



US006049749A

# United States Patent [19] Kobayashi

[11] **Patent Number:** **6,049,749**  
[45] **Date of Patent:** **Apr. 11, 2000**

## [54] LIGHTING DEVICE FOR A VEHICLE

[75] Inventor: **Shoji Kobayashi**, Shizuoka, Japan  
[73] Assignee: **Koito Manufacturing Co., Ltd.**,  
Tokyo, Japan

[21] Appl. No.: **08/989,415**

[22] Filed: **Dec. 12, 1997**

### [30] Foreign Application Priority Data

Dec. 13, 1996 [JP] Japan ..... 8-353006

[51] **Int. Cl.<sup>7</sup>** ..... **G06F 17/00**

[52] **U.S. Cl.** ..... **701/49; 701/36; 362/466;**  
362/37; 362/276; 340/469

[58] **Field of Search** ..... 701/49, 36; 362/272,  
362/276, 466, 494, 540, 541, 544, 465,  
524, 37, 40; 340/469, 471, 472

### [56] References Cited

#### U.S. PATENT DOCUMENTS

4,663,696	5/1987	Miyazaki et al.	362/80
4,733,333	3/1988	Shibata et al.	362/40
5,060,120	10/1991	Kobayashi et al.	362/61
5,068,768	11/1991	Kobayashi et al.	362/61
5,237,306	8/1993	Adell	340/469
5,343,371	8/1994	Kobayashi et al.	362/61
5,379,196	1/1995	Kobayashi et al.	362/61
5,404,278	4/1995	Shibata et al.	362/83.3
5,412,543	5/1995	Kobayashi et al.	362/66
5,426,294	6/1995	Kobayashi et al.	250/226
5,436,807	7/1995	Kobayashi	362/41
5,497,306	3/1996	Pastrick	362/494
5,562,336	10/1996	Gotou	362/466
5,588,733	12/1996	Gotou	362/37
5,660,454	8/1997	Mori et al.	362/466
5,879,074	3/1999	Pastrick	362/494
5,931,572	8/1999	Gotoh	362/466

## FOREIGN PATENT DOCUMENTS

43 27 780	3/1994	Germany	.....	G08G 1/0968
196 01 572	8/1996	Germany	.....	B60Q 1/12
196 02 622	8/1996	Germany	.....	B60Q 1/06

*Primary Examiner*—Jacques H. Louis-Jacques

*Attorney, Agent, or Firm*—Sughrue, Mion, Zinn, Macpeak  
& Seas, PLLC

## [57] ABSTRACT

A lighting device in which the vehicle advancing direction at which a driver aims is predicted, and the irradiating direction and irradiating range of a lighting device are controlled by comparing the result of the prediction to the information of the profile of a road on which the vehicle is running at present. The lighting device (1) includes a road profile calculating device (2) for finding an advancing direction of the vehicle in the case where the vehicle advances along a road on which the vehicle is running at present, in accordance with the map information including the road profile and the present position information of the vehicle; and a vehicle advancing direction predicting device (3) for predicting an advancing direction of the vehicle intended by a driver, by an operation signal given by the driver or detection information of the vehicle running state. The irradiation controller device (4) compares the direction data of the road profile calculating device (2) with the direction data of the vehicle advancing direction predicting device (3), the irradiation control of the lighting device (5) is conducted by the road profile in accordance with the direction data of the road profile calculating device (2) when a difference between them is in an allowable range, and the irradiation control of the lighting device (5) is conducted by the direction data of the vehicle advancing direction predicting device (3) when the difference between them is out of the allowable range.

