
> On the other hand, when the vehicle speed v is equal to or larger than a few km/h (for example, 2 [kin/hi) and the acceleration dV/dt obtained by differentiating the vehicle speed V exceeds a preset threshold (such as -,-2 [m/s2]), the filter B corresponding to the acceleration mode or the deceleration mode is used. Since the change in the pitch angle is large, no filtering or very weak filtering is performed so that the actuator is allowed to respond quickly to the change in the pitch angle." (col. 5, line 66- col. 6, line 14)

Regarding claim 35: The automatic directional control system defined in claim 1, wherein the automatic directional control system is configured such that the predetermined minimum threshold amount functions as a filter to minimize undesirable operation of at least one of the two or more actuators.

> "When the vehicle speed V is equal to or higher than a few km/h (such as 2 [km/h]) and the acceleration dV/dt obtained by differentiating the vehicle speed V is lower than the preset threshold (for example, +/- 2 [m/s2 ]), the filter C corresponding to the constant speed mode is used. Since it is generally expected that the pitch angle does not largely change, strong filtering is performed so as to remove high frequency components of a vibration at the time of driving and the change in the pitch angle due to unevenness of the road surface, thereby preventing the actuator from responding." (col. 6, lines 29-38)

Regarding claim 36: The automatic directional control system defined in claim 1, wherein said controller (20) is configured to be responsive to said two or more sensor signals (11F, 11R ) for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one of the two or more actuators (35L, 35R) from being operated continuously in response to relatively small variations in the sensed conditions (Takahashi teaches the threshold value with respect to time may be set in detection of the road gradient, and only when the amount of variations in the detection signal of the vehicle posture exceed a given reference value and such excessive state continues for a time longer than the set threshold time will the illumination direction be adjusted (page 9, line 16 to page 10, line 3)).

Regarding claim 37: The automatic directional control system defined in claim 1, wherein said controller (20) is configured to be responsive to said two or more sensor signals (11F, 11R) for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one of the two or more actuators from being operated unduly frequently in response to relatively small variations in the sensed conditions (Takahashi teaches the threshold value with respect to time may be set in detection of the road gradient, and only when the amount of variations in the detection signal of the vehicle posture exceed a given reference value and such excessive state continues for a time longer than the set threshold time will the illumination direction be adjusted (page 9, line 16 to page 10, line 3)).

**Issue 29**: The proposed rejection of claims 1, 2, 4-6, 9-13, 15-18, 20-22, 25, 28, 29, 33, 35, 37-42, 44 and 45 are unpatentable over the combination of Okuchi et al. and Hussman under 35 U.S.C. § 103(a) (Request at pages 66-69, and claim chart, pages 388-425).

1/ As noted above, this Office action is based on claims 1-5 under reexamination as amended on 4/27/2012 and newly added claims 6-41 that accompanied the amendment (see MPEP 2221). In the amendment filed 4/27/2012, there are no claims 42, 44 and 45.

2/ The rejection of claims 1, 2, 4-6, 9-13, 15-18, 20-22, 25, 28, 29, 33, 35, 37-42, 44 and 45 are unpatentable over the combination of Okuchi et al. and Hussman under 35 U.S.C. § 103(a) were proposed by the requester in the request for reexamination, pages 66-69, and claim chart, pages 388-425, is **NOT ADOPTED**.

It is not agreed that consideration of Okuchi in view of Hussman presented a reasonable rejection with respect to the amended claims 1-41 of the '034 patent. This rejection will not be applied against these claims for the following reason: Particularly, without the additional teachings of Hussman, Okuchi is not presented in a different light than it was presented in the prosecution history. As indicated above issue 23, Hussman does not specifically include the teachings identified "a controller ... *only when said at least one of the two or more sensor signals changes by more than* ***a predetermined minimum threshold amount to prevent at least one first one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in the sensed conditions***" as having the significance limitation with respect to the amended claim 1.

Since Okuchi does not clearly suggest "... *only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one first one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in the sensed conditions*", and Hussman which is relied upon as the secondary reference for the teaching, does not also clearly demonstrate the details of "...*only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one first one of two or more actuators from being operated continuously or* *unduly frequently in response to relatively small variations in the sensed conditions".* Neither Okuchi nor Hussman teaches a key element of claim 1.

Hussman only teaches:

> "The curve-recognition device K is electrically conductively coupled with the switchover device SE and thereby couples the third filter F3 electrically conductively with the regulator R if a difference signal other than zero is fed to it from the subtractor SU. When no difference signal from the subtractor SU is present, the curve-recognition device K switches the switchover device SE so that the first filter FI is coupled to the regulator R". (col. 3, lines 30-39)

> "At the coupling between the switchover device SE and the regulator R, a matching device AE is, here for example, arranged which, upon a switchover by the switchover device SE, adjusts the various nominal values to one another so that discontinuities or jumps in the adjustment and regulation of the illumination range are avoided". (col. 4, lines 6-12)

Therefore, the combination of Okuchi in view of Hussman do not result the lacking limitation "*... only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one first one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in the sensed conditions"* as called for in claim 1. Thus, the rejection based on Okuchi in view of Hussman for claim 1 is not adopted.

Claims 2, 4-6, 9-13, 15-18, 20-22, 25, 28, 29, 33-35, 37-41 depend upon claim 1. Since the proposed rejection for claim 1 was not adopted; therefore, the proposed rejection for dependent claims 2, 4-6, 9-13, 15-18, 20-22, 25, 28, 33-35, 37-41 are also not adopted.

**Issue 30**: The proposed rejection of claims 1-13, 20, 22, 24-26, 28, 29, 37, 38 and 41-45 are unpatentable over the combination of Gotoh and Uchida under 35 U.S.C. § 103(a) (Request at pages 69-71 and claim chart, pages 426-460).

1/ As noted above, this Office action is based on claims 1-5 under reexamination as amended on 4/27/2012 and newly added claims 6-41 that accompanied the amendment (see MPEP 2221). In the amendment filed 4/27/2012, there are no claims 42-45.

2/ The rejection of claims 1-13, 20, 22, 24-26, 28, 29, 37, 38 and 41 as unpatentable over the combination of Gotoh and Uchida under 35 U.S.C. § 103(a) were proposed by the requester in the request for reexamination, pages 69-71 and claim chart, pages 426-460, is **NOT ADOPTED**.

This rejection will not be applied against these claims for the following reason:

Independent claim 1 now required:

"two or more sensors that are each adapted to generate a signal that is representative of at least one of a plurality of sensed conditions of a vehicle, said sensed conditions including at least steering angle and pitch of the vehicle;

a controller that is responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than

> a predetermined minimum threshold amount to prevent at least one first one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in the sensed conditions; and
>
> said two or more actuators each being adapted to be connected to the headlight to effect movement thereof in accordance with said at least one output signal".

Gotoh only seen disclosed in Fig. 3 two or more sensors (21, 22, 23) and a controller (ECU 10). However, there are no actuators disclosed in Gotoh. And while Uchida does teach in Fig. 1 two or more sensors (i.e, 2, 7), a controller (3) and actuator (4). However, claim 1 now required **"two or more actuators"**. Uchida Fig. 1 only shows one actuator (4) connected to the headlight (5) to effect movement thereof in accordance with the output signal (the output of 3a, 3b). Thus, the proposed rejection of claim 1 fails to persuasively show any teaching of Gotoh in view of Uchida corresponding to the feature of "***two or more actuators* that each being adapted to be connected to the headlight** *to effect movement thereof in accordance with said at least one output signal*" of claim 1. The references put forth in the request, Gotoh and Uchida, are not seen to teach the amendatory subject matter of independent claim 1.

Claims 2-13, 20, 22, 24-26, 28, 29, 37, 38, 41 depend upon claim 1. Since the proposed rejection for claim 1 was not adopted; therefore, the proposed rejection for dependent claims 2-13, 20, 22, 24-26, 28, 29, 37, 38, 41 are also not adopted.

**Issue 31**: The proposed rejection of claims 1-12, 14, 16-18, 20-22, 24-26, 28, 29, 33, 34, 37, 38 and 41-45 are unpatentable over the combination of Gotoh and Takahashi under 35 U.S.C. § 103(a) (Request at pages 71-74 and claim chart, pages 461-495 ).

1/ As noted above, this Office action is based on claims 1-5 under reexamination as amended on 4/27/2012 and newly added claims 6-41 that accompanied the amendment (see MPEP 2221). In the amendment filed 4/27/2012, there are no claims 42-45.

2/ The rejection of claims 1-12, 14, 16-18, 20-22, 24-26, 28, 29, 33, 34, 37, 38 and 41 as unpatentable over the combination of Gotoh and Takahashi under 35 U.S.C. § 103(a) were proposed by the requester in the request for reexamination, pages 71-74 and claim chart, pages 461-495, is **NOT ADOPTED**.

This rejection will not be applied against these claims for the following reason:

Independent claim 1 now required:

"two or more sensors that are each adapted to generate a signal that is representative of at least one of a plurality of sensed conditions of a vehicle, said sensed conditions including at least steering angle and pitch of the vehicle;

a controller that is responsive to said two or more sensor signals for generating at least one output signal only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one first one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in the sensed conditions; and

> said two or more actuators each being adapted to be connected to the headlight to effect movement thereof in accordance with said at least one output signal".

Gotoh only seen disclosed in Fig. 3 two or more sensors (21, 22, 23) and a controller (ECU 10). However, there are no actuators disclosed in Gotoh. Thus, Gotoh, is not seen to teach the amendatory subject matter of independent claim 1. Furthermore, Requester does not provide a detail explanation of the pertinency and manner of combining actuators of Takahashi to the device of Gotoh. Requester provides no motivation/suggestion or convincing line of reasoning to support the substitution of Gotoh and Takahashi. Thus, the rejection of claim 1 as unpatentable over the combination of Gotoh and Takahashi is not accepted.

Claims 2-12, 14, 16-18, 20-22, 24-26, 28, 29, 33, 34, 37, 38, 41 depend upon claim 1. Since the proposed rejection for claim 1 was not adopted; therefore, the proposed rejection for dependent claims 2-12, 14, 16-18, 20-22, 24-26, 28, 29, 33, 34, 37, 38, 41 are also not adopted.

**<u>Issue 32</u>**: The proposed rejection of claims 1-13, 24, 26, 28, 29, 37, 38 and 41-45 are unpatentable over the combination of Gotoh and Hussman under 35 U.S.C. § 103(a) (Request at pages 74-76, and claim chart, pages 496-522).

1/ As noted above, this Office action is based on claims 1-5 under reexamination as amended on 4/27/2012 and newly added claims 6-41 that accompanied the amendment (see MPEP 2221). In the amendment filed 4/27/2012, there are no claims 42, 44 and 45.

2/ The rejection of claims 1-13, 24, 26, 28, 29, 37, 38 and 41 are unpatentable over the combination of Gotoh et al. and Hussman under 35 U.S.C. § 103(a) were proposed by the requester in the request for reexamination, pages 74-76, and claim chart, pages 496-522, is **NOT ADOPTED**.

It is not agreed that consideration of Gotoh in view of Hussman presented a reasonable rejection with respect to the amended claims 1-41 of the '034 patent. This rejection will not be applied against these claims for the following reason: Particularly, without the additional teachings of Hussman, Gotoh is not presented in a different light than it was presented in the prosecution history. As indicated above issue 23, Hussman does not specifically include the teachings identified "a controller ... *only when said at least one of the two or more sensor signals changes by more than* ***a predetermined minimum threshold amount to prevent at least one first***

***one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in the sensed conditions***" as having the significance limitation with respect to the amended claim 1.

Since Gotoh does not clearly suggest "... *only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one first one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in the sensed conditions"*, and Hussman which is relied upon as the secondary reference for the teaching, does also not clearly demonstrate the details of "*...only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one first one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in the sensed conditions"*. Neither Gotoh nor Hussman teaches a key element of claim 1.

Hussman only teaches:

"The curve-recognition device K is electrically conductively coupled with the switchover device SE and thereby couples the third filter F3 electrically conductively with the regulator R if a difference signal other than zero is fed to it from the subtractor SU. When no difference signal from the subtractor SU is present, the curve-recognition device K switches the switchover device SE so that the first filter FI is coupled to the regulator R". (col. 3, lines 30-39)

> "At the coupling between the switchover device SE and the regulator R, a matching device AE is, here for example, arranged which, upon a switchover by the switchover device SE, adjusts the various nominal values to one another so that discontinuities or jumps in the adjustment and regulation of the illumination range are avoided". (col. 4, lines 6-12)

Therefore, the combination of Gotoh in view of Hussman do not result the lacking limitation "*... only when said at least one of the two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one first one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in the sensed conditions*" as called for in claim 1. Moreover, Claim 1 now required "**two or more actuators**"; However, there is no actuators disclosed in Gotoh. Thus, the rejection based on Gotoh in view of Hussman for claim 1 is not adopted.

Claims 2-13, 24, 26, 28, 29, 37, 38, 41 depend upon claim 1. Since the proposed rejection for claim 1 was not adopted; therefore, the proposed rejection for dependent claims 2-13, 24, 26, 28, 29, 37, 38, 41 are also not adopted.

**<u>Issue 33</u>**: The proposed rejection of claims 17, 19, 21, 23, 26, 30-32 are unpatentable over the combination of Uchida and the admitted prior art described in the '034 patent specification under 35 U.S.C. § 103(a) (Request at pages 76-78, and claim chart, pages 523-530).

The rejection of claims 17, 19, 21, 23, 26, 30-32 are unpatentable over the combination of Uchida and the admitted prior art described in the '034 patent specification under 35 U.S.C. § 103(a) were proposed by the requester in the request for reexamination, pages76-78, and claim chart, pages 523-530, is **NOT ADOPTED**.

Claims 17, 19, 21, 23, 26, 30-32 depend upon claim 1. Since the proposed rejection for claim 1, issue 21 was not adopted; Therefore, the proposed rejection for dependent claims 17, 19, 21, 23, 26, 30-32 are also not adopted.

**<u>Issue 34</u>**: The proposed rejection of claims 19, 23, 26 and 30-32 (claims 16, 20, 21, 25-27 as amended on 4/27/2012) are unpatentable in view of the combination of Takahashi and the admitted prior art described in the '034 patent specification under 35 U.S.C. § 103(a) (Request at pages 78-80, and claim chart, pages 531-536).

The rejection of claims 19, 23, 26 and 30-32 (similar as claims 16, 20, 21, 25-27 as amended on 4/27/2012) are unpatentable in view of the combination of Takahashi and the admitted prior art described in the '034 patent specification under 35 U.S.C. § 103(a) were proposed by the requester in the request for reexamination, pages 78-80, and claim chart, pages 531-536, is **ADOPTED**.

Claims 16, 20, 21, 25-27 (as amended on 4/27/2012) are rejected under 35 U.S.C. §103(a) as being unpatentable over Takahashi in view of the admitted prior art described in the '034 patent specification.

Pages 78-80 and claim chart, pages 531-536 of the request for reexamination is hereby incorporated by reference for the Requester's explanation of the proposed rejection.

**Issue 35**: The proposed rejection of claims 17-21, 23-26, 30-32 are unpatentable over the combination of Hussman and the admitted prior art described in the '034 patent specification under 35 U.S.C. § 103(a) (Request at pages 80-82, and claim chart, pages 537-548).

The rejection of claims 17-21, 23-26, 30-32 are unpatentable over the combination of Hussman and the admitted prior art described in the '034 patent specification under 35 U.S.C. § 103(a) were proposed by the requester in the request for reexamination, pages 80-82, and claim chart, pages 537-548, is **NOT ADOPTED**.

Claims 17-21, 23-26, 30-32 depend upon claim 1. Since the proposed rejection for claim 1, issue 23 was not adopted; Therefore, the proposed rejection for dependent claims 17-21, 23-26, 30-32 are also not adopted.

**<u>Issue 36</u>**: The proposed rejection of claim 27 is unpatentable over the combination of Uchida and Wassen under 35 U.S.C. § 103(a) (Request at pages 82-84, and claim chart, page 549).

The rejection of claim 27 is unpatentable over the combination of Uchida and Wassen under 35 U.S.C. § 103(a) were proposed by the requester in the request for reexamination, pages 82-84, and claim chart, page 549, is **NOT ADOPTED**.

Claim 27 depends upon claim 1. Since the proposed rejection for claim 1, issue 21 was not adopted; Therefore, the proposed rejection for dependent claim 27 is also not adopted.

**<u>Issue 37</u>**: The proposed rejection of claim 27 (similar with claim 22 as amended on 4/27/2012) are unpatentable in view of the combination of Takahashi and Wassen under 35 U.S.C. § 103(a) (Request at pages 84-85, and claim chart, page 550).

The rejection of claim 27 (similar as claim 22 as amended on 4/27/2012) is unpatentable in view of the combination of Takahashi and Wassen under 35

U.S.C. § 103(a) were proposed by the requester in the request for reexamination, pages 84-85, and claim chart, page 550, is **ADOPTED**.

Claim 22 is rejected under 35 U.S.C. §103(a) as being unpatentable over Takahashi in view of Wassen.

Pages 84-85 and claim chart, page 550 of the request for reexamination is hereby incorporated by reference for the Requester's explanation of the proposed rejection. Two or more actuators are seen in Fig. 9, 19 and 19', of Takahashi.

**Issue 38**: The proposed rejection of claim 27 is unpatentable over the combination of Hussman and Wassen under 35 U.S.C. § 103(a) (Request at pages 85-87, and claim chart, page 551).

The rejection of claim 27 is unpatentable over the combination of Hussman and Wassen under 35 U.S.C. § 103(a) were proposed by the requester in the request for reexamination, pages 85-87, and claim chart, page 551, is **NOT ADOPTED**.

Claim 27 depends upon claim 1. Since the proposed rejection for claim 1, issue 23 was not adopted; therefore, the proposed rejection for dependent claim 27 is also not adopted.

**PROPOSED REJECTION OF PROPOSED CLAIMS 12 TO 16 UNDER 35 U.S.C. § 314(A)**

As noted above, all subsequent reexamination prosecution and examination will be on the basis of claims 1-41 as amended in the proposed amendment filed on 4/27/2012. Thus, the proposed rejection with respect to claims 12-16 under 35 U.C.C 314(A) has been considered but is moot in view of the amendment filed on 4/27/2012.

**PROPOSED REJECTION OF PROPOSED CLAIMS 12 TO 16 UNDER 35 U.S.C. § 112.**

As noted above, all subsequent reexamination prosecution and examination will be on the basis of claims 1-41 as amended in the proposed amendment filed on 4/27/2012. Thus, the proposed rejection with respect to claims 12-16 under 35 U.C.C 314(A) has been considered but is moot in view of the amendment filed on 4/27/2012.

***Allowable Subject Matter***

Claims 3, 7, 11 and 38-41 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### *Service of Papers*

After the filing of a request for reexamination by a third party requester, any document filed by either the patent owner or the third party requester must be served on the other party (or parties where two or more third party requester proceedings are merged) in the reexamination proceeding in the manner provided in 37 CFR 1.248. See 37 CFR 1.550(t).

### *Extensions of Time*

Extensions of time under 37 CFR 1.136(a) will not be permitted in inter partes reexamination proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 314(c) requires that inter partes reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.937). Patent owner extensions of time in inter partes reexamination proceedings are provided for in 37 CFR 1.956. Extensions of time are not available for third party requester comments, because a comment period of 30 days from service of patent owner's response is set by statute 35 U.S.C. 314(b)(3). Time periods may be extended only upon a strong showing of sufficient cause.

### Notification of Concurrent Proceedings

The patent owner is reminded of the continuing responsibility under 37 CFR 1.985(a), to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving the '034 patent throughout the course of this reexamination proceeding. The third party requester is also reminded of the ability to similarly apprise the Office of any such activity or proceeding throughout the course of this reexamination proceeding. See MPEP 2686 and 2686.04.

### *Complete Response Reminder*

In order to ensure full consideration of any amendments, affidavits or declarations, or other documents as evidence of patentability, such documents must be submitted in response to this Office action. Submissions after the next Office action, which is intended to be an Action Closing Prosecution (ACP), will be governed by 37 CFR 1.1 16(b) and (d), which will be strictly enforced.

