PTO/SB/05 (08-03)
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# UTILITY PATENT APPLICATION TRANSMITTAL

*(Only for new nonprovisional applications under 37 CFR 1.53(b))*

| | |
|---|---|
| *Attorney Docket No.* | **500.38315CC5** |
| *First Inventor* | **T. NAKANO** |
| *Title* | **ELECTRIC CAMERA** |
| *Express Mail Label No.* | |

**APPLICATION ELEMENTS**
***SEE MPEP chapter 600 concerning utility patent application contents.***

*ADDRESS TO:* **Commissioner for Patents, P.O. Box 1450, Alexandria VA 22313-1450**

1. ☐ **Fee Transmittal Form** (e.g., PTO/SB/17)
*(Submit an original and a duplicate for fee processing)*

2. ☐ **Applicant claims small entity status.**
See 37 CFR 1.27.

3. ☒ **Specification** [*Total Pages* 39 ]
Both the claims and abstract must start on a new page
*(For information on the preferred arrangement, see MPEP 608 01(a))*

4. ☒ **Drawing(s)** *(35 U.S.C. 113)* [*Total Sheets* 8 ]

5. **Oath or Declaration** [*Total Sheets* ]
a. ☐ Newly executed (original or copy)
b. ☐ Copy from a prior application (37 CFR 1.63 (d))
*(for continuation/divisional with Box 18 completed)*
i. ☐ DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s) Named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b)

6. ☒ **Application Data Sheet.** See 37 CFR 1.76

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

8. **Nucleotide and/or Amino Acid Sequence Submission**
*(if applicable, all necessary)*
a. ☐ Computer Readable Form (CRF)
b. Specification Sequence Listing on:
i. ☐ CD-ROM or CD-R (2 copies); or
ii. ☐ Paper
c. ☐ Statements verifying identity of above copies

**ACCOMPANYING APPLICATION PARTS**

9. ☐ **Assignment Papers** (cover sheet & documents(s))

10. ☐ **37 CFR 3.73(b) Statement** ☒ **Power of Attorney**
***(when there is an assignee)***

11. ☐ **English Translation Document** *(if applicable)*

12. ☒ **Information Disclosure Statement** (PTO/SB/08 OR PTO-1449) ☐ Copies of Citations attached

13. ☐ **Preliminary Amendment**

14. ☐ **Return Receipt Postcard** (MPEP 503)
*(Should be specifically itemized)*

15. ☐ **Certified Copy of Priority Document(s)**
*(if foreign priority is claimed)*

16. ☐ **Nonpublication Request** under 35 U.S.C. 122 (b)(2)(B)(i).
Applicant must attach form PTO/SB/35 or equivalent.

17. ☐ **Other:**

18. If a CONTINUING APPLICATION, *check appropriate box, and supply the requisite information below and in a preliminary amendment, or in an Application Data Sheet under 37 CFR 1.76:*

☒ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: 13/681,495

*Prior application information:* *Examiner:* Luong Trung Nguyen *Art Unit:* 2663

19. CORRESPONDENCE ADDRESS : THE ADDRESS ASSOCIATED WITH CUSTOMER NUMBER **020457**

| | | | |
|---|---|---|---|
| *Signature* | **/Ayal I. Sharon /** | *Date* | **APRIL 29, 2014** |
| *Name (Print/Type)* | **Ayal I. Sharon** | *Registration No. (Attorney/Agent)* | 55,986 |

| Electronic Patent Application Fee Transmittal | |
|---|---|
| **Application Number:** | |
| **Filing Date:** | |
| **Title of Invention:** | ELECTRIC CAMERA |
| **First Named Inventor/Applicant Name:** | Takahiro Nakano |
| **Filer:** | Ayal I. Sharon/Krista Hargrove |
| **Attorney Docket Number:** | 500.38315CC5 |
| Filed as Large Entity | |

**Utility under 35 USC 111(a) Filing Fees**

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Basic Filing:** | | | | |
| Utility application filing | 1011 | 1 | 280 | 280 |
| Utility Search Fee | 1111 | 1 | 600 | 600 |
| Utility Examination Fee | 1311 | 1 | 720 | 720 |
| **Pages:** | | | | |
| **Claims:** | | | | |
| **Miscellaneous-Filing:** | | | | |
| Late Filing Fee for Oath or Declaration | 1051 | 1 | 140 | 140 |
| **Petition:** | | | | |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| Patent-Appeals-and-Interference: | | | | |
| Post-Allowance-and-Post-Issuance: | | | | |
| Extension-of-Time: | | | | |
| Miscellaneous: | | | | |
| | | Total in USD ($) | | 1740 |

| Electronic Acknowledgement Receipt | |
|---|---|
| **EFS ID:** | 18887444 |
| **Application Number:** | 14264243 |
| **International Application Number:** | |
| **Confirmation Number:** | 1644 |
| **Title of Invention:** | ELECTRIC CAMERA |
| **First Named Inventor/Applicant Name:** | Takahiro Nakano |
| **Customer Number:** | 20457 |
| **Filer:** | Ayal I. Sharon/Krista Hargrove |
| **Filer Authorized By:** | Ayal I. Sharon |
| **Attorney Docket Number:** | 500.38315CC5 |
| **Receipt Date:** | 29-APR-2014 |
| **Filing Date:** | |
| **Time Stamp:** | 12:14:16 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

| | |
|---|---|
| Submitted with Payment | yes |
| Payment Type | Credit Card |
| Payment was successfully received in RAM | $1740 |
| RAM confirmation Number | 11821 |
| Deposit Account | |
| Authorized User | |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| 1 | Application Data Sheet | 38315ADS.pdf | 1561624<br>4b82e2b4dc89de7cb56d03882092460ef1c76814 | no | 8 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 2 | Specification | 38315Application.pdf | 5505966<br>52cdbe1d80d0e843efe24c12038ed3024e31985c | no | 40 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 3 | Drawings-only black and white line drawings | 38315DRAWINGS.pdf | 473115<br>08f7fe6bea83afcbba131d3714ce701af13048be | no | 8 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 4 | Transmittal Letter | 38315ids.pdf | 54668<br>9922e445edb799c1ae58acc5686267e4f3c70fc0 | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 5 | Power of Attorney | 38315POA.pdf | 497214<br>a5f13f377a696266e923d0ac596d9ddbae89d3f4 | no | 3 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 6 | Power of Attorney | 38315PowerofAttorneycover.pdf | 162823<br>1c1e35025ffbdfd0c40eaa441e73efd5e0833356 | no | 1 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 7 | Information Disclosure Statement (IDS) Form (SB08) | 38315sb08.pdf | 131504<br>1aba9cf67836f2e3daed8c7dd76238e9016cfe5c | no | 3 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| This is not an USPTO supplied IDS fillable form | | | | | |
| 8 | Transmittal of New Application | 38315utl.pdf | 124709<br>445bd56320501dd6422757e73f0d112148aadaf1 | no | 1 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 9 | Fee Worksheet (SB06) | fee-info.pdf | 36232<br>bf7f7ad62183c2e99ef43613f85ab245aed21cf6 | no | 2 |

| Warnings: | |
|---|---|
| Information: | |
| Total Files Size (in bytes): | 8547855 |

**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.**

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| Application Data Sheet 37 CFR 1.76 | Attorney Docket Number | 500.38315CC5 |
|---|---|---|
| | Application Number | |
| Title of Invention | ELECTRIC CAMERA | |

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

## Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

## Inventor Information:

**Inventor 1** Remove

**Legal Name**

| Prefix | Given Name | Middle Name | Family Name | Suffix |
|---|---|---|---|---|
| | Takahiro | | Nakano | |

**Residence Information (Select One)** ○ US Residency ◉ Non US Residency ○ Active US Military Service

| City | Tokyo | Country of Residence i | JP |
|---|---|---|---|

**Mailing Address of Inventor:**

| | | | |
|---|---|---|---|
| **Address 1** | c/o Hitachi, Ltd, Intellectual Property Group | | |
| **Address 2** | 6-1, Marunouchi 1-chome, Chiyoda-ku | | |
| **City** | Tokyo | **State/Province** | |
| **Postal Code** | 100-8220 | **Country** i | JP |

**Inventor 2** Remove

**Legal Name**

| Prefix | Given Name | Middle Name | Family Name | Suffix |
|---|---|---|---|---|
| | Ryuji | | Nishimura | |

**Residence Information (Select One)** ○ US Residency ◉ Non US Residency ○ Active US Military Service

| City | Tokyo | Country of Residence i | JP |
|---|---|---|---|

**Mailing Address of Inventor:**

| | | | |
|---|---|---|---|
| **Address 1** | c/o Hitachi, Ltd, Intellectual Property Group | | |
| **Address 2** | 6-1, Marunouchi 1-chome, Chiyoda-ku | | |
| **City** | Tokyo | **State/Province** | |
| **Postal Code** | 100-8220 | **Country** i | JP |

**Inventor 3** Remove

**Legal Name**

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| Application Data Sheet 37 CFR 1.76 | Attorney Docket Number | 500.38315CC5 |
|---|---|---|
| | Application Number | |
| Title of Invention | ELECTRIC CAMERA | |

| Prefix | Given Name | Middle Name | Family Name | Suffix |
|---|---|---|---|---|
| | Toshiro | | Kinugasa | |

**Residence Information (Select One)** ◯ US Residency ◉ Non US Residency ◯ Active US Military Service

| City | Tokyo | Country of Residence i | JP |
|---|---|---|---|

**Mailing Address of Inventor:**

| | | | |
|---|---|---|---|
| **Address 1** | c/o Hitachi, Ltd, Intellectual Property Group | | |
| **Address 2** | 6-1, Marunouchi 1-chome, Chiyoda-ku | | |
| **City** | Tokyo | **State/Province** | |
| **Postal Code** | 100-8220 | **Country** i | JP |

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

## Correspondence Information:

**Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).**

☐ **An Address is being provided for the correspondence Information of this application.**

| | | | |
|---|---|---|---|
| **Customer Number** | 020457 | | |
| **Email Address** | | Add Email | Remove Email |

## Application Information:

| | | | |
|---|---|---|---|
| **Title of the Invention** | ELECTRIC CAMERA | | |
| **Attorney Docket Number** | 500.38315CC5 | **Small Entity Status Claimed** | ☐ |
| **Application Type** | Nonprovisional | | |
| **Subject Matter** | Utility | | |
| **Total Number of Drawing Sheets (if any)** | 8 | **Suggested Figure for Publication (if any)** | |

## Filing By Reference :

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

| Application number of the previously filed application | Filing date (YYYY-MM-DD) | Intellectual Property Authority or Country i |
|---|---|---|
| | | |

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| Application Data Sheet 37 CFR 1.76 | Attorney Docket Number | 500.38315CC5 |
|---|---|---|
| | Application Number | |
| Title of Invention | ELECTRIC CAMERA | |

## Publication Information:

| | |
|---|---|
| ☐ | Request Early Publication (Fee required at time of Request 37 CFR 1.219) |
| ☐ | **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing. |

## Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

| | | | |
|---|---|---|---|
| Please Select One: | ◉ Customer Number | ○ US Patent Practitioner | ○ Limited Recognition (37 CFR 11.9) |
| Customer Number | 020457 | | |

## Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the application number blank.

| Prior Application Status | Pending | | Remove |
|---|---|---|---|
| Application Number | Continuity Type | Prior Application Number | Filing Date (YYYY-MM-DD) |
| | Continuation of | 13681495 | 2012-11-20 |

| Prior Application Status | Patented | | | | Remove |
|---|---|---|---|---|---|
| Application Number | Continuity Type | Prior Application Number | Filing Date (YYYY-MM-DD) | Patent Number | Issue Date (YYYY-MM-DD) |
| 13681495 | Continuation of | 12845266 | 2010-07-28 | 8339493 | 2012-12-25 |

| Prior Application Status | Patented | | | | Remove |
|---|---|---|---|---|---|
| Application Number | Continuity Type | Prior Application Number | Filing Date (YYYY-MM-DD) | Patent Number | Issue Date (YYYY-MM-DD) |
| 12845266 | Continuation of | 10660710 | 2003-09-12 | 8059177 | 2011-11-15 |

| Prior Application Status | Patented | | | | Remove |
|---|---|---|---|---|---|
| Application Number | Continuity Type | Prior Application Number | Filing Date (YYYY-MM-DD) | Patent Number | Issue Date (YYYY-MM-DD) |
| 10660710 | Division of | 09520836 | 2000-03-08 | 6765616 | 2004-07-20 |

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

PTO/AIA/14 (12-13)
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| Application Data Sheet 37 CFR 1.76 | Attorney Docket Number | 500.38315CC5 |
|---|---|---|
| | Application Number | |
| Title of Invention | ELECTRIC CAMERA | |

## Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) [i]the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

| Application Number | Country [i] | Filing Date (YYYY-MM-DD) | Access Code[i] (if applicable) |
|---|---|---|---|
| 00-006064 | JP | 2000-01-11 | |

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

## Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

## Authorization to Permit Access:

☒ Authorization to Permit Access to the Instant Application by the Participating Offices

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| **Application Data Sheet 37 CFR 1.76** | Attorney Docket Number | 500.38315CC5 |
|---|---|---|
| | Application Number | |
| Title of Invention | ELECTRIC CAMERA | |

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.

## Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

**Applicant 1** Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

| ◉ Assignee | ○ Legal Representative under 35 U.S.C. 117 | ○ Joint Inventor |
|---|---|---|
| ○ Person to whom the inventor is obligated to assign. | ○ Person who shows sufficient proprietary interest | |

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor :

If the Applicant is an Organization check here. ☒

| Organization Name | Hitachi Consumer Electronics Co., Ltd. |
|---|---|

**Mailing Address Information:**

| **Address 1** | 2-1, Otemachi 2-chome, Chiyoda-ku | | |
|---|---|---|---|
| Address 2 | | | |
| **City** | Tokyo | **State/Province** | |
| **Country** [i] | JP | Postal Code | 100-0004 |
| Phone Number | | Fax Number | |

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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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| **Application Data Sheet 37 CFR 1.76** | Attorney Docket Number | 500.38315CC5 |
|---|---|---|
| | Application Number | |
| Title of Invention | ELECTRIC CAMERA | |

| Email Address | |
|---|---|

Additional Applicant Data may be generated within this form by selecting the Add button. Add

## Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not subsitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

**Assignee 1**

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication . An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

| Prefix | **Given Name** | Middle Name | **Family Name** | Suffix |
|---|---|---|---|---|
| | | | | |

**Mailing Address Information For Assignee including Non-Applicant Assignee:**

| **Address 1** | | | |
|---|---|---|---|
| Address 2 | | | |
| **City** | | **State/Province** | |
| **Country** i | | Postal Code | |
| Phone Number | | Fax Number | |
| Email Address | | | |

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

## Signature:

Remove

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications

| **Signature** | /Ayal I. Sharon/ | | | Date (YYYY-MM-DD) | 2014-04-29 |
|---|---|---|---|---|---|
| First Name | Ayal | Last Name | Sharon | Registration Number | 55986 |

Additional Signature may be generated within this form by selecting the Add button. Add

PTO/AIA/14 (12-13)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE


| **Application Data Sheet 37 CFR 1.76** | Attorney Docket Number | 500.38315CC5 |
|---|---|---|
| | Application Number | |
| Title of Invention | ELECTRIC CAMERA | |

This collection of information is required by 37 CFR 1.76. 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 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet 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.**

# 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 the Freedom of Information Act requires disclosure of these records.

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.

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# ELECTRIC CAMERA

## CROSS REFERENCE TO RELATED APPLICATION

This application is a continuation of U.S. application serial no. 13/681,495, filed November 20, 2012, which is a continuation of U.S. application serial no. 12/845,266, filed July 28, 2010, now U.S. Patent No. 8,339,493, issued December 25, 2012, which is a continuation of U.S. application serial no. 10/660,710, filed September 12, 2003, now U.S. Patent No. 8,059,177, issued November 15, 2011, and is related to U.S. application serial no. 10/660,711, filed September 12, 2003, now U.S. Patent No. 7,403,226, issued July 22, 2008, both of which are divisional applications of U.S. application Serial No. 09/520,836, filed March 8, 2000, now U.S. Patent No. 6,765,616, issued July 20, 2004, the subject matter of all the above is incorporated by reference herein.

## BACKGROUND OF THE INVENTION

The present invention relates to a photography related to video cameras, camcorders, digital still cameras and others using a solid-state image sensing device, and more particularly to an electric camera using a solid-state image sensing device with a large number of pixels.

Electric cameras using solid-state image sensors such as CCDs (charge-coupled devices) include a so-called video camera or camcorder for taking moving images and a so-called digital still camera for taking still images. In recent years, video cameras with a still image taking function and digital still cameras with a moving image taking function have become available.

In a video camera to photograph moving images, it is generally assumed that the video is viewed on a display such as television monitor and thus the camera is designed to produce output signals conforming to a television system such as NTSC and

PAL. Therefore, the effective number of vertically arranged pixels or picture elements on the image sensing device used in such a camera is determined to enable television signals to be generated. The NTSC system, for example, performs interlaced scanning on two fields, each of which has an effective scanning line number of about 240 lines (the number of scanning lines actually

displayed on the monitor which is equal to the number of scanning lines in the vertical blanking period subtracted from the total number of scanning lines in each field). To realize this, the image sensing device has about 480 pixel rows as the standard effective number of vertically arranged pixels. That is, the signals of two vertically adjoining pixels in each field are mixed together inside or outside the image sensing device to generate about 240 scanning lines, and the combinations of pixels to be cyclically mixed together are changed from one field to another to achieve the interlaced scanning.

Some image sensing devices to take moving images according to the NTSC system have an area of pixels for image stabilization added to the area of effective pixel area, thus bringing the effective number of vertically arranged pixels to about 480 or more. In this case, an area beyond 480th pixels is read out at high speed during the vertical blanking period and therefore the signals thus read out are not used as effective signals. Therefore, the video signals can only be generated from those signals coming from the area of about 480 vertically arranged pixels. When such a camera is used to photograph a still image, it is relatively easy to generate a static image signal conforming to, for example, JPEG (Joint Photographic Expert Group) from the signals coming from the same pixel area that is used to take a moving image. A problem remains, however, that the number of vertically arranged pixels obtained is limited to around 480, making it

impossible to produce more detailed static image signals.

In a camera having an image sensing device with the area of pixels for image stabilization mentioned above, a method of alleviating this problem may involve using the entire area of effective pixels including the area of image stabilization pixels in photographing a still image. Even when photographing a still image, however, the photographed image needs to be monitored for check and, for that purpose, it is necessary to generate signals conforming to the television system from signals read out from all effective pixels.