10 Claims, 9 Drawing Sheets

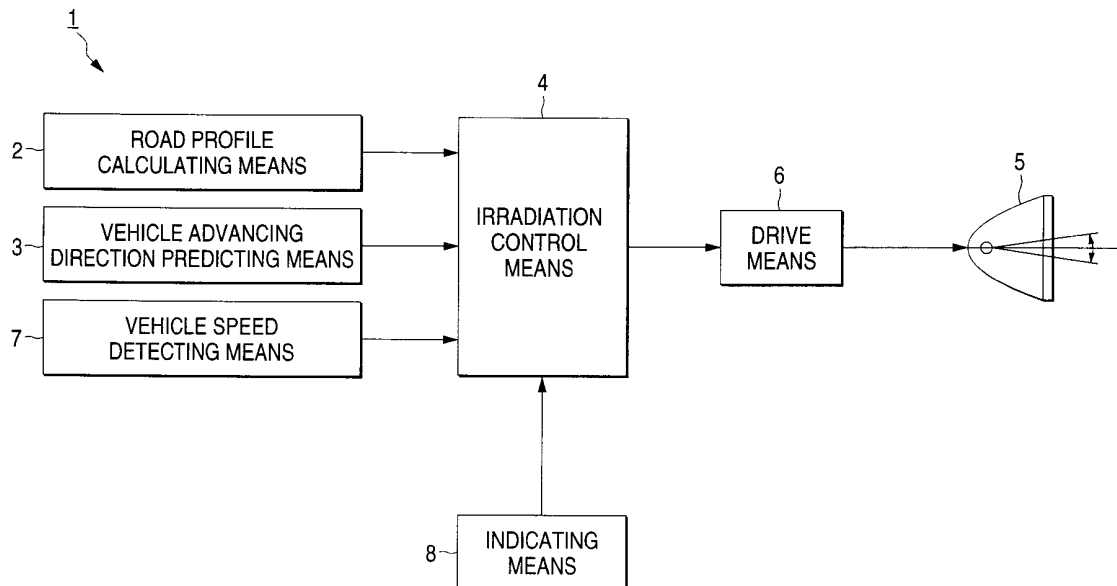


FIG. 1

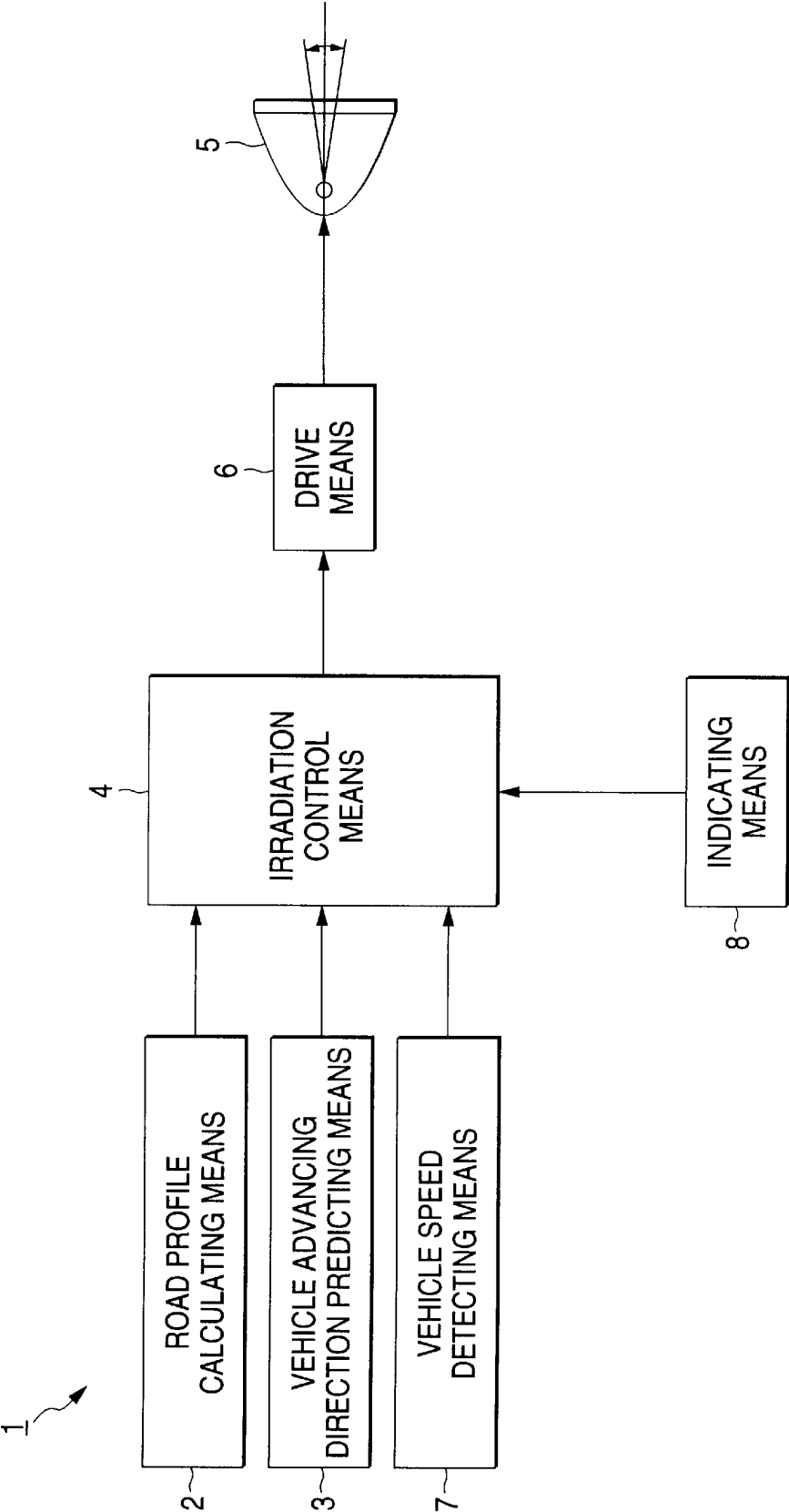


FIG. 2

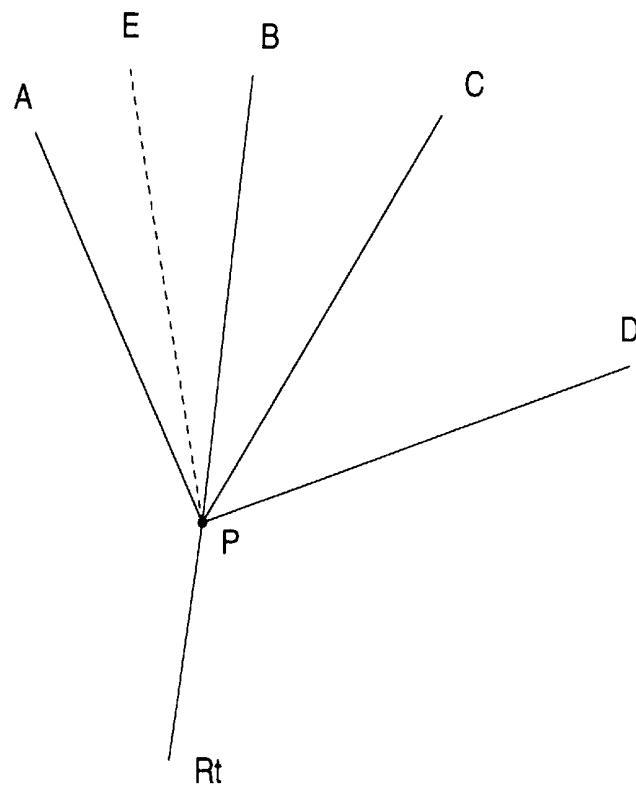


FIG. 3

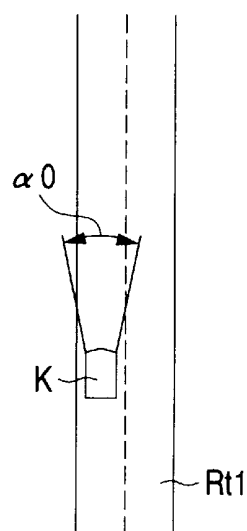