### *Service of Papers*

Any paper filed by either the patent owner or the third party requester must be served on the other party in the reexamination proceeding in the manner provided by 37 CFR 1.248. See 37 CFR 1.903 and MPEP 2666.06.

**Amendments in Reexamination Procedures**

Patent owner is notified that any proposed amendment to the specification and/or claims in this reexamination proceeding must comply with 37 CFR 1.530(d)-(j), must be formally presented pursuant to 37 CFR 1.52(a) and (b), and must contain any fees required by 37 CFR 1.20(c). Amendments in an inter partes reexamination proceeding are made in the same manner that amendments in an ex parte reexamination are made. MPEP 2666.01. See MPEP 2250 for guidance as to the manner of making amendments in a reexamination proceeding.

All correspondence relating to this inter partes reexamination proceeding should be directed:

By Mail to: Mail Stop Inter Partes Reexam
Attn: Central Reexamination Unit
Commissioner for Patents
United States Patent & Trademark Office
P.O. Box 1450
Alexandria, Virginia 22313-1450

By FAX to: (571) 273-9900
Central Reexamination Unit

By hand: Customer Service Window
Attn: Central Reexamination Unit
Randolph Building, Lobby Level
401 Dulany Street
Alexandria, VA 22314

By EFS-Web:
Registered users of EFS-Web may alternatively submit such correspondence via the electronic filing system EFS-Web, at

https://sportal.uspto.gov/authenticate/authenticateuserlocalepf.html

EFS-Web offers the benefit of quick submission to the particular area of the Office that needs to act on the correspondence. Also, EFS-Web submissions are "soft scanned" (i.e., electronically uploaded) directly into the official file for the reexamination proceeding, which offers parties the opportunity to review the content of their submissions after the "soft scanning" process is complete.

Any inquiry concerning this communication or earlier communications from the examiner, or as to the status of this proceeding, should be directed to the Central Reexamination Unit at telephone number (571) 272-7705.

/My-Trang Nu Ton/
Primary Examiner, CRU 3992

Conferees:
/Margaret Rubin/
Primary Examiner CRU 3992

ANDREW J. FISCHER ajf
Supervisory Patent Reexamination Specialist
CRU -- Art Unit 3992

| Index of Claims | Application/Control No. | Applicant(s)/Patent under Reexamination |
|---|---|---|
| | 95/001,621, 90/011,011 | 7,241,034 |
| | Examiner | Art Unit |
| | MY-TRANG TON | 3992 |

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|---|---|---|---|---|---|---|---|
| √ | Rejected | – | (Through numeral) Cancelled | N | Non-Elected | A | Appeal |
| = | Allowed | ÷ | Restricted | I | Interference | O | Objected |

| Claim Final | Claim Original | Date 5/24/12 |
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| Search Notes | Application/Control No. 95/001,621 ,90/011,011 | Applicant(s)/Patent under Reexamination 7,241,034 | |
|---|---|---|---|
| | Examiner MY-TRANG TON | Art Unit 3992 | |

**SEARCHED**

| Class | Subclass | Date | Examiner |
|---|---|---|---|
| n/a | - | 5/23/11 | MT |
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**SEARCH NOTES (INCLUDING SEARCH STRATEGY)**

| | DATE | EXMR |
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| n/a | 5/23/12 | MR |
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**INTERFERENCE SEARCHED**

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|---|---|---|---|
| n/a | - | 5/23/12 | MT |
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| *Reexamination* | Application/Control No. 95/001,621, 90/011,011 | Applicant(s)/Patent Under Reexamination 7,241,034 |
|---|---|---|
| | Certificate Date | Certificate Number |

| Requester | Correspondence Address: | ☐ Patent Owner | ☒ Third Party |
|---|---|---|---|

Kenyon & Kenyon, LLP
One Broadway
New York, NY
10004

| LITIGATION REVIEW ☒ | mt (examiner initials) | 5/23/12 (date) |
|---|---|---|
| Case Name | | Director Initials |
| I U.S. District - Texas Eastern (Tyler) 6:10CV78 Balther Technologies, Llc v. American Honda Motor Co Inc et A | | CGJ for I.Y. |
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| COPENDING OFFICE PROCEEDINGS | |
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| TYPE OF PROCEEDING | NUMBER |
| 1. 90/011011 | |
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U.S. Patent and Trademark Office

DOC. CODE RXFILJKT

**PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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| In re application of: | ) |
| | ) |
| 7,241,034 | ) Art Unit: 3992 |
| | ) |
| Applications No. 95/001,621 & 90/011,011 | ) Examiner: MY-TRANG N. TON |
| | ) |
| Filed: 05/16/2011 | ) Atty. Docket No.: |
| | ) SVIPGP109RE |
| For: AUTOMATIC DIRECTIONAL CONTROL SYSTEM FOR VEHICLE HEADLIGHTS | ) |
| | ) Date: 07/26/2012 |
| | ) |
| | ) |

**AMENDMENT E**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Examiner:

In response to the Office Action mailed 6/29/2012 ("Office Action"), please enter the following amendments believed to place the Claims in condition for allowance.

AMENDMENTS TO THE CLAIMS

Amended claims follow:

1. (Cancelled).

2. (Cancelled).

3. (Currently Amended) [The automatic directional control system defined in claim 1] An automatic directional control system for a vehicle headlight, comprising:

two or more sensors that are each adapted to generate a signal that is representative of at least one of a plurality of sensed conditions of a vehicle such that two or more sensor signals are generated, said sensed conditions including at least a steering angle and a pitch of the vehicle;

a controller that is responsive to said two or more sensor signals for generating at least one output signal only when at least one of said two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one first one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in at least one of the sensed conditions; and

said two or more actuators each being adapted to be connected to the headlight to effect movement thereof in accordance with said at least one output signal;

wherein at least one of said two or more sensors generates [a]at least one of said two or more sensor signals that is representative of [the]a rate of change of the steering angle of the vehicle.

4. (Currently Amended) The automatic directional control system defined in claim [1]3, wherein at least one of said two or more sensors generates a signal that is representative of [the]a rate of change of the pitch of the vehicle.

5. (Currently Amended) The automatic directional control system defined in claim [1]3, wherein at least one of said two or more sensors generates a signal that is representative of [the]a suspension height of the vehicle.

6. (New) The automatic directional control system defined in claim 3, wherein said two or more sensors include a first sensor and a second sensor.

7. (New) An automatic directional control system for a vehicle headlight, comprising:

two or more sensors that are each adapted to generate a signal that is representative of at least one of a plurality of sensed conditions of a vehicle such that two or more sensor signals are generated, said sensed conditions including at least a steering angle and a pitch of the vehicle;

a controller that is responsive to said two or more sensor signals for generating at least one output signal only when at least one of said two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in at least one of the sensed conditions; and

said two or more actuators each being adapted to be connected to the vehicle headlight to effect movement thereof in accordance with said at least one output signal;

wherein said two or more sensors include a first sensor and a second sensor; and

wherein said first sensor is adapted to generate a signal that is representative of a condition including the steering angle of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle.

8. (New) The automatic directional control system defined in claim 7, wherein said first sensor is physically separate from said second sensor.

9. (New) The automatic directional control system defined in claim 7, further comprising one or more additional sensors for sensing one or more of a rate of change of road speed of the vehicle, a rate of change of the steering angle of the vehicle, a rate of

change of the pitch of the vehicle, a suspension height of the vehicle, or a rate of change of suspension height of the vehicle.

10. (New) The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors generate a signal that is representative of the rate of change of the road speed of the vehicle.

11. (New) The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors generate a signal that is representative of the rate of change of the steering angle of the vehicle.

12. (New) The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors generate a signal that is representative of the rate of change of the pitch of the vehicle.

13. (New) The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors generate a signal that is representative of the suspension height of the vehicle.

14. (New) The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured to include a first actuator connected to the headlight to effect movement thereof in a first direction and a second actuator connected to the headlight to effect movement thereof in a second direction different from the first direction.

15. (New) The automatic directional control system defined in claim 7, wherein the two or more actuators include a first actuator that is adapted to be connected to the headlight to effect movement thereof in a vertical direction.

16. (New) The automatic directional control system defined in claim 15, wherein the two or more actuators include a second actuator that is adapted to be connected to the headlight to effect movement thereof in a horizontal direction.

17. (New) The automatic directional control system defined in claim 7, wherein the two or more actuators include an electronically controlled mechanical actuator.

18. (New) The automatic directional control system defined in claim 7, wherein the two or more actuators include a step motor.

19. (New) The automatic directional control system defined in claim 7, wherein the two or more actuators include a servo motor.

20. (New) The automatic directional control system defined in claim 7, wherein the two or more actuators include a microstepping motor capable of being operated in fractional step increments.

21. (New) The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted both up and down relative to a horizontal reference position and left and right relative to a vertical reference position.

22. (New) The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that, while in a calibration mode, a directional orientation at which a beam of light projects is capable of being adjusted relative to the vehicle by manual operation of the two or more actuators.

23. (New) The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that the controller includes a microprocessor.

24. (New) The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that the controller includes a programmable electronic controller.

25. (New) The automatic directional control system defined in claim 7, wherein the automatic directional control system further includes at least one position feedback sensor capable of providing a position feedback signal associated with at least one of the two or more actuators.

26. (New) The automatic directional control system defined in claim 25, wherein the at least one position feedback sensor includes a Hall Effect sensor.

27. (New) The automatic directional control system defined in claim 25, wherein the at least one position feedback sensor includes an optical interrupter.

28. (New) The automatic directional control system defined in claim 7, wherein the automatic directional control system further includes memory.

29. (New) The automatic directional control system defined in claim 28, wherein the memory includes non-volatile memory.

30. (New) The automatic directional control system defined in claim 28, wherein the memory is configured to store a predetermined reference position associated with the headlight.

31. (New) The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by sensing a front and a rear suspension height of the vehicle.

32. (New) The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by a pitch sensor.

33. (New) The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that the controller is programmed to be responsive to changes in a suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle.

34. (New) The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that the controller is programmed to be responsive to changes in a suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle, thereby ignoring frequency changes in the suspension height of the vehicle that are a result of bumps in a road.

35. (New) The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that the predetermined minimum threshold amount functions as a filter to minimize undesirable operation of at least one of the two or more actuators.

36. (New) The automatic directional control system defined in claim 7, wherein said controller is configured to be responsive to said two or more sensor signals for generating said at least one output signal only when said at least one of the two or more sensor signals changes by more than the predetermined minimum threshold amount to prevent said at least one of the two or more actuators from being operated continuously in response to said relatively small variations in the at least one of the sensed conditions.

37. (New) The automatic directional control system defined in claim 7, wherein said controller is configured to be responsive to said two or more sensor signals for generating said at least one output signal only when said at least one of the two or more sensor signals changes by more than the predetermined minimum threshold amount to prevent

said at least one of the two or more actuators from being operated unduly frequently in response to said relatively small variations in the at least one of the sensed conditions.

38. (New) The automatic directional control system defined in claim 7, wherein said controller is further responsive to at least one of said two or more sensor signals to automatically activate one or more vehicle lights that are different than the headlight.

39. (New) The automatic directional control system defined in claim 38, wherein said one or more vehicle lights that are different than the headlight include one or more lights for illuminating a road in front of the vehicle during a turn.

40. (New) The automatic directional control system defined in claim 7, wherein said controller is further responsive to a steering angle in excess of a predetermined magnitude for automatically activating one or more vehicle lights that are different than the headlight.

41. (New) The automatic directional control system defined in claim 7, wherein said controller is further responsive to a steering angle in excess of a predetermined magnitude for automatically activating one or more vehicle lights that are different than the headlight to extend an angular range of a road surface.

REMARKS

Applicant thanks the Examiner for noting the allowable subject matter. Applicant has incorporated the subject matter of amended Claim 1 (as presented in Applicant's Amendment D2, dated 4/27/2012) into Claims 3 and 7. Furthermore, Applicant has amended the claims such that the remaining dependent claims depend on either Claim 3 or Claim 7. Table 1 shows a summary of Applicant's amendments, relative to Applicant's Amendment D2, dated 4/27/2012.

**Table 1**

| |
|---|
| Claim 1 – Cancelled. |
| Claim 2 - Cancelled. |
| Claim 3 – Applicant deleted "The automatic directional control system defined in claim 1" and the comma added in Amendment D2. Applicant inserted the subject matter of amended Claim 1 (the subject matter as presented in Amendment D2). Applicant deleted "a" and added "at least one of said two or more sensor" before "signal". Applicant added an "s" to "signal". Applicant added "the" before "steering angle". Applicant deleted "further", which was added in the Amendment D2. |
| Claim 4 - Applicant deleted "1" and inserted "3" such that Claim 4 depends on Claim 3. Applicant deleted "further", which was added in Amendment D2. Applicant added "the" before "pitch". |
| Claim 5 - Applicant deleted "1" and inserted "3" such that Claim 5 depends on Claim 3. Applicant deleted "further", which was added in Amendment D2. Applicant deleted "the" and added "a" before "suspension height of the vehicle". |
| Claim 6 - Applicant deleted "1" (which was presented in Amendment D2) and inserted "3" such that Claim 6 depends on Claim 3. |
| Claim 7 – Applicant inserted the subject matter of amended Claim 1 (the subject matter as presented in Amendment D2), in addition to the subject matter of Claim 6 (as presented in Amendment D2). |
| Claim 8 – Applicant deleted "6" (which was presented in Amendment D2) and |

inserted “7” such that Claim 8 depends on Claim 7.

Claim 9 - Applicant deleted “1” (which was presented in Amendment D2) and inserted “7” such that Claim 9 depends on Claim 7. Applicant added “of a vehicle” after “suspension height.”

Claim 10 – Same text as Amendment D2.

Claim 11 – Applicant added “the” before “steering angle of the vehicle”.

Claim 12 – Applicant added “the” before “pitch of the vehicle”.

Claim 13 – Same text as Amendment D2.

Claim 14 - Applicant deleted “1” (which was presented in Amendment D2) and inserted “7” such that Claim 14 depends on Claim 7. Applicant changed “form” to “from”.

Claim 15 - Applicant deleted “1” (which was presented in Amendment D2) and inserted “7” such that Claim 15 depends on Claim 7.

Claim 16 – Same text as Amendment D2.

Claim 17 - Applicant deleted “1” (which was presented in Amendment D2) and inserted “7” such that Claim 17 depends on Claim 7.

Claim 18 - Applicant deleted “1” (which was presented in Amendment D2) and inserted “7” such that Claim 18 depends on Claim 7.

Claim 19 - Applicant deleted “1” (which was presented in Amendment D2) and inserted “7” such that Claim 19 depends on Claim 7.

Claim 20 - Applicant deleted “1” (which was presented in Amendment D2) and inserted “7” such that Claim 20 depends on Claim 7.

Claim 21 - Applicant deleted “1” (which was presented in Amendment D2) and inserted “7” such that Claim 21 depends on Claim 7.

Claim 22 - Applicant deleted “1” (which was presented in Amendment D2) and inserted “7” such that Claim 22 depends on Claim 7.

Claim 23 - Applicant deleted “1” (which was presented in Amendment D2) and inserted “7” such that Claim 23 depends on Claim 7.

Claim 24 - Applicant deleted “1” (which was presented in Amendment D2) and inserted “7” such that Claim 24 depends on Claim 7.

Claim 25 - Applicant deleted “1” (which was presented in Amendment D2) and inserted "7" such that Claim 25 depends on Claim 7.

Claim 26 – Same text as Amendment D2.

Claim 27 – Same text as Amendment D2.

Claim 28 - Applicant deleted "1" (which was presented in Amendment D2) and inserted "7" such that Claim 28 depends on Claim 7.

Claim 29 – Same text as Amendment D2.

Claim 30 – Same text as Amendment D2.

Claim 31 - Applicant deleted "1" (which was presented in Amendment D2) and inserted "7" such that Claim 31 depends on Claim 7.

Claim 32 - Applicant deleted "1" (which was presented in Amendment D2) and inserted "7" such that Claim 32 depends on Claim 7. Applicant added "a" and deleted "the" before "suspension height".

Claim 33 - Applicant deleted "1" (which was presented in Amendment D2) and inserted "7" such that Claim 33 depends on Claim 7. Applicant added "a" and deleted "the" before "suspension height".

Claim 34 - Applicant deleted "1" (which was presented in Amendment D2) and inserted "7" such that Claim 34 depends on Claim 7.

Claim 35 - Applicant deleted "1" (which was presented in Amendment D2) and inserted "7" such that Claim 35 depends on Claim 7.

Claim 36 - Applicant deleted "1" (which was presented in Amendment D2) and inserted "7" such that Claim 36 depends on Claim 7. Applicant added "the at least one of" before "the sensed conditions".

Claim 37 - Applicant deleted "1" (which was presented in Amendment D2) and inserted "7" such that Claim 37 depends on Claim 7. Applicant added "the at least one of" before "the sensed conditions".

Claim 38 - Applicant deleted "1" (which was presented in Amendment D2) and inserted "7" such that Claim 38 depends on Claim 7. Also, applicant inserted "to at least one of".

Claim 39 – Same text as Amendment D2.

Claim 40 - Applicant deleted "1" (which was presented in Amendment D2) and inserted "7" such that Claim 40 depends on Claim 7.

Claim 41 - Applicant deleted "1" (which was presented in Amendment D2) and inserted "7" such that Claim 41 depends on Claim 7.

Applicant believes no fees are due. In the event any fees are due, the Commissioner is authorized to charge any additional fees or credit any overpayment to Deposit Account No. 50-4964 (Order No. SVIPGP109RE).

In the event the Examiner believes a telephone conversation would advance prosecution, Applicant invites the Examiner to telephone the undersigned attorney at the number listed below.

Additionally, the undersigned hereby certifies that a true and complete copy of the forgoing Amendment E has been served on Third Party Requestor by mailing said copy on 26 Jul 2012, via First Class Mail, postage prepaid to:

Kenyon & Kenyon, LLP
One Broadway
New York, NY 10004

Respectfully submitted,

Patrick E. Caldwell, Esq.
Reg. No. 44,580

Dated: 26 July 2012

The Caldwell Firm, LLC
PO Box 59655
Dallas, Texas 75229-0655
Telephone: (972) 243-4523
pcaldwell@thecaldwellfirm.com

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 13353636 |
| **Application Number:** | 95001621 |
| **International Application Number:** | |
| **Confirmation Number:** | 1240 |
| **Title of Invention:** | Automatic Directional Control System for Vehicle Headlights |
| **First Named Inventor/Applicant Name:** | 7,241,034 |
| **Customer Number:** | 92045 |
| **Filer:** | Patrick Edgar Caldwell |
| **Filer Authorized By:** | |
| **Attorney Docket Number:** | SVIPGP109RE |
| **Receipt Date:** | 26-JUL-2012 |
| **Filing Date:** | 16-MAY-2011 |
| **Time Stamp:** | 20:15:39 |
| **Application Type:** | inter partes reexam |

## Payment information:

| | |
|---|---|
| Submitted with Payment | no |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | Amendment/Req. Reconsideration-After Non-Final Reject | SVIPGP109RE_Amndt_E_vF_07-26-2012.pdf | 57906<br>d623ca3972794b2eb553ea804252de417ec9ec55 | no | 12 |

**Warnings:**

**Information:**

| | |
|---|---|
| **Total Files Size (in bytes):** | 57906 |

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

# Litigation Search Report CRU 3999

## Reexam Control No. 95/001,621

| | |
|---|---|
| TO: My Trang Ton<br>Location: CRU<br>Art Unit: 3992<br>Date: 12/06/2012<br>Merged: 90/011,011 | From: Patricia Volpe<br>Location: CRU 3999<br>MDE 5D30<br>Phone: (571) 272-6825<br>Patricia.volpe@uspto.gov |

## Search Notes

Litigation search for U.S. Patent Number: 7,241,034

Status (**CLOSED**) 6:10cv78 *Balther Technologies, Llc v. American Honda Motor Co. Inc. et al*

1) I performed a KeyCit Search in Westlaw, which retrieves all history on the patent including any litigation.

2) I performed a search on the patent in Lexis CourtLink for any open dockets or closed cases.

3) I performed a search in Lexis in the Federal Courts and Administrative Materials databases for any cases found.

4) I performed a search in Lexis in the IP Journal and Periodicals database for any articles on the patent.