An example of such a conventional camera has been proposed in JP-A-11-187306. In the camera disclosed in this publication, signals from all the effective pixels are read out taking two or more times the field period of the television system, stored in a memory means such as a field memory, and then subjected to interpolation processing for transformation into signals conforming to the field cycle and horizontal scan cycle of television.

This conventional camera, however, requires a large processing circuit, such as field memory, for signal conversion. Another drawback is that the image sensing device readout cycle is a plurality of times the field cycle, degrading the dynamic resolution. Even with the use of this circuit, the number of pixels obtained as the static image signals is limited to the number of effective pixels used for moving videos plus the area of image stabilization pixels.

In a digital still camera designed for taking still images, there has been a trend in recent years toward an increasing number of pixels used on the moving video image sensing device in order to obtain higher resolution static image signals. When taking a moving image or monitoring the video, it is necessary to generate signals that conform to the television system. The number of pixels on such an image sensing device, however, does not necessarily match the number of scanning lines of the television system and therefore some form of conversion means is required.

The conversion means may involve, as in the video camera with the area of image stabilization pixels, reading out signals from the image sensing device taking a longer time than the field cycle and interpolating them to generate television signals. This method has, in addition to the problem described above, a drawback that the readout cycle increases as the number of pixels increases, further degrading the dynamic resolution.

To mitigate this problem, JP-A-9-270959 discloses an apparatus which mixes together or culls the pixel signals inside the image sensing device to reduce the number of signals to be read and therefore the read cycle. Although this apparatus alleviates the problem of the degraded dynamic resolution, it requires a large processing circuit such as field memory to perform time-axis transformation to generate signals conforming to the television system and the image sensing device itself needs to have a

special structure for performing desired mixing and culling.

SUMMARY OF THE INVENTION

The present invention relates to a photography of video cameras, camcorders, digital still cameras and others using a solid-state image sensing device, and more particularly to an electric camera using a solid-state image sensing device with a large number of pixels.

The conventional electric cameras, as described above, have drawbacks that when taking a still picture by using a video camera, the number of pixels is not sufficient and that when taking a moving image with a still camera, the associated circuit inevitably increases and the dynamic image quality deteriorates. Taking both moving and static images of satisfactory quality with a single camera is difficult to achieve. In addition to solving the above problems, to obtain good dynamic picture quality by using an image sensing device having a large number of pixels intended for still images requires extracting a pixel area that is used to realize an image stabilizing function. The conventional art and cameras do not offer a means to accomplish this function.

An object of the present invention is to provide an electric camera that solves these problems and which uses an image sensing device with a sufficient number of pixels for still images and enables taking of highly detailed still images and a moving video taking with

reduced image quality degradation without increasing circuitry such as field memory. It is also an object of the present invention to provide an electric camera that can also realize the image stabilizing function.

According to one aspect of this invention, the electric camera to realize the above objectives has: an image sensing device with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than three times the number of effective scanning lines M of a display screen of a television system; a driver to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce a number of lines of output signals which corresponds to the number of effective scanning lines M, K being at least one of integers equal to or less than an integral part of a quotient of N divided by M (a number of lines of output signals corresponds to 1/K the number of vertically arranged pixels N of the image sensing device); and a signal processing unit to generate image signals by using the output signals of the image sensing device.

As explained above, since this invention eliminates the limit on the number of vertically arranged pixels, an electric camera can be provided which enables taking of highly detailed still images and a satisfactory moving video taking by using an image sensing device with a large enough pixel number even for still images.

## BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a block diagram showing the configu

ration of a first embodiment of an electric camera according to the present invention.

Figure 2 is a schematic diagram showing the structure of an image sensing device in the first embodiment of the electric camera of the invention.

Figure 3 is a drive pulse timing diagram in the first embodiment of the electric camera of the invention.

Figure 4 is a schematic diagram showing a mixing operation in the first embodiment of the electric camera of the invention.

Figure 5 is a schematic diagram showing a readout area in the first embodiment of the electric camera of the invention.

Figure 6 is a schematic diagram showing a mixing operation in the first embodiment of the electric camera of the invention.

Figure 7 is a block diagram showing the configuration of a second embodiment of an electric camera according to the present invention.

Figure 8 is a schematic diagram showing a mixing operation in the second embodiment of the electric camera of the invention.

Figure 9 is a schematic diagram showing a readout area in the second embodiment of the electric camera of the invention.

Figure 10 is a schematic diagram showing the structure of an image sensing device in a third embodiment of the electric camera according to the present invention.

Figure 11 is a drive pulse timing diagram in the third embodiment of the electric camera of the invention.

Figure 12 is a schematic diagram showing an interpolation operation in the third embodiment of the electric camera of the invention.

Figures 13A and 13B are schematic diagrams showing the arrangement of color filters in the image sensing device in a fourth embodiment of the electric camera according to the present invention.

DESCRIPTION OF THE EMBODIMENTS

Now embodiments of the present invention will be described by referring to the accompanying drawings. Figure 1 is a block diagram showing the configuration of one embodiment of an electric camera according to the invention.

In Figure 1, reference number 1 represents a lens, 2 an aperture, 3 an image sensing device, 4 a drive circuit, 5 a gain adjust circuit, 6 an analog-digital (A/D) conversion circuit, 7 a signal processing circuit, 8 a vertical interpolation circuit to perform interpolation in a vertical direction, 9 a horizontal interpolation circuit to perform interpolation in a horizontal direction, 10 a recording unit including recording media such as magnetic tape, semiconductor memory and optical disk to record a video signal, 11 a control circuit to control these constitutional elements according to the operating state, 12 an encoder circuit to modulate the video signal into a

standard television signal, 13 a digital-analog (D/A) conversion circuit, 14 a mode selector switch to change over the operation mode between the moving video taking and the still image taking, 15 a record button to start or stop the recording, 16a and 16b gyro sensors to detect vertical image-unstability and lateral image-unstability, respectively, and 17 an image-unstability decision circuit to determine the image-instability from signals output from the gyro sensors.

In the above configuration, light coming from the lens 1 through the aperture 2 is focused on a light receiving surface of the image sensing device 3 where it is converted into an electric signal. In this embodiment the image sensing device 3 is of a CCD type. Figure 2 shows the structure of this image sensing device 3. In Figure 2, denoted 30 are pixels each formed of a photodiode, which are arranged horizontally and vertically in a grid pattern. On these grid-arrayed pixels three types of color filters that pass yellow (Ye), green (G) and cyan (Cy), respectively, are arranged in such a way that the combination of these three colors is repeated horizontally every three pixels and that the filters of the same colors are lined vertically in so-called vertical stripes. Although an arbitrary number of pixels may be used, this embodiment has an array of 1200 pixels vertically and 1600 pixels horizontally. A vertical transfer unit 32 is a CCD which is driven by three phase pulses V1, V2, V3. This CCD has a three-gate structure in which each pixel corresponds to

three phase pulses and thus can vertically transfer a signal charge of each pixel independently. Transfer gates 31 for transferring the charge of each pixel to the vertical transfer unit 32 are commonly connected to a gate of the vertical transfer unit 32 that corresponds to the V2 pulse. An operation to transfer the charge from each pixel to the vertical transfer unit 32 in response to a peak value of the pulse applied to the commonly connected gate and an operation to transfer the charge vertically are performed separately. A horizontal transfer unit 33 horizontally transfers the charges supplied from the vertical transfer units 32 and outputs them successively through an output amplifier 34 from the output terminal.

Referring back to Figure 1, the operation performed when the moving video mode is selected by the mode selector switch 14 will be explained. The number of vertically arranged pixels on the image sensing device in this embodiment is 1200, so if the number of effective scanning lines in the field of the NTSC system is assumed to be 240 lines, then vertically mixing five pixels (= 1200 pixel rows/240 scanning lines) can match the number of lines of output signals from the image sensing device to the number of effective scanning lines.

However, in this embodiment, to realize the image stabilizing function described later, four vertically arranged pixels are mixed together during motion image taking mode. When four vertically arranged pixels are to be cyclically mixed together, the signals from the area of

960 pixels (= 240 scanning lines × 4 pixels) out of the 1200 vertically arranged pixels are used as effective signals and the remaining 240 pixels (= 1200 (all pixels) - 960 (effective pixels)) are not used for image forming. Figure 3 shows the timing of a vertical drive pulse for the image sensing device in this operation mode, with V1, V2 and V3 representing three phase drive pulses applied to each gate of the CCD or vertical transfer unit 32.

In Figure 3, in a period T1 included in the vertical blanking period, the drive pulse V2 is held high to transfer the signal charge accumulated in each pixel to under the V2 gate of the vertical CCD. Next, in a period T2, while the V2 pulse is still at middle level, the V3 pulse is raised from low level to middle level; next, while the V3 pulse is at middle level, the V2 pulse is changed from middle level to low level, after which the V1 pulse is changed from low level to middle level; next, while the V1 pulse is at middle level, the V3 pulse is changed from middle level to low level, after which the V2 pulse is changed to middle level and finally the V1 pulse is changed from middle level to low level. With this sequence of pulse operations, the signal charges under the V2 gate for one pixel row are transferred and held again under the V2 gate.

By repeating this series of operations, the signal charges for a desired number of pixel rows can be transferred. In Figure 3, during a period T3 included in the vertical blanking period before the vertical effective

scanning period (the vertical scanning period minus the vertical blanking period which corresponds to the actually displayed image) and during a period T4 included in the vertical blanking period after the vertical effective scanning period, the above transfer operation for one pixel row is repeated a total of 240 times to transfer the signal charges of the 240 pixel rows not used for image generation to the horizontal transfer unit 33 during the vertical blanking period. For example, if this transfer operation is performed 120 times during the period T3 and 120 times during the period T4, the signal charges from upper 120 pixel rows and lower 120 pixel rows on the light receiving surface are transferred to the horizontal transfer unit 33 during the period T3 and period T4 within the vertical blanking period. During each of the subsequent periods T5 and T6 in the vertical blanking period, the horizontal transfer unit 33 is driven for a predetermined period to output the charges transferred to the horizontal transfer unit 33 from the output terminal. These charges are not used as valid signals as they are output during the vertical blanking period.

Next, in the vertical effective scanning period of Figure 3, the above one-pixel-row transfer operation is performed four times during each horizontal blanking period to transfer the signal charges of four pixel rows to the horizontal transfer unit 33 where they are mixed together. Then, during a horizontal effective scanning period (the horizontal scanning period minus the horizontal blanking

period which corresponds to the actually displayed image), the horizontal transfer unit 33 is driven to read out the signal charges from the horizontal transfer unit to produce an output signal conforming to the television system. If the above operation is performed on the A field and if, on the B field, the number of pixel rows transferred during the period T3 is set to 122 rows and that during the period T4 is set to 118 rows, then the combination of four pixel rows to be cyclically mixed together shifts by two rows between the two fields, thus allowing the interlaced scanning to be performed as shown in Figure 4. (Figure 4 shows the light receiving surface of the image sensing device and its relation to the displayed screen is vertically inverted.)

Let us return to Figure 1. The output signal from the image sensing device 3 is adjusted in gain by the gain adjust circuit 5 and then converted by the A/D conversion circuit 6 into a digital signal. The digital signal is then processed by the signal processing circuit 7 that performs color signal processing and luminance signal processing, such as generation of color signals, gamma correction, white balance processing and outline enhancement. The image sensing device in this embodiment has an array of vertical stripes of yellow (Ye), green (G) and cyan (Cy) color filters, so the color signals for Ye, G and Cy are obtained as a series of color points from one line of output signals at all times no matter how many pixels are vertically combined. From these color signals three

primary color signals R, G, B can be obtained from the following calculations.

$$R = Ye - G$$

$$B = Cy - G$$

$$G = G$$

The R, G and B signals undergoes the white balance processing and gamma correction processing in the signal processing circuit 7 and are then converted into color difference signals such as R-Y, B-Y or U and V. The luminance signals and the color difference signals are then entered through the vertical interpolation circuit 8 into the horizontal interpolation circuit 9. In this operation state the signals just pass through the vertical interpolation circuit 8 without being processed. The horizontal interpolation circuit 9 performs interpolation on the signals in the horizontal direction.

Figure 5 shows the light receiving surface of the image sensing device. As described above, in the operating state of this embodiment, the signals read out during the vertical effective scanning period correspond to an area having 960 of the 1200 vertically arranged pixels and a horizontal width of 1600 pixels, as shown shaded at A in Figure 5. If the entire light receiving surface of the image sensing device has a 4-to-3 (width to height) aspect ratio, the shaded area A is more laterally elongate than this aspect ratio. Hence, if the signals of all horizontal pixels of the light receiving surface are displayed, for example, on an NTSC standard television monitor with the

4-to-3 aspect ratio, the image displayed is compressed horizontally and looks vertically elongate, compared with the original image. It is therefore necessary to output during the horizontal effective scanning period only those signals coming from a pixel area with the horizontal width conforming to the aspect ratio of the television system, as shown by a shaded area B. When the television system has an 4-to-3 aspect ratio, the number of pixels in the horizontal width of the shaded area B is 1280 (= 960 (vertical effective pixels) × 4/3).

Returning back to Figure 1, the horizontal interpolation circuit 9 performs interpolation processing on the signals from the horizontal 1280 pixels to expand the signals so that they can be output over the entire horizontal effective scanning period. It also performs switching among different clocks as required. With the above operation, an area having 960 pixels in height and 1280 pixels in width is demarcated from the light receiving surface as signals conforming to the television system. Then, the luminance signal and the color difference signal are encoded by the encoder circuit 12 into television signals, which are then converted by the D/A conversion circuit 13 into analog signals for output. When the recording is specified by the record button 15, the signals are recorded by the recording unit 10. At this time, the signals may be compressed in the MPEG (Moving Picture Expert Group) format.

Next, the image stabilizing operation will be

explained. Image-unstability information obtained by the gyro sensors 16a, 16b that detect vertical and horizontal image-unstabilities is entered into the image-unstability decision circuit 17, which checks the received information for the amount and direction of the image-unstability and converts them into the number of pixels in vertical and horizontal directions on the light receiving surface of the image sensing device. Based on the converted pixel numbers, the position of an extracted area (effective pixel area) on the light receiving surface is shifted in a direction that cancels the image-unstability. This can correct the image-unstability. The positional shifting of the extracted area is performed as follows. The shifting in the vertical direction can be made by changing the number of pixel rows transferred during the periods T3 and T4 in Figure 3 and the shifting in the horizontal direction made by changing the interpolation start position in the horizontal interpolation circuit 9.

The operation during the moving video mode has been described above. Next, the operation performed when the static image mode is selected by the mode selector switch 14 will be explained.

In the static image mode, too, until the recording is requested by the record button 15, the camera outputs signals compatible with the television system to monitor the angle of view. Unlike the moving video photographing, all of the effective pixels on the image sensing device are used in this embodiment during the still image

photographing to produce signals with as high a resolution as possible. Hence, during the monitoring the television signals need to be generated from the signals coming from the entire pixel area.

The image sensing device of this embodiment has 1200 vertically arranged pixels, and the number of lines of output signals from the image sensing device can be made to match the number of effective scanning lines of NTSC system, which is assumed to have 240 scanning lines, by vertically mixing five pixels (= 1200/240). To make the image sensing device operate in this manner, the one-pixel-row transfer operation is performed five times during each horizontal blanking period in the vertical effective scanning period shown in the pulse timing diagram of Figure 3. With this operation, the signal charges of five pixel rows can be mixed by the horizontal transfer unit 33. As for the transfer operations during the periods T3 and T4 in the vertical blanking period, because the interlaced scanning is carried out, only two pixel rows are transferred during the period T3 on the B field, with no transfer operations performed in other vertical blanking periods (In this embodiment, 1200/240 = 5 with no remainder produced, so no further transfer is necessary; if, however, a remainder occurs, the remaining pixels need only be transferred during the periods T3 and T4).

The charges mixed by the horizontal transfer unit 33 are read out by driving the horizontal transfer unit 33 during the horizontal effective scanning period. With the

above operations, the signal charges of all pixels on the image sensing device can be read out in a manner conforming to the television system. The output signal from the image sensing device 3 is, as during the moving image photographing, adjusted in gain by the gain adjust circuit 5 and converted by the A/D conversion circuit 6 into a digital signal, which is then subjected to the color signal processing and the luminance signal processing in the signal processing circuit 7 before being entered into the vertical interpolation circuit 8. During the static image monitoring, the vertical interpolation circuit 8 performs a vertical gravity center correction on the received signals.

Figure 6 shows combinations of pixels to be cyclically mixed on the A field and the B field and also the vertical position of the gravity center of the mixed signals. In the interlaced scanning, scanning lines of the A field and the B field are located at the centers of adjoining scanning lines on other field. Hence, the signal samplings in the camera system for the two fields must be 180 degrees out of phase in the vertical direction. In the operating state of this embodiment, however, because five pixels are mixed together, the gravity centers of the output signals for the A field and the B field are deviated 36 degrees (= 1/2 pixel or 1/10 the line-to-line distance on the same field) from the ideal sampling phase difference of 180 degrees, as shown in Figure 6. To correct this requires generating a signal from two adjoining output lines by interpolation. For example, if we let an nth

output line on a field be Sn and an (n+1)th output line on the same field be Sn+1, then a signal Sn' obtained by calculating Sn'=(Sn × 9/10) + (Sn+1 × 1/10) is one whose gravity center is shifted by 1/10 output line from the gravity center of the nth output line toward the (n+1)th output line. The above calculation can also be performed on the signals for the B field to correct the gravity center deviation of sampling. In this embodiment, however, to equalize the effects of interpolation of the A field and the B field, the following calculations are performed to correct the nth output line by 1/20 line toward the (n-1) line on the A field and by 1/20 line toward the (n+1)th line on the B field.

A field: Sn' = (Sn × 19/20) + (Sn-1 × 1/20)

B field: Sn' = (Sn × 19/20) + (Sn+1 × 1/20)

While this embodiment performs the interpolation based on the calculation of two adjoining lines of output signals, a greater number of lines may be used for the interpolation processing. The output signal of the vertical interpolation circuit 8 is supplied to the horizontal interpolation circuit 9, which in this operating state does nothing but passes the signal. Then, as in the case of the moving image photographing, the signal is encoded by the encoder circuit 12 into a television signal, which is then converted by the D/A conversion circuit 13 into an analog signal for output. As described above, the television signals can be generated from all of the pixel area of the image sensing device also during the static

image mode.