FIG. 4

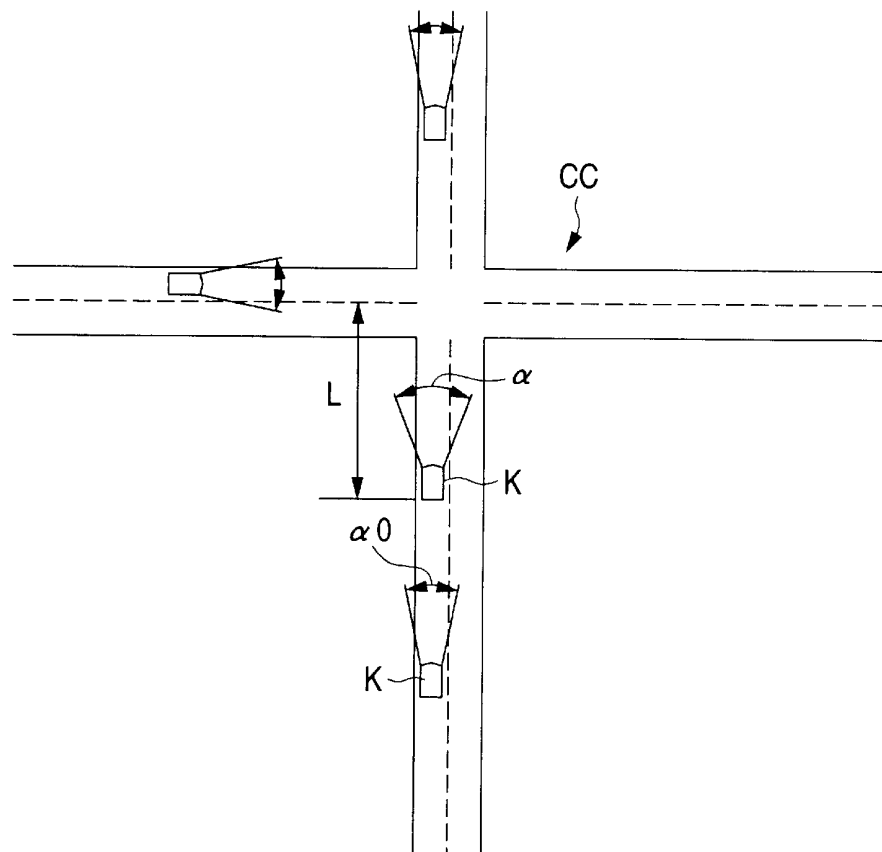


FIG. 5

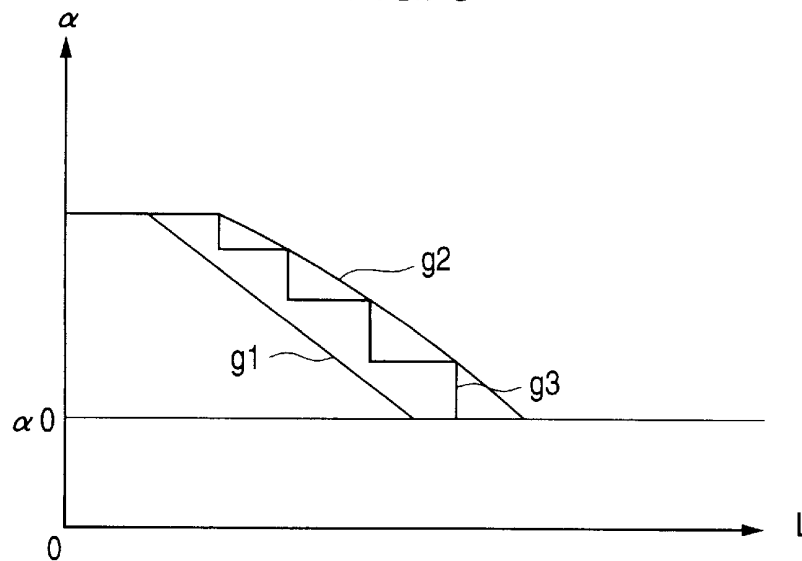
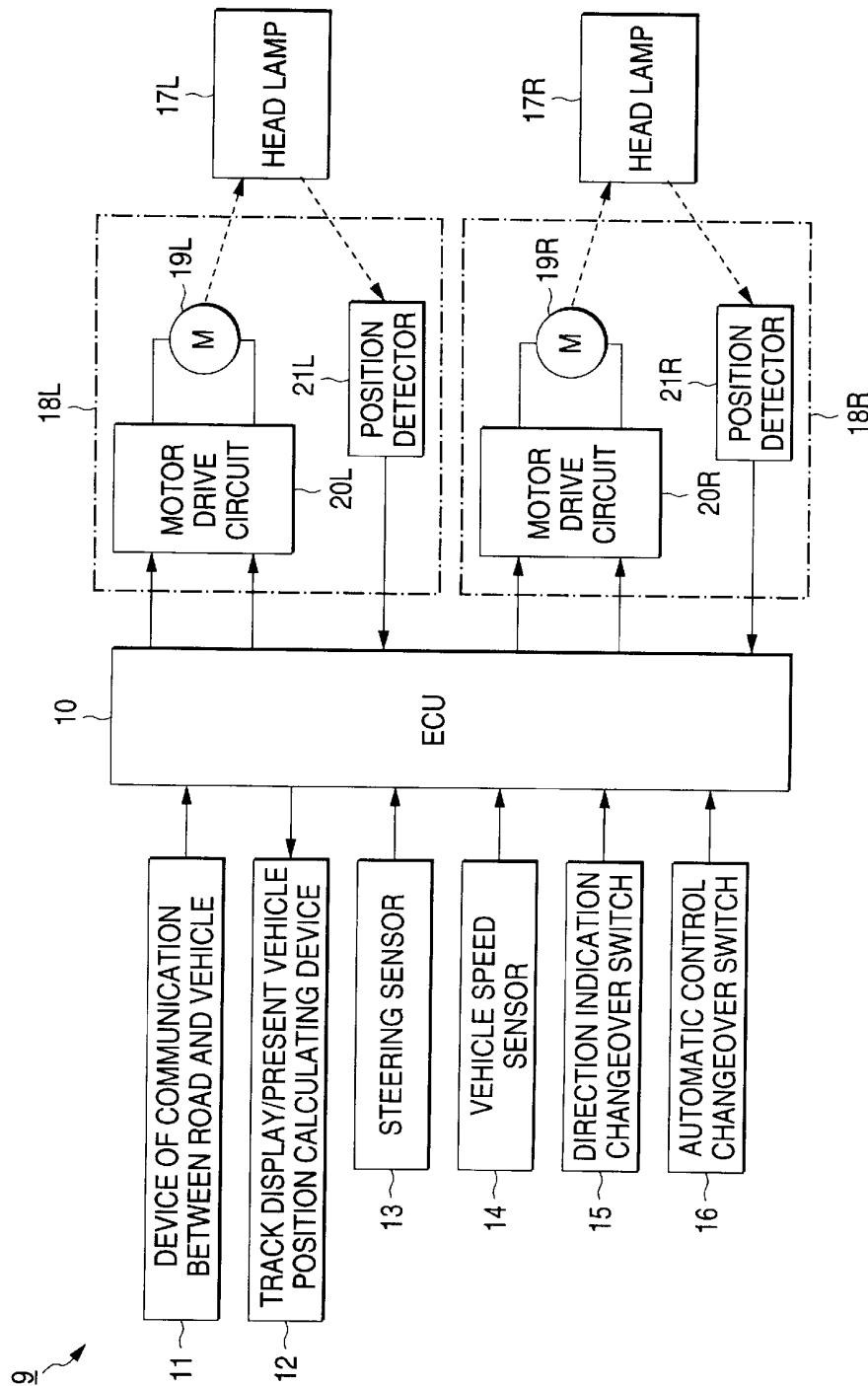


FIG. 6



# Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

## Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

## Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

## Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

## API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

## LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

## FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

## E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.