5) I performed a search in Lexis in the news databases for any articles about the patent or any articles about litigation on this patent.

Date of Printing: Dec 06, 2012

**KEYCITE**

**C US PAT 7241034 AUTOMATIC DIRECTIONAL CONTROL SYSTEM FOR VEHICLE HEADLIGHTS, Assignee: Dana Corporation (Jul 10, 2007)**

**History**

**Direct History**

=> 1 **AUTOMATIC DIRECTIONAL CONTROL SYSTEM FOR VEHICLE HEADLIGHTS**, US PAT 7241034, 2007 WL 1978614 (U.S. PTO Utility Jul 10, 2007)

**Patent Family**

2 AUTOMATIC DIRECTIONAL CONTROL SYSTEM FOR A VEHICLE HEADLIGHT USES SENSOR TO GENERATE SIGNAL REPRESENTATIVE OF CONDITION OF VEHICLE, CONTROLLER RESPONSIVE TO SENSOR SIGNAL TO GENERATE OUTPUT SIGNAL AND ACTUATOR TO EFFECT HEADLIGHT MOVEMENT, Derwent World Patents Legal 2003-543647

**Assignments**

3 Action: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS). Number of Pages: 002, (DATE RECORDED: Mar 08, 2010)

4 Action: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS). Number of Pages: 002, (DATE RECORDED: Jun 12, 2009)

5 Action: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS). Number of Pages: 030, (DATE RECORDED: Feb 22, 2008)

6 Action: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS). Number of Pages: 003, (DATE RECORDED: Feb 06, 2003)

**Patent Status Files**

.. Request for Re-Examination, (OG DATE: Jun 29, 2011)

.. Request for Re-Examination, (OG DATE: Sep 07, 2010)

.. Patent Suit(See LitAlert Entries),

**Docket Summaries**

10 BALTHER TECHNOLOGIES, LLC v. AMERICAN HONDA MOTOR CO. INC. ET AL, (E.D.TEX. Mar 08, 2010) (NO. 6:10CV00078), (35 USC 271 PATENT INFRINGEMENT)

**Litigation Alert**

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11 Derwent LitAlert P2010-11-45 (Mar 08, 2010) Action Taken: complaint

**Prior Art (Coverage Begins 1976)**

C 12 ADJUSTABLE HEADLIGHTS, HEADLIGHT ADJUSTING AND DIRECTION SENSING CONTROL SYSTEM AND METHOD OF ADJUSTING HEADLIGHTS, US PAT 5868488 (U.S. PTO Utility 1999)

C 13 APPARATUS AND METHOD FOR CONTROLLING LIGHT DISTRIBUTION OF HEAD-LAMP, US PAT 5660454Assignee: Toyota Jidosha Kabushiki Kaisha, (U.S. PTO Utility 1997)

C 14 APPARATUS AND METHOD FOR CONTROLLING THE LIGHT-RANGE OF MOTOR VEHICLE HEADLIGHTS, US PAT 5193894Assignee: Robert Bosch GmbH, (U.S. PTO Utility 1993)

C 15 APPARATUS FOR AUTOMATICALLY ADJUSTING AIMING OF HEADLIGHTS OF AN AUTOMOTIVE VEHICLE, US PAT 5877680Assignee: Denso Corporation; Toyota Jidosha Kabushiki Kaisha, (U.S. PTO Utility 1999)

C 16 APPARATUS FOR CONTROLLING A HEADLIGHT OF A VEHICLE, US PAT 4891559Assignee: Nippondenso Soken, Inc.; Nippondenso Co., Ltd., (U.S. PTO Utility 1990)

C 17 APPARATUS FOR REGULATING THE ILLUMINATION FIELD OF A VEHICLE HEAD-LIGHT, US PAT 6144159Assignee: Robert Bosch GmbH, (U.S. PTO Utility 2000)

C 18 ARRANGEMENT FOR AUTOMATIC HEADLIGHT ADJUSTMENT, US PAT 6231216Assignee: Dr. Ing. h.c.F. Porsche AG, (U.S. PTO Utility 2001)

C 19 AUTOMATIC LEVELING APPARATUS FOR USE WITH AUTOMOBILE HEADLAMPS, US PAT 6183118Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 2001)

C 20 AUTOMATIC LEVELING DEVICE FOR AUTOMOTIVE VEHICLE HEADLAMPS, US PAT 6305823Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 2001)

C 21 AUTOMOTIVE ILLUMINATION SYSTEM, US PAT 4943893Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 1990)

C 22 CONTINUOUSLY VARIABLE HEADLAMP CONTROL, US PAT 6281632Assignee: Gentex Corporation, (U.S. PTO Utility 2001)

C 23 CORNERING LIGHT SYSTEM FOR TWO-WHEELED VEHICLES, US PAT 4024388Assignee: Marvin H. Kleinberg, Inc.; Richard Morganstern Inc.; Scholnick, Seymour A., (U.S. PTO Utility 1977)

C 24 DEVICE FOR ADJUSTING THE INCLINATION OF AUTOMOBILE HEADLIGHTS, US PAT 4186428Assignee: Cibie Projecteurs, (U.S. PTO Utility 1980)

C 25 DEVICE FOR ADJUSTING THE LEVEL OF A VEHICLE HEADLIGHT, US PAT 5779342Assignee: Bayerische Motoren Werke Aktiengellschaft, (U.S. PTO Utility 1998)

C 26 DEVICE FOR ADJUSTING AN OBJECT TO ASSUME A PREDETERMINED ANGLE TO A CERTAIN PLANE, US PAT 4217631 (U.S. PTO Utility 1980)

C 27 DEVICE FOR ADJUSTING A PRESETTABLE LIGHTING LEVEL OF A HEADLIGHT IN MOTOR VEHICLES, US PAT 5785405Assignee: Bayerische Motoren Werke, (U.S. PTO Utility 1998)

C 28 DEVICE FOR CONTROLLING THE LIGHT WIDTH OF HEADLIGHTS FOR VEHICLES, US

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PAT 5896011Assignee: Robert Bosch GmbH, (U.S. PTO Utility 1999)

C 29 DEVICE FOR REGULATING LIGHT WIDTH OF HEADLIGHTS FOR VEHICLES, AND VEHICLE PROVIDED THEREWITH, US PAT 6142655Assignee: Robert Bosch GmbH, (U.S. PTO Utility 2000)

C 30 DIRECTION TURNING DEVICE FOR A HEADLIGHT OF AN AUTOMOBILE, US PAT 5550717 (U.S. PTO Utility 1996)

C 31 FOCUSING MIRROR CONTROL SYSTEM AND METHOD FOR ADJUSTING SAME, US PAT 6118113 (U.S. PTO Utility 2000)

C 32 HEAD LAMP DEVICE FOR VEHICLE, US PAT 6010237Assignee: Honda Giken Kogyo Kabushiki Kaisha, (U.S. PTO Utility 2000)

C 33 HEAD LAMP DEVICE FOR VEHICLE, US PAT 5909949Assignee: Honda Giken Kogyo Kabushiki Kaisha, (U.S. PTO Utility 1999)

C 34 HEADLAMP, US PAT 5158352Assignee: Honda Giken Kogyo Kabushiki Kaisha, (U.S. PTO Utility 1992)

C 35 HEADLAMP DRIVE AND CONTROL APPARATUS, US PAT 4583152Assignee: Aisin Seiki Kabushiki Kaisha, (U.S. PTO Utility 1986)

C 36 HEADLAMP FOR MOTOR VEHICLES WITH PROGRAMMABLE LIGHT DISTRIBUTION, US PAT 4868721 (U.S. PTO Utility 1989)

C 37 HEADLAMP POSITIONING DEVICE, US PAT 5181429Assignee: Saia AG, (U.S. PTO Utility 1993)

C 38 HEADLIGHT AIMING AND LIGHT PATTERN TESTING APPARATUS AND METHOD, US PAT 4948249Assignee: Hopkins Manufacturing Corporation, (U.S. PTO Utility 1990)

C 39 HEADLIGHT AIMING APPARATUS, US PAT 5751832Assignee: Progressive Tool & Industries Co.; Panter Master Controls, Inc., (U.S. PTO Utility 1998)

C 40 HEADLIGHT AIMING APPARATUS AND DISPLAY, US PAT 5164785Assignee: Hopkins Manufacturing Corporation, (U.S. PTO Utility 1992)

C 41 HEADLIGHT AIMING METHOD USING PATTERN FRAMING, US PAT 5373357Assignee: Hopkins Manufacturing Corporation, (U.S. PTO Utility 1994)

C 42 HEADLIGHT ARRANGEMENT FOR MOTOR VEHICLE, US PAT 6227691Assignee: Robert Bosch GmbH, (U.S. PTO Utility 2001)

C 43 HEADLIGHT ARRANGEMENT FOR VEHICLES, US PAT 4768135Assignee: Robert Bosch GmbH, (U.S. PTO Utility 1988)

C 44 HEADLIGHT BEAM CONTROL SYSTEM FOR MOTOR VEHICLES, US PAT 4225902 (U.S. PTO Utility 1980)

C 45 HEADLIGHT CONTROL APPARATUS FOR MOTORCYCLES, US PAT 4870545Assignee: Honda Giken Kogyo Kabushiki Kaisha, (U.S. PTO Utility 1989)

C 46 HEADLIGHT FOR VEHICLE, US PAT 4833573Assignee: Koito Seisakusho Co., Ltd., (U.S. PTO Utility 1989)

C 47 HEADLIGHT MOVING APPARATUS FOR A MOTOR VEHICLE, US PAT 5099400 (U.S. PTO Utility 1992)

C 48 HEIGHT SENSOR AND VEHICULAR HEADLIGHT BEAM AXIS LEVELING APPARATUS,

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US PAT 6234654Assignee: Denso Corporation, (U.S. PTO Utility 2001)

C 49 INFINITELY ADJUSTABLE LEVEL LIGHT, US PAT 3953726 (U.S. PTO Utility 1976)

C 50 IRRADIATION DIRECTION CONTROL APPARATUS FOR VEHICULAR LAMP, US PAT 5907196Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 1999)

C 51 LIGHT DESTRIBUTION OF HEADLIGHT BEAM, US PAT 4907877 (U.S. PTO Utility 1990)

C 52 LIGHT MANAGEMENT SYSTEM FOR A VEHICLE, US PAT 5781105Assignee: Ford Motor Company, (U.S. PTO Utility 1998)

C 53 LIGHTING CONTROL FOR MOTOR VEHICLE LAMPS, US PAT 3634677Assignee: ROBERT BOSCH GMBH, (U.S. PTO Utility 1972)

C 54 LIGHTING DEVICE FOR A VEHICLE, US PAT 6049749Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 2000)

C 55 LIGHTING DEVICE FOR VEHICLES, US PAT 6293686Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 2001)

C 56 LIGHTING SYSTEM FOR A MOTORCYCLE, US PAT 3939339 (U.S. PTO Utility 1976)

C 57 LOAD TRIM COMPENSATING VEHICLE HEADLIGHT DEFLECTION SYSTEM, US PAT 4162424Assignee: Robert Bosch GmbH, (U.S. PTO Utility 1979)

C 58 MAGNETIC COUPLING MECHANISM FOR USE IN AN AUTOMOTIVE VEHICLE, US PAT 5977678Assignee: UT Automotive Dearborn, Inc., (U.S. PTO Utility 1999)

C 59 METHOD AND APPARATUS FOR ADJUSTING THE ORIENTATION OF VEHICLE HEADLIGHTS, US PAT 4204270Assignee: Societe pour l'Equipement de, (U.S. PTO Utility 1980)

C 60 METHOD AND APPARATUS FOR LOCATING A SPECIFIC LOCATION ON A VEHICLE HEADLAMP, US PAT 5331393Assignee: Hopkins Manufacturing Corporation, (U.S. PTO Utility 1994)

C 61 METHOD OF MEASURING AND ADJUSTING OPTICAL AXIS OF HEADLIGHT, US PAT 5392111Assignee: Honda Giken Kogyo Kabushiki Kaisha, (U.S. PTO Utility 1995)

C 62 MOTOR VEHICLE LIGHTING SYSTEM HAVING AT LEAST TWO BEND LIGHTING DRIVING LIGHTS, US PAT 6176590Assignee: Valeo Vision, (U.S. PTO Utility 2001)

C 63 MOTOR VEHICLE WITH HEADLAMP TILTING MECHANISM, US PAT 4066886Assignee: The Lucas Electrical Company Limited, (U.S. PTO Utility 1978)

C 64 MOTORCYCLE HEADLIGHT AIMING DEVICE, US PAT 5426571 (U.S. PTO Utility 1995)

C 65 MULTIPLE SENSOR INCLINATION MEASURING SYSTEM, US PAT 4549277Assignee: Brunson Instrument Company, (U.S. PTO Utility 1985)

C 66 POSITION CONTROL SYSTEM, US PAT 4310172Assignee: General Motors Corporation, (U.S. PTO Utility 1982)

C 67 ROAD SURFACE-SENSITIVE BEAM PATTERN LEVELING SYSTEM FOR A VEHICLE HEADLAMP, US PAT 4868720Assignee: Koito Seisakusho Co., Ltd., (U.S. PTO Utility 1989)

C 68 SIDELIGHTING ARRANGEMENT AND METHOD, US PAT 5428512 (U.S. PTO Utility 1995)

C 69 STEPPER MOTOR SHAFT POSITION SENSOR, US PAT 4791343Assignee: Allied-Signal Inc., (U.S. PTO Utility 1988)

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C 70 SUPPORT FRAME FOR HEADLIGHT AIMING APPARATUS, US PAT 5920386Assignee: Panter Master Controls, Inc.; Progressive Tool & Industries Co., (U.S. PTO Utility 1999)

C 71 SWITCHING CONTROL SYSTEM FOR AUTOMATICALLY TURNING HEADLIGHTS OFF AND ON AT INTERSECTIONS, US PAT 6097156 (U.S. PTO Utility 2000)

C 72 SYSTEM FOR AUTOMATICALLY ADJUSTING OPTICAL AXIS DIRECTION OF VEHICLE HEADLIGHT, US PAT 6193398Assignee: DENSO Corporation, (U.S. PTO Utility 2001)

C 73 SYSTEM FOR SELF-ALIGNING VEHICLE HEADLAMPS, US PAT 5633710Assignee: EGS Inc., (U.S. PTO Utility 1997)

C 74 TILTING DEVICE OF VEHICLE HEADLIGHT, US PAT 4916587Assignee: Koito Seisakusho Co., Ltd., (U.S. PTO Utility 1990)

C 75 VARIABLE DISTRIBUTION TYPE AUTOMOTIVE HEADLAMP, US PAT 5060120Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 1991)

C 76 VEHICLE CORNERING LAMP SYSTEM, US PAT 5526242Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 1996)

C 77 VEHICLE CORNERING LAMP SYSTEM, US PAT 4908560Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 1990)

C 78 VEHICLE HEADLIGHT AIMING APPARATUS, US PAT 5485265Assignee: Hopkins Manufacturing Corporation, (U.S. PTO Utility 1996)

C 79 VEHICLE HEADLIGHT WITH ADJUSTING MEANS FOR DIFFERENT TRAFFIC CONDITIONS, US PAT 5938319Assignee: Robert Bosch GmbH, (U.S. PTO Utility 1999)

C 80 VEHICULAR CORNERING LAMP SYSTEM, US PAT 5404278Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 1995)

C 81 VEHICULAR HEADLAMP PRODUCING LOW BEAM HAVING CUT LINE CONTROLLED IN ACCORDANCE WITH CONDITION OF CURVED ROAD, US PAT 5707129Assignee: Koito Manufacturing Co., Ltd., (U.S. PTO Utility 1998)

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## US District Court Civil Docket

**U.S. District - Texas Eastern**
**(Tyler)**

## 6:10cv78

## Balther Technologies, Llc v. American Honda Motor Co. Inc. et al

**This case was retrieved from the court on Thursday, November 29, 2012**

| | | | |
|---|---|---|---|
| **Date Filed:** | **03/08/2010** | **Class Code:** | **CLOSED** |
| **Assigned To:** | **Judge Leonard Davis** | **Closed:** | **Yes** |
| **Referred To:** | | **Statute:** | **35:271** |
| **Nature of suit:** | **Patent (830)** | **Jury Demand:** | **Plaintiff** |
| **Cause:** | **Patent Infringement** | **Demand Amount:** | **$0** |
| **Lead Docket:** | **None** | **NOS Description:** | **Patent** |
| **Other Docket:** | **None** | | |
| **Jurisdiction:** | **Federal Question** | | |

| Litigants | Attorneys |
|---|---|
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American Honda Motor Co. Inc.
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Honda Motor Company, Ltd.
Defendant

Bmw of North America, Llc
Defendant

Bmw AG
Defendant

Chrysler Group Llc
Defendant

Ferrari North America, Inc.
Defendant

Ferrari S.P.A.
Defendant

General Motors, Llc
Defendant

Hyundai Motor America
Defendant

Hyundai Motor Company
Defendant

Jaguar Land Rover North America, Llc
Defendant

Jaguar Cars Limited
Defendant

Maserati North America Inc
Defendant

Maserati S.P.A.
Defendant

Mercedes-Benz USA, Llc
Defendant

Daimler North America Corporation
Defendant

Daimler AG
Defendant

Mazda Motor of North America, Inc.
Defendant

Mazda Motor Corp.
Defendant

Mitsubishi Motors North America, Inc.
Defendant

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Nissan North America, Inc.
Defendant

Nissan Motor Co., Ltd.
Defendant

Porsche Cars North America, Inc.
Defendant

Dr. Ing. Hc.F. Porsche AG
Defendant

Saab Cars North America, Inc.
Defendant

Toyota Motor North America, Inc.
Defendant

Toyota Motor Sales, U.S.A., Inc.
Defendant

Toyota Motor Corp.
Defendant

Volkswagen Group of America, Inc.
Defendant

Automobili Lamborghini S.P.A.