Next, the operation performed when the recording is requested by the record button 15 will be described. During the monitoring in the static mode, the signals are mixed together inside the image sensing device to reduce the number of signals and thereby generate television signals. During recording, however, the mixing processing is not performed and all the pixel signals need to be read out independently of each other in order to produce high resolution signals. To realize this, the one-pixel-row transfer operation is performed only once during each horizontal blanking period in the vertical effective scanning period shown in the pulse timing diagram of Figure 3. This causes only the signal charges for one pixel row to be transferred into the horizontal transfer unit 33, which is then driven to read out the signal charges for one pixel row. Repeating this operation the number of times equal to the number of vertically arranged pixel rows enables the signal charges of all pixel rows to be read out independently of each other. The transfer operation is not done during the periods T3 and T4 in the vertical blanking period.

The signal charges thus read out are adjusted in gain by the gain adjust circuit 5 and converted by the A/D conversion circuit 6 into digital signals, which are then subjected to the color signal processing and the luminance signal processing in the signal processing circuit 7, after which the signals are supplied through the vertical inter-

polation circuit 8 and the horizontal interpolation circuit 9 to the recording unit 10 where they are recorded. At this time, no interpolation processing is performed by the vertical interpolation circuit 8 or horizontal interpolation circuit 9. The recording unit 10 may compress the signals in the JPEG (Joint Photographic Expert Group) format, for example. Because during the static image recording, no television signal can be generated, an image immediately before starting the recording or a single color image is output as the television signal for monitoring purpose. With the above operation, high resolution signals obtained from all the pixels of the image sensing device can be recorded. Although in this embodiment the recording unit is used commonly for the moving video mode and for the static image mode, dedicated recording units may be provided separately for these modes.

As explained above, since there is no limit on the number of vertically arranged pixels in this embodiment, an image sensing device with a large enough pixel number even for still images can be used to photograph highly detailed still images and satisfactory moving images.

Further, the signal mixing and the vertical signal transfer during the vertical blanking period allow the signals from the image sensing device with a large number of pixels to be read out in a manner that conforms to the television system. This in turn can reduce image quality degradation and realize the moving image photo-

graphing with an image stabilizing function and the monitoring during still image photographing.

Only the output signals from that horizontal segment which virtually corresponds to the television system's aspect ratio with respect to the vertical segment are extracted and output over the entire horizontal effective scanning period of the television system. This ensures that the output signals obtained conform to the television system's aspect ratio regardless of the extracted vertical segment position.

Further, the image sensing device is driven in such a way as to shift the position of the pixels to be cyclically mixed together every display cycle of the television system in order to output interlaced signals. With this arrangement, the interlaced scanning can be performed even when an image sensing device with a large number of pixels is used.

Further, the output signals produced by the mixing are interpolated so that the gravity centers of the output signals interlaced every display cycle have a phase difference of 180 degrees in the vertical direction. This ensures that the interlaced output signals have no deviation from the ideal 180-degree phase difference during interlacing even when an interlace phase deviation would normally occur, as when odd numbered pixels are mixed together.

In this embodiment, the image sensing device has 1200 vertically arranged pixels, and four pixels are mixed

together during the moving video mode and five pixels during the static image mode. Because the area of image-stabilization pixels may or may not be used and set to any desire size, the number of pixels to be cyclically mixed together in each mode needs only to be equal to or less than the integral part of a quotient of the number of vertically arranged pixels divided by the number of television system's effective scanning lines (in the above example, 5 or less). (The number of vertically arranged pixels does not need to be divisible and, in the above example, may be more than 1200).

The number of vertically arranged pixels for static image photographing needs only to be three or more times the number of effective scanning lines on each field of the television system. In this embodiment the vertically adjoining pixels are mixed together to reduce the number of output lines from the image sensing device during the vertical effective scanning period. The number of lines of output signals can also be reduced by a so-called culling operation, by which only one line of signal charges of pixels is read out for every predetermined number of lines.

While in this embodiment the vertical transfer unit of the image sensing device is formed as a CCD that is driven by three phase pulses for each pixel, the image sensing device may have any desired structure as long as it can realize the mixing or culling of pixels that meets the above conditions.

Although this embodiment described the case of NTSC system, the invention can also be applied to other television systems, such as PAL standard, with different numbers of effective scanning lines.

In summary, a variety of constructions essentially equal in the working principle to this embodiment can be realized by the use of an image sensing device that has an arbitrary number of vertically arranged pixels N three or more times the number of effective scanning lines M of each field of the television system and which allows the vertical mixing or culling of that number of pixels which is at least one of integers equal to or less than the integral part of a quotient of N divided by M (a number of lines of output signals corresponds to 1/K the number of vertically arranged pixels N of the image sensing device).

Next, another embodiment of the present invention will be described by referring to Figure 7 showing the configuration of the embodiment. The configuration shown in Figure 7 differs from that of Figure 1 in that it has a view angle change switch 18. In Figure 7 constitutional elements identical with those shown in Figure 1 are assigned like reference numbers and explanations on the constitutional elements performing the same operations as those in Figure 1 are omitted here.

The operations of the moving video mode, the monitoring during the static image mode and the static image recording are similar in normal condition to the operations of the previous embodiment which was explained with reference to the configuration diagram of Figure 1. An operation performed when during the moving video mode a

request to change the angle of view is made by the view angle change switch 18 will be described.

In the normal condition of this embodiment, as explained in the previous embodiment, the mixing of four vertically arranged pixels, the vertical transfer during the vertical blanking period and the horizontal interpolation processing are performed to extract an area of 960 pixels in height and 1280 pixels in width from the entire pixel area to generate television signals. When a view angle change (which means a zooming function without image quality degradations in the vertical direction) is requested by the view angle change switch 18, three vertically arranged pixels are mixed together and the signals from the excess vertically arranged pixels are read out during the vertical blanking periods before and after the vertical effective scanning period.

In this embodiment, signals of 480 pixels (= 1200 - 240×3) or 160 lines of output signals after mixing (= 480/3) need to be read out during the vertical blanking period. This allows the signals of 720 vertically arranged pixels to be read out as 240 lines of output signals conforming to the television system. To carry out this reading requires, in the pulse timing diagram of Figure 3, transferring the signals of three pixel rows during each horizontal blanking period in the vertical effective scanning period and also transferring a total of 480 pixel rows (= 160 lines of output signals) during the T3 and T4 periods in the vertical blanking period. The combinations

of pixels to be cyclically mixed together are changed from one field to another to achieve the interlaced scanning.

The output signals of the image sensing device 3 are supplied to the gain adjust circuit 5. Because the signal level produced as a result of the 3-pixel mixing is 3/4 the signal level of the 4-pixel mixing, the again of the gain adjust circuit 5 is increased to 4/3 the gain of the 4-pixel mixing to make the 3- and 4-pixel-mixed input signal levels to the subsequent circuit equal. Then, the signals are processed by the A/D conversion circuit 6 and the signal processing circuit 7 before being supplied to the vertical interpolation circuit 8. The combinations of pixels to be cyclically mixed on the A field and the B field and the vertical positions of the gravity centers of the mixed signals are shown in Figure 8. As in the static image monitoring of the previous embodiment, the phase difference between the two fields is 180 degrees. Because the sampling phases of the fields are deviated from the ideal 180-degree phase difference, the vertical position of the gravity centers are corrected by the vertical interpolation circuit 8. The amount of phase deviation in this operating state is 60 degrees (= 1/2 pixel or 1/6 the line-to-line distance on the same field). To correct the phase deviation evenly on the both fields, the following calculations should be performed.

A field: $Sn' = (Sn \times 11/12) + (Sn-1 \times 1/12)$

B field: $Sn' = (Sn \times 11/12) + (Sn+1 \times 1/12)$

As described earlier, the interpolation process-

ing may use three or more output lines. Next, the horizontal interpolation circuit 9 horizontally expands the signals from that horizontal segment which corresponds to the 4-to-3 aspect ratio with respect to the 720 vertically arranged pixels (i.e., signals from a horizontal 960-pixel segment (=1600 × 720/1200) in this operating state) so that the expanded signals can be output during the entire horizontal effective scanning period. With the above operation, an area of 720 pixels in height and 960 pixels in width can be extracted from the light receiving surface.

Next, when the view angle change is requested again by the view angle change switch 18, two vertically arranged pixels are mixed together, an area of 480 vertically arranged pixels is read out during the vertical effective scanning period, and the horizontal interpolation circuit 9 expands the signals from the horizontal 640-pixel segment and outputs the expanded signals during the entire horizontal effective scanning period to extract an area of 480 pixels in height and 640 pixels in width. (During the two-pixel mixing, because the interlace phase deviation does not occur, the gravity center position correction by the vertical interpolation circuit 8 is not performed.) If a further view angle change is requested by the view angle change switch 18, the operation is restored to a normal state where four vertically arranged pixels are mixed together.

As a result of the above operation, the area extracted from the light receiving surface of the image

sensing device can be changed to three different areas: (A) 960 pixels high by 1280 pixels wide, (B) 720 pixels high by 960 pixels wide and (C) 4880 pixels high by 640 pixels wide. That is, the angle of view can be changed to three different angles. With the area A produced by the 4-pixel mixing taken as a reference, the area B produced by the 3-pixel mixing can provide an image enlarged by 1.33 times and the area C produced by the 2-pixel mixing can provide an image enlarged by two times. It should be noted here that because the three different areas are chosen by changing the number of pixel to be cyclically mixed together in order to make the number of the effective output lines from the imaging device agree with the number of the effective scanning lines of the television system, the angle of view can be changed while maintaining a good image with no image quality degradation in the vertical direction, when compared with an ordinary so-called digital zoom which generates effective scanning lines of signals by interpolating a small number of output lines. During the monitoring of a static image, too, it is possible to perform the similar operation of changing the angle of view by changing the number of pixel rows to be cyclically mixed together.

As described above, in addition to the advantages provided by the previous embodiment, this embodiment can also realize the view angle change with little image quality degradation even for still images by using an image sensing device with a large number of pixels and changing

the number of pixels to be cyclically mixed together.

Further, because changes in signal level caused when the number of pixels to be cyclically mixed is changed are absorbed by the gain adjust means, the input signal level to the subsequent signal processing means can be kept constant.

While in this embodiment, the view angle change is performed by the view angle change switch 18, the angle of view may be changed continuously by a zoom switch. In this case, when the magnification factor does not reach the value that is obtained by changing the pixel mixing, the digital zoom performs the ordinary interpolation processing. In this embodiment, when the magnification factor is 1 or more and less than 1.33, the 4-pixel mixing is performed; for the factor of 1.33 or more and less than 2, the 3-pixel mixing is done; and for the factor of 2 or higher, the 2-pixel mixing is carried out. The mixing operation may be interlocked with an optical zooming mechanism.

Regardless of the number of pixels in the image sensing device, the structure of the image sensing device or the television system employed, this embodiment, as in the previous embodiment, may also use an image sensing device that has an arbitrary number of vertically arranged pixels N three or more times the number of effective scanning lines M of each field and which allows the vertical mixing or culling of those numbers of pixels which are at least two of integers equal to or less than the integral

part of a quotient of N divided by M. The use of this image sensing device can form a variety of constructions essentially equal in the working principle to this embodiment.

Next, a further embodiment of the present invention will be described. The overall configuration of this embodiment is similar to that of Figure 1, except that the inner structure of the image sensing device 3 is different. The configuration of the image sensing device in this embodiment is shown in Figure 10. In Figure 10, denoted 30 are pixels formed of photodiodes, which are arranged horizontally and vertically in a grid pattern. On these grid-arrayed pixels three types of color filters that pass yellow (Ye), green (G) and cyan (Cy), respectively, are arranged in so-called vertical stripes.

In this embodiment, the image sensing device has an array of pixels measuring 864 pixels vertically and 1152 pixels horizontally. A vertical transfer unit 32 is a CCD which is driven by six phase pulses V1, V2, V3, V4, V5, V6. This CCD has a two-gate structure in which each pixel corresponds to two phase pulses and six gates corresponding to the six phase pulses are repeated for every three pixels. Transfer gates 31 for transferring the signal charge of each pixel to the vertical transfer unit 32 are commonly connected to respective gates of the vertical transfer unit 32 corresponding to the pulses V1, V3, V5. An operation to transfer the signal charge from each pixel to the vertical transfer unit 32 in response to peak values

of pulses applied to the commonly connected gates and an operation to transfer the charge vertically are performed separately.

A horizontal transfer unit 33 horizontally transfers the charges supplied from the vertical transfer units 32 and outputs them successively through an output amplifier 34 from the output terminal. This image sensing device, unlike the one in the previous embodiment, cannot vertically transfer all pixels independently of each other, but can mix together the signal charges of three vertically adjoining pixels inside the vertical transfer unit 32 before transferring them.

First, the operation performed in this embodiment during the moving video mode will be explained. In the image sensing device of this embodiment the effective number of vertically arranged pixels is 864. If three pixels are vertically mixed, the signals of the 720 (=240×3) of the 864 vertically arranged pixels can be used as the effective signals and the remaining 144 (= 864 - 720) pixels can be used as the image-unstability correction pixel area.

Figure 11 shows the timings of vertical drive pulses for the image sensing device of Figure 10 during this operation mode, with V1, V2, V3, V4, V5, V6 representing the six phase drive pulses applied to the respective gates of the CCD or vertical transfer unit 32. In Figure 11, during a period T1 included in the vertical blanking period, the drive pulses V1, V3 and V5 are held high to

cause the signal charge of each pixel to be transferred to under the V1, V3 and V5 gates of the vertical CCD. Then, the V2 and V4 pulses are changed from low level to middle level to mix the charges of the adjoining three pixels. After the mixing, the V5 pulse is changed from middle level to low level to hold the mixed signal charges under the V1, V2, V3, V4 gates.

Next, a series of operations performed during a period T2 (changing the drive pulses from middle level to low level or from low level to middle level in the order of V1, V2, V3, V4, V5 and V6) causes one mixed output line (3 pixel rows) to be transferred and held again under the V1, V2, V3, V4 gate. By repeating this series of operations, a desired number of output lines of mixed signal charges can be transferred.

In Figure 11, during a period T3 included in the vertical blanking period before the vertical effective scanning period and during a period T4 included in the vertical blanking period after the vertical effective scanning period, the transfer operation for one output line is repeated a total of 144 times to transfer 144 output lines of signal charges not used for image forming to the horizontal transfer unit 33 at high speed during the vertical blanking periods. During subsequent periods T5 and T6 in the vertical blanking periods, the horizontal transfer unit 33 is driven for predetermined periods to output the signal charges transferred to the horizontal transfer unit 33 from the output terminal.

Next, in the vertical effective scanning period of Figure 11, the one-output-signal-line transfer operation is performed during each horizontal blanking period. Then, during the horizontal effective scanning period, the horizontal transfer unit 33 is driven to read out the signal charges from the horizontal transfer unit 33. With this operation the signal charges of three pixels mixed together can be read out in a way conforming to the television system. As shown in Figure 11, the signals for the A field are mixed by changing the V2 and V4 pulses to middle level after transferring the signals from the pixels to the vertical transfer unit 32. The signals for the B field, on the other hand, are mixed by changing the V2 and V6 pulses to middle level. With this mixing method, the combinations of pixels to be cyclically mixed together can be changed from one field to another, thereby realizing the interlaced scanning. The output signals from the image sensing device are processed in the similar manner to that of the previous embodiment. A vertical interpolation circuit 8 performs the gravity center correction, as in the 3-pixel mixing in the previous embodiment, and a horizontal interpolation circuit 9 performs interpolation processing to match the aspect ratio with that of the television system.

Next, the operation during the monitoring in the static image mode will be explained. It is assumed that the still image photographing is done by using all effective pixels of the image sensing device, as in the previous

embodiment. The image sensing device of this embodiment has 864 vertically arranged pixels and, when 3-pixel mixing is done as in the moving video taking, the number of output lines is 288 (=864/3), which means that these signal lines cannot be read out in a manner conforming to the television system. Hence, during the monitoring in the static image mode, vertical 6-pixel mixing is performed. The 6-pixel mixing can be achieved by transferring to the horizontal transfer unit 33 in each horizontal blanking period two output lines of signal charges each of which line has been generated by vertically mixing three pixels within the vertical transfer unit 32. The 6-pixel mixing can reduce the number of output lines from the image sensing device down to 144 (= 864/6) lines. The output signals of the image sensing device that were reduced to 144 output lines are interpolated by the vertical interpolation circuit 8 to transform the 144 output lines of signals into 240 lines of signals, which conform to the television system. To generate 240 lines of signals from the 144 lines requires interpolation processing that generates five lines from three lines (144/240 = 3/5).

Figure 12 shows how the interpolation is performed using two adjoining output lines. Let three output lines of the image sensing device be n, n+1 and n+2. The five output lines of signals can be generated from the following calculations.

$$n' = n$$

$$n' + 1 = n/2 + (n+1)/2$$

$$n' + 2 = n + 1$$

$$n' + 3 = (n+1)/2 + (n+2)/2$$

$$n' + 4 = n + 2$$

Three or more output lines of signals may be used for interpolation processing. With the above operation, television signals can be generated by using signals of all pixels of the image sensing device also during the monitoring in the static image mode.

Next, the operation performed when the recording is requested by the record button 15 will be explained. In the recording process, the mixing processing is not performed and signals of all pixels need to be read independently of each other in order to obtain high-resolution signals. To realize this, the aperture 2 is first closed and then, during the period T2 in the pulse timing diagram of Figure 11, only the V1 pulse is raised to high level to transfer the signal charge of only the pixel adjacent to the V1 gate to the vertical transfer unit 32. Then, the vertical transfer unit 32 and the horizontal transfer unit 33 are successively driven to read out the signal charges. Similarly, the V3 pulse is raised to high level to read the signal charge of the pixel adjacent to the V3 gate, followed by raising the V5 pulse to high level to read the signal charge of the pixel adjacent to the V5 gate. With the above processing, the signal charges of all pixels can be read out independently in three successive operations. The signal charges thus read out are recorded in the recording unit 10. At this time, they are

rearranged properly to reconstruct the pixel arrangement on the light receiving surface of the image sensing device.

As described above, this embodiment offers the following advantages. If the number of vertically arranged pixels is not an integral multiple of the number of scanning lines of the television system, the signals conforming to the television system can be generated from the whole area of effective pixels by performing the pixel mixing and the vertical interpolation.