Defendant

Audi AG
Defendant

Volkswagen AG
Defendant

Ford Motor Company
Defendant

Volvo Cars of North America, Llc
Defendant

Volvo Car Corp.
Defendant

| Date | # | Proceeding Text | Source |
|---|---|---|---|
| 03/08/2010 | 1 | COMPLAINT for Patent Infringement against all defendants ( Filing fee $ 350 receipt number 0540000000000002387982.), filed by Balther Technologies, LLC. (Attachments: # 1 Exhibit A, # 2 Civil Cover Sheet)(Albritton, Eric) (Entered: 03/08/2010) | |
| 03/08/2010 | | Judge Leonard Davis added. (mll, ) (Entered: 03/08/2010) | |
| 03/08/2010 | 2 | Notice of Filing of Patent/Trademark Form (AO 120). AO 120 mailed to the Director of the U.S. Patent and Trademark Office. (Albritton, Eric) (Entered: 03/08/2010) | |
| 03/09/2010 | 3 | NOTICE of Attorney Appearance by Thomas John Ward, Jr on behalf of Balther Technologies, LLC (Ward, Thomas) (Entered: 03/09/2010) | |
| 03/09/2010 | 4 | NOTICE of Attorney Appearance by Jack Wesley Hill on behalf of Balther Technologies, LLC (Hill, Jack) (Entered: 03/09/2010) | |
| 03/09/2010 | 5 | NOTICE of Attorney Appearance by Adam A Biggs on behalf of Balther Technologies, LLC (Biggs, Adam) (Entered: 03/09/2010) | |
| 03/09/2010 | 6 | NOTICE of Attorney Appearance by Debra Rochelle Coleman on behalf of Balther Technologies, LLC (Coleman, Debra) (Entered: 03/09/2010) | |
| 03/09/2010 | 7 | NOTICE of Attorney Appearance by Matthew Clay Harris on behalf of Balther Technologies, LLC (Harris, Matthew) (Entered: 03/09/2010) | |
| 03/10/2010 | 8 | NOTICE of Attorney Appearance by J Mike Amerson on behalf of Balther Technologies, LLC (Amerson, J) (Entered: 03/10/2010) | |
| 03/10/2010 | 9 | NOTICE of Attorney Appearance by Matthew Richard Rodgers on behalf of Balther Technologies, LLC (Rodgers, Matthew) (Entered: 03/10/2010) | |
| 03/10/2010 | 10 | NOTICE of Attorney Appearance by Michael Aaron Benefield on behalf of Balther Technologies, LLC (Benefield, Michael) (Entered: 03/10/2010) | |
| 03/10/2010 | 11 | NOTICE of Attorney Appearance by David Wynne Morehan on behalf of Balther Technologies, LLC (Morehan, David) (Entered: 03/10/2010) | |
| 03/10/2010 | 12 | NOTICE of Attorney Appearance by Danny Lloyd Williams on behalf of Balther Technologies, LLC (Williams, Danny) (Entered: 03/10/2010) | |
| 03/10/2010 | 13 | NOTICE of Attorney Appearance by Jaison Chorikavumkal John on behalf of Balther Technologies, LLC (John, Jaison) (Entered: 03/10/2010) | |
| 03/10/2010 | 14 | NOTICE of Attorney Appearance by Christopher Needham Cravey on behalf of Balther Technologies, LLC (Cravey, Christopher) (Entered: 03/10/2010) | |
| 04/26/2010 | 15 | ORDER that plaintiff file a notice that the case is ready for scheduling conference when all of the defendants have either answered or filed a motion to transfer or dismiss. The notice shall be filed within five days of the last remaining defendant's answer or motion. Signed by Judge Leonard Davis on 04/26/10. cc:attys 4-27-10(mll, ) (Entered: 04/27/2010) | |
| 04/28/2010 | 16 | E-GOV SEALED SUMMONS Issued as to American Honda Motor Co. Inc., BMW of North America, LLC, Chrysler Group LLC, Daimler North America Corporation, Ferrari North America, Inc., Ford Motor Company, General Motors, LLC, Hyundai Motor America, Jaguar Land Rover North America, LLC, Maserati North America Inc, Mazda Motor of North America, Inc., Mercedes-Benz USA, LLC, Mitsubishi Motors North America, Inc., | |

| | | |
|---|---|---|
| | | Nissan North America, Inc., Porsche Cars North America, Inc., SAAB Cars North America, Inc., Toyota Motor North America, Inc., Toyota Motor Sales, U.S.A., Inc., Volkswagen Group of America, Inc., Volvo Cars of North America, LLC., and emailed to pltf for service. (mll, ) (Entered: 04/28/2010) |
| 05/17/2010 | 17 | NOTICE of Voluntary Dismissal by Balther Technologies, LLC (Attachments: # 1 Text of Proposed Order)(Albritton, Eric) (Entered: 05/17/2010) |
| 05/18/2010 | 18 | ORDER DISMISSING CASE. This civil action is dismissed without prejudice. Pltf and defts shall bear their own costs, expenses and legal fees. Signed by Judge Leonard Davis on 05/18/10. cc:attys 5-18-10(mll, ) (Entered: 05/18/2010) |
| 05/18/2010 | 19 | Agreed MOTION for Extension of Time to File Answer re 1 Complaint by Mitsubishi Motors Corp., Mitsubishi Motors North America, Inc.. (Attachments: # 1 Text of Proposed Order) (Smith, Michael) (Entered: 05/18/2010) |
| 05/19/2010 | 20 | NOTICE by Mitsubishi Motors Corp., Mitsubishi Motors North America, Inc. re 19 Agreed MOTION for Extension of Time to File Answer re 1 Complaint (Notice of Withdrawal of Agreed MOTION for Extension of Time to File Answer) (Smith, Michael) (Entered: 05/19/2010) |

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*285312 (10) 7241034 July 10, 2007*

UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT

**7241034**

Get Drawing Sheet 1 of 7
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Link to Claims Section

July 10, 2007

Automatic directional control system for vehicle headlights

**REEXAM-LITIGATE:**

Reexamination requested July 10, 2010 by PATENT OWNER, Reexamination No. 90/011,011 (O.G. September 7, 2010) Ex. Gp.: 3992 July 10, 2010

Reexamination requested May 16, 2011 by Volkswagen Group of America, Inc.; (Att'y Is: Clifford A. Ulrich, Kenyon & Kenyon, LLP., New York, NY), Reexamination No. 95/001,621 (O.G. June 28, 2011) Ex. Gp.: 3992 May 16, 2011

NOTICE OF LITIGATION

Balther Technologies, LLC v. American Honda Motor Co Inc et al, Filed March 8, 2010, D.C. E.D. Texas, Doc. No. 6:10cv78

**INVENTOR:** Smith, James E. - Berkey, Ohio, United States of America (US), United States of America () ; McDonald, Anthony B. - Perrysburg, Ohio, United States of America (US), United States of America ()

**APPL-NO:** 285312 (10)

**FILED-DATE:** October 31, 2002

**GRANTED-DATE:** July 10, 2007

**ASSIGNEE-PRE-ISSUE:**
February 6, 2003 - ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS)., DANA CORPORATION 4500 DORR STREET TOLEDO OHIO 43615, Reel and Frame Number: 013729/0559

**ASSIGNEE-AT-ISSUE:**
Dana Corporation, Toledo, Ohio, United States of America (US), United States company or corporation (02)

**ASSIGNEE-AFTER-ISSUE:**
February 22, 2008 - ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS)., DANA AUTOMOTIVE SYSTEMS GROUP, LLC 4500 DORR STREET TOLEDO OHIO 43615, 4500 DORR STREET, TOLEDO, OHIO, UNITED STATES OF AMERICA (US), 43615, Reel and Frame Number: 020540/0476
June 12, 2009 - ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).,

STRAGENT, LLC 211 W. TYLER, SUITE C LONGVIEW TEXAS 75601, 211 W. TYLER, SUITE C, LONGVIEW, TEXAS, UNITED STATES OF AMERICA (US), 75601, Reel and Frame Number: 022813/0432
March 8, 2010 - ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS)., BALTHER TECHNOLOGIES, LLC, SUITE C-4, 211 W. TYLER, LONGVIEW, TEXAS, UNITED STATES OF AMERICA (US), 75601, Reel and Frame Number: 024045/0235

**LEGAL-REP:** MacMillan, Sobanski & Todd, LLC

**PRIM-EXMR:** Alavi, Ali

**CORE TERMS:** headlight, directional, controller, adjustment, sensed, algorithm, sensor, actuator, steering, minus, control system, road, suspension, responsive, automatic, feedback, orientation, beam, aiming, height, generating, electrical, input output device, plane, stored, automatically, optical, pitch, calibration, accomplish

**NO-OF-CLAIMS:** 5

Source: **Legal > / . . . / > Utility, Design and Plant Patents** [i]
Terms: **patno=7241034** (Suggest Terms for My Search)
View: Custom
Segments: Appl-no, Assignee, Cert-correction, Date, Exmr, Inventor, Legal-rep, Lit-reex, No-of-claims, Patno, Reexam-litigate, Reissue, Reissue-comment
Date/Time: Thursday, December 6, 2012 - 11:23 AM EST

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1. Weekly: Honey Hope Honesty Enterprise unchanged on weak volume, News Bites Asian Markets, September 8, 2012 Saturday, 674 words

2. Reexamination Requests Filed Weeks of 5/16/11 And 5/23/11, Patent Law Practice Center, May 31, 2011 Tuesday 10:11 AM EST, , 2671 words, Stefanie Levine

Source: **Combined Source Set 3 [i] - News, Most Recent Two Years (English, Full Text)**
Terms: **7241034 or 7,241,034** (Suggest Terms for My Search)
View: Cite
Date/Time: Thursday, December 6, 2012 - 11:24 AM EST

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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 95/001,621 | 05/16/2011 | 7,241,034 | SVIPGP109RE | 1240 |

90/011611

92045 7590 12/18/2012

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Dallas, TX 75229

| EXAMINER | |
|---|---|
| TON, MY TRANG | |
| **ART UNIT** | **PAPER NUMBER** |
| 3992 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 12/18/2012 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

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(THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS)

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New York, NY

10004

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DEC 18 2012

**CENTRAL REEXAMINATION UNIT**

# Transmittal of Communication to Third Party Requester *Inter Partes* Reexamination

REEXAMINATION CONTROL NUMBER 95/001,621; 90/011,011

PATENT NUMBER 7,241,034.

TECHNOLOGY CENTER 3900.

ART UNIT 3992.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above-identified reexamination proceeding. 37 CFR 1.903.

Prior to the filing of a Notice of Appeal, each time the patent owner responds to this communication, the third party requester of the *inter partes* reexamination may once file written comments within a period of 30 days from the date of service of the patent owner's response. This 30-day time period is statutory (35 U.S.C. 314(b)(2)), and, as such, it cannot be extended. See also 37 CFR 1.947.

If an *ex parte* reexamination has been merged with the *inter partes* reexamination, no responsive submission by any *ex parte* third party requester is permitted.

**All correspondence** relating to this inter partes reexamination proceeding should be directed to the **Central Reexamination Unit** at the mail, FAX, or hand-carry addresses given at the end of the communication enclosed with this transmittal.

PTOL-2070 (Rev.07-04)

| ACTION CLOSING PROSECUTION (37 CFR 1.949) | Control Nos. 95/001,621; 90/011,011 | Patent Under Reexamination 7,241,034 |
|---|---|---|
| | Examiner MY-TRANG TON | Art Unit 3992 |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address. --*

**Responsive to the communication(s) filed by:**
Patent Owner on 26 July, 2012
Third Party(ies) on _____

Patent owner may once file a submission under 37 CFR 1.951(a) within 1 month(s) from the mailing date of this Office action. Where a submission is filed, third party requester may file responsive comments under 37 CFR 1.951(b) within 30-days (not extendable- 35 U.S.C. § 314(b)(2)) from the date of service of the initial submission on the requester. **Appeal cannot be taken from this action.** Appeal can only be taken from a Right of Appeal Notice under 37 CFR 1.953.

**All correspondence** relating to this inter partes reexamination proceeding should be directed to the **Central Reexamination Unit** at the mail, FAX, or hand-carry addresses given at the end of this Office action.

**PART I. THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:**

1. ☐ Notice of References Cited by Examiner, PTO-892
2. ☐ Information Disclosure Citation, PTO/SB/08
3. ☐ _____

**PART II. SUMMARY OF ACTION:**

1a. ☒ Claims 1-41 are subject to reexamination.
1b. ☐ Claims _____ are not subject to reexamination.
2. ☒ Claims 1 and 2 have been canceled.
3. ☐ Claims _____ are confirmed. [Unamended patent claims]
4. ☒ Claims 3-13 and 15-35, 38-41 are patentable. [Amended or new claims]
5. ☒ Claims 14,36 and 37 are rejected.
6. ☐ Claims _____ are objected to.
7. ☐ The drawings filed on _____ ☐ are acceptable ☐ are not acceptable.
8 ☐ The drawing correction request filed on _____ is: ☐ approved. ☐ disapproved.
9 ☐ Acknowledgment is made of the claim for priority under 35 U.S.C. 119 (a)-(d). The certified copy has: ☐ been received. ☐ not been received. ☐ been filed in Application/Control No _____
10. ☐ Other _____

## ACTION CLOSING PROSECUTION

This is an inter partes reexamination of United States Patent Number 7,241,034 ("the '034 patent"), a merger of proceedings having control Number 95/001,621 and 90/011,011.

The '034 patent issued on July 10, 2007 based on US Patent Application No. 10/285,312 (the base application) filed on October 31, 2002.

The '034 patent is currently assigned to "Dana Corporation".

### Status of Patent Owner's Response

Patent owner responded to the prior office action on 7/26/2012 ("Response") and proposed amendments to claims 3-5, and cancellation of claims 1-2. This proposed amendment has been considered by the examiner and made of record. This action is in response to the Patent Owner's response.

### Status of Requester's Comments

There is no comment from the third Party requester.

### Status of the claims

The following is the status of the claims with respect to the proposed Amendment:

Claims 1-2 are cancelled.

Claims 3-5 are amended (Amend claim 3 to allegedly incorporate the features of claim 1, and amend claim 4-5 to depend on claim 3).

Claims 6-41 are newly added (the amendments filed 4/27/2012).

Of these, claims 3 and 7 are independent claims.

Thus, all subsequent reexamination prosecution and examination will be on the basis of the claims as amended in the proposed amendment. **It is noted that although the Office actions will treat proposed amendments as though they have been entered, the proposed amendments will not be effective until the reexamination certificate is issued.**

**References**

Request for reexamination in EP 90/011,011:

U.S. Patent 4,733,333 issued to Shibata (hereinafter "Shibata")

Request for reexamination in IP 95/001,621:

1. United Kingdom Patent Application Publication No. 2309773 by Uchida (hereinafter "Uchida").

2. United Kingdom Patent Application Publication No. 2309774 by Takahashi (hereinafter "Takahashi").

3. U.S. Patent No. 5,182,460 by Hussman (hereinafter "Hussman").

4. German Patent Application Publication No. 3110094 by Miskin et al (hereinafter "Miskin et al."}.

5. German Patent Application Publication No. 3129891 by Leleve (hereinafter "Leleve").

6. U.S. Patent No. 6,305,823 by Toda et al (hereinafter "Toda. et al.").

7. U.S. Patent No: 6,193,398 by Okuchi et al (hereinafter "Okuchi et al.").

8. U.S. Patent No. 5,909,949 by Gotoh (hereinafter "Gotoh").

9. U.S. Patent No. 4,954,933 by Wassen et al (hereinafter "Wassen et al.").

**Status of Previous not adopted Rejections**

Request for reexamination in EP 90/011,011:

Shibata's issue has been withdrawn in the Non-Office action. For reasoning see the Non-final Office action at pages 9-10.

Request for reexamination in IP 95/001,621:

1/ Issues 3, 8, 13 and 18 were found not to raise a SNQ in the Order will not be listed and will not be discussed further.

2/ Issues 1-2, 4-7, 9-12, 14-17 and 19-20 raised for the original claims 1-5 will not be evaluated because of the amendment filed on 4/27/2012.

3/ Issues 21, 23, 26, 29-33, 35, 36, 38 were found not adopted in the non-final Office action are not listed and will not be discussed further. For reasoning see the Non-final Office action at pages 11-12, 23-25, 53-55, 85-98.

**Status of Previous Rejections**

The following rejections were previously made by the Office:

Issue 22: Claims 1, 2, 4-6, 8, 15, 17-19, 23-24, 28-29, 31-32, 35-37 are rejected under 35 U.S.C. § 102(b) as being anticipated by Takahashi.

Issue 24: Claims 1, 2, 4-6, 8-9, 12, 14, 15, 17-19, 23-25, 31-37 are rejected under 35 U.S.C § 103(a) as being unpatentable over Toda in view of Uchida.

Issue 25: Claims 1, 2, 4-6, 8-9, 12, 14, 15, 17-19, 23-25, 28-29, 31-37 are rejected under 35 U.S.C § 103(a) as unpatentable over Toda in view of Takahashi.

Issue 27: Claims 1, 2, 4-6, 8-10,~ 12-15, 17-19, 23-24, 28-37 are rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Okuchi et al. and Uchida.

Issue 28: Claims 1, 2, 4-6, 8-10, 12-15, 17-19, 23-24, 28-37 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Okuchi et al. and Takahashi.

Issue 34: Claims 16, 20, 21, 25-27 (as amended on 4/27/2012) are rejected under 35 U.S.C. §103(a) as being unpatentable over Takahashi in view of the admitted prior art described in the '034 patent specification.

Issue 37: Claim 22 is rejected under 35 U.S.C. §103(a) as being unpatentable over Takahashi in view of Wassen.

**Details of previous rejections**

In view of the amendment filed by Patent Owner on 7/26/2012, grounds of rejection have been changed to reflect the changes.

As to issue 22: The rejection of claims 1, 2, 4-6, 8, 15, 17-19, 23-24, 28-29, 31-32, 35-37 under 35 U.S.C. § 102(b) as being anticipated by Takahashi **is withdrawn**.

Insofar as claim 3 has been amended to allegedly incorporate the features of claims 1 and 3, and claim 7 has been amended to allegedly incorporate the features of claims 1 and 7, Takahashi is no longer an anticipatory reference. Examiner agrees to withdrawn the previously adopted rejections in issue 22. The reference put forth in the request, Takahashi, is not seen to teach the subject matter of claims 3 and 7.

Remaining proposed reject claims 4-6, 8, 15, 17-19, 23-24, 28-29, 31-32, 35-37 are dependent claims and therefore are distinguishable from Takahashi at least the same reasons as their respective independent claims 3 and 7, and add further claim limitations of their own.

As to issue 24: The rejection of claims 1, 2, 4-6, 8-9, 12, 14, 15, 17-19, 23-25, 31-37 under 35 U.S.C § 103(a) as being unpatentable over Toda in view of Uchida **is withdrawn**.

Insofar as claim 3 has been amended to allegedly incorporate the features of claims 1 and 3, and claim 7 has been amended to allegedly incorporate the features of claims 1 and 7, the combination of Toda and Uchida no longer renders claims 3 and 7 obvious. Examiner agrees to withdrawn the previously adopted rejections in issue 24. The references put forth in the request, Toda in view of Uchida, are not seen to teach the subject matter of claims 3 and 7.

Remaining proposed reject claims 4-6, 8-9, 12, 14, 15, 17-19, 23-25, 31-37 are dependent claims and therefore are distinguishable from Toda in view of Uchida at least the same reasons as their respective independent claims 3 and 7, and add further claim limitations of their own.

As to issue 25: The rejection of claims 1, 2, 4-6, 8-9, 12, 14, 15, 17-19, 23-25, 28-29, 31-37 under 35 U.S.C § 103(a) as unpatentable over Toda in view of Takahashi **is withdrawn.**

Insofar as claim 3 has been amended to allegedly incorporate the features of claims 1 and 3, and claim 7 has been amended to allegedly incorporate the features of claims 1 and 7, the combination of Toda and Takahashi no longer renders claims 3 and 7 obvious. Examiner agrees to withdrawn the previously adopted rejections in issue 25. The references put forth in the request, Toda in view of Takahashi, are not seen to teach the subject matter of claims 3 and 7.

Remaining proposed reject claims 4-6, 8-9, 12, 14, 15, 17-19, 23-25, 28-29, 31-37 are dependent claims and therefore are distinguishable from Toda in view of Takahashi at least the same reasons as their respective independent claims 3 and 7, and add further claim limitations of their own.

As to issue 27: The rejection of claims 1, 2, 4-6, 8-10, 12-15, 17-19, 23-24, 28-37 under 35 U.S.C. § 103(a) as unpatentable over the combination of Okuchi et al and Uchida **is withdrawn.**

Insofar as claim 3 has been amended to allegedly incorporate the features of claims 1 and 3, and claim 7 has been amended to allegedly incorporate the features of claims 1 and 7, the combination of Okuchi and Uchida no longer renders claims 3 and 7 obvious. Examiner agrees to withdrawn the previously adopted rejections in issue 27. The references put forth in the request, Okuchi in view of Uchida, are not seen to teach the subject matter of claims 3 and 7.

Remaining proposed reject claims 4-6, 8-10, 12-15, 17-19, 23-24, 28-37 are dependent claims and therefore are distinguishable from Okuchi in view of Uchida at least the same reasons as their respective independent claims 3 and 7, and add further claim limitations of their own.

As to issue 28: The rejection of claims 1, 2, 4-6, 8-10, 12-15, 17-19, 23-24, 28-37 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Okuchi et al. and Takahashi **is withdrawn**.

Insofar as claim 3 has been amended to allegedly incorporate the features of claims 1 and 3, and claim 7 has been amended to allegedly incorporate the features of claims 1 and 7, the combination of Okuchi and Takahashi no longer renders claims 3 and 7 obvious. Examiner agrees to withdrawn the previously adopted rejections in issue 28. The references put forth in the request, Okuchi in view of Takahashi, are not seen to teach the subject matter of claims 3 and 7.

Remaining proposed reject claims 4-6, 8-10, 12-15, 17-19, 23-24, 28-37 are dependent claims and therefore are distinguishable from Okuchi in view of Takahashi at least the same reasons as their respective independent claims 3 and 7, and add further claim limitations of their own.

As to issue 34: The rejection of claims 16, 20, 21, 25-27 (as amended on 4/27/2012) under 35 U.S.C. §103(a) as being unpatentable over Takahashi in view of the admitted prior art described in the '034 patent specification **is withdrawn.**

Claims 16, 20, 21, 25-27 are dependent claims and therefore are distinguishable from Takahashi in view of the admitted prior art described in the '034 patent specification at least the same reasons as their respective independent claim 7, and add further claim limitations of their own.

As to issue 37: The rejection of claim 22 under 35 U.S.C. §103(a) as being unpatentable over Takahashi in view of Wassen **is withdrawn**.

Claim 22 is dependent claim and therefore is distinguishable from Takahashi in view of Wassen at least the same reasons as its respective independent claim 7, and add further claim limitation of its own.

### *Claim Rejections - 35 USC § 112*

Claims 14, 36 and 37 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 14: claim 7 already recites the limitations "two or more actuators". It appears that "a first actuator" and "a second actuator" now recite in claim 14 are a part of "two or more actuators" already recites in claim 7. Thus, in order to avoid any confusion, it is suggested that claim 14 should be amended as:

> 14. (Currently Amended) The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured [to include] <u>such that said two or more actuators include a first actuator and a second actuator and wherein</u> [a] <u>the</u> first actuator connected to the headlight to effect movement thereof in a first direction and [a] <u>the</u> second actuator connected to the headlight to effect movement thereof in a second direction different form the first direction.

Claims 36 and 37 include the same limitations for "the controller" as claim 7 and are therefore redundant. These claims should be cancelled.

## STATEMENT OF REASONS FOR PATENTABILITY AND/OR CONFIRMATION

The following is an examiner's statement of reasons for patentability and/or confirmation of the claims found patentable in this reexamination proceeding:

Independent claim 3 is patentable because of the fact that no single reference of record or combination of references teach "at least one of said two or more sensors generates at least one of said two or more sensor signals that is **representative of a rate of change of the steering angle of the vehicle**" in combination with a "**a controller**" **and "two or more actuators**" as required in claim 3.

Dependent claims 4-6 come freighted with the limitations of claim 3 from which they stem and are therefore patentable for the same reasons.

Independent claim 7 is patentable because of the fact that no single reference of record or combination of references teach "wherein **said first sensor is adapted to generate a signal that is representative of a condition including the steering angle of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle** " in combination with **"a controller" and "two or more actuators"** as required in claim 7.

Dependent claims 8-13, 15-35, 38-41 come freighted with the limitations of claim 7 from which they stem and are therefore patentable for the same reasons.

Any comments considered necessary by PATENT OWNER regarding the above statement must be submitted promptly to avoid processing delays. Such submission by the patent owner should be labeled: "Comments on Statement of Reasons for Patentability and/or Confirmation" and will be placed in the reexamination file.

## Conclusion

**This is an ACTION CLOSING PROSECUTION (ACP)**; see MPEP § 2671.02.

(1) Pursuant to 37 CFR 1.951(a), the patent owner may once file written comments limited to the issues raised in the reexamination proceeding and/or present a proposed amendment to the claims which amendment will be subject to the criteria of 37 CFR 1.116 as to whether it shall be entered and considered. Such comments and/or proposed amendments must be filed within a time period of 30 days or one month (whichever is longer) from the mailing date of this action. Where the patent owner files such comments and/or a proposed amendment, the third party requester may once file comments under 37 CFR 1.951(b) responding to the patent owner's submission within 30 days from the date of service of the patent owner's submission on the third party requester.

(2) If the patent owner does not timely file comments and/or a proposed amendment pursuant to 37 CFR 1.951(a), then the third party requester is precluded from filing comments under 37 CFR 1.951(b).

(3) Appeal **cannot** be taken from this action, since it is not a final Office action.

### *Extensions of Time*

Extensions of time under 37 CFR 1.136(a) will not be permitted in *inter partes* reexamination proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 314(c) requires that *inter partes* reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.937). Patent owner extensions of time in *inter partes* reexamination proceedings are provided for in 37 CFR 1.956. Extensions of time are not available for third party requester comments, because a comment period of 30 days from service of patent owner's response is set by statute. 35 U.S.C. 314(b)(3).

### *Notification of Other Proceedings*

The patent owner is reminded of the continuing responsibility under 37 CFR 1.985(a), to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving the '034 patent throughout the course of this reexamination proceeding. The third party requester is also reminded of the ability to similarly apprise the Office of any such activity or proceeding throughout the course of this reexamination proceeding. See MPEP § 2686 and 2686.04.

All correspondence relating to this inter partes reexamination proceeding should be directed:

By Mail to: Mail Stop InterPartes Reexam
Attn: Central Reexamination Unit
Commissioner for Patents
United States Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

By FAX to: (571) 273-9900
Central Reexamination Unit

By hand:
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Randolph Building
401 Dulany Street
Alexandria, VA 22314

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Any inquiry concerning this communication or earlier communications from the examiner, or as to the status of this proceeding, should be directed to the Central Reexamination Unit at telephone number (571) 272- 7705.

/My-Trang N. Ton/
Primary Examiner
Central Reexam Unit 3992

Conferees:

/Margaret Rubin/
Primary Examiner 3992

ANDREW J. FISCHER ajf
Supervisory Patent Reexamination Specialist
CRU -- Art Unit 3992

| Search Notes | Application/Control Nos. | Applicant(s)/Patent under Reexamination | |
|---|---|---|---|
| | 95/001,621; 90/011,011 | 7,241,034 | |
| | Examiner | Art Unit | |
| | MY-TRANG TON | 3992 | |

| SEARCHED | | | |
|---|---|---|---|
| Class | Subclass | Date | Examiner |
| n/a | - | 12/4/2012 | MT |

| SEARCH NOTES (INCLUDING SEARCH STRATEGY) | | |
|---|---|---|
| | DATE | EXMR |
| N/a | 12/4/2012 | MT |

| INTERFERENCE SEARCHED | | | |
|---|---|---|---|
| Class | Subclass | Date | Examiner |
| n/a | - | 12/4/2012 | MT |

| *Reexamination* | Application/Control Nos. 95/001,621; 90/011,011 | Applicant(s)/Patent Under Reexamination 7,241,034 |
|---|---|---|
| | **Certificate Date** | **Certificate Number** |

| **Requester** **Correspondence Address:** ☐ **Patent Owner** ☒ **Third Party** |
|---|
| Kenyon & Kenyon, LLP One Broadway<br>New York, NY<br>10004 |

| **LITIGATION REVIEW** ☒ | **mt** (examiner initials) | **12/6/2012** (date) |
|---|---|---|
| Case Name | | Director Initials |
| U.S. District - Texas Eastern<br>(Tyler)<br>6:10cv78<br>Balther Technologies, Llc v. American Honda Motor Co Inc et A | | /A.J.F./ for I.Y. |
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| **COPENDING OFFICE PROCEEDINGS** | |
|---|---|
| **TYPE OF PROCEEDING** | **NUMBER** |
| 1. 90/011011; 95/001,621 | |
| 2. | |
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| 4. | |

U.S. Patent and Trademark Office DOC. CODE **RXFILJKT**

**PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

| | |
|---|---|
| In re application of: | ) |
| | ) |
| 7,241,034 | ) Art Unit: 3992 |
| | ) |
| Applications No. 95/001,621 & 90/011,011 | ) Examiner: MY-TRANG N. TON |
| | ) |
| Filed: 05/16/2011 | ) Atty. Docket No.: |
| | ) SVIPGP109RE |
| For: AUTOMATIC DIRECTIONAL CONTROL SYSTEM FOR VEHICLE HEADLIGHTS | ) Date: 01/02/2013 |
| | ) |
| | ) |

**COMMENTS ON STATEMENT OF REASONS FOR PATENTABILITY AND/OR CONFIRMATION**

**AND**

**AMENDMENT F**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Examiner:

In response to the Office Action Closing Prosecution mailed 12/18/2012 ("Office Action"), please enter the following.

AMENDMENTS TO THE CLAIMS

Amended claims follow:

1. (Cancelled).

2. (Cancelled).

3. (Currently Amended) [The automatic directional control system defined in claim 1] An automatic directional control system for a vehicle headlight, comprising:

two or more sensors that are each adapted to generate a signal that is representative of at least one of a plurality of sensed conditions of a vehicle such that two or more sensor signals are generated, said sensed conditions including at least a steering angle and a pitch of the vehicle;

a controller that is responsive to said two or more sensor signals for generating at least one output signal only when at least one of said two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one first one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in at least one of the sensed conditions; and

said two or more actuators each being adapted to be connected to the headlight to effect movement thereof in accordance with said at least one output signal;

wherein at least one of said two or more sensors generates [a]at least one of said two or more sensor signals that is representative of [the]a rate of change of the steering angle of the vehicle.

4. (Currently Amended) The automatic directional control system defined in claim [1]3, wherein at least one of said two or more sensors generates a signal that is representative of [the]a rate of change of the pitch of the vehicle.

5. (Currently Amended) The automatic directional control system defined in claim [1]3, wherein at least one of said two or more sensors generates a signal that is representative of [the]a suspension height of the vehicle.

6. (New) The automatic directional control system defined in claim 3, wherein said two or more sensors include a first sensor and a second sensor.

7. (New) An automatic directional control system for a vehicle headlight, comprising:

two or more sensors that are each adapted to generate a signal that is representative of at least one of a plurality of sensed conditions of a vehicle such that two or more sensor signals are generated, said sensed conditions including at least a steering angle and a pitch of the vehicle;

a controller that is responsive to said two or more sensor signals for generating at least one output signal only when at least one of said two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in at least one of the sensed conditions; and

said two or more actuators each being adapted to be connected to the vehicle headlight to effect movement thereof in accordance with said at least one output signal;

wherein said two or more sensors include a first sensor and a second sensor; and

wherein said first sensor is adapted to generate a signal that is representative of a condition including the steering angle of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle.

8. (New) The automatic directional control system defined in claim 7, wherein said first sensor is physically separate from said second sensor.

9. (New) The automatic directional control system defined in claim 7, further comprising one or more additional sensors for sensing one or more of a rate of change of road speed of the vehicle, a rate of change of the steering angle of the vehicle, a rate of

change of the pitch of the vehicle, a suspension height of the vehicle, or a rate of change of suspension height of the vehicle.

10. (New) The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors generate a signal that is representative of the rate of change of the road speed of the vehicle.

11. (New) The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors generate a signal that is representative of the rate of change of the steering angle of the vehicle.

12. (New) The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors generate a signal that is representative of the rate of change of the pitch of the vehicle.

13. (New) The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors generate a signal that is representative of the suspension height of the vehicle.

14. (Currently Amended) The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that said two or more actuators include a first actuator and a second actuator and wherein the first actuator connected to the headlight to effect movement thereof in a first direction and the second actuator connected to the headlight to effect movement thereof in a second direction different from the first direction.

15. (New) The automatic directional control system defined in claim 7, wherein the two or more actuators include a first actuator that is adapted to be connected to the headlight to effect movement thereof in a vertical direction.

16. (New) The automatic directional control system defined in claim 15, wherein the two or more actuators include a second actuator that is adapted to be connected to the headlight to effect movement thereof in a horizontal direction.

17. (New) The automatic directional control system defined in claim 7, wherein the two or more actuators include an electronically controlled mechanical actuator.

18. (New) The automatic directional control system defined in claim 7, wherein the two or more actuators include a step motor.

19. (New) The automatic directional control system defined in claim 7, wherein the two or more actuators include a servo motor.

20. (New) The automatic directional control system defined in claim 7, wherein the two or more actuators include a microstepping motor capable of being operated in fractional step increments.

21. (New) The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted both up and down relative to a horizontal reference position and left and right relative to a vertical reference position.

22. (New) The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that, while in a calibration mode, a directional orientation at which a beam of light projects is capable of being adjusted relative to the vehicle by manual operation of the two or more actuators.

23. (New) The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that the controller includes a microprocessor.

24. (New) The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that the controller includes a programmable electronic controller.

25. (New) The automatic directional control system defined in claim 7, wherein the automatic directional control system further includes at least one position feedback sensor capable of providing a position feedback signal associated with at least one of the two or more actuators.

26. (New) The automatic directional control system defined in claim 25, wherein the at least one position feedback sensor includes a Hall Effect sensor.

27. (New) The automatic directional control system defined in claim 25, wherein the at least one position feedback sensor includes an optical interrupter.

28. (New) The automatic directional control system defined in claim 7, wherein the automatic directional control system further includes memory.

29. (New) The automatic directional control system defined in claim 28, wherein the memory includes non-volatile memory.

30. (New) The automatic directional control system defined in claim 28, wherein the memory is configured to store a predetermined reference position associated with the headlight.

31. (New) The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by sensing a front and a rear suspension height of the vehicle.

32. (New) The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by a pitch sensor.

33. (New) The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that the controller is programmed to be responsive to changes in a suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle.

34. (New) The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that the controller is programmed to be responsive to changes in a suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle, thereby ignoring frequency changes in the suspension height of the vehicle that are a result of bumps in a road.

35. (New) The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that the predetermined minimum threshold amount functions as a filter to minimize undesirable operation of at least one of the two or more actuators.

36. (Cancelled).

37. (Cancelled).

38. (New) The automatic directional control system defined in claim 7, wherein said controller is further responsive to at least one of said two or more sensor signals to automatically activate one or more vehicle lights that are different than the headlight.

39. (New) The automatic directional control system defined in claim 38, wherein said one or more vehicle lights that are different than the headlight include one or more lights for illuminating a road in front of the vehicle during a turn.

40. (New) The automatic directional control system defined in claim 7, wherein said controller is further responsive to a steering angle in excess of a predetermined magnitude for automatically activating one or more vehicle lights that are different than the headlight.

41. (New) The automatic directional control system defined in claim 7, wherein said controller is further responsive to a steering angle in excess of a predetermined magnitude for automatically activating one or more vehicle lights that are different than the headlight to extend an angular range of a road surface.

REMARKS

Patent Owner thanks the Examiner for noting the allowable subject matter. Patent Owner has amended Claim 14 to overcome alleged 35 U.S.C. §112 issues. Furthermore, Patent Owner has cancelled Claims 36 and 37. Table 1 shows a summary of Patent Owner's amendments, relative to Patent Owner's Amendment E, dated 7/26/2012.

**Table 1**

| |
|---|
| Claim 1 – Cancelled, same as Amendment E. |
| Claim 2 – Cancelled, same as Amendment E. |
| Claim 3 – Same text as Amendment E. |
| Claim 4 – Same text as Amendment E. |
| Claim 5 – Same text as Amendment E. |
| Claim 6 – Same text as Amendment E. |
| Claim 7 – Same text as Amendment E. |
| Claim 8 – Same text as Amendment E. |
| Claim 9 – Same text as Amendment E. |
| Claim 10 – Same text as Amendment E. |
| Claim 11 – Same text as Amendment E. |
| Claim 12 – Same text as Amendment E. |
| Claim 13 – Same text as Amendment E. |
| Claim 14 – Patent Owner deleted "to include" (which was presented in Amendment D1) and inserted "such that said two or more actuators include a first actuator and a second actuator and wherein." Patent Owner changed "a" to "the" relating to "the first actuator connected to the headlight" and "the second actuator connected to the headlight." |
| Claim 15 – Same text as Amendment E. |
| Claim 16 – Same text as Amendment E. |
| Claim 17 – Same text as Amendment E. |
| Claim 18 – Same text as Amendment E. |
| Claim 19 – Same text as Amendment E. |

Claim 20 – Same text as Amendment E.

Claim 21 – Same text as Amendment E.

Claim 22 – Same text as Amendment E.

Claim 23 – Same text as Amendment E.

Claim 24 – Same text as Amendment E.

Claim 25 – Same text as Amendment E.

Claim 26 – Same text as Amendment E.

Claim 27 – Same text as Amendment E.

Claim 28 – Same text as Amendment E.

Claim 29 – Same text as Amendment E.

Claim 30 – Same text as Amendment E.

Claim 31 – Same text as Amendment E.

Claim 32 – Same text as Amendment E.

Claim 33 – Same text as Amendment E.

Claim 34 – Same text as Amendment E.

Claim 35 – Same text as Amendment E.

Claim 36 – Cancelled

Claim 37 – Cancelled

Claim 38 – Same text as Amendment E.

Claim 39 – Same text as Amendment E.

Claim 40 – Same text as Amendment E.

Claim 41 – Same text as Amendment E.

Patent Owner further notes that the ‘034 patent is currently assigned to “Stragent, LLC” and not to “Dana Corporation” as stated by the Examiner on Page 2 of the Office Action. Patent Owner includes the accompanying 3.73(b) statement and assignment documents for the Examiner’s convenience.

In the event fees are due, the Commissioner is authorized to charge any additional fees or credit any overpayment to Deposit Account No. 50-4964 (Order No.

SVIPGP109RE). Patent Owner invites the Examiner to telephone the undersigned attorney at the number listed below in the event such communication would advance prosecution.

Additionally, the undersigned hereby certifies that a true and complete copy of the forgoing COMMENTS ON STATEMENT OF REASONS FOR PATENTABILITY AND/OR CONFIRMATION AND AMENDMENT F has been served on Third Party Requestor by mailing said copy on 02 Jan 2013, via First Class Mail, postage prepaid to:

Kenyon & Kenyon, LLP
One Broadway
New York, NY 10004

Respectfully submitted,

Dated: 02 Jan 2013

Patrick E. Caldwell, Esq.
Reg. No. 44,580

The Caldwell Firm, LLC
PO Box 59655
Dallas, Texas 75229-0655
Telephone: (214) 734-2313
pcaldwell@thecaldwellfirm.com

## STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Stragent, LLC

Application No./Patent No.: 7,241,034 Filed/Issue Date: 7-10-2007

Titled:
AUTOMATIC DIRECTIONAL CONTROL SYSTEM FOR VEHICLE HEADLIGHTS

Stragent, LLC, a Limited Liability Company
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;

2. ☐ an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is ________ %); or

3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel ________, Frame ________, or for which a copy therefore is attached.

**OR**

B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Smith, James E. and McDonald, Anthony B. To: Dana Corporation

The document was recorded in the United States Patent and Trademark Office at Reel 013729, Frame 0559, or for which a copy thereof is attached.

2. From: Dana Corporation To: Dana Automotive Systems Group, LLC

The document was recorded in the United States Patent and Trademark Office at Reel 020540, Frame 0476, or for which a copy thereof is attached.

3. From: Dana Automotive Systems Group, LLC To: Stragent, LLC

The document was recorded in the United States Patent and Trademark Office at Reel 022813, Frame 0432, or for which a copy thereof is attached.

☒ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (*i.e.*, a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Andrew Gordon/ 12/31/2012
Signature Date

Andrew Gordon Executive VP
Printed or Typed Name Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

## STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Stragent, LLC

Application No./Patent No.: 7,241,034 Filed/Issue Date: 7-10-2007

Titled: AUTOMATIC DIRECTIONAL CONTROL SYSTEM FOR VEHICLE HEADLIGHTS

Stragent, LLC, a Limited Liability Company
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;

2. ☐ an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is ________ %); or

3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel ____________, Frame ____________, or for which a copy therefore is attached.

**OR**

B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Stragent, LLC To: Balther Technologies, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 024045, Frame 0235, or for which a copy thereof is attached.

2. From: Balther Technologies, LLC To: Stragent, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel ____________, Frame ____________, or for which a copy thereof is attached.

3. From: ____________ To: ____________

The document was recorded in the United States Patent and Trademark Office at
Reel ____________, Frame ____________, or for which a copy thereof is attached.

☒ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (*i.e.*, a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Andrew Gordon/ 12/31/2012
Signature Date

Andrew Gordon Executive VP
Printed or Typed Name Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

ASSIGNMENT

WHEREAS, Balther Technologies, LLC, a Texas Limited Liability Company having a place of business at 211 W. Tyler, Suite C, Longview, TX 75601 (hereinafter "ASSIGNOR") is owner of:

Title: Automatic Directional Control System For Vehicle Headlights
Application Number: 10/285,312
Filing Date: 10/31/2002
Patent Number: 7,241,034
Issue Date: 7/10/2007

("Patent(s)/Application(s)")

WHEREAS, Stragent, LLC, a Texas Limited Liability Company having a place of business at 211 W. Tyler, Suite C, Longview, TX 75601 (hereinafter "ASSIGNEE") desires to acquire ASSIGNOR's entire right, title, and interest in and to the Patent(s)/Application(s);

NOW, THEREFORE, for good and valuable consideration, the receipt of which is hereby acknowledged, ASSIGNOR hereby acknowledges that it has sold, assigned, and transferred, and by these presents does hereby sell, assign, and transfer, unto ASSIGNEE, its successors, legal representatives, and assigns, the entire, irrevocable, and unconditional right, title, and interest of ASSIGNOR in, to, and under the Patent(s)/Application(s), and the inventions disclosed in the Patent(s)/Application(s) (regardless of whether claimed) including but not limited to (a) all rights of ASSIGNOR in any and all priority patent application(s), and all foreign and domestic patents that may issue from the Patent(s)/Application(s) and the aforementioned priority patent application(s), including reexaminations, reissues, renewals, continuations, continuations-in-part, divisionals, or extensions thereof that have been or may hereafter be filed, and (b) the right to sue for and collect damages for past, present, and future infringements of the Patent(s)/Application(s).