In this embodiment, as in the previous embodiment, regardless of the number of pixels in the image sensing device, the structure of the image sensing device or the television system employed, a variety of constructions essentially equal in the working principle to this embodiment can be realized by using an image sensing device that has an arbitrary number of vertically arranged pixels N three or more times the number of effective scanning lines M of each field and which allows the vertical mixing or culling of that number of pixels which is greater by at least one than the integral part of a quotient of N divided by M.

Next, a further embodiment of the present invention will be explained. This embodiment differs from the previous embodiments in that the image sensing device have different arrangements of color filters. Figures 13A and 13B show arrangements of color filters in this embodiment. These color filters in both examples are arranged in vertical stripes and, regardless of the number of pixels to

be vertically mixed or culled, the R, G, B primary color signals can be generated from one line of output signals. Figure 13A shows a color filter arrangement on the image sensing device in which white filters (W = passing all colors) are used instead of the green (G) filters used in the previous embodiment. The R, G, B signals can be obtained by the following calculations.

$$R = W - Cy$$

$$G = Ye + Cy - W$$

$$B = W - Ye$$

When this color filter arrangement is used, a higher sensitivity can be obtained than the color filter arrangement of the previous embodiment. Figure 13B show a color filter arrangement that uses, in stead of complementary colors, color filters that pass the primary colors R, G, B. This color filter arrangement can directly produce the primary color signals, R, G, B and can provide a camera with good color purity and good color S/N.

With the above color filter arrangements, it is possible to produce color signals corresponding to the three kinds of color filters from each line of output signals at all times no matter how many pixels are vertically mixed or culled. Therefore, color signals conforming to the television system can be generated easily.

CLAIMS:

1. An electric camera comprising:

an image sensing device with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than three times the number of effective scanning lines M of a display screen of a television system;

a driver to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce a number of lines of output signals which corresponds to the number of effective scanning lines M, K being at least one of integers equal to or less than an integral part of a quotient of N divided by M; and

a signal processing unit to generate image signals by using the out put signals of the image sensing device.

**ABSTRACT OF THE DISCLOSURE:**

An electric camera includes an image sensing device with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than three times the number of effective scanning lines M of a display screen of a television system, a driver to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of K pixels to produce, during a vertical effective scanning period of the television system, a number of lines of output signals which corresponds to 1/K the number of vertically arranged pixels N of the image sensing device, K being an integer equal to or less than an integral part of a quotient of N divided by M, and a signal processing unit having a function of generating image signals by using the output signals of the image sensing device.

FIG.1

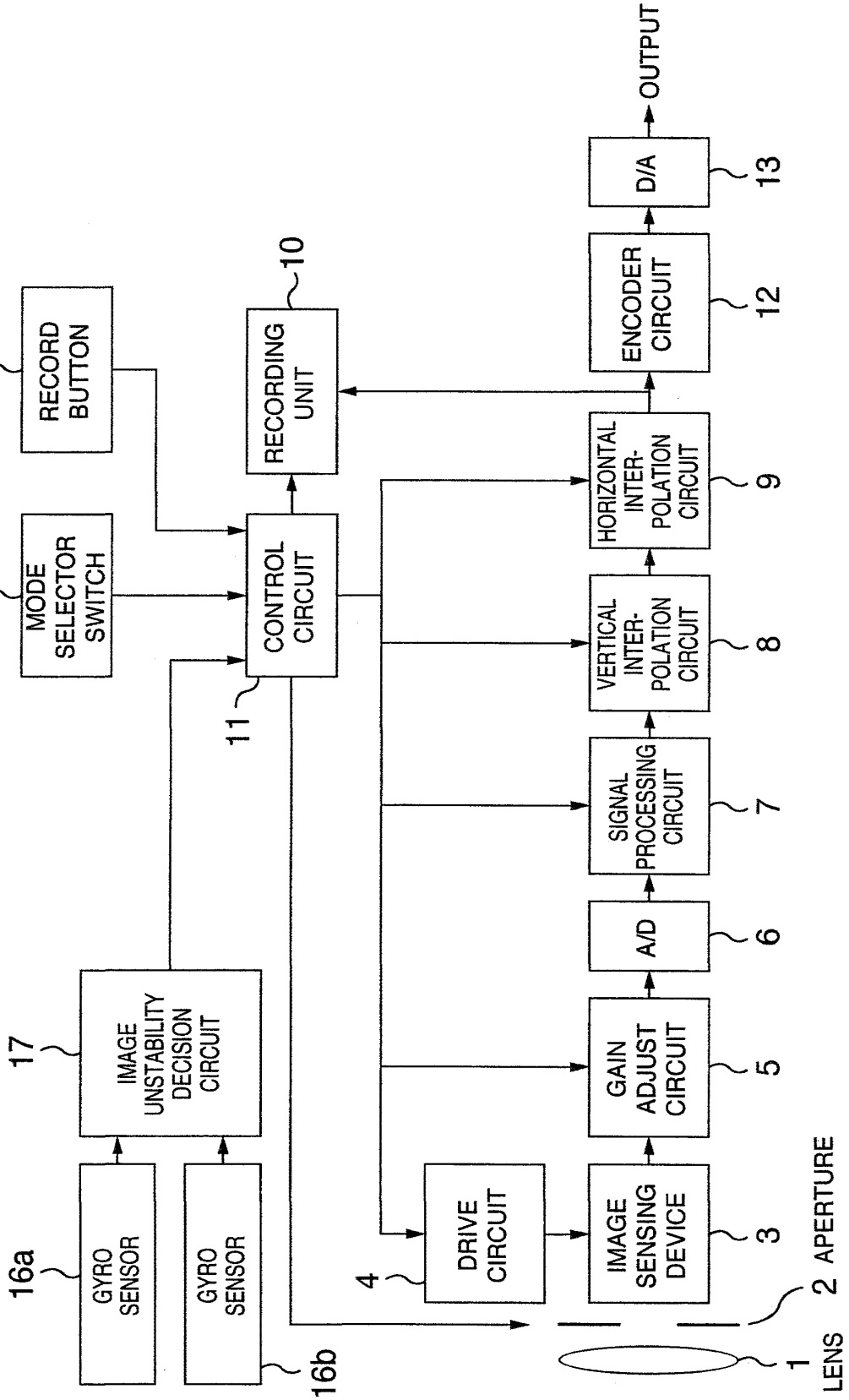

LENS
1
2 APERTURE
IMAGE SENSING DEVICE
3
DRIVE CIRCUIT
4
GAIN ADJUST CIRCUIT
5
A/D
6
SIGNAL PROCESSING CIRCUIT
7
VERTICAL INTER-POLATION CIRCUIT
8
HORIZONTAL INTER-POLATION CIRCUIT
9
RECORDING UNIT
10
CONTROL CIRCUIT
11
ENCODER CIRCUIT
12
D/A
13
OUTPUT
MODE SELECTOR SWITCH
14
RECORD BUTTON
15
GYRO SENSOR
16a
GYRO SENSOR
16b
IMAGE UNSTABILITY DECISION CIRCUIT
17

FIG.2

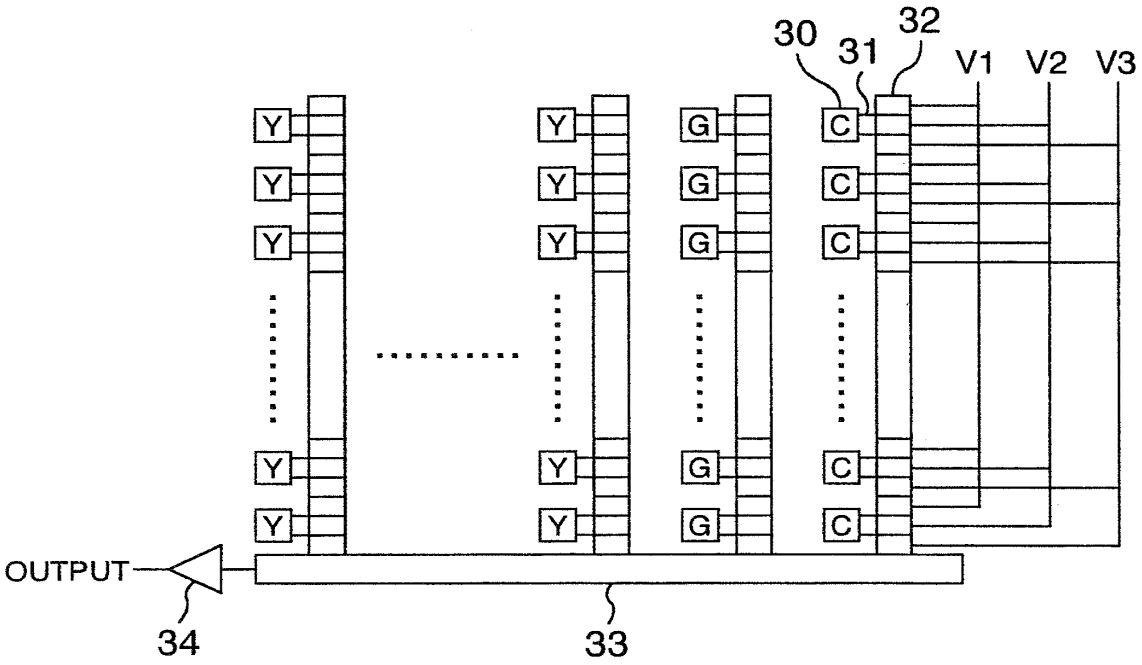

30
31
32
V1
V2
V3
Y
G
C
OUTPUT
34
33

FIG.4

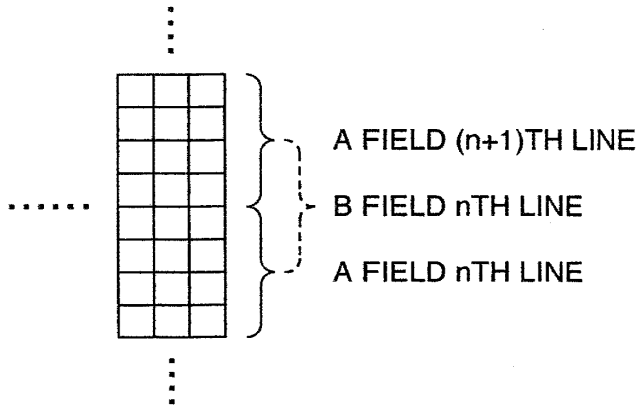

A FIELD (n+1)TH LINE
B FIELD nTH LINE
A FIELD nTH LINE

FIG.3

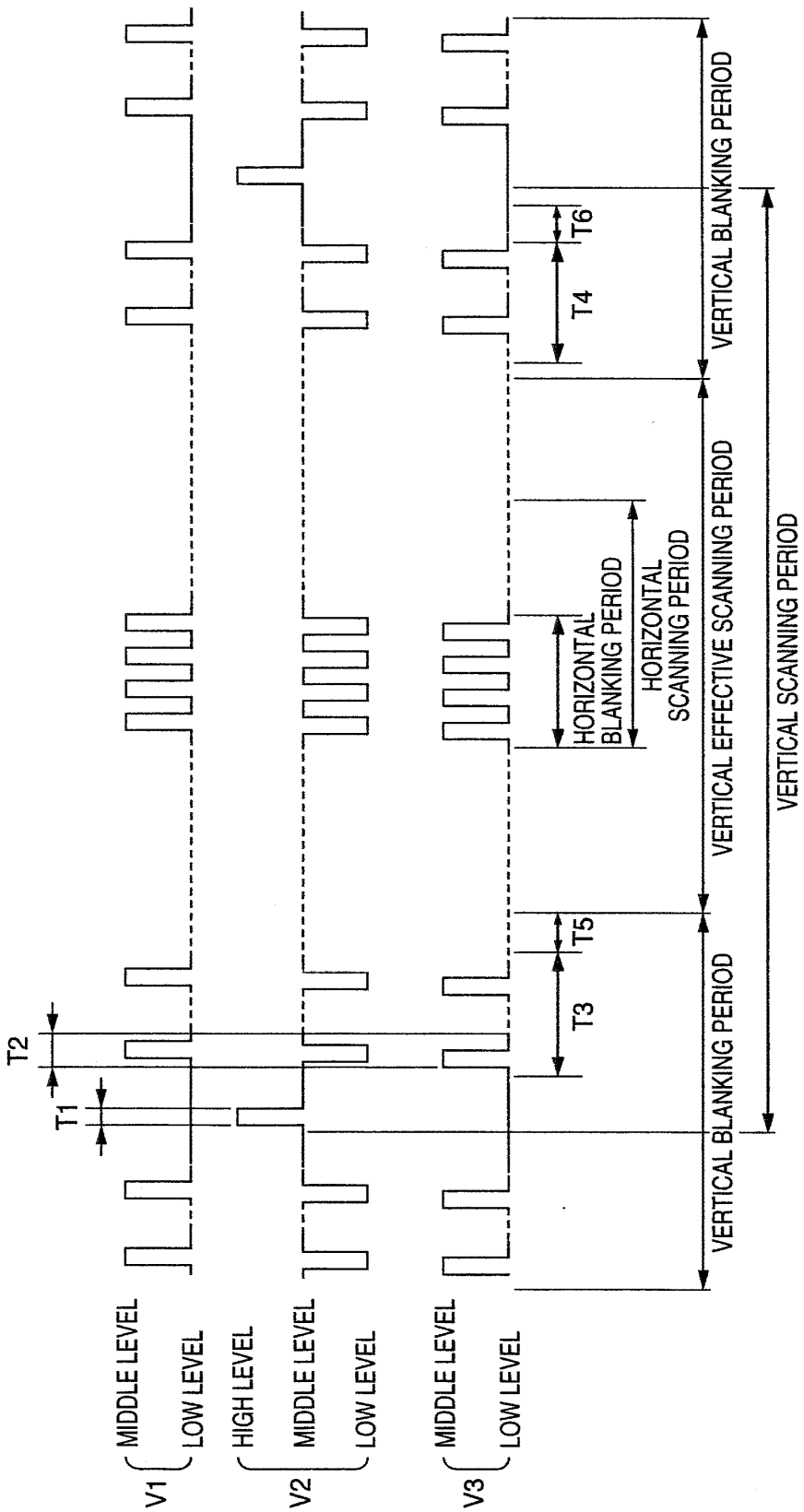

V1
MIDDLE LEVEL
LOW LEVEL
V2
HIGH LEVEL
MIDDLE LEVEL
LOW LEVEL
V3
MIDDLE LEVEL
LOW LEVEL
T1
T2
T3
T4
T5
T6
HORIZONTAL BLANKING PERIOD
HORIZONTAL SCANNING PERIOD
VERTICAL BLANKING PERIOD
VERTICAL EFFECTIVE SCANNING PERIOD
VERTICAL BLANKING PERIOD
VERTICAL SCANNING PERIOD