IN TESTIMONY WHEREOF, I hereunto set my hand and seal this 4 day of December 2010.

Chris Edgeworth

Name: Christopher M. Edgeworth
Title: President & CEO, Balther Technologies, LLC

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 14597762 |
| **Application Number:** | 95001621 |
| **International Application Number:** | |
| **Confirmation Number:** | 1240 |
| **Title of Invention:** | Automatic Directional Control System for Vehicle Headlights |
| **First Named Inventor/Applicant Name:** | 7,241,034 |
| **Customer Number:** | 92045 |
| **Filer:** | Patrick Edgar Caldwell |
| **Filer Authorized By:** | |
| **Attorney Docket Number:** | SVIPGP109RE |
| **Receipt Date:** | 02-JAN-2013 |
| **Filing Date:** | 16-MAY-2011 |
| **Time Stamp:** | 18:03:32 |
| **Application Type:** | inter partes reexam |

## Payment information:

| | |
|---|---|
| Submitted with Payment | no |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | | SVIPGP109RE_Combined_Amndt_F_vF_01-02-2013.pdf | 362488<br>4a1d6465bc470dcd3d530ab1d99005a4668d8376 | yes | 14 |

| | Multipart Description/PDF files in .zip description | | |
|---|---|---|---|
| | **Document Description** | **Start** | **End** |
| | Amendment/Req. Reconsideration-After Non-Final Reject | 1 | 11 |
| | Assignee showing of ownership per 37 CFR 3.73. | 12 | 14 |
| **Warnings:** | | | |
| **Information:** | | | |
| | **Total Files Size (in bytes):** | 362488 | |

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**
**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**
**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**
**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 95/001,621 + 90/011011 | 05/16/2011 | 7,241,034 | SVIPGP109RE | 1240 |

92045 7590 03/05/2013

The Caldwell Firm, LLC
PO Box 59655
Dept. SVIPGP
Dallas, TX 75229

| EXAMINER | |
|---|---|
| TON, MY TRANG | |
| **ART UNIT** | **PAPER NUMBER** |
| 3992 | |
| **MAIL DATE** | **DELIVERY MODE** |
| 03/05/2013 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

UNITED STATES PATENT AND TRADEMARK OFFICE

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(THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS)

Kenyon & Kenyon, LLP

One Broadway

New York, NY 10004

# Transmittal of Communication to Third Party Requester *Inter Partes* Reexamination

REEXAMINATION CONTROL NUMBER 95/001,621; 90/011,011

PATENT NUMBER 7,241,034.

TECHNOLOGY CENTER 3900.

ART UNIT 3992.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above-identified reexamination proceeding. 37 CFR 1.903.

Prior to the filing of a Notice of Appeal, each time the patent owner responds to this communication, the third party requester of the *inter partes* reexamination may once file written comments within a period of 30 days from the date of service of the patent owner's response. This 30-day time period is statutory (35 U.S.C. 314(b)(2)), and, as such, it cannot be extended. See also 37 CFR 1.947.

If an *ex parte* reexamination has been merged with the *inter partes* reexamination, no responsive submission by any *ex parte* third party requester is permitted.

PTOL-2070 (Rev.07-04)

| # Right of Appeal Notice (37 CFR 1.953) | Control No. 95/001,621; 90/011,011 | Patent Under Reexamination 7,241,034 |
|---|---|---|
| | Examiner MY-TRANG TON | Art Unit 3992 |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address. --*

Responsive to the communication(s) filed by:
Patent Owner on 02 January, 2013
Third Party(ies) on _____

Patent owner and/or third party requester(s) may file a notice of appeal with respect to any adverse decision with payment of the fee set forth in 37 CFR 41.20(b)(1) within **one-month or thirty-days (whichever is longer)**. See MPEP 2671. In addition, a party may file a notice of **cross** appeal and pay the 37 CFR 41.20(b)(1) fee **within fourteen days of service** of an opposing party's timely filed notice of appeal. See MPEP 2672.

**All correspondence** relating to this inter partes reexamination proceeding should be directed to the **Central Reexamination Unit** at the mail, FAX, or hand-carry addresses given at the end of this Office action.

If no party timely files a notice of appeal, prosecution on the merits of this reexamination proceeding will be concluded, and the Director of the USPTO will proceed to issue and publish a certificate under 37 CFR 1.997 in accordance with this Office action.

The proposed amendment filed 02 January, 2013 ☒ will be entered ☐ will not be entered*

*Reasons for non-entry are given in the body of this notice.

1a. ☒ Claims 1-41 are subject to reexamination.
1b. ☐ Claims _____ are not subject to reexamination.
2. ☒ Claims 1,2,36 and 37 have been cancelled.
3. ☐ Claims _____ are confirmed. [Unamended patent claims].
4. ☒ Claims 3-35 and 38-41 are patentable. [Amended or new claims].
5. ☐ Claims _____ are rejected.
6. ☐ Claims _____ are objected to.
7. ☐ The drawings filed on _____ ☐ are acceptable. ☐ are not acceptable.
8. ☐ The drawing correction request filed on _____ is ☐ approved. ☐ disapproved.
9. ☐ Acknowledgment is made of the claim for priority under 35 U.S.C. 119 (a)-(d) or (f). The certified copy has:
☐ been received. ☐ not been received. ☐ been filed in Application/Control No. _____.
10. ☐ Other _____

**Attachments**
1. ☐ Notice of References Cited by Examiner, PTO-892
2. ☐ Information Disclosure Citation, PTO/SB/08
3. ☐ _____

## DETAIL OFFICE ACTION

This is an inter partes reexamination of United States Patent Number 7,241,034 (herein "the '034 patent"), a merger of proceedings having control Number 95/001,621 and 90/011,011.

The '034 patent issued on July 10, 2007 based on US Patent Application No. 10/285,312 (the base application) filed on October 31, 2002.

The '034 patent is currently assigned to "Stragent, LLC".

This is a RIGHT OF APPEAL NOTICE (RAN); see MPEP § 2673.02 and § 2674. The decision in this Office action as to the patentability or unpatentability of any original patent claim, any proposed amended claim and any new claim in this proceeding is a **FINAL DECISION**.

**Submissions after Action Closing Prosecution**

Patent owner responded to the ACP on 1/2/2013 ("Response") and proposed amendments to claim 14, and cancellation of claims 36 and 37.

**Status of Patent Owner's Response**

The proposed amendment filed 1/2/2013 has been considered by the examiner and made of record. This action is in response to the Patent Owner's response.

**Status of Requester's Comments**

There is no comment from the third Party requester.

**Status of Claims**

The following is the status of the claims with respect to the proposed Amendment:

Claims 1, 2 (the amendment filed 4/27/2012) and 36, 37 (the Amendment filed 1/2/2013) are cancelled.

Claim 14 is amended to correct the rejection under 35 U.S.C 112, second paragraph (the amendment filed 1/2/2013).

Claims 3-13, 15-35 and 38-41 are remained as of the amendments filed 4/27/2012.

Of these, claims 3 and 7 are independent claims.

The Action Closing Prosecution, dated 12/18/2012, indicated that claims 3-13, 15-35, 38-41 were noted as being patentable. Amended claim 14 is now patentable.

## *Prior Art References*

Request for reexamination in EP 90/011,011:

U.S. Patent 4,733,333 issued to Shibata (hereinafter "Shibata")

Request for reexamination in IP 95/001,621:

1. United Kingdom Patent Application Publication No. 2309773 by Uchida (hereinafter "Uchida").

2. United Kingdom Patent Application Publication No. 2309774 by Takahashi (hereinafter "Takahashi").

3. U.S. Patent No. 5,182,460 by Hussman (hereinafter "Hussman").

4. German Patent Application Publication No. 3110094 by Miskin et al (hereinafter "Miskin et al."}.

5. German Patent Application Publication No. 3129891 by Leleve (hereinafter "Leleve").

6. U.S. Patent No. 6,305,823 by Toda et al (hereinafter "Toda. et al.").

7. U.S. Patent No: 6,193,398 by Okuchi et al (hereinafter "Okuchi et al.").

8. U.S. Patent No. 5,909,949 by Gotoh (hereinafter "Gotoh").

9. U.S. Patent No. 4,954,933 by Wassen et al (hereinafter "Wassen et al.").

## Status of Previous not adopted Rejections

Request for reexamination in EP 90/011,011:

Shibata's issue has been withdrawn in the Non-Office action. For reasoning see the Non-final Office action at pages 9-10.

Request for reexamination in IP 95/001,621:

1/ Issues 3, 8, 13 and 18 were found not to raise a SNQ in the Order will not be listed and will not be discussed further.

2/ Issues 1-2, 4-7, 9-12, 14-17 and 19-20 raised for the original claims 1-5 will not be evaluated because of the amendment filed on 4/27/2012.

3/ Issues 21, 23, 26, 29-33, 35, 36, 38 were found not adopted in the non-final Office action are not listed and will not be discussed further. For reasoning see the Non-final Office action at pages 11-12, 23-25, 53-55, 85-98.

## Status of Previous Rejections

The following rejections are previously noted by the Office:

As to issue 22: The rejection of claims 1, 2, 4-6, 8, 15, 17-19, 23-24, 28-29, 31-32, 35-37 under 35 U.S.C. § 102(b) as being anticipated by Takahashi.

As noted in the ACP, insofar as claim 3 has been amended to allegedly incorporate the features of claims 1 and 3, and claim 7 has been amended to allegedly incorporate the features of claims 1 and 7, Takahashi is no longer an anticipatory reference. Examiner agrees to withdrawn the previously adopted rejections in issue 22. Thus, the anticipated rejection based on the Takahashi **was withdrawn.**

As noted in the ACP, remaining proposed reject claims 4-6, 8, 15, 17-19, 23-24, 28-29, 31-32, 35-37 are dependent claims and therefore are distinguishable from Takahashi at least the same reasons as their respective independent claims 3 and 7, and add further claim limitations of their own.

The ACP mailed out 12/18/2012 is incorporated herein by reference.

As to issue 24: The rejection of claims 1, 2, 4-6, 8-9, 12, 14, 15, 17-19, 23-25, 31-37 under 35 U.S.C § 103(a) as being unpatentable over Toda in view of Uchida.

As noted in the ACP, insofar as claim 3 has been amended to allegedly incorporate the features of claims 1 and 3, and claim 7 has been amended to allegedly incorporate the features of claims 1 and 7, the combination of Toda and Uchida no longer renders claims 3 and 7 obvious. Examiner agrees to withdrawn the previously adopted rejections in issue 24. The references put forth in the request, Toda in view of Uchida, are not seen to teach the subject matter of claims 3 and 7. Thus, the obviousness rejection based on the combination of Toda in view of Uchida **was withdrawn.**

As noted in the ACP, remaining proposed reject claims 4-6, 8-9, 12, 14, 15, 17-19, 23-25, 31-37 are dependent claims and therefore are distinguishable from Toda in view of Uchida at least the same reasons as their respective independent claims 3 and 7, and add further claim limitations of their own.

The ACP mailed out 12/18/2012 is incorporated herein by reference.

As to issue 25: The rejection of claims 1, 2, 4-6, 8-9, 12, 14, 15, 17-19, 23-25, 28-29, 31-37 under 35 U.S.C § 103(a) as unpatentable over Toda in view of Takahashi.

As noted in the ACP, insofar as claim 3 has been amended to allegedly incorporate the features of claims 1 and 3, and claim 7 has been amended to allegedly incorporate the features of claims 1 and 7, the combination of Toda and Takahashi no longer renders claims 3 and 7 obvious. Examiner agrees to withdrawn the previously adopted rejections in issue 25. The references put forth in the request, Toda in view of Takahashi, are not seen to teach the subject matter of claims 3 and 7. Thus, the obviousness rejection based on the combination of Toda in view of Takahashi **was withdrawn.**

As noted in the ACP, remaining proposed reject claims 4-6, 8-9, 12, 14, 15, 17-19, 23-25, 28-29, 31-37 are dependent claims and therefore are distinguishable from Toda in view of Takahashi at least the same reasons as their respective independent claims 3 and 7, and add further claim limitations of their own.

The ACP mailed out 12/18/2012 is incorporated herein by reference.

As to issue 27: The rejection of claims 1, 2, 4-6, 8-10, 12-15, 17-19, 23-24, 28-37 under 35 U.S.C. § 103(a) as unpatentable over the combination of Okuchi et al and Uchida.

As noted in the ACP, insofar as claim 3 has been amended to allegedly incorporate the features of claims 1 and 3, and claim 7 has been amended to allegedly incorporate the features of claims 1 and 7, the combination of Okuchi and Uchida no longer renders claims 3 and 7 obvious. Examiner agrees to withdrawn the previously adopted rejections in issue 27. The references put forth in the request, Okuchi in view of Uchida, are not seen to teach the subject matter of claims 3 and 7. Thus, the obviousness rejection based on the combination of Okuchi in view of Uchida **was withdrawn.**

As noted in the ACP, remaining proposed reject claims 4-6, 8-10, 12-15, 17-19, 23-24, 28-37 are dependent claims and therefore are distinguishable from Okuchi in view of Uchida at least the same reasons as their respective independent claims 3 and 7, and add further claim limitations of their own.

The ACP mailed out 12/18/2012 is incorporated herein by reference.

As to issue 28: The rejection of claims 1, 2, 4-6, 8-10, 12-15, 17-19, 23-24, 28-37 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Okuchi et al. and Takahashi.

As noted in the ACP, insofar as claim 3 has been amended to allegedly incorporate the features of claims 1 and 3, and claim 7 has been amended to allegedly incorporate the features of claims 1 and 7, the combination of Okuchi and Takahashi no longer renders claims 3 and 7 obvious. Examiner agrees to withdrawn the previously adopted rejections in issue 28. The references put forth in the request, Okuchi in view of Takahashi, are not seen to teach the subject matter of claims 3 and 7. Thus, the obviousness rejection based on the combination of Okuchi in view of Takahashi **was withdrawn.**

As noted in the ACP, remaining proposed reject claims 4-6, 8-10, 12-15, 17-19, 23-24, 28-37 are dependent claims and therefore are distinguishable from Okuchi in view of Takahashi at least the same reasons as their respective independent claims 3 and 7, and add further claim limitations of their own.

The ACP mailed out 12/18/2012 is incorporated herein by reference.

As to issue 34: The rejection of claims 16, 20, 21, 25-27 (as amended on 4/27/2012) under 35 U.S.C. §103(a) as being unpatentable over Takahashi in view of the admitted prior art described in the '034 patent specification.

As noted in the ACP, claims 16, 20, 21, 25-27 are dependent claims and therefore are distinguishable from Takahashi in view of the admitted prior art described in the '034 patent specification at least the same reasons as their respective independent claim 7, and add further claim limitations of their own. Thus, the obviousness rejection based on the combination of Takahashi in view of the admitted prior art described in the '034 patent specification **was withdrawn**.

The ACP mailed out 12/18/2012 is incorporated herein by reference.

As to issue 37: The rejection of claim 22 under 35 U.S.C. §103(a) as being unpatentable over Takahashi in view of Wassen.

As noted in the ACP, claim 22 is dependent claim and therefore is distinguishable from Takahashi in view of Wassen at least the same reasons as its respective independent claim 7, and adds further claim limitation of its own. Thus, the obviousness rejection based on the combination of Takahashi in view of Wassen **was withdrawn**.

The ACP mailed out 12/18/2012 is incorporated herein by reference.

**STATEMENT OF REASONS FOR PATENTABILITY AND/OR CONFIRMATION**

The following is an examiner's statement of reasons for patentability and/or confirmation of the claims found patentable in this reexamination proceeding:

As noted in the ACP, independent claim 3 is patentable because of the fact that no single reference of record or combination of references teach "at least one of said two or more sensors generates at least one of said two or more sensor signals that is **representative of a rate of change of the steering angle of the vehicle**" in combination with a "**a controller**" **and "two or more actuators**" as required in claim 3.

Dependent claims 4-6 come freighted with the limitations of claim 3 from which they stem and are therefore patentable for the same reasons.

Independent claim 7 is patentable because of the fact that no single reference of record or combination of references teach "wherein **said first sensor is adapted to generate a signal that is representative of a condition including the steering angle of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle** " in combination with **"a controller" and "two or more actuators**" as required in claim 7.

Dependent claims 8-35, 38-41 come freighted with the limitations of claim 7 from which they stem and are therefore patentable for the same reasons.

Any comments considered necessary by PATENT OWNER regarding the above statement must be submitted promptly to avoid processing delays. Such submission by the patent owner should be labeled: "Comments on Statement of Reasons for Patentability and/or Confirmation" and will be placed in the reexamination file.

**Conclusion**

Extensions of time under 37 CFR 1.136(a) will not be permitted in *inter partes* reexamination proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 314(c) requires that *inter partes* reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.937). Patent owner extensions of time in *inter partes* reexamination proceedings are provided for in 37 CFR 1.956. Extensions of time are not available for third party requester comments, because a comment period of 30 days from service of patent owner's response is set by statute. 35 U.S.C. 314(b (3).

The patent owner is reminded of the continuing responsibility under 37 CFR 1.985(a), to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving the base patent throughout the course of this reexamination proceeding. The third party requester is also reminded of the ability to similarly apprise the Office of any such activity or proceeding throughout the course of this reexamination proceeding. See MPEP § 2686 and 2686.04.

**This is a RIGHT OF APPEAL NOTICE (RAN)**; see MPEP § 2673.02 and § 2674. The decision in this Office action as to the patentability or unpatentability of any original patent claim, any proposed amended claim and any new claim in this proceeding is a FINAL DECISION.

No amendment can be made in response to the Right of Appeal Notice in an *inter partes* reexamination. 37 CFR 1.953(c). Further, no affidavit or other evidence can be submitted in an *inter partes* reexamination proceeding after the right of appeal notice, except as provided in 37 CFR 1.981 or as permitted by 37 CFR 41.77(b)(1). 37 CFR 1.116(f).

Each party has a **thirty-day or one-month time period, whichever is longer**, to file a notice of appeal. The patent owner may appeal to the Board of Patent Appeals and Interferences with respect to any decision adverse to the patentability of any original or proposed amended or new claim of the patent by filing a notice of appeal and paying the fee set forth in 37 CFR 41.20(b)(1). The third party requester may appeal to the Board of Patent Appeals and Interferences with respect to any decision favorable to the patentability of any original or proposed amended or new claim of the patent by filing a notice of appeal and paying the fee set forth in 37 CFR 41.20(b)(1).

In addition, a patent owner who has not filed a notice of appeal may file a notice of cross appeal within **fourteen days of service** of a third party requester's timely filed notice of appeal and pay the fee set forth in 37 CFR 41.20(b)(1). A third party requester who has not filed a notice of appeal may file **a notice of cross appeal within fourteen days of service** of a patent owner's timely filed notice of appeal and pay the fee set forth in 37. CFR 41.20(b)(1).

Any appeal in this proceeding must identify the claim(s) appealed, and must be signed by the patent owner (for a patent owner appeal) or the third party requester (for a third party requester appeal), or their duly authorized attorney or agent.

Any party that does not file a timely notice of appeal or a timely notice of cross appeal will lose the right to appeal from any decision adverse to that party, but will not lose the right to file a respondent brief and fee where it is appropriate for that party to do so. If no party files a timely appeal, the reexamination prosecution will be terminated, and the Director will proceed to issue and publish a certificate under 37 CFR 1.997 in accordance with this Office action.

All correspondence relating to this inter partes reexamination proceeding should be directed:

By Mail to: Mail Stop lnterPartes Reexam
Attn: Central Reexamination Unit
Commissioner for Patents
United States Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

By FAX to: (571) 273-9900
Central Reexamination Unit

By hand:
Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Registered users of EFS-Web may alternatively submit such correspondence via the electronic filing system EFS-Web, at https://sportal.uspto.gov/authenticate/authenticateuserlocalepf.html. EFS-Web offers the benefit of quick submission to the particular area of the Office that needs to act on the correspondence. Also, EFS- Web submissions are "soft scanned" (i.e., electronically uploaded) directly into the official file for the reexamination proceeding, which offers parties the opportunity to review the content of their submissions after the "soft scanning." processing complete.

Any inquiry concerning this communication or earlier communications from the examiner, or as to the status of this proceeding, should be directed to the Central Reexamination Unit at telephone number (571) 272- 7705.

/My-Trang Nu Ton/
Primary Examiner
Central Reexam Unit 3992

Conferees:
/Margaret Rubin/
Primary Examiner, CRU 3992

/ANDREW J. FISCHER/
Supervisory Patent Examiner, Art Unit 3992

| *Reexamination* | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 95/001,621; 90/011,011 | 7,241,034 |
| | **Certificate Date** | **Certificate Number** |
| | | |

**Requester** **Correspondence Address:** ☐ **Patent Owner** ☒ **Third Party**

Kenyon & Kenyon, LLP
One Broadway
New York, NY 10004

| LITIGATION REVIEW ☒ | mt (examiner initials) | 2/19/2013 (date) |
|---|---|---|
| Case Name | | Director Initials |
| U.S. District - Texas Eastern (Tyler) 6:10cv78 Balther Technologies, Llc v. American Honda Motor Co. Inc. et al | | /A.J.F./ for I.Y. |
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| COPENDING OFFICE PROCEEDINGS | |
|---|---|
| **TYPE OF PROCEEDING** | **NUMBER** |
| 1. 90/011011 | |
| 2. | |
| 3. | |
| 4. | |

U.S. Patent and Trademark Office DOC. CODE RXFILJKT

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 95/001,621<br>90/011011 | 05/16/2011 | 7,241,034 | SVIPGP109RE | 1240 |

92045 7590 04/29/2013

The Caldwell Firm, LLC
PO Box 59655
Dept. SVIPGP
Dallas, TX 75229

| EXAMINER | |
|---|---|
| TON, MY TRANG | |
| **ART UNIT** | **PAPER NUMBER** |
| 3992 | |
| **MAIL DATE** | **DELIVERY MODE** |
| 04/29/2013 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 90/011,011 | 07/10/2010 | 7,241,034 | SVIPGP109RE | 3919 |

95/001621

92045 7590 04/29/2013

The Caldwell Firm, LLC
PO Box 59655
Dept. SVIPGP
Dallas, TX 75229

| EXAMINER | |
|---|---|
| TON, MY TRANG | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 3992 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 04/29/2013 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patents and Trademark Office
P.O.Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS
KENYON & KENYON LLP
ONE BROADWAY
NEW YORK, NY 10004

Date:

MAILED

APR 29 2013

CENTRAL REEXAMINATION UNIT

**Transmittal of Communication to Third Party Requester**
**Inter Partes Reexamination**

REEXAMINATION CONTROL NO. : 95001621 + 90/011011
PATENT NO. : 7241034
ART UNIT : 3992

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above-identified reexamination proceeding. 37 CFR 1.903.

Prior to the filing of a Notice of Appeal, each time the patent owner responds to this communication, the third party requester of the inter partes reexamination may once file written comments within a period of 30 days from the date of service of the patent owner's response. This 30-day time period is statutory (35 U.S.C. 314(b)(2)), and, as such, it cannot be extended. See also 37 CFR 1.947.

If an ex parte reexamination has been merged with the inter partes reexamination, no responsive submission by any ex parte third party requester is permitted.

All correspondence relating to this inter partes reexamination proceeding should be directed to the Central Reexamination Unit at the mail, FAX, or hand-carry addresses given at the end of the communication enclosed with this transmittal.

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450

| APPLICATION NO./ CONTROL NO. | FILING DATE | FIRST NAMED INVENTOR / PATENT IN REEXAMINATION | ATTORNEY DOCKET NO. |
|---|---|---|---|
| 95/001621& 90/011011 | 16 May, 2011 | 7,241,034 | SVIPGP109RE |

| | EXAMINER | |
|---|---|---|
| The Caldwell Firm, LLC<br>PO Box 59655<br>Dept. SVIPGP<br>Dallas, TX 75229 | MY-TRANG TON | |
| | ART UNIT | PAPER |
| | 3992 | 20130411 |

DATE MAILED:

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner for Patents**

On March 5, 2013, the USPTO mailed a right of appeal notice (RAN) for reexamination of U.S Patent 7,241,034, a merger of proceedings having control Number 95/001,621 and 90/011,011, indicated under Status of claims section on page 4, lines 7-8, that "Claims 3-13, 15-35 and 38-41 are remained as of the amendments filed 4/27/2012". However, lines 7-8 of page 4 should be "Claims 3-13, 15-35 and 38-41 are remained as of the amendments filed 7/26/2012 and 1/2/2013".

Any inquiry concerning this communication or earlier communications from the examiner, or as to the status of this proceeding, should be directed to the Central Reexamination Unit at telephone number (571) 272- 7705.

| | |
|---|---|
| /My-Trang Ton/<br>Primary Examiner, CRU 3992 | /Margaret Rubin/<br>Primary Examiner, CRU 3992<br>/Andrew J. Fischer/<br>SPRS, CRU 3992 |

PTO-90C (Rev.04-03)

| Transmittal of Communication to Third Party Requester *Inter Partes* Reexamination | Control No. | Patent Under Reexamination | |
|---|---|---|---|
| | 95/001,621; 90/011,011 | 7,241,034 | |
| | Examiner | Art Unit | |
| | MY-TRANG TON | 3992 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address. --*

(THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS)

Kenyon & Kenyon, LLP
One Broadway
New York, NY 10004

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above-identified reexamination prceeding. 37 CFR 1.903.

Prior to the filing of a Notice of Appeal, each time the patent owner responds to this communication, the third party requester of the *inter partes* reexamination may once file written comments within a period of 30 days from the date of service of the patent owner's response. This 30-day time period is statutory (35 U.S.C. 314(b)(2)), and, as such, it cannot be extended. See also 37 CFR 1.947.

If an *ex parte* reexamination has been merged with the *inter partes* reexamination, no responsive submission by any *ex parte* third party requester is permitted.

**All correspondence** relating to this inter partes reexamination proceeding should be directed to the **Central Reexamination Unit** at the mail, FAX, or hand-carry addresses given at the end of the communication enclosed with this transmittal.

U.S. Patent and Trademark Office
PTOL-2070 (Rev. 07-04)

Paper No. 20130411

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 95/001,621 | 05/16/2011 | 7,241,034 | SVIPGP109RE | 1240 |

40101101

92045 7590 05/17/2013

The Caldwell Firm, LLC
PO Box 59655
Dept. SVIPGP
Dallas, TX 75229

| EXAMINER | |
|---|---|
| TON, MY TRANG | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 3992 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 05/17/2013 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

**DO NOT USE IN PALM PRINTER**

(THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS)

Kenyon & Kenyon, LLP

One Broadway

New York, NY 10004

**MAILED**

MAY 17 2013

**CENTRAL REEXAMINATION UNIT**

## Transmittal of Communication to Third Party Requester *Inter Partes* Reexamination

REEXAMINATION CONTROL NUMBER 95/001,621.

PATENT NUMBER 7,241,034.

TECHNOLOGY CENTER 3900.

ART UNIT 3992.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above-identified reexamination proceeding. 37 CFR 1.903.

Prior to the filing of a Notice of Appeal, each time the patent owner responds to this communication, the third party requester of the *inter partes* reexamination may once file written comments within a period of 30 days from the date of service of the patent owner's response. This 30-day time period is statutory (35 U.S.C. 314(b)(2)), and, as such, it cannot be extended. See also 37 CFR 1.947.

If an *ex parte* reexamination has been merged with the *inter partes* reexamination, no responsive submission by any *ex parte* third party requester is permitted.

**All correspondence** relating to this inter partes reexamination proceeding should be directed to the **Central Reexamination Unit** at the mail, FAX, or hand-carry addresses given at the end of the communication enclosed with this transmittal.

PTOL-2070 (Rev.07-04)

| NOTICE OF INTENT TO ISSUE INTER PARTES REEXAMINATION CERTIFICATE | Control No. 95/001,621; 90/011,011 | Patent Under Reexamination 7,241,034 |
|---|---|---|
| | Examiner MY-TRANG TON | Art Unit 3992 |

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address.* --

1. ☒ Prosecution on the merits is (or remains) closed in this *inter partes* reexamination proceeding. This proceeding is subject to reopening at the initiative of the Office or upon petition. *Cf.* 37 CFR 1.313(a). A Certificate will be issued in view of:
   a. ☒ The communication filed on 02 January, 2013 by Patent Owner.
   b. ☐ Patent owner's failure to file an appropriate timely response to the Office action dated .
   c. ☒ The failure to timely file an Appeal with fee by all parties to the reexamination proceeding entitled to do so. 37 CFR 1.959 and 41.61.
   d. ☐ The failure to timely file an Appellant's Brief with fee by all parties to the reexamination proceeding entitled to do so. 37 CFR 41.66(a).
   e. ☐ The decision on appeal by the ☐ Board of Patent Appeals and Interferences ☐ Court dated
   f. ☐ Other:

2. ☒ The Reexamination Certificate will indicate the following:
   a. Change in the Specification: ☐ Yes ☒ No
   b. Change in the Drawings: ☐ Yes ☒ No
   c. Status of the Claims:
      (1) Patent claim(s) confirmed: .
      (2) Patent claim(s) amended (including dependent on amended claim(s)): 3-5
      (3) Patent claim(s) cancelled: 1 and 2.
      (4) Newly presented claim(s) patentable: 6-35 and 38-41.
      (5) Newly presented cancelled claims: 36 and 37.
      (6) Patent claim(s) ☐ previously ☐ currently disclaimed:
      (7) Patent claim(s) not subject to reexamination: .

3. ☒ Note the attached statement of reasons for patentability and/or confirmation. Any comments considered necessary by patent owner regarding reasons for patentability and/or confirmation must be submitted promptly to avoid processing delays. Such submission(s) should be labeled: "Comments On Statement of Reasons for Patentability and/or Confirmation."

4. ☐ Note attached NOTICE OF REFERENCE CITED, (PTO-892).

5. ☐ Note attached LIST OF REFERENCES CITED (PTO/SB/08 or PTO/SB/08 substitute).

6. ☐ The drawings filed on ______ is: ☐ approved ☐ disapproved.

7. ☐ Acknowledgment is made of the claim for priority under 35 U.S.C. § 119(a) - (d) or (f).
   a)☐ All b)☐ Some* c)☐ None of the certified copies have
   ☐ been received.
   ☐ not been received.
   ☐ been filed in Application No. .
   ☐ been filed in reexamination Control No. .
   ☐ been received by the International Bureau in PCT Application No. .

   * Certified copies not received: .

8. ☐ Note Examiner's Amendment.

9. ☐ Other: .

**All correspondence** relating to this *inter partes* reexamination proceeding should be directed to the **Central Reexamination Unit** at the mail, FAX, or hand-carry addresses given at the end of this Office action.

U.S. Patent and Trademark Office
PTOL-2068 (07-10) NOTICE OF INTENT TO ISSUE *INTER PARTES* REEXAMINATION CERTIFICATE
Part of Paper No. 20130513

**Notice of Intent to Issue Reexamination Certificate for *Control No.* 95/001,621 and 90/011,011**

This is an inter partes reexamination of United States Patent Number 7,241,034 (herein "the '034 patent"), a merger of proceedings having control Number 95/001,621 and 90/011,011.

The '034 patent is currently assigned to Dana Corporation.

**Review of Facts**

1/ Amendments were filed on April 27, 2012 and July 26, 2012. These amendments have been considered and entered.

2/ An Action Closing Prosecution was mailed on December 18, 2012.

3/ A Right of Appeal Notice was mailed on March 5, 2013 in which Patent Owner and Third Party Requester were given a thirty-day or one-month time period (whichever is longer) to file a notice of appeal.

4/ No response has been received.

The RAN indicates:

*If no party timely files a notice of appeal, prosecution on the merits of this reexamination proceeding will be concluded, and the Director of the USPTO will proceed to issue and publish a certificate under 37 CFR 1.997 accordance with this Office action.*

Accordingly, this Notice of Intent to Issue Inter Partes Reexamination Certificate is being issued.

***Claim Status***

Claims 1-41 are subject to reexamination.

Of these:

1/ Claims 1-2 and 36-37 are cancelled (the Amendments filed July 26, 2012 and January 2, 2013).

2/ Claims 3-35 and 38-41 are patentable. Of these, claims 3 and 7 are independent claims.

**STATEMENT OF REASONS FOR PATENTABILITY AND/OR CONFIRMATION**

The following is an examiner's statement of reasons for patentability and/or confirmation of the claims found patentable in this reexamination proceeding:

Independent claim 1 is patentable because of the fact that no single reference of record or combination of references teach "at least one of said two or more sensors generates at least one of said two or more sensor signals that is **representative of a rate of change of the steering angle of the vehicle**" in combination with a "a **controller" and "two or more actuators**" as required in claim 3.

Claims 4-6 depend directly from claim 3 are patentable for at least the reasons claim 3 is found patentable.

Independent claim 7 is patentable because of the fact that no single reference of record or combination of references teach "wherein **said first sensor is adapted to generate a signal that is representative of a condition including the steering angle of the vehicle and said second sensor is**

**adapted to generate a signal that is representative of a condition including the pitch of the vehicle** " in combination with "**a controller" and** "**two or more actuators**" as required in claim 7.

Claims 8-35 and 38-41 depend directly from claim 7 are patentable for at least the reasons claim 7 is found patentable.

Any comments considered necessary by PATENT OWNER regarding the above statement must be submitted promptly to avoid processing delays. Such submission by the patent owner should be labeled: "Comments on Statement of Reasons for Patentability and/or Confirmation" and will be placed in the reexamination file.

All correspondence relating to this *inter partes* reexamination proceeding should be directed:

By Mail to: Mail Stop *Inter Partes* Reexam
Attn: Central Reexamination Unit
Commissioner for Patents
United States Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

By FAX to: (571) 273-9900
Central Reexamination Unit

By hand: Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Registered users of EFS-Web may alternatively submit such correspondence via the electronic filing system EFS-Web, at https://sportal.uspto.gov/authenticate/authenticateuserlocalepf.html. EFS-Web offers the benefit of quick submission to the particular area of the Office that needs to act on the correspondence. Also, EFS-Web submissions are "soft scanned" (i.e., electronically uploaded) directly into the official file for the reexamination proceeding, which offers parties the opportunity to review the content of their submissions after the "soft scanning" process is complete.

Any inquiry concerning this communication or earlier communications from the examiner, or as to the status of this proceeding, should be directed to the Central Reexamination Unit at telephone number (571) 272-7705.

/My-Trang N. Ton/
Primary Examiner
Central Reexamination Unit 3992

Conferees:

/Margaret Rubin/
Primary Examiner CRU 3992

/ANDREW J. FISCHER/
Supervisory Patent Examiner, Art Unit 3992

| ***Search Notes*** | Application/Control No. 95/001,621 | Applicant(s)/Patent under Reexamination 7,241,034 |
|---|---|---|
| | Examiner MY-TRANG TON | Art Unit 3992 |

**SEARCHED**

| Class | Subclass | Date | Examiner |
|---|---|---|---|
| N/A | - | 5/13/2013 | MT |
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**INTERFERENCE SEARCHED**

| Class | Subclass | Date | Examiner |
|---|---|---|---|
| n/a | - | 5/13/2013 | MT |
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**SEARCH NOTES (INCLUDING SEARCH STRATEGY)**

| | DATE | EXMR |
|---|---|---|
| None | 5/13/2013 | MT |
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| *Issue Classification* | Application/Control No. | Applicant(s)/Patent under Reexamination | |
|---|---|---|---|
| | 95/001,621; 90/011,011 | 7,241,034 | |
| | Examiner | Art Unit | |
| | MY-TRANG TON | 3992 | |

# ISSUE CLASSIFICATION

| ORIGINAL | | | | | CROSS REFERENCE(S) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CLASS | | | | SUBCLASS | CLASS | SUBCLASS (ONE SUBCLASS PER BLOCK) | | | | | | |
| 362 | | | | 465 | 701 | 49 | | | | | | |
| INTERNATIONAL CLASSIFICATION | | | | | | | | | | | | |
| B | 6 | 0 | Q | 1/00 | | | | | | | | |
| B | 0 | 6 | R | 22/00 | | | | | | | | |
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|---|---|---|
| (Assistant Examiner) (Date) | /My Trang Nu Ton/<br>Primary Examiner, CRU 3992 | Total Claims Allowed: 37 |
| (Legal Instruments Examiner) (Date) | (Primary Examiner) (Date) | O.G. Print Claim(s): 3 — O.G. Print Fig.: 1 |

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

| Final | Original | Final | Original | Final | Original | Final | Original | Final | Original | Final | Original | Final | Original |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 31 | | 61 | | 91 | | 121 | | 151 | | 181 |
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| | 4 | | 34 | | 64 | | 94 | | 124 | | 154 | | 184 |
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| | 6 | | 36 | | 66 | | 96 | | 126 | | 156 | | 186 |
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# BIB DATA SHEET

**CONFIRMATION NO. 1240**

| SERIAL NUMBER | FILING or 371(c) DATE | CLASS | GROUP ART UNIT | ATTORNEY DOCKET NO. |
|---|---|---|---|---|
| 95/001,621 | 05/16/2011<br>RULE | 362 | 3992 | SVIPGP109RE |

**APPLICANTS**

7,241,034, Residence Not Provided;
BALTHER TECHNOLOGIES, LLC (OWNER), LONGVIEW, TX;
KENYON & KENYON LLP, (3RD.PTY.REQ.), NEW YORK, NY;
VOLKSWAGEN GROUP OF AMERICA, INC. (REAL.PTY.IN.INTEREST.), HERNDON, VA;
KENYON & KENYON LLP, NEW YORK, NY

**** CONTINUING DATA ***************************

This application is a REX of 10/285,312 10/31/2002 PAT 7241034
which claims benefit of 60/335,409 10/31/2001
and claims benefit of 60/356,703 02/13/2002
and claims benefit of 60/369,447 04/02/2002

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****

| Foreign Priority claimed ☐ Yes ☑ No<br>35 USC 119(a-d) conditions met ☐ Yes ☑ No<br>Verified and Acknowledged /MY-TRANG TON/ Examiner's Signature | ☐ Met after Allowance<br>mt Initials | STATE OR COUNTRY | SHEETS DRAWINGS | TOTAL CLAIMS | INDEPENDENT CLAIMS |
|---|---|---|---|---|---|

**ADDRESS**

The Caldwell Firm, LLC
PO Box 59655
Dept. SVIPGP
Dallas, TX 75229
UNITED STATES

**TITLE**

Automatic Directional Control System for Vehicle Headlights

| FILING FEE RECEIVED | FEES: Authority has been given in Paper No.__________ to charge/credit DEPOSIT ACCOUNT No.__________ for following: | ☐ All Fees<br>☐ 1.16 Fees (Filing)<br>☐ 1.17 Fees (Processing Ext. of time)<br>☐ 1.18 Fees (Issue)<br>☐ Other __________<br>☐ Credit |
|---|---|---|

BIB (Rev. 05/07).

| Reexamination | Application/Control No.<br>95/001,621; 90/011,011 | Applicant(s)/Patent Under Reexamination<br>7,241,034 |
|---|---|---|
| | Certificate Date | Certificate Number<br>C1 |

**Requester** **Correspondence Address:** ☐ Patent Owner ☒ Third Party

Kenyon & Kenyon, LLP
One Broadway
New York, NY 10004

| LITIGATION REVIEW ☒ | MT (examiner initials) | 5/13/13 (date) |
|---|---|---|
| Case Name | | Director Initials |
| U.S. District - Texas Eastern (Tyler) 6:10cv78 Balther Technologies, Llc v. American Honda Motor Co. Inc. et al | | |
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| TYPE OF PROCEEDING | NUMBER |
| 1. 90/011011 | |
| 2. | |
| 3. | |
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U.S. Patent and Trademark Office DOC. CODE RXFILJKT

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UNITED STATES PATENT AN D TRADEMARK OFFICE

# EXAMINER CHECKLIST - REEXAMINATION

☐ *Ex Parte* Reexam ☒ *Inter Partes* Reexam

**CONTROL NO(S).**

9 5/001621

9 0/011011

9

EXAMINER:

All items must be reviewed and completed by the examiner. After completion, this checklist and the reexamination IFW Action Folder (and the patent file wrapper, if one exists) should be forwarded (a) for a reexam in the TC, to the reexamination clerk, or (b) for a reexam in the CRU,to the Patent Reexamination Specialist. Note: If a previous reexamination certificate has been issued, all references below to "the patent" should be replaced by "previous reexamination certificate" and all data entries should be made accordingly.