FIG.5

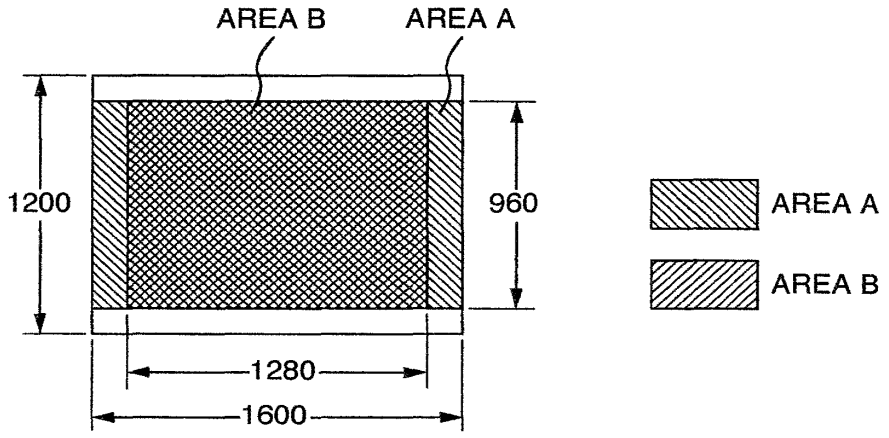

AREA B
AREA A
1200
960
1280
1600
AREA A
AREA B

FIG.6

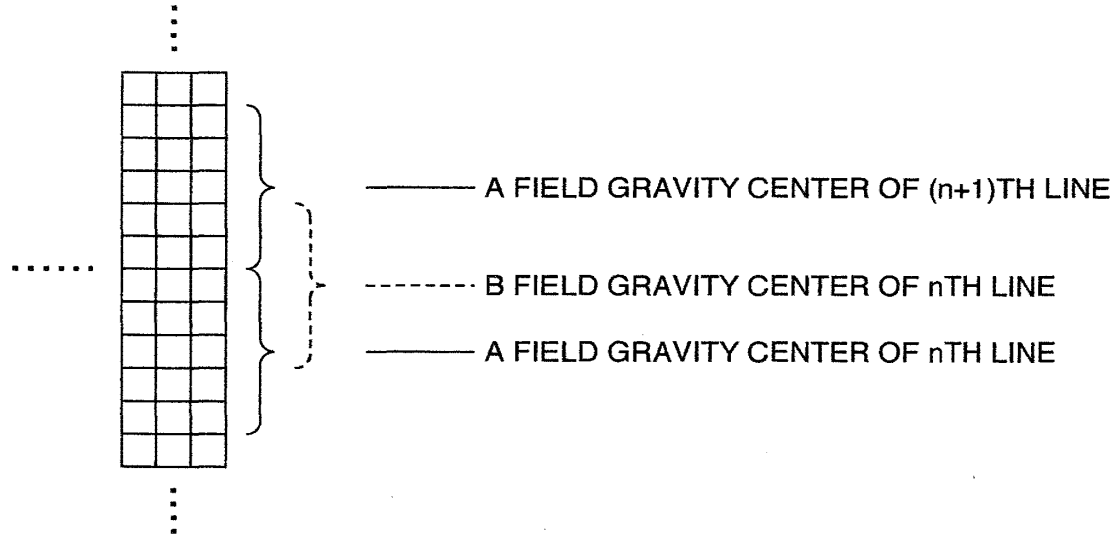

A FIELD GRAVITY CENTER OF (n+1)TH LINE
B FIELD GRAVITY CENTER OF nTH LINE
A FIELD GRAVITY CENTER OF nTH LINE

FIG.7

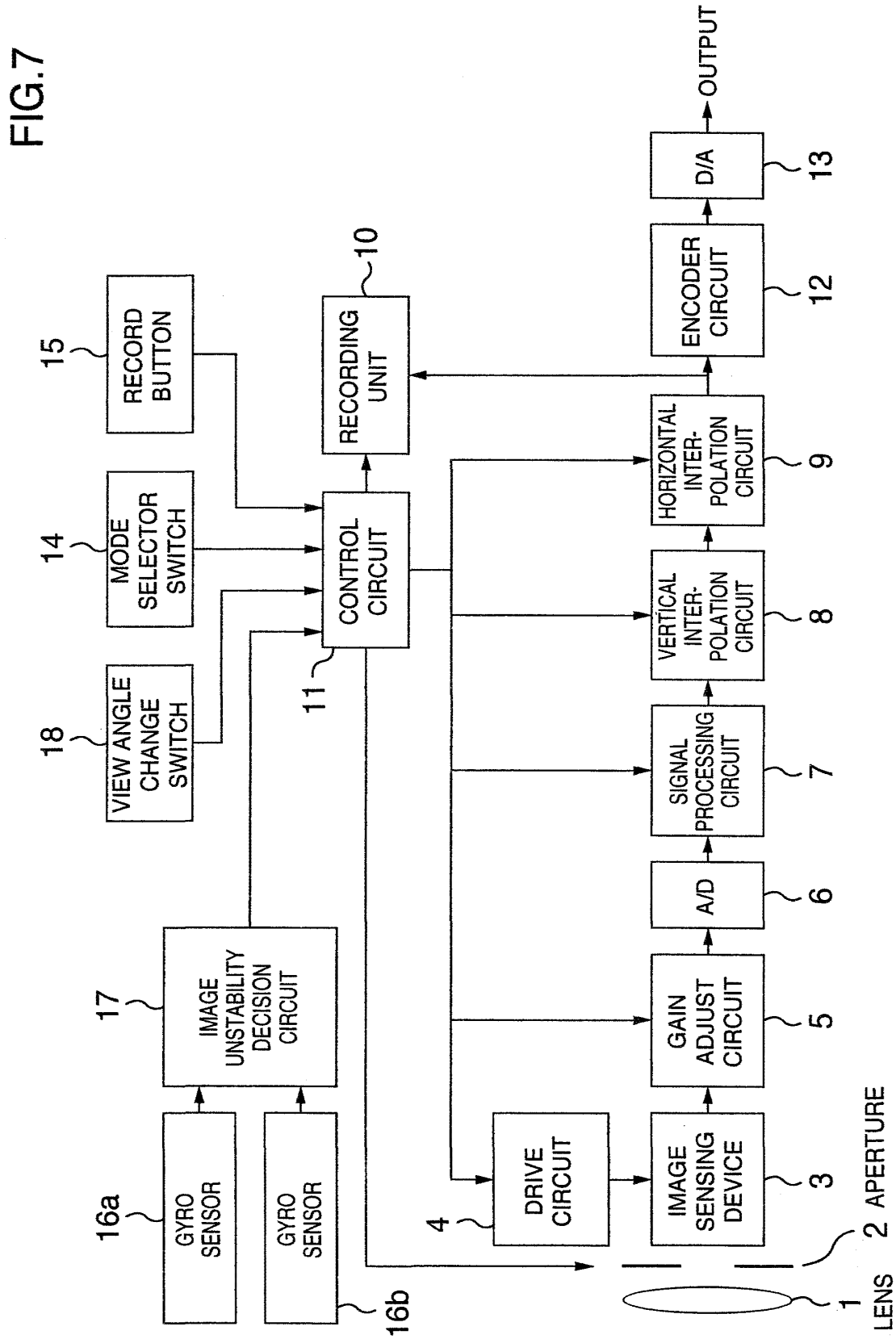

LENS
1
2 APERTURE
IMAGE SENSING DEVICE
3
DRIVE CIRCUIT
4
GAIN ADJUST CIRCUIT
5
A/D
6
SIGNAL PROCESSING CIRCUIT
7
VERTICAL INTER-POLATION CIRCUIT
8
HORIZONTAL INTER-POLATION CIRCUIT
9
RECORDING UNIT
10
CONTROL CIRCUIT
11
ENCODER CIRCUIT
12
D/A
13
OUTPUT
RECORD BUTTON
15
MODE SELECTOR SWITCH
14
VIEW ANGLE CHANGE SWITCH
18
IMAGE UNSTABILITY DECISION CIRCUIT
17
GYRO SENSOR
16a
GYRO SENSOR
16b

FIG.8

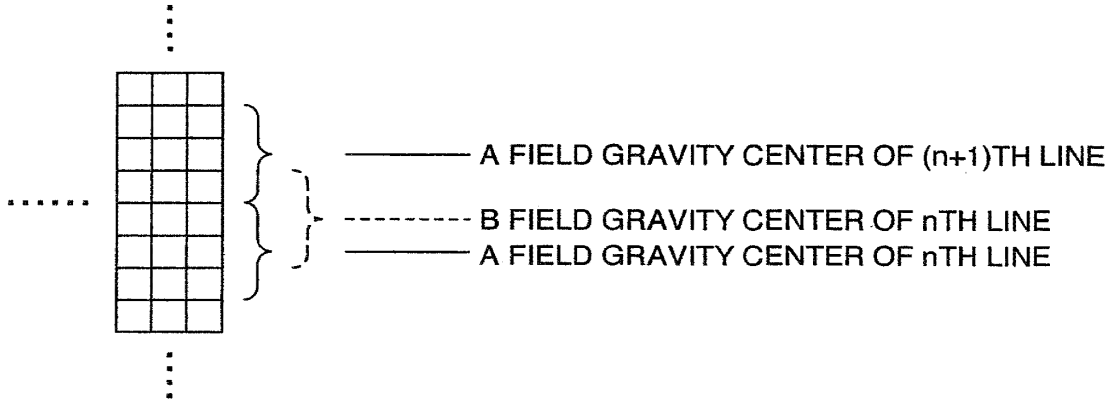

A FIELD GRAVITY CENTER OF (n+1)TH LINE
B FIELD GRAVITY CENTER OF nTH LINE
A FIELD GRAVITY CENTER OF nTH LINE

FIG.9

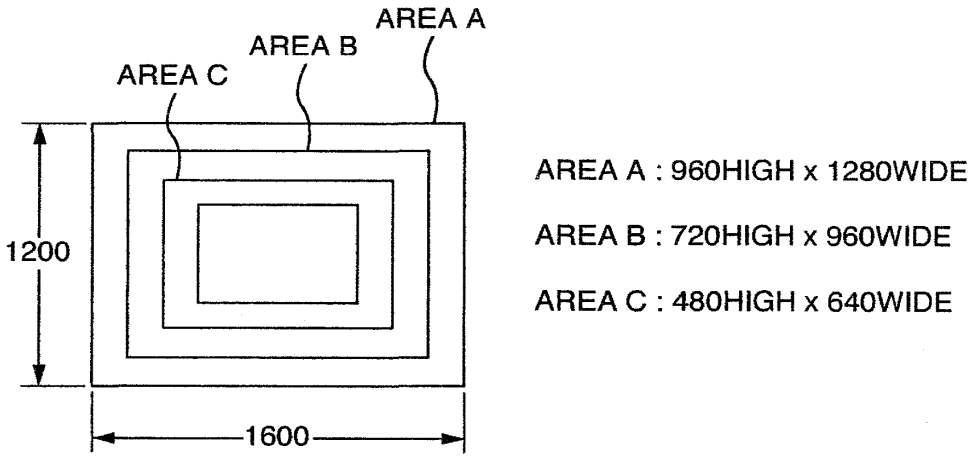

AREA A
AREA B
AREA C
1200
1600
AREA A : 960HIGH x 1280WIDE
AREA B : 720HIGH x 960WIDE
AREA C : 480HIGH x 640WIDE

FIG.10

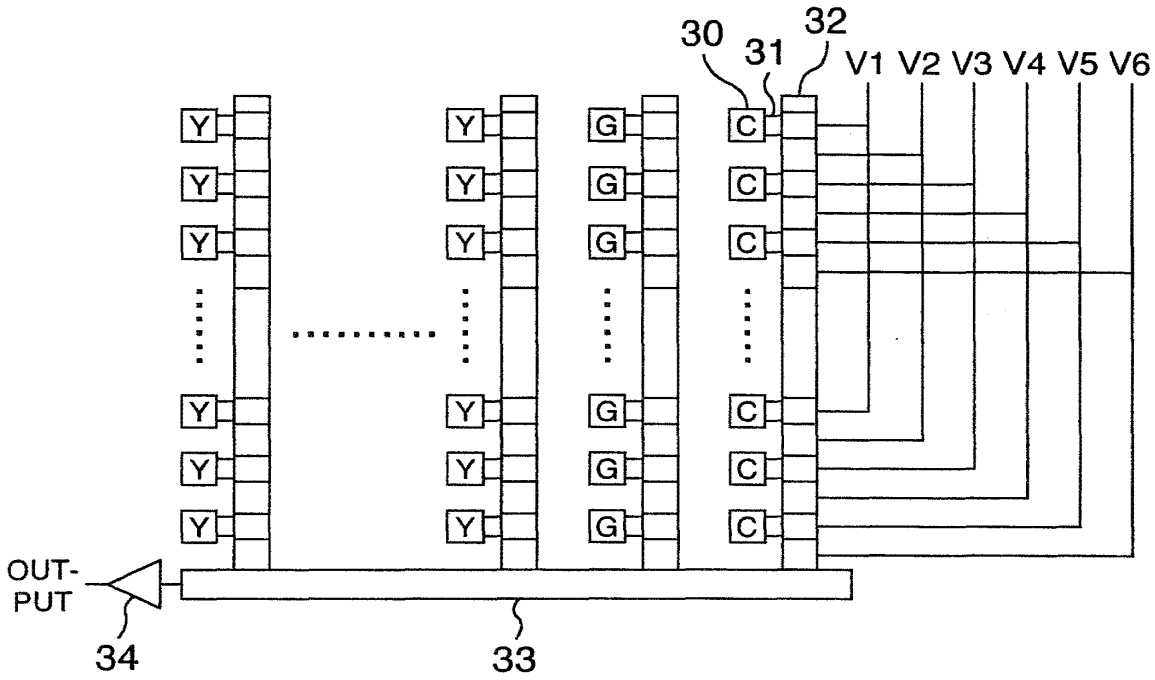
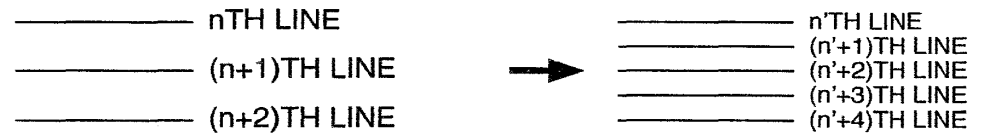



FIG.12




(BEFORE INTERPOLATION)

(AFTER INTERPOLATION)

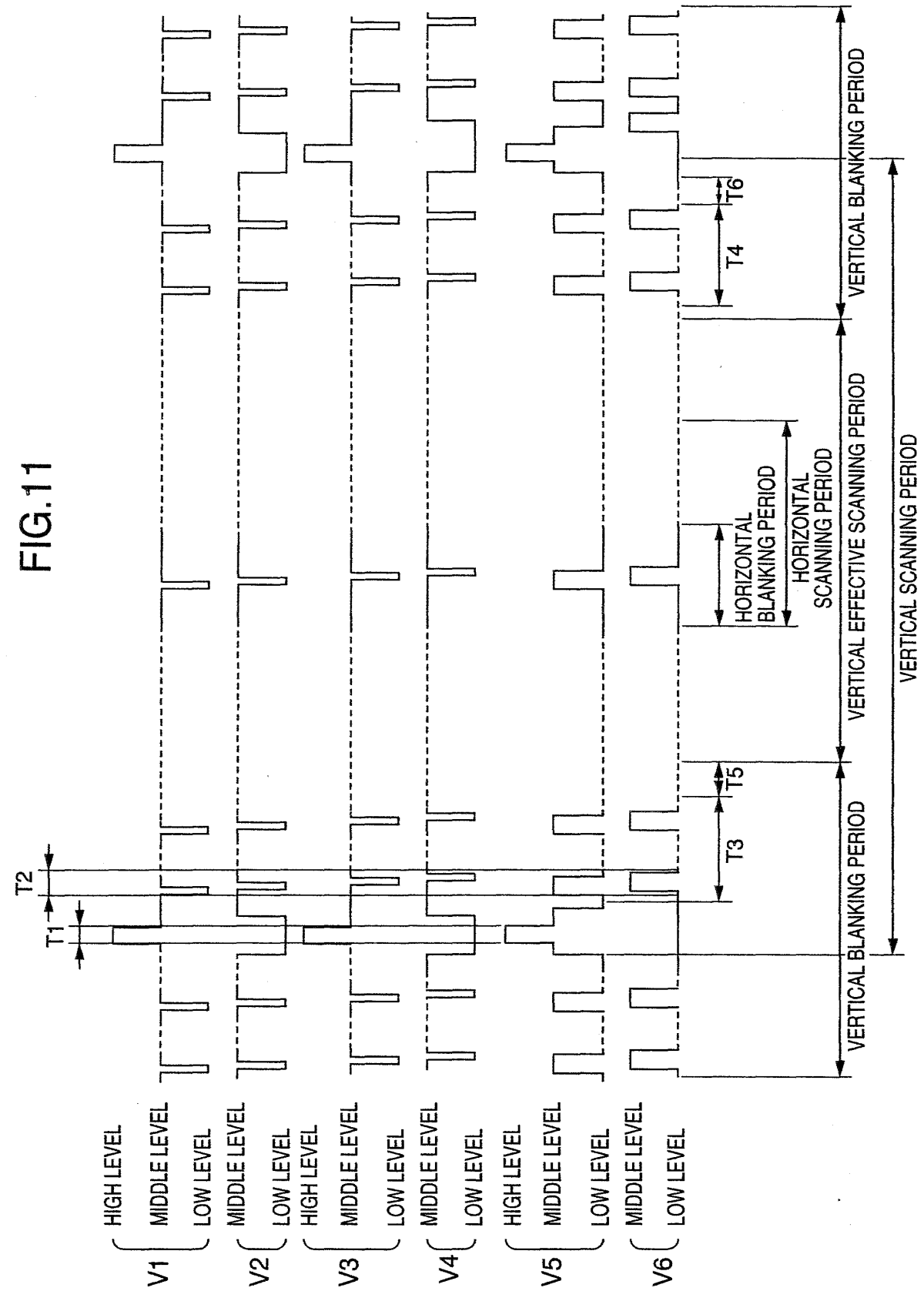
FIG.13A

| | | |
|---|---|---|
| Ye | W | Cy |
| Ye | W | Cy |
| Ye | W | Cy |
| Ye | W | Cy |
| Ye | W | Cy |

FIG.13B

| | | |
|---|---|---|
| R | G | B |
| R | G | B |
| R | G | B |
| R | G | B |
| R | G | B |

FIG.11


V1
V2
V3
V4
V5
V6
HIGH LEVEL
MIDDLE LEVEL
LOW LEVEL
T1
T2
T3
T4
T5
T6
HORIZONTAL BLANKING PERIOD
HORIZONTAL SCANNING PERIOD
VERTICAL BLANKING PERIOD
VERTICAL EFFECTIVE SCANNING PERIOD
VERTICAL BLANKING PERIOD
VERTICAL SCANNING PERIOD

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

| | |
|---|---|
| Applicants: | T. NAKANO, ET AL. |
| Application No: | To be assigned |
| Filed: | April 29, 2014 |
| For: | ELECTRIC CAMERA |
| Group AU: | 2663 (Expected) |
| Examiner: | Luong Trung Nguyen (Expected) |

**INFORMATION DISCLOSURE STATEMENT**
**UNDER 37 CFR 1.97 AND 1.98**

**Mail Stop: NEW APPS**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

April 29, 2014

SIR:

Pursuant to Applicants' duty of disclosure, enclosed please find a List, on Forms PTO/SB/08A and PTO/SB/08B, of documents cited in connection with a prior application of the above-identified application, that is, Application No. 13/681,495, filed November 20, 2012.

As all of the documents on the enclosed List were cited in connection with a prior application, Application No. 13/681,495, being relied upon under 35 USC 120 in the above-identified application, copies of these listed documents are not enclosed. See 37 CFR 1.98(d).

This Information Disclosure Statement is being submitted concurrently with the filing of the above-identified application. Clearly, requirements of 37 CFR 1.97(b) are satisfied.

To the extent that the documents on the enclosed List are not in English, it is respectfully submitted that requirements of 37 CFR 1.98(a)(3) are satisfied by English-language abstracts submitted with the respective non-English language

documents, and/or by Search Reports/Official Actions in English or with English translations thereof.

In view of all the foregoing, it is respectfully submitted that all applicable requirements of 37 CFR 1.97 and 1.98 have been satisfied, in connection with all of the documents on the enclosed List. Accordingly, consideration of the listed documents, upon examination of the above-identified application, is respectfully requested.

Kindly charge any shortage in fees due in connection with the filing of this paper to the Deposit Account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (case 500.38315CC5), and credit any excess fees to such deposit account.

Respectfully submitted,

**ANTONELLI, TERRY, STOUT & KRAUS, LLP**

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Document Description: Power of Attorney

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Approved for use through 11/30/2014. OMB 0651-0051
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE


# TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

| | |
|---|---|
| Application Number | To be assigned |
| Filing Date | April 29, 2014 |
| First Named Inventor | T. NAKANO |
| Title | ELECTRIC CAMERA |
| Art Unit | n/a |
| Examiner Name | n/a |
| Attorney Docket Number | 500.38315CC5 |

**SIGNATURE of Applicant or Patent Practitioner**

| | | | |
|---|---|---|---|
| Signature | /Ayal I. Sharon/ | Date (Optional) | April 29, 2014 |
| Name | Ayal I. Sharon | Registration Number | 55,986 |
| Title (if Applicant is a juristic entity) | | | |
| Applicant Name (if Applicant is a juristic entity) | | | |

**NOTE:** This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ *Total of _____ forms are submitted.

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U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE


Substitute for form 1449A/PTO

# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

*(use as many sheets as necessary)*

Sheet 1 of 2

| *Complete if Known* | |
|---|---|
| Application Number | **To be assigned** |
| Filing Date | **April 29, 2014** |
| First Named Inventor | **T. NAKANO, et al.** |
| Art Unit (expected) | **2663** |
| Examiner Name (expected) | **Luong Trung Nguyen** |
| Attorney Docket Number | **500.38315CC5** |

## U.S. PATENT DOCUMENTS

| Examiner Initials' | Cite No.[1] | Document Number Number-Kind Code[2] (if known) | | Publication Date MM-DD-YYYY | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear |
|---|---|---|---|---|---|---|
| | | **US- 6,661,451** | | 12-2003 | Kijima, et al. | |
| | | **US- 7,154,539** | | 12-2006 | Nishimura, et al. | |
| | | **US- 5.828,406** | | 10-1998 | Parulski et al. | |
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| | | **US- 5,170,249** | | 12-1992 | Ohtsubo, et al. | |
| | | **US- 5,187,569** | | 02-1993 | Tani, Nobuhiro | |
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| | | **US-6,906,746** | | 06-2005 | Hijishiri et al. | |
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| | | **US-5,847,758** | | 12-1998 | Iizuka, Tetsuya | |

## FOREIGN PATENT DOCUMENTS

| Examiner Initials' | Cite No.[1] | Foreign Patent Document Country Code[3]–Number[4]–Kind Code[5] (if known) | Publication Date MM-DD-YYYY | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear | T[6] |
|---|---|---|---|---|---|---|
| | | JP 9-270959 | 10-97 | | | |
| | | JP 11-187306 | 07-99 | | | |
| | | JP 04-323973 | 11/13/1992 | Hitachi, Ltd. | | |
| | | JP 11-004456 | 01/06/1999 | Fuji Photo Film Co., Ltd. | | |
| | | JP 11-355665 | 12/24/1999 | Fuji Photo Film Co., Ltd. | | |
| | | | | | | |

| Examiner Signature | | Date Considered | |
|---|---|---|---|

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

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# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

*(use as many sheets as necessary)*

Sheet 2` of 2

| *Complete if Known* | |
|---|---|
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| First Named Inventor | **T. NAKANO, et al.** |
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| Examiner Name (expected) | **Luong Trung Nguyen** |
| Attorney Docket Number | **500.38315CC5** |

## U.S. PATENT DOCUMENTS

| Examiner Initials' | Cite No.[1] | Document Number<br>Number-Kind Code[2] *(if known)* | | Publication Date MM-DD-YYYY | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear |
|---|---|---|---|---|---|---|
| | | **US - 6,970,191** | | 11-2005 | Sase et al. | |
| | | US - 5,374,424 | | 03-1998 | Sasaki, Takashi | |
| | | **US - 6,798,448** | | 09-2004 | Motono et al. | |
| | | **US - 5,287,192** | | 02-1994 | Iizuka, Tetsuya | |
| | | **US - 6,765,616** | | 07-2004 | Nakano et al. | |
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## FOREIGN PATENT DOCUMENTS

| Examiner Initials' | Cite No.[1] | Foreign Patent Document<br>Country Code[3]–Number[4]–Kind Code[5] *(if known)* | Publication Date MM-DD-YYYY | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear | T[6] |
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| Examiner Signature | | Date Considered | |
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

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020457

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| ☐ 事務所または個人名 Firm or Individual Name | | | | | |
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| 市町村名 City | | 州名 State | | 郵便番号 Zip | |
| 国名 Country | | | | | |
| 電話 Telephone | | イーメール Email | | | |

PTO/AIA/82B (07-12)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE


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# POWER OF ATTORNEY BY APPLICANT

私は出願者であり：
I am the Applicant:

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  Inventor or Joint Inventor
- ☐ 死亡、あるいは禁治産者とされた発明者の法的代理人である
  Legal Representative of a Deceased or Legally Incapacitated Inventor
- ■ 被譲渡人あるいは発明者が譲渡する義務を負う人物である
  Assignee or Person to Whom the Inventor is Under an Obligation to Assign
- ☐ 別面において十分な*独占的*所有権 (たとえば出願のなかで 37 CFR 1.46(b)(2) のもとにおける請願が出願のなかで受理された、あるいは本書類とともに申請がなされた場合)を有することを示した人物である)
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**特許出願人の署名**
**SIGNATURE of Applicant for Patent**

| | | | |
|---|---|---|---|
| 署名<br>Signature | | 日付<br>Date | September 14, 2012 |
| 姓名<br>Name | Shutoku WATANABE | 電話<br>Telephone | |
| 肩書きおよび会社<br>Title and Company | President and Representative Director Hitachi Consumer Electronics Co., Ltd. | | |

**注記:** 署名:本書式は 37 CFR 1.33 にのっとり、出願者あるいは出願者の代理人の署名がなされていなければならない。署名およびその証明必要条件については 37 CFR 1.4 を参照のこと。署名がひとつ以上ある場合はその数の書式を提出すること。下記参照*。
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☐ *提出書式の合計数は _____ である。

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UNITED STATES DEPARTMENT OF COMMERCE
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| APPLICATION NUMBER | FILING or 371(c) DATE | GRP ART UNIT | FIL FEE REC'D | ATTY.DOCKET.NO | TOT CLAIMS | IND CLAIMS |
|---|---|---|---|---|---|---|
| 14/264,243 | 04/29/2014 | 2673 | 1740 | 500.38315CC5 | 1 | 1 |

**CONFIRMATION NO. 1644**

20457
ANTONELLI, TERRY, STOUT & KRAUS, LLP
1300 NORTH SEVENTEENTH STREET
SUITE 1800
ARLINGTON, VA 22209-3873

**FILING RECEIPT**

*OC000000068414548*

Date Mailed: 05/14/2014

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

**Inventor(s)**

Takahiro Nakano, Tokyo, JAPAN;
Ryuji Nishimura, Tokyo, JAPAN;
Toshiro Kinugasa, Tokyo, JAPAN;

**Applicant(s)**

Hitachi Consumer Electronics Co., Ltd., Tokyo, JAPAN

**Assignment For Published Patent Application**

Hitachi Consumer Electronics Co., Ltd., Tokyo, JAPAN

**Power of Attorney:** The patent practitioners associated with Customer Number 020457

**Domestic Priority data as claimed by applicant**

This application is a CON of 13/681,495 11/20/2012 PAT 8736729
which is a CON of 12/845,266 07/28/2010 PAT 8339493
which is a CON of 10/660,710 09/12/2003 PAT 8059177
which is a DIV of 09/520,836 03/08/2000 PAT 6765616

**Foreign Applications** (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)
JAPAN 00-006064 01/11/2000

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The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/264,243**

**Projected Publication Date:** 08/21/2014

**Non-Publication Request:** No

**Early Publication Request:** No

**Title**

ELECTRIC CAMERA

**Preliminary Class**

358

**Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications:** No

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## PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 14/264,243

### APPLICATION AS FILED - PART I

| FOR | (Column 1) NUMBER FILED | (Column 2) NUMBER EXTRA | SMALL ENTITY RATE($) | SMALL ENTITY FEE($) | OR | OTHER THAN SMALL ENTITY RATE($) | OTHER THAN SMALL ENTITY FEE($) |
|---|---|---|---|---|---|---|---|
| BASIC FEE (37 CFR 1.16(a), (b), or (c)) | N/A | N/A | N/A | | | N/A | 280 |
| SEARCH FEE (37 CFR 1.16(k), (i), or (m)) | N/A | N/A | N/A | | | N/A | 600 |
| EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | N/A | N/A | N/A | | | N/A | 720 |
| TOTAL CLAIMS (37 CFR 1.16(i)) | 1 minus 20 = | * | | | OR | x 80 = | 0.00 |
| INDEPENDENT CLAIMS (37 CFR 1.16(h)) | 1 minus 3 = | * | | | | x 420 = | 0.00 |
| APPLICATION SIZE FEE (37 CFR 1.16(s)) | If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | | | | 0.00 |
| MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | | | | | | 0.00 |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | | | TOTAL | 1600 |

### APPLICATION AS AMENDED - PART II

AMENDMENT A

| | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | SMALL ENTITY RATE($) | SMALL ENTITY ADDITIONAL FEE($) | OR | OTHER THAN SMALL ENTITY RATE($) | OTHER THAN SMALL ENTITY ADDITIONAL FEE($) |
|---|---|---|---|---|---|---|---|---|---|
| Total (37 CFR 1.16(i)) | * | Minus | ** | = | x = | | OR | x = | |
| Independent (37 CFR 1.16(h)) | * | Minus | *** | = | x = | | OR | x = | |
| Application Size Fee (37 CFR 1.16(s)) | | | | | | | | | |
| FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | | OR | | |
| | | | | | TOTAL ADD'L FEE | | OR | TOTAL ADD'L FEE | |

AMENDMENT B

| | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE($) | ADDITIONAL FEE($) | OR | RATE($) | ADDITIONAL FEE($) |
|---|---|---|---|---|---|---|---|---|---|
| Total (37 CFR 1.16(i)) | * | Minus | ** | = | x = | | OR | x = | |
| Independent (37 CFR 1.16(h)) | * | Minus | *** | = | x = | | OR | x = | |
| Application Size Fee (37 CFR 1.16(s)) | | | | | | | | | |
| FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | | OR | | |
| | | | | | TOTAL ADD'L FEE | | OR | TOTAL ADD'L FEE | |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

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| 14/264,243 | 04/29/2014 | Takahiro Nakano | 500.38315CC5 |

**CONFIRMATION NO. 1644**

20457
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**NOTICE**

*OC000000068414549*

Date Mailed: 05/14/2014

## INFORMATIONAL NOTICE TO APPLICANT

Applicant is notified that the above-identified application contains the deficiencies noted below. No period for reply is set forth in this notice for correction of these deficiencies. However, if a deficiency relates to the inventor's oath or declaration, the applicant must file an oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each actual inventor no later than the expiration of the time period set in the "Notice of Allowability" to avoid abandonment. See 37 CFR 1.53(f).

The item(s) indicated below are also required and should be submitted with any reply to this notice to avoid further processing delays.

- A properly executed inventor's oath or declaration has not been received for the following inventor(s):
  Takahiro Nakano
  Ryuji Nishimura
  Toshiro Kinugasa

# 日　本　国　特　許　庁
## JAPAN PATENT OFFICE

別紙添付の書類に記載されている事項は下記の出願書類に記載されている事項と同一であることを証明する。

This is to certify that the annexed is a true copy of the following application as filed with this Office.

| | |
|---|---|
| 出願年月日<br>Date of Application: | ２０００年　１月１１日 |
| 出願番号<br>Application Number: | 特願２０００－００６０６４ |
| パリ条約による外国への出願に用いる優先権の主張の基礎となる出願の国コードと出願番号<br>The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is | ＪＰ２０００－００６０６４ |
| 出願人<br>Applicant(s): | 株式会社日立製作所 |

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【発明の名称】撮像装置

【請求項の数】 16

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【書類名】　明細書
【発明の名称】　撮像装置
【特許請求の範囲】
【請求項１】
テレビジョン方式の一表示画面の有効走査線数Mの３倍以上の数Nの画素を垂直方向に、任意の数の画素を水平方向に配した受光面を備えた撮像素子と、
該画素配列の各画素に蓄積された信号電荷を、NをMで除した商の整数部またはそれ以下の整数の内少なくとも一つの整数であるところのK画素周期で、垂直方向に混合または間引きを行い、前記有効走査線数Mに相当するライン数の出力信号を得るように該撮像素子を駆動する駆動手段と、
前記撮像素子の出力信号を用いて画像信号を生成する信号処理手段とを備えていることを特徴とする撮像装置。
【請求項２】
前記駆動手段は、前記撮像素子の垂直方向の画素数Nから前記混合または間引き周期Kと前記有効走査線数Mとの積K･Mを減じた数の垂直画素に対応する画素領域の信号電荷を前記テレビジョン方式の垂直帰線期間内に読み出しまたは掃き捨てることにより、前記テレビジョン方式の有効垂直走査期間内に、前記撮像素子の画素の内K･Mの垂直画素に相当する画素領域の信号電荷を切り出して、前記有効走査線数Mに相当するライン数の出力信号を得るように前記撮像素子を駆動することを特徴とする請求項１記載の撮像装置。
【請求項３】
前記信号処理手段は、該撮像素子の該受光面の内、該切り出した垂直領域に対して該テレビジョン方式の縦横比と略等しくなる水平領域部分に相当する出力信号期間のみを切り出して該テレビジョン方式の有効水平走査期間全体にわたって出力する機能を有することを特徴とする請求項１または２記載の撮像装置。
【請求項４】
前記駆動手段は、該テレビジョン方式の表示周期毎に該混合または間引きの画素位置をずらすことによりインターレース信号を出力するように該撮像素子を駆動することを特徴とする請求項１～３のいずれか１項に記載の撮像装置。

【請求項５】

前記信号処理手段は、該混合または間引きによって得られるインターレース出力信号の垂直方向の重心位置が表示周期毎に１８０度の位相差となるように補間する機能を有することを特徴とする請求項４記載の撮像装置。

【請求項６】

前記撮像素子は、該垂直方向の画素数Nを該有効走査線数Mで除した商の整数部またはそれ以下の整数の内少なくとも二つの整数画素周期で垂直方向に混合または間引きすることができ、該駆動手段は、該少なくとも二つの整数に対応した少なくとも二つのモードで、該撮像素子を駆動することを特徴とする請求項１～５のいずれか１項に記載の撮像装置。

【請求項７】

前記撮像素子の該駆動手段は、装置内部または外部に設けたズームスイッチ等の画角変化を指示するスイッチ手段からの入力情報に対応して、該混合または間引きの画素周期を変化させることを特徴とする請求項６記載の撮像装置。

【請求項８】

前記撮像素子の出力信号の利得を調整する利得調整手段を有し、該撮像素子の混合の画素周期が変化した時にも、該利得調整手段の出力信号レベルが同一になるように、混合画素周期に対応して該利得調整手段の利得を変化させることを特徴とする請求項６または７記載の撮像装置。

【請求項９】

前記撮像装置の手振れを検出する手振れ検出手段を有し、該手振れ検出手段で検出した手振れ量に応じて、該受光面内における垂直方向及び水平方向の切り出し位置を、該手振れを補正するように変化させることを特徴とする請求項１～８のいずれか１項に記載の撮像装置。

【請求項１０】

テレビジョン方式の一表示画面の有効走査線数Mの３倍以上の数Nの画素を垂直方向に、任意の数の画素を水平方向に配した受光面を備えた撮像素子と、該画素配列の各画素に蓄積された信号電荷を、NをMで除した商の整数部より大きな整数であるところのK画素周期で、垂直方向に混合または間引きを行い、前記テレビ

ジョン方式の有効垂直走査期間内に、前記撮像素子の垂直画素数NのK分の一のライン数の出力信号を得るように前記撮像素子を駆動する駆動手段と、
前記撮像素子の出力信号を用いて画像信号を生成する機能を有する信号処理手段とを備えていることを特徴とする撮像装置。

【請求項１１】

テレビジョン方式の一表示画面の有効走査線数Mの３倍以上の数Nの画素を垂直方向に、任意の数の画素を水平方向に配した受光面を備えた撮像素子と、

該画素配列の各画素に蓄積された信号電荷を、NをMで除した商の整数部またはそれ以下の整数の内少なくとも一つの整数であるところのK画素周期で、垂直方向に混合または間引きを行い、前記有効走査線数Mに相当するライン数の出力信号を得るように該撮像素子を駆動する第１の駆動手段と、

該画素配列の各画素に蓄積された信号電荷を、NをMで除した商の整数部より大きな整数であるところのK画素周期で、垂直方向に混合または間引きを行い、前記テレビジョン方式の有効垂直走査期間内に、前記撮像素子の垂直画素数NのK分の一のライン数の出力信号を得るように前記撮像素子を駆動する第２の駆動手段と、

前記撮像素子の出力信号を用いて画像信号を生成する信号処理手段とを備え、前記第１の駆動手段による駆動と前記第２の駆動手段による駆動とを、装置内部または外部に設けたスイッチ手段からの入力情報に対応して選択、切り替えを行うことを特徴とする撮像装置。

【請求項１２】

シャッターボタン等のトリガー手段を有し、該トリガー手段によりトリガーが発生した時には、該撮像素子の各画素に蓄積した信号電荷を混合せずに全画素独立で読み出すことを特徴とする請求項１～１１のいずれか１項に記載の撮像装置。

【請求項１３】

前記撮像素子の受光面を構成する画素配列の各画素に対して、水平方向に第一、第二、および第三の各色を各々透過する色フィルターを三画素周期で周期的に配し、垂直方向には同一種類の色を透過する色フィルターを配したことを特徴と

する請求項１～１２のいずれか１項に記載の撮像装置。

【請求項１４】

前記第一、第二、および第三の各色は各々黄色、緑、シアンであることを特徴とする請求項１３記載の撮像装置。

【請求項１５】

前記第一、第二、および第三の各色は各々黄色、白色、シアンであることを特徴とする請求項１３記載の撮像装置。

【請求項１６】

前記第一、第二、および第三の各色は各々赤、緑、青であることを特徴とする請求項１３記載の撮像装置。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】

本発明は、固体撮像素子を用いたビデオカメラ、ＶＴＲ一体型カメラ、電子スチルカメラ等の撮像技術に係り、特に、画素数の多い固体撮像素子を用いた撮像装置に関する。

【０００２】

【従来の技術】

ＣＣＤ（Charge Coupled Device）等の固体撮像素子を用いた撮像装置として、動画撮影を目的としたいわゆるビデオカメラと、静止画撮影を目的としたいわゆる電子スチルカメラが存在する。また、近年では、動画撮影用の装置であっても静止画撮影機能を有したもの、或いは静止画撮影用の装置であっても動画撮影機能を有したものも存在している。

【０００３】

動画撮影を目的としたいわゆるビデオカメラでは、一般的にテレビモニター等の表示装置での表示を前提としており、ＮＴＳＣ、ＰＡＬ等のテレビジョン方式に準拠した出力信号を得るように構成されている。そのため、このような装置に用いられる撮像素子の垂直方向の有効画素数は、テレビジョン信号の生成を前提として定まっている。例えば、ＮＴＳＣ方式ではフィールドあたりの有効走査線

数（フィールドあたりの全走査線数から垂直帰線期間に含まれる走査線数を除いた走査線数であり、実際に表示装置に表示される走査線数の意味）は約２４０本でかつフィールド毎に飛び越し走査（インターレース走査）を行うが、これを実現するために撮像素子の垂直方向の有効画素数は約４８０画素が基準となっている。すなわち、各フィールドで垂直方向に隣接する２画素の信号を撮像素子内部或いは撮像素子外部で混合することによって約２４０本の走査線を生成し、かつフィールド毎に混合する画素の組み合わせを変えることによって飛び越し走査を実現している。

【０００４】

また、ＮＴＳＣ方式の動画撮像用の撮像素子として、手振れ補正用の画素領域を有効画素領域に付加して、垂直方向に約４８０画素以上の有効画素を有するものもあるが、この場合でも約４８０以上の画素領域は垂直帰線期間中に高速に読み出されて、有効な信号としては用いられず、画像信号はあくまでも垂直約４８０画素領域の信号から生成される。このような撮像装置で静止画を撮影する場合、動画撮影時と同一の画素領域の信号からＪＰＥＧ（Joint Photographic Expert Cpoup）等の静止画信号を生成することは比較的容易であるが、得られる画素数が垂直４８０画素程度に限定されてしまい、より高精細の静止画信号を得ることが出来ないという問題が有る。

【０００５】

この問題を軽減する手段として、前述の手振れ補正領域を持つ撮像素子を用いた撮像装置においては、静止画撮影時には手振れ補正用画素領域を含めた全有効画素領域を用いる事が考えられるが、静止画撮影時においても撮影画像確認などの為にモニタリングをする必要が有り、その為には読み出した全有効画素の信号からテレビジョン方式に準拠した信号を生成する必要が有る。

【０００６】

このような装置の従来例として特開平１１－１８７３０６号公報に記載の装置が提案されている。この公報に開示された装置では、先ず、テレビジョン方式の１フィールド期間の複数倍の時間を要して全有効画素の信号を読み出してフィールドメモリー等の記憶手段に記憶し、しかる後に補間処理等によってテレビジョ

ンのフィールド周期、水平走査周期に対応した信号への変換を行っている。

【０００７】

しかしながら、この従来例では、信号変換のために、フィールドメモリー等の大規模な処理回路が必要であり、また、撮像素子からの読み出し周期がフィールド周期の複数倍となるため動解像度が劣化する。また、このような手段を用いても、静止画信号として得られる画素数は動画時の有効画素数に手振れ補正画素領域を加えた画素数が限度である。

【０００８】

一方、静止画撮影を目的としたいわゆる電子スチルカメラでは、より高精細な静止画信号を得るために、近年動画撮影用の撮像素子に対してより多画素化した撮像素子を用いる傾向に有る。このような装置で動画撮影、またはモニタリングを行う場合には、やはりテレビジョン方式に準拠した信号を生成する必要があるが、前記多画素化した撮像素子では、画素数が必ずしもテレビジョン方式の走査線数に対応していないため、何らかの変換手段が必要である。

【０００９】

このような変換手段としては、例えば、前述の手振れ補正用画素領域を有した動画撮像装置と同様に、フィールド周期よりも長い時間を用いて撮像素子から信号を読み出し、補間によってテレビジョン信号を生成する方法が有るが、この場合には前述の問題点と共に、画素数が多くなるにつれて、更に読み出し周期が長くなり動解像度が更に劣化する。

【００１０】

また、この問題を軽減する手段として、撮像素子内部で画素信号を混合または間引きすることにより、読み出すべき信号数を減少し、読み出し周期を短くする装置の例が特開平９－２７０９５９号公報に開示されている。この装置においては、前記動解像度劣化の問題は軽減されるが、テレビジョン方式に同期した信号を生成するための時間軸変換を行うために、フィールドメモリー等の大規模な処理回路を必要とし、また、所望の混合、間引きを行うために撮像素子自体も特殊な構造を取る必要が有る。

【００１１】

【発明が解決しようとする課題】

上述のように従来技術の撮像装置では、動画撮像装置で静止画撮影を行う場合には画素数の不足、静止画撮像装置で動画撮影する場合には、回路規模の増加と共に、動画画質の劣化という問題が有り、一つの撮像装置で動画、静止画とも十分な画像を得ることが難しい。また、静止画用の多画素撮像素子を用いて十分な動画画質を得るためには、前記問題点の解決の他に、手振れ補正機能等を実現するための読み出し領域の切り出しを行う必要も有るが、上記従来技術ではこれを実現する手段も提供されていない。

【００１２】

本発明の目的は、かかる問題を解決し、静止画に対しても十分な画素数をもつ多画素の撮像素子を用いて、高精細な静止画に加えて、フィールドメモリー等により回路規模を増加すること無く、画質劣化を低減した動画撮影を可能とする撮像装置を提供すること、、また、併せて手振れ補正機能の実現も可能とした撮像装置を提供することにある。

【００１３】

【課題を解決するための手段】

上記目的を達成するため、本発明のうち、その一つとしては、テレビジョン方式の一表示画面の有効走査線数Mの３倍以上の数Nの画素を垂直方向に、任意の数の画素を水平方向に配した受光面を備えた撮像素子と、該画素配列の各画素に蓄積された信号電荷を、NをMで除した商の整数部またはそれ以下の整数の内少なくとも一つの整数であるところのK画素周期で、垂直方向に混合または間引きを行い、前記有効走査線数Mに相当するライン数の出力信号を得るように該撮像素子を駆動する駆動手段と、前記撮像素子の出力信号を用いて画像信号を生成する信号処理手段とを備えた撮像装置とする。

【００１４】

【発明の実施の形態】

以下、本発明の実施形態を図面を用いて説明する。図１は、本発明の撮像装置の一つの実施形態を示す構成図である。

【００１５】

図１において、符号１はレンズ、符号２は絞り、符号３は撮像素子、符号４は撮像素子を駆動する駆動回路、符号５は利得調整回路、符号６はアナログ－デジタル変換（Ａ／Ｄ変換）回路、符号７は信号処理回路、符号８は垂直方向の補間処理を行う垂直補間回路、符号９は水平方向の補間処理を行う水平補間回路、符号１０は画像信号を記録する磁気テープ、半導体メモリー、光ディスク等の記録媒体を含む記録部、符号１１は動作状態に応じてこれらの構成要素の制御を行う制御回路、符号１２は標準テレビジョン信号への変調処理等を行うエンコーダ回路、符号１３はデジタル－アナログ変換（Ｄ／Ａ変換）回路、符号１４は動画撮影、静止画撮影等の動作モードの切り替えを行うモード切り替えスイッチ、符号１５は記録開始／停止の指示を行うための記録ボタン、符号１６ａ、１６ｂはそれぞれ撮像装置の縦方向、横方向の手振れを検出する手振れセンサー、符号１７は手振れセンサーの出力信号から撮像装置の手振れを判定する手振れ判定回路を示している。

【００１６】

上記の構成において、レンズ１から入射された光は、絞り２を介して撮像素子３の受光面上に結像して電気信号に変換される。本実施形態では、撮像素子３をＣＣＤ型撮像素子としている。図２にこの撮像素子３の構成を示す。図２において、符号３０はフォトダイオードで構成されている画素であり、水平、垂直方向に格子状に配置されている。格子状に配された画素には、それぞれ黄色（Ｙｅ），緑（Ｇ），シアン（Ｃｙ）の各色を透過する色フィルターが、水平方向に３画素周期で繰り返し配され、垂直方向には同一の色を配されたいわゆる縦ストライプ状に配されている。画素数は任意であるが、本実施形態では垂直方向に１２００画素、水平方向に１６００画素が配置されているものとする。垂直転送部３２は、Ｖ１，Ｖ２，Ｖ３の３相のパルスで駆動されるＣＣＤである。本ＣＣＤは１画素あたり３相パルスに対応する３ゲート構成となっており、各画素の信号電荷を独立で垂直方向に転送することが可能である。画素の電荷を垂直転送部に転送するための転送ゲート３１は、垂直転送部３２のＶ２パルスに対応するゲートと共通化されており、共通化されたゲートに対して印加するパルスの波高値によっ

て画素からの電荷を垂直転送部に転送する動作と、垂直方向への転送動作とが区別して行われる。水平転送部３３は、垂直転送部３２から転送された電荷を水平方向に転送し、出力アンプ３４を介して順次出力端子から出力する。

【００１７】

図１の説明に戻る。以下、まずモード切り替えスイッチ１４によって動画撮影モードが選択された時の動作について説明する。本実施形態における撮像素子の垂直方向の画素数は１２００であるため、ＮＴＳＣ方式の場合のフィールド有効走査線数を２４０ラインとすると、垂直方向に５（＝１２００画素／２４０ライン）画素の混合を行うことにより撮像素子からの出力信号ライン数を有効走査線数と一致させることが出来る。

【００１８】

しかしながら、本実施形態では、後に説明する手振れ補正機能を実現するために、動画撮影モード時には、垂直方向に４画素の混合を行うこととする。垂直方向に４画素の混合を行う場合には、垂直方向１２００画素の内、９６０（＝２４０ライン×４画素）画素分の領域の信号を有効な信号として用い、残りの２４０（＝１２００（全画素）－９６０（有効画素））画素分の領域の信号は出画に用いない。図３は本動作モードにおける撮像素子の垂直駆動パルスのタイミングを示した図であり、Ｖ１，Ｖ２，Ｖ３は前記垂直転送部３２であるＣＣＤの各ゲートに入力される３相の駆動パルスである。

【００１９】

図３において、垂直帰線期間に含まれる期間Ｔ１において駆動パルスＶ２をハイレベルの電圧とすることによって各画素に蓄積された信号電荷は垂直ＣＣＤのＶ２ゲート下に転送される。次にＴ２で示す期間における動作、すなわちＶ２パルスがミドルレベルの期間にＶ３パルスをローレベルからミドルレベルに変化させ、次にＶ３パルスがミドルレベルの期間にＶ２パルスをミドルレベルからローレベルに変化させた後、Ｖ１パルスをローレベルからミドルレベルに変化させ、次にＶ１パルスがミドルレベルの期間にＶ３パルスをミドルレベルからローレベルに変化させた後、Ｖ２パルスをローレベルからミドルレベルに変化させ、最後にＶ１パルスをミドルレベルからローレベルに変化させるという一連の動作によ

って、Ｖ２ゲート下の信号電荷は一ライン分転送されて再びＶ２ゲート下に保持される。

【００２０】

この一連の動作を繰り返すことによって、信号電荷を任意のライン数分転送することができる。図３において、垂直有効走査期間（垂直帰線期間を除いた実際に表示させる画像に対応する垂直走査期間の意味）の前の垂直帰線期間に含まれる期間Ｔ３および垂直有効走査期間の後の垂直帰線期間に含まれる期間Ｔ４において、合わせて２４０回上記一行分の転送動作を繰り返すことによって出画に用いない２４０行分の信号電荷を垂直帰線期間中に水平転送部３３に転送する。例えば期間Ｔ３で１２０回、期間Ｔ４で１２０回の一連の転送を行うと、受光面上の上下それぞれ１２０行分の信号電荷が垂直帰線期間内の期間Ｔ３及び期間Ｔ４に水平転送部３３に転送される。その後の垂直帰線期間内の期間Ｔ５及び期間Ｔ６に水平転送部３３をそれぞれ一定期間駆動することによって水平転送部に転送された電荷は出力端から出力されるが、垂直帰線期間中であるので有効な信号としては用いられない。

【００２１】

次に、図３の垂直有効走査期間では、各水平帰線期間に上記一行分の転送動作を４回行うことにより４行分の信号電荷が水平転送部３３に転送され水平転送部３３で混合される。その後水平有効走査期間（水平帰線期間を除いた実際に表示させる画像に対応する水平走査期間の意味）に水平転送部３３を駆動して水平転送部の信号電荷を読み出すことによって、テレビジョン方式に同期した出力信号を得ることができる。また、Ａフィールドで上記動作を行い、Ｂフィールドでは期間Ｔ３の転送行数を１２２行、期間Ｔ４の転送行数を１１８行とすると、フィールド毎に混合される４行の組み合わせが２行分ずれ、図４に示すようにインターレース走査を行う事ができる。（図４は撮像素子受光面を示しているため、表示画面上とは上下反転している）

図１の説明に戻る。撮像素子３の出力信号は利得調整回路５で利得調整された後、Ａ／Ｄ変換回路６でデジタル信号に変換され、信号処理回路７で色信号の生成、ガンマ補正、ホワイトバランス処理、輪郭強調等の色信号処理、輝度信号処

理を施される。ここで本実施形態における撮像素子は、前記黄色（Ｙｅ），緑（Ｇ），シアン（Ｃｙ）の縦ストライプ状の色フィルターが配されたものであるため、どのような画素数で垂直方向に混合を行っても、常に１ラインの出力信号から、Ｙｅ，Ｇ，Ｃｙの各色信号が点順次で得られる。これらの色信号から、３原色信号Ｒ、Ｇ、Ｂ信号は以下の演算で得ることが出来る。

【００２２】

Ｒ＝Ｙｅ－Ｇ

Ｂ＝Ｃｙ－Ｇ

Ｇ＝Ｇ

Ｒ，Ｇ，Ｂ信号は信号処理回路７でホワイトバランス処理、ガンマ補正処理等を施された後、Ｒ－Ｙ，Ｂ－ＹまたはＵ，Ｖ等の色差信号に変換される。その後、輝度信号および色差信号は垂直補間回路８を介して水平補間回路９に入力される。本動作状態では垂直補間回路では処理は行われず通過するのみである。水平補間回路では水平方向の補間処理が行われる。

【００２３】

図５は撮像素子の受光面を示した図である。前述のように本実施形態の本動作状態では、垂直有効走査期間に読み出される信号は垂直１２００画素の内の９６０画素に相当し、水平方向は全画素（１６００画素）に相当するする領域であり、図５に斜線部Ａで示している。ここで、撮像素子の受光面全体の縦横比が縦：横＝３：４であった場合、斜線部Ａの領域はそれに対して横長となるため、水平方向全画素分の信号をＮＴＳＣ方式等縦横比３：４のテレビジョン方式の表示機器で表示すると水平方向が圧縮された縦長の画像となる。従って、図５において斜線部Ｂで示した、テレビジョン方式の縦横比と合致した水平領域の信号のみを水平有効走査期間に出力する必要が有る。テレビジョン方式の縦横比が３：４の場合には斜線部Ｂの水平画素数は１２８０（＝９６０（垂直方向有効画素）×（４／３））となる。

【００２４】

図１の説明に戻る。水平補間回路９では水平１２８０画素分の信号を補間処理により水平方向に伸長し水平有効走査期間全体にわたって出力できるようにし、

また、必要に応じてクロックの乗せ替え等を行う。以上の動作によって、受光面上の垂直９６０画素、水平１２８０画素の領域を切り出して、テレビジョン方式に同期した信号として得ることが可能となる。その後、輝度信号及び色差信号はエンコーダ１２でテレビジョン信号へのエンコード処理を施され、Ｄ／Ａ変換回路１３でアナログ信号に変換されて出力される。また、記録ボタン１５によって記録の指示がなされた場合には、記録部１０で信号の記録が行われる。この時、必要に応じてＭＰＥＧ（Moving Picture Expert Group）等の圧縮処理を施すこともできる。

【００２５】

次に、手振れ補正の動作に関して説明する。撮像装置の縦方向、横方向の手振れを検出する手振れセンサー１６ａ、１６ｂによって検出された振れ情報は手振れ判定回路１７に入力され、ここで手振れ量、方向などが判定され、撮像素子の受光面上での垂直方向、水平方向の画素数に換算される。換算された画素数に対して手振れを打ち消す方向に受光面上での切り出し位置（有効画素領域）をずらすことによって手振れを補正することができる。切り出し位置の移動は、垂直方向に関しては、前述の図３の期間Ｔ３および期間Ｔ４における転送行数を変化させることにより実現でき、水平方向に関しては前述の水平補間回路における、補間開始位置を変化させることにより実現することができる。

【００２６】

以上動画撮影モード時の動作に関して説明した。次に、モード切り替えスイッチ１４によって静止画撮影モードが選択された時の動作について説明する。

【００２７】

静止画撮影モードにおいても、記録ボタン１５によって記録の指示がなされるまでは、撮影画角の確認等のためのモニタリングを行うために、テレビジョン方式に準拠した信号の出力を行う。ただし、静止画撮影時にはできるだけ高精細な信号を得るために、本実施形態では、動画撮影時とは異なり撮像素子の全有効画素数を用いて撮影を行う。従って、モニタリング時には、全画素領域の信号から、テレビジョン信号を生成する必要がある。

【００２８】

本実施形態の撮像素子の垂直方向の画素数は１２００画素であるため、ＮＴＳＣ方式の有効走査線数を２４０ラインとすると、垂直方向に５（＝１２００／２４０）画素の混合を行うことにより、出力信号ライン数を有効走査線数と一致させることができる。このように撮像素子を動作させるために、図３に示したパルスタイミング図において、垂直有効走査期間中の各水平帰線期間に前記１行分の転送動作を５回行う。これにより５ライン数分の信号電荷を水平転送部３３で混合することができる。また、垂直帰線期間中の期間Ｔ３およびＴ４での転送動作は、インターレース走査を行うために、Ｂフィールドの期間Ｔ３において２行分の転送のみを行い、他の垂直帰線期間では転送動作は行わない（本実施形態では１２００／２４０＝５であり、余りが生じないため、上記以外の転送は不要だが、仮に余りが生じる場合には、余りの画素数分を期間Ｔ３，Ｔ４で転送すれば良い）。

【００２９】

水平転送部３３で混合された電荷は水平有効走査期間に水平転送部を駆動して読み出す。以上により撮像素子の全画素の信号電荷をテレビジョン方式に同期して読み出すことができる。撮像素子３の出力信号は動画撮影時と同様に利得調整回路５で利得調整された後、Ａ／Ｄ変換回路６でデジタル信号に変換され、信号処理回路７で色信号処理、輝度信号処理を施され、垂直補間回路８に入力される。静止画撮影モニタリング時には垂直補間回路８で垂直方向の重心補正の処理を行う。

【００３０】

図６に本動作状態におけるＡフィールド、Ｂフィールドにおける混合される画素の組み合わせおよび混合された信号の垂直方向の重心位置を示す。インターレース走査では、Aフィールド、Bフィールドでの走査線の位置は相互に他フィールドの走査線間の中心の位置であるため、これに対応して撮像系での信号の垂直方向のサンプリングはそれぞれのフィールドで１８０度の位相差となる必要が有る。ところが、本実施形態の本動作状態では混合画素数が５画素であるため、図６に示すように、Ａフィールド、Ｂフィールドでの出力信号の重心位置が１８０度

の位相差に対して、３６度（＝１／２画素、同一フィールドのライン間距離の１／１０）ずれている。これを補正するには、隣接２ラインの信号から補間によって信号を生成すれば良く、例えば同一フィールドのｎラインの信号をSn、ｎ＋１ラインの信号Sn+1とすると、Sn’＝（Sn×９／１０）＋（Sn+1×１／１０）の演算で得られるSn’はｎラインの信号の重心位置に対して１／１０ライン分ｎ＋１ライン方向に重心位置のずれた信号である。Bフィールドの信号に対して上記演算を行うことによってサンプリングの重心ずれの補正が可能であるが、本実施形態では、Aフィールド、Bフィールドの補間の影響を均一にするために、ｎラインの信号を、Aフィールドでは１／２０ライン分ｎ－１ライン方向に、Ｂフィールドでは１／２０ライン分ｎ＋１ライン方向に補正するために、以下の演算を行う。

【００３１】

Ａフィールド：　Sn’＝（Sn×１９／２０）＋（Sn-1×１／２０）

Ｂフィールド：　Sn’＝（Sn×１９／２０）＋（Sn+1×１／２０）

尚、本実施形態では隣接２ラインの信号からの演算によって補間処理を行っているが、更に複数ラインの信号を用いた補間処理を行う事もできる。垂直補間回路８の出力信号は水平補間回路９に入力されるが、本動作状態では水平補間回路では処理は行われず通過するのみである。その後は、動画撮影時と同様に、エンコーダ１２でテレビジョン信号へのエンコード処理を施され、Ｄ／Ａ変換回路１３でアナログ信号に変換されて出力される。以上説明したように、静止画撮影モードでのモニタリング時にも、撮像素子の全画素領域の信号から、テレビジョン信号を生成する事ができる。

【００３２】

次に、記録ボタン１５によって記録の指示がなされた場合について説明する。静止画撮影モードにおけるモニタリング時には、テレビジョン信号を生成するために、撮像素子内で信号を混合する事によって信号量の削減を行っているが、記録する際には高精細な信号を得るために混合処理を行わずに、全画素の信号を独立で読み出す必要がある。これを実現するためには、図３に示したパルスタイミング図において、垂直有効走査期間中の各水平帰線期間の前記１行分の転送動作

を１回のみ行う。これにより１行分の信号電荷のみが水平転送部３３に転送される。その後水平転送部３３を駆動して１行分の信号電荷を読み出す。上記動作を垂直画素数分繰り返す事によって全画素の信号電荷を独立で読み出す事ができる。尚、垂直帰線期間中の期間Ｔ３およびＴ４での転送動作は行わない。

【００３３】

読み出された信号電荷は、利得調整回路５で利得調整された後、Ａ／Ｄ変換回路６でデジタル信号に変換され、信号処理回路７で色信号処理、輝度信号処理を施され、垂直補間回路８、水平補間回路９を介して記録部１０で記録される。この時、垂直補間回路８、水平補間回路９では補間処理は行われない。記録部１０では、記録に際してＪＰＥＧ（Joint Photographic Expert Gpoup）等の圧縮処理を施すこともできる。尚、上記静止画記録動作中はテレビジョン信号の生成はできないため、モニタリング用の出力には、記録開始直前の画像、または単一色の信号等に置き換えたテレビジョン信号を出力する。以上の動作により、撮像素子全画素から得られる高精細な信号を記録する事ができる。なお、本実施形態においては、動画撮影モード時と静止画撮影モード時の記録部は共通としているが、モードによって記録部を各々専用に設けても良い。

【００３４】

以上説明したように、本実施形態では、垂直方向の画素数に上限がなくなるため、静止画に対しても十分な画素数をもつ多画素の撮像素子を用いて、高精細な静止画に加えて、良好な動画撮影が可能になる。

【００３５】

また、信号の混合と垂直帰線期間中の垂直転送により、多画素の撮像素子においてもテレビジョン方式に同期した信号読み出しを可能とし、よって画質劣化を低減し、かつ手振れ補正機能を有した動画撮影および静止画撮影におけるモニタリングを実現することができる。

【００３６】

また、切り出した垂直領域に対してテレビジョン方式の縦横比と略等しくなる水平領域部分に相当する出力信号のみを切り出してテレビジョン方式の有効水平走査期間全体にわたって出力するように構成することによって、垂直方向の切り

出し位置をどのように行っても、テレビジョン方式の縦横比に等しい出力信号を得ることができる。

【００３７】

また、テレビジョン方式の表示周期毎に混合する画素位置をずらすことによりインターレース信号を出力するように撮像素子を駆動することによって、多画素の撮像素子を用いてもインターレース走査を行うことができる。

【００３８】

また、混合によって得られるインターレース出力信号の垂直方向の重心位置が表示周期毎に１８０度の位相差となるように補間することによって、混合周期が奇数の場合のようにインターレースの位相ずれが生じる場合であっても、インターレースずれのない出力信号を得ることができる。

【００３９】

なお、本実施形態においては、撮像素子の垂直画素数を１２００、動画撮影モード時の混合画素数を４、静止画撮影モード時の混合画素数を５としているが、手振れ補正用の画素領域の有無、大きさは任意であるため、各モードにおける混合画素数は、垂直画素数をテレビジョン方式の有効走査線数で除した商の整数部（上記実施例では５）以下であれば任意で良い（必ずしも割り切れる必要はなく、上記例の場合、垂直画素数は１２００以上であっても良い）。

【００４０】

また、静止画撮影時の画素数はテレビジョン方式のフィールド有効走査線数の３倍以上程度の垂直画素数をもてば良い。また、本実施形態では撮像素子の垂直有効走査期間中の出力ライン数を減じるために垂直方向の画素混合を行ったが、画素からの信号電荷を複数ライン中の一ラインしか読み出さない、いわゆる間引きによっても同様に出力ライン数を減じる事ができる。

【００４１】

また、本実施形態では撮像素子の垂直転送部を１画素あたり３相のパルスで駆動するＣＣＤとしたが、上記条件を満たす画素周期での混合または間引きの実現できる形態であれば、撮像素子の構造は任意で良い。

【００４２】

また、本実施形態ではＮＴＳＣ方式の場合について説明を行ったが、ＰＡＬ方式等有効走査線数の異なるテレビジョン方式であっても同様に実現する事ができる。

【００４３】

従って、以上まとめると、テレビジョン方式のフィールド有効走査線数Mの３倍以上の任意の垂直画素数Ｎをもち、かつ、NをMで除した商の整数部以下の整数の内少なくとも一つの整数周期での垂直方向の混合または間引きを行うことのできる撮像素子を用いる事により、本実施形態と要旨を同一にする種々の構成を取る事ができる。

【００４４】

次に本発明による他の実施形態を図７に示した構成図によって説明する。図７の構成図は、図１に示す構成図に対して画角変化指示スイッチ１８を追加したものである。図７において図１に示した構成要素と同一の構成要素に対しては同一の符号を付し、同一の動作を行う場合には説明を省略する。

【００４５】

本実施形態における、動画撮影モード、静止画撮影モード時のモニタリング、および静止画記録の動作は、通常状態においては図１の構成図により説明した前述の実施形態の動作と同様である。次に動画撮影モード時に画角変化指示スイッチ１８により画角変化が指示された時の動作に関して説明する。

【００４６】

本実施形態の通常状態では、前述の実施形態にて説明したのと同様、垂直方向４画素の画素混合と垂直帰線期間中の垂直転送、および水平方向の補間処理により全画素領域の内、垂直９６０画素、水平１２８０画素の領域を切り出してテレビジョン信号を生成するものとする。ただし、画角変化（垂直方向の画質劣化を伴わないズーム機能の意味）指示スイッチ１８により画角変化が指示された時には、まず垂直方向の混合画素数を３画素とし、垂直有効走査期間の前後の垂直帰線期間中に余分な垂直画素領域の信号を読み出す。

【００４７】

本実施形態の場合には、４８０（＝１２００－２４０×３）画素分、混合後のライン数としては１６０（＝４８０／３）ライン分の信号を垂直帰線期間中に読み出せば良い。これにより、垂直７２０画素分の領域の信号を２４０ラインの信号としてテレビジョン方式に同期して読み出す事ができる。前記読み出しを実現するには、図３に示したパルスタイミング図において、垂直有効走査期間中の各水平帰線期間に３ライン数分の転送動作を行い、垂直帰線期間中の期間Ｔ３およびＴ４での転送行数を１６０ラインとすれば良い。また、フィールド毎に混合の組み合わせを変えてインターレース走査を行う。

【００４８】

撮像素子３の出力信号は利得調整回路５に入力されるが、３画素混合時の信号レベルは４画素混合時に比べて３／４倍になっているため、利得調整回路の利得を４画素混合時に対して４／３倍して後段の回路の入力信号レベルを同一にする。その後Ａ／Ｄ変換回路６、信号処理回路７で各々処理を施され、垂直補間回路８に入力される。３画素混合の場合のＡフィールド、Ｂフィールドにおける混合される画素の組み合わせおよび混合された信号の垂直方向の重心位置は図８に示す通りであり、前述の実施形態における静止画撮影モニタリング時と同様にフィールド間のサンプリング位相が１８０度の位相差からずれているため、垂直補間回路８で垂直方向の重心補正の処理を行う。本動作状態における位相のずれ量は６０度（＝１／２画素、同一フィールドのライン間距離の１／６）であり、これを両フィールドで均一に補正するためには、以下の演算を行えば良い。

【００４９】

Ａフィールド：　$Sn' = (Sn \times 11/12) + (Sn-1 \times 1/12)$

Ｂフィールド：　$Sn' = (Sn \times 11/12) + (Sn+1 \times 1/12)$

尚、前述のように、３ライン以上の複数ラインの信号を用いた補間処理を行う事もできる。次に水平補間回路９で、垂直７２０画素に対して縦横比が３：４となる水平領域（本動作状態では水平９６０（＝１６００×７２０／１２００）画素の領域）の信号を補間処理により水平方向に伸長し水平有効走査期間全体にわたって出力できるようにする。以上の動作によって、受光面上の垂直７２０画素

、水平９６０画素の領域を切り出すことができる。

【００５０】

次に、画角変化指示スイッチ１８により再度画角変化が指示された時には、垂直方向の混合画素数を２画素とし、垂直４８０画素分の領域を垂直有効走査期間に読み出し、水平補間回路で６４０画素分の領域の信号を伸長し水平有効走査期間全体にわたって出力する事により、受光面上の垂直４８０画素、水平６４０画素の領域を切り出す（２画素混合時にはインターレースずれが生じないので垂直補間回路での重心補正は行わない）。更に、画角変化指示スイッチ１８により画角変化が指示された時には、垂直方向の混合画素数を４画素とし、通常の状態に戻す。

【００５１】

以上の動作により、図９に示すように撮像素子受光面上の切り出し領域を（Ａ）垂直９６０×水平１２８０、（Ｂ）垂直７２０×水平９６０、（Ｃ）垂直４８０×水平６４０の３種類に変化させる事ができ、すなわち、撮影画角を３種類に変化させる事ができる。４画素混合時の領域Ａを基準とすると、３画素混合時の領域Ｂでは１．３３倍、２画素混合時の領域Ｃでは２倍に拡大した画像を得る事ができる。ここで、３種類の領域の読み出しに際しては、画素混合数を変える事によって、常に、撮像素子からの有効出力ライン数をテレビジョン方式の有効走査線数に一致させているため、少ない出力ライン数から補間処理によって有効走査線数の信号を生成する通常のいわゆる電子ズームと比較して、垂直方向の画質劣化の無い良好な画像を保ったまま、画角を変化させる事ができる。なお、静止画モニタリング時においても画素混合数を変化させて切り出し画角を変化させる同様の動作を行っても良い。

【００５２】

以上説明したように、本実施形態では、上述の実施形態によって得られる効果のほか、静止画に対しても十分な画素数をもつ多画素の撮像素子を用い、かつ画素混合数を変化させる事によって、画質劣化の少ない画角変化を実現する事ができる。

【００５３】

また、混合の画素周期が変化したときに生じる信号レベルの変化を利得調整手段で吸収することにより、後段の信号処理手段の入力信号レベルを一定に保つことができる。

【００５４】

なお、本実施形態においては、画角変化指示スイッチによって間欠的に画角変化を行ったが、ズームスイッチによって連続的に変化させても良い。この時には、倍率変化が画素混合を変化させた時の倍率まで達しない間は通常の補間処理による電子ズームを行う事とする。本実施形態の場合には１倍以上１．３３倍未満の間は４画素混合、１．３３倍以上２倍未満の関は３画素混合、２倍以上では２画素混合となる。また、この時に光学ズーム機構と連動させても良い。

【００５５】

また、本実施形態においても前記実施形態の場合と同様に、撮像素子の画素数、撮像素子の構造、テレビジョン方式等にかかわらず、フィールド有効走査線数Ｍの３倍以上の任意の垂直画素数Ｎをもち、かつ、NをMで除した商の整数部以下の整数の内少なくとも二つ整数周期での垂直方向の混合または間引きを行うことのできる撮像素子を用いる事により、本実施形態と要旨を同一にする種々の構成を取る事ができる。

【００５６】

次に本発明による他の実施形態について説明する。ここで説明する実施形態の全体構成は、図１に示す構成図と同一であるが、撮像素子３の内部構成が異なっている。本実施形態における、撮像素子の構成を図１０に示す。図１０において、３０はフォトダイオードで構成されている画素であり、水平、垂直方向に格子状に配置されており、これらの画素にはそれぞれ黄色（Ｙｅ），緑（Ｇ），シアン（Ｃｙ）の各色を透過する色フィルターが縦ストライプ状に配されている。

【００５７】

本実施形態においては垂直方向に８６４画素、水平方向に１１５２画素が配置されているものとする。垂直転送部３２は、Ｖ１，Ｖ２，Ｖ３、Ｖ４、Ｖ５，Ｖ６の６相のパルスで駆動されるＣＣＤであり、１画素あたり２相パルスに対応す

る２ゲート構成となっており、３画素周期で６相パルスに対応する６ゲートが繰り返すように構成されている。画素の電荷を垂直転送部３２に転送するための転送ゲート３１は、垂直転送部３２のＶ１、Ｖ３、Ｖ５の各パルスに対応するゲートと共通化されており、共通化されたゲートに対して印加するパルスの波高値によって画素からの電荷を垂直転送部に転送する動作と、垂直方向への転送動作とが区別して行われる。

【００５８】

水平転送部３３は、垂直転送部３２から転送された電荷を水平方向に転送し、出力アンプ３４を介して順次出力端子から出力する。本撮像素子は、前記実施形態における撮像素子とは異なり、全画素を独立した状態で垂直転送を行う事はできないが、垂直方向に隣接する３画素の信号電荷を垂直転送部内で混合した後に転送する事ができる。

【００５９】

まず、本実施形態における動画撮影モード時の動作について説明する。本実施形態における撮像素子の垂直方向の有効画素数は８６４であるため、垂直方向に３画素の混合を行うと垂直８６４画素の内、７２０（＝２４０×３）画素分の領域の信号を有効な信号として用い、残りの１４４（＝８６４－７２０）画素分の領域を手振れ補正領域とする事ができる。

【００６０】

図１１は本動作モードにおける図１０の撮像素子の垂直駆動パルスのタイミングを示した図であり、Ｖ１，Ｖ２，Ｖ３，Ｖ４，Ｖ５，Ｖ６は前記垂直転送部３２であるＣＣＤの各ゲートに入力される６相の駆動パルスである。図１１において、垂直帰線期間に含まれる期間Ｔ１において駆動パルスＶ１，Ｖ３およびＶ５をハイレベルの電圧とすることによって各画素に蓄積された信号電荷は垂直ＣＣＤのＶ１，Ｖ３およびＶ５ゲート下に各々転送される。その後Ｖ２およびＶ４パルスをローレベルからミドルレベルに変化させる事によって隣接３画素分の電荷を混合し、混合後Ｖ５パルスをミドルレベルからローレベルに変化させる事によって、混合された電荷はＶ１，Ｖ２，Ｖ３，Ｖ４ゲート下に保持される。

【００６１】

次に、Ｔ２で示す期間における一連の動作（駆動パルスをＶ１、Ｖ２、Ｖ３、Ｖ４、Ｖ５，Ｖ６の順にミドルレベルからローレベルあるいはローレベルからミドルレベルに変化させる）によって、信号電荷は混合後の一行分（３画素分）転送されて再びＶ１，Ｖ２，Ｖ３，Ｖ４ゲート下に保持される。この一連の動作を繰り返すことによって、混合された信号電荷を任意の行数分転送することができる。

【００６２】

図１１において、垂直有効走査期間の前の垂直帰線期間に含まれる期間Ｔ３および垂直有効走査期間の後の垂直帰線期間に含まれる期間Ｔ４において、合わせて１４４回上記一行分の転送動作を繰り返すことによって出画に用いない１４４行分の信号電荷を垂直帰線期間中に高速に水平転送部３３に転送する。その後の垂直帰線期間内の期間Ｔ５及びＴ６にに水平転送部３３をそれぞれ一定期間駆動することによって水平転送部に転送された電荷は出力端から出力される。

【００６３】

次に、図１１の垂直有効走査期間では、各水平帰線期間に上記一行分の転送動作を行い、その後水平有効走査期間に水平転送部を駆動して水平転送部３３の信号電荷を読み出すことによって、３画素分混合された信号電荷をテレビジョン方式に同期して読み出す事ができる。また、図１１に示すように、Ａフィールドでは信号を画素から垂直転送部３２に転送した後Ｖ２，Ｖ４パルスをミドルレベルにして混合を行うのに対して、ＢフィールドではＶ２，Ｖ６パルスをミドルレベルにして混合を行う。これによって、フィールド毎に混合する画素の組み合わせを変えてインターレース走査を実現する事ができる。撮像素子の出力信号は前記実施形態と同様に処理される。ここで、垂直補間回路８では前記実施形態の３画素混合の場合と同様に重心補正の処理がなされ、水平補間回路９ではテレビジョン方式と縦横比を一致させる補間がなされる。

【００６４】

次に、静止画撮影モードのモニタリング時の動作について説明する。静止画撮影時には前記実施形態と同様に撮像素子の全有効画素数を用いて撮影を行うもの

とする。本実施形態の撮像素子の垂直方向の画素数は８６４画素であり、動画撮影時と同様に３画素混合を行った場合には、出力ライン数が２８８（＝８６４／３）ラインとなりテレビジョン方式に同期して信号を読み出す事ができないため、静止画撮影モードのモニタリング時には、垂直方向６画素の混合を行うものとする。