☐ YES ☒ NO

**1.** Are there any amendments to the description? If yes, indicate (a) the doc code and date of the document containing the amendments and (b) the patent column number(s) and beginning and ending lines of the paragraph(s) containing the changes.

(1)(a) IFW doc code ________ Date ________

(1)(b) beginning ________

(1)(b) end line ________

(2)(a) IFW doc code ________ Date ________

(2)(b) beginning ________

(2)(b) end line ________

☐ YES ☒ NO

**2.** Are there any amendments to the patent drawings? If yes, indicate (a) Fig. No. containing the change(s), (b) the doc code and date of the document containing the NEW sheet of drawings, and (c) a brief description of the change(s0, e.g., "reference numerals 10 and 11 have been added to Fig. 1."

(1)(a) Fig. No(s). ________

(1)(b) IFW doc code ________ Date ________

(1)(c) The drawings figure(s) have been changed as follows:

(2)(a) Fig. No(s). ________

(2)(b) IFW doc code ________ Date ________

(2)(c) The drawings figure(s) have been changed as follows:

☐ YES ☒ NO

**3.** Was a terminal disclaimer filed and approved DURING reexaminatin? If terminal disclaimer approved, "approved" box on the IFS - Terminal Disclaimer form (available in OACS) must be checked. Also, give the doc code and date(s) of each document containing approved terminal disclaimer.

Terminal Disclaimer IFW doc code ________ Date ________

Terminal Disclaimer IFW doc code ________ Date ________

Terminal Disclaimer IFW doc code ________ Date ________

☐ YES ☒ NO

**4.** Have any certificates of correction to the patent been issued? If yes, give date(s) issued (the date signed and sealed by the USPTO Director on the certificate of correction).

Dates issued:

☐ YES ☒ NO

**5.** Has a document been submitted indicating the names of the registered attorneys or agents or a law firm to be printed on the reexaminations certificate? If yes, indicate the doc code and date of the document containing the names. (Must be a separate document addressed solely to this issue.)

IFW doc code ______________________ Date ______________

☐ YES ☒ NO

**6.** Did a litigation search, or any other part of the record, indicate the existence of litigation with respect to the patent being reexamined? Has an entry been made in the "Litigation Review" box of the IFW - Reexamination form? If yes, and a court decision has been issued, complete the following entry. Such decisions include final court decisions (even if still appealable), vacate decisions, remands, and decisions as to the merits of the patent claims. Non-merits decisions on motions such as for a new venue, a new trial/discovery date, or sanctions are not to be entered.

"Attention is directed to the decision of:

relating to this patent. This reexamination may not have resolved all questions raised by this decision. See 37 CFR 1.552 (c) for ex parte reexam and 37 CFR 1.906(c) for inter partes reexam." (Enter case name, court, and date of decision.)

☐ YES ☒ NO

**6.1.** Is there a reissue application/reexamination proceeding pending at this point, with which this reexamination proceeding has not been merged? If yes, (a) fill in the application or reexamination control number(s), and the filing date (s), and (b) check the appropriate box(es) (two boxes–if both reissue & reexam are pending).

☐ >> "At the time of issuance and publication of this certificate, the patent remains subject to pending reissue application number ______________________ filed ______________________ .

The claim content of the patent may be subsequently revised in the reissue proceeding."

☐ >> "At the time of issuance and publication of this certificate, the patent remains subject to pending reissue application numbers filed respectively.

The claim content of the patent may be subsequently revised in the reissue proceedings."

☐ >> "At the time of issuance and publication of this certificate, the patent remains subject to pending reexamination control number ______________________ filed ______________________ .

The claim content of the patent may be subsequently revised in the reexamination proceeding."

☐ >> "At the time of issuance and publication of this certificate, the patent remains subject to pending reexamination control numbers filed respectively.

The claim content of the patent may be subsequently revised in the reexamination proceedings."

For items 7-16, mark the "YES" box(es) where appropriate and complete the statement. If not applicable, mark the "NO" box(es). Patent claims retain their original number. All **NEW** allowed claims should be renumbered, if necessary, to immediately follow the highest numbered patent claim. Note that a Claim is "amended" if there is **ANY** change to its text. A claim number should **NOT** be repeated in items 7-16.

**ALL** the **ORIGINAL** patent claims and **ONLY** new renumbered claims must be listed in items 7-16. Only original patent claims are to be listed in items 7-13 and 15-16. Only new allowed claims are listed in item 14; cancelled new claims are not listed anywhere on this form.

☐ YES ☒ NO **7.** The patentability of claim(s) ____ is confirmed.

☐ YES ☒ NO **8.** Claim(s) ____ was (were) previously cancelled. (Relates to a **prior** proceeding.)

☐ YES ☒ NO **9.** Claim(s) ____ was (were) previously disclaimed. (Statutory disclaimer **prior** to **present** reexam.)

☐ YES ☒ NO **10.** Claim(s) ____ is (are) now disclaimed. (Statutory disclaimer in present reexamination.)

☒ YES ☐ NO **11.** Claim(s) 1-2 is (are) cancelled.

(**Examiner Note:** item 11 is <u>not</u> to be used for new claims that were cancelled. Cancelled new claims are not entered on this form.)

☒ YES ☐ NO **12.** Claim(s) 3-5 is (are) determined to be patentable as amended.

(**Printer Note:** these claims are to be printed on the reexamination certificate.)

☐ YES ☒ NO **13.** Claim(s) ____ dependent on an amended claim, is (are) determined to be patentable.

(**Examiner Note:** item 13 is to be used for dependent claims whose text has not changed. Dependent claims with changes in the text are "amended claims" which must be listed in item 12, above.)

☒ YES ☐ NO **14.** New claim(s) 6-39 is (are) added and determined to be patentable.

(**Printer Note**: these claims are to be printed on the reexamination certificate.)

☐ YES ☒ NO **15.** Claim(s)

was (were) not reexamined.

☐ YES ☒ NO **16.** Other (identify claims and status)

Mark the following boxes upon ensuring that the following statements relating to the IFW – *Issue Classification* form (available in OACS) are correct.

☒ **17.** The international classification (updated to reflect the current format of the most recent edition) includes all international classifications presently listed on the patent.

☒ **18.** The reexamination original U.S. classification is the same as the current original U.S. classification of the patent.

☒ **19.** All current cross-reference classifications are included.

For items 21-25, mark the "YES" or "NO" box indicating whether the item has been changed or added during the reexamination. If yes, indicate doc code date of document containing the change or addition. Certificate of Correction changes are not to be indicated here; instead see Item 4.

☐ YES ☒ NO INID CODE: (54) **21.** Title of Invention.
IFW doc code ____________ Date ____________

☐ YES ☒ NO INID CODE: (75) **22.** Inventor(s)
**- OR -**
☐ YES ☒ NO INID CODE: (76)
IFW doc code ____________ Date ____________

**23.** Continuing Data

☐ YES ☒ NO INID CODE: (60) **a.** -- Combination of Division and Continuation and/or C.I.P.
Give doc code and date of document adding data:
IFW doc code ____________ Date ____________

--Provisional Application(s)
Give doc code and date of document adding data:
IFW doc code ____________ Date ____________

☐ YES ☒ NO INID CODE: (62) **b.** Division(s)
Give doc code and date of document adding data:
IFW doc code ____________ Date ____________

☐ YES ☒ NO INID CODE: (63) **c.** Continuation(s) and/or C.I.P.
Give doc code and date of document adding data:
IFW doc code ____________ Date ____________

☐ YES ☒ NO INID CODE: (64) **d.** Reissue(s)
Give doc code and date of amendment document :
IFW doc code ____________ Date ____________

☐ YES ☒ NO INID CODE: (30) **24.** Foreign Priority
Give doc code and date of document adding data:
IFW doc code ______ Date ______

☐ YES ☒ NO INID CODE: (57) **25.** Abstract
Give doc code and date:
IFW doc code ______ Date ______

26. For item 26, (a) check the box indicating which document identifies the correct, current **owner/assignee** of the patent, and (b) indicate the date of the document that you checked.

(**Examiner Note**: only **one** box is to be checked and completed.)

☒ **(a)** Title Report, (b) Prepared [Give doc code and date]

IFW doc code R3.73B Date 01/02/2013

☐ **(b)** § 3.73 (b) Statement, (b) Filed [Give doc code and date]

IFW doc code ______ Date ______

(**Examiner Note**:Give the latest document, unless the record reflects that an earlier document gives the current patent owner/assignee.)

| EXAMINER | DATE | CRU SPE/TC SPRE REVIEW | DATE |
|---|---|---|---|
| | Ton 5/23/2013 | /Andrew J. Fischer/ | 5/24/2013 |

US007241034C1

(12) INTER PARTES REEXAMINATION CERTIFICATE (624th)

**United States Patent** (10) **Number: US 7,241,034 C1**

**Smith et al.** (45) **Certificate Issued: Jun. 14, 2013**

(54) **AUTOMATIC DIRECTIONAL CONTROL SYSTEM FOR VEHICLE HEADLIGHTS**

(75) Inventors: **James E. Smith**, Berkey, OH (US); **Anthony B. McDonald**, Perrysburg, OH (US)

(73) Assignee: **Balther Technologies, LLC**, Longview, TX (US)

**Reexamination Request:**
No. 95/001,621, May 16, 2011
No. 90/011,011, Jul. 10, 2010

**Reexamination Certificate for:**

| | |
|---|---|
| Patent No.: | **7,241,034** |
| Issued: | **Jul. 10, 2007** |
| Appl. No.: | **10/285,312** |
| Filed: | **Oct. 31, 2002** |

**Related U.S. Application Data**

(60) Provisional application No. 60/369,447, filed on Apr. 2, 2002, provisional application No. 60/356,703, filed on Feb. 13, 2002, provisional application No. 60/335,409, filed on Oct. 31, 2001.

(51) **Int. Cl.**
***B60Q 1/00*** (2006.01)
***B06R 22/00*** (2006.01)

(52) **U.S. Cl.**
USPC .............................................. **362/465**; 701/49

(58) **Field of Classification Search**
None
See application file for complete search history.

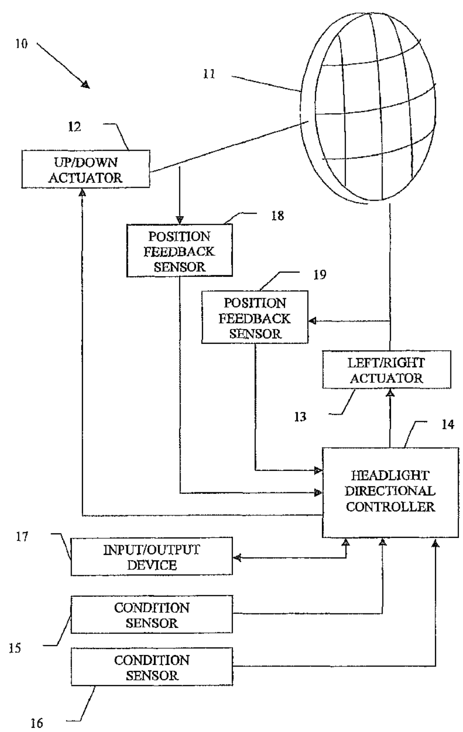
(56) **References Cited**

To view the complete listing of prior art documents cited during the proceedings for Reexamination Control Numbers 95/001,621 and 90/011,011, please refer to the USPTO's public Patent Application Information Retrieval (PAIR) system under the Display References tab.

*Primary Examiner* — My Trang Nu Ton

(57) **ABSTRACT**

A structure and method for operating a directional control system for vehicle headlights that is capable of altering the directional aiming angles of the headlights to account for changes in the operating conditions of the vehicle. One or more operating condition sensors may be provided that generate signals that are representative of a condition of the vehicle, such as road speed, steering angle, pitch, suspension height, rate of change of road speed, rate of change of steering angle, rate of change of pitch, and rate of change of suspension height of the vehicle. A controller is responsive to the sensor signal for generating an output signal. An actuator is adapted to be connected to the headlight to effect movement thereof in accordance with the output signal. The controller can include a table that relates values of sensed operating condition to values of the output signal. The controller is responsive to the sensor signal for looking up the output signal in the table.



# INTER PARTES REEXAMINATION CERTIFICATE ISSUED UNDER 35 U.S.C. 316

THE PATENT IS HEREBY AMENDED AS INDICATED BELOW.

**Matter enclosed in heavy brackets [ ] appeared in the patent, but has been deleted and is no longer a part of the patent; matter printed in italics indicates additions made to the patent.**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1-2** are cancelled.

Claims **3-5** are determined to be patentable as amended.

New claims **6-39** are added and determined to be patentable.

**3**. **[**The automatic directional control system defined in claim 1**]** *An automatic directional control system for a vehicle headlight, comprising:*

*two or more sensors that are each adapted to generate a signal that is representative of at least one of a plurality of sensed conditions of a vehicle such that two or more sensor signals are generated, said sensed conditions including at least a steering angle and a pitch of the vehicle;*

*a controller that is responsive to said two or more sensor signals for generating at least one output signal only when at least one of said two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one first one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in at least one of the sensed conditions; and*

*said two or more actuators each being adapted to be connected to the headlight to effect movement thereof in accordance with said at least one output signal;*

wherein *at least one of* said **[**sensor**]** *two or more sensors* generates **[**a signal**]** *at least one of said two or more sensor signals* that is representative of **[**the**]** *a rate of change of the* steering angle of the vehicle.

**4**. The automatic directional control system defined in claim **[1]** *3*, wherein *at least one of* said **[**sensor**]** *two or more sensors* generates a signal that is representative of **[**the**]** *a rate of change of the* pitch of the vehicle.

**5**. The automatic directional control system defined in claim **[1]** *3*, wherein *at least one of* said **[**sensor**]** *two or more sensors* generates a signal that is representative of **[**the**]** *a* suspension height of the vehicle.

*6. The automatic directional control system defined in claim 3, wherein said two or more sensors include a first sensor and a second sensor.*

*7. An automatic directional control system for a vehicle headlight, comprising:*

*two or more sensors that are each adapted to generate a signal that is representative of at least one of a plurality of sensed conditions of a vehicle such that two or more sensor signals are generated, said sensed conditions including at least a steering angle and a pitch of the vehicle;*

*a controller that is responsive to said two or more sensor signals for generating at least one output signal only when at least one of said two or more sensor signals changes by more than a predetermined minimum threshold amount to prevent at least one of two or more actuators from being operated continuously or unduly frequently in response to relatively small variations in at least one of the sensed conditions; and*

*said two or more actuators each being adapted to be connected to the vehicle headlight to effect movement thereof in accordance with said at least one output signal;*

*wherein said two or more sensors include a first sensor and a second sensor; and*

*wherein said first sensor is adapted to generate a signal that is representative of a condition including the steering angle of the vehicle and said second sensor is adapted to generate a signal that is representative of a condition including the pitch of the vehicle.*

*8. The automatic directional control system defined in claim 7, wherein said first sensor is physically separate from said second sensor.*

*9. The automatic directional control system defined in claim 7, further comprising one or more additional sensors for sensing one or more of a rate of change of road speed of the vehicle, a rate of change of the steering angle of the vehicle, a rate of change of the pitch of the vehicle, a suspension height of the vehicle, or a rate of change of suspension height of the vehicle.*

*10. The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors generate a signal that is representative of the rate of change of the road speed of the vehicle.*

*11. The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors generate a signal that is representative of the rate of change of the steering angle of the vehicle.*

*12. The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors generate a signal that is representative of the rate of change of the pitch of the vehicle.*

*13. The automatic directional control system defined in claim 9, wherein at least one of said one or more additional sensors generate a signal that is representative of the suspension height of the vehicle.*

*14. The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that said two or more actuators include a first actuator and a second actuator and wherein the first actuator connected to the headlight to effect movement thereof in a first direction and the second actuator connected to the headlight to effect movement thereof in a second direction different from the first direction.*

*15. The automatic directional control system defined in claim 7, wherein the two or more actuators include a first actuator that is adapted to be connected to the headlight to effect movement thereof in a vertical direction.*

*16. The automatic directional control system defined in claim 15, wherein the two or more actuators include a second actuator that is adapted to be connected to the headlight to effect movement thereof in a horizontal direction.*

*17. The automatic directional control system defined in claim 7, wherein the two or more actuators include an electronically controlled mechanical actuator.*

*18. The automatic directional control system defined in claim 7, wherein the two or more actuators include a step motor.*

*19. The automatic directional control system defined in claim 7, wherein the two or more actuators include a servo motor.*

*20. The automatic directional control system defined in claim 7, wherein the two or more actuators include a microstepping motor capable of being operated in fractional step increments.*

*21. The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that the headlight is adjustably mounted on the vehicle such that a directional orientation at which a beam of light projects therefrom is capable of being adjusted both up and down relative to a horizontal reference position and left and right relative to a vertical reference position.*

*22. The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that, while in a calibration mode, a directional orientation at which a beam of light projects is capable of being adjusted relative to the vehicle by manual operation of the two or more actuators.*

*23. The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that the controller includes a microprocessor.*

*24. The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that the controller includes a programmable electronic controller.*

*25. The automatic directional control system defined in claim 7, wherein the automatic directional control system further includes at least one position feedback sensor capable of providing a position feedback signal associated with at least one of the two or more actuators.*

*26. The automatic directional control system defined in claim 25, wherein the at least one position feedback sensor includes a Hall Effect sensor.*

*27. The automatic directional control system defined in claim 25, wherein the at least one position feedback sensor includes an optical interrupter.*

*28. The automatic directional control system defined in claim 7, wherein the automatic directional control system further includes memory.*

*29. The automatic directional control system defined in claim 28, wherein the memory includes non-volatile memory.*

*30. The automatic directional control system defined in claim 28, wherein the memory is configured to store a predetermined reference position associated with the headlight.*

*31. The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by sensing a front and a rear suspension height of the vehicle.*

*32. The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that the pitch of the vehicle is capable of being determined by a pitch sensor.*

*33. The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that the controller is programmed to be responsive to changes in a suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle.*

*34. The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that the controller is programmed to be responsive to changes in a suspension height of the vehicle that occur at frequencies lower than a suspension rebound frequency of the vehicle, thereby ignoring frequency changes in the suspension height of the vehicle that are a result of bumps in a road.*

*35. The automatic directional control system defined in claim 7, wherein the automatic directional control system is configured such that the predetermined minimum threshold amount functions as a filter to minimize undesirable operation of at least one of the two or more actuators.*

*36. The automatic directional control system defined in claim 7, wherein said controller is further responsive to at least one of said two or more sensor signals to automatically activate one or more vehicle lights that are different than the headlight.*

*37. The automatic directional control system defined in claim 36, wherein said one or more vehicle lights that are different than the headlight include one or more lights for illuminating a road in front of the vehicle during a turn.*

*38. The automatic directional control system defined in claim 7, wherein said controller is further responsive to a steering angle in excess of a predetermined magnitude for automatically activating one or more vehicle lights that are different than the headlight.*

*39. The automatic directional control system defined in claim 7, wherein said controller is further responsive to a steering angle in excess of a predetermined magnitude for automatically activating one or more vehicle lights that are different than the headlight to extend an angular range of a road surface.*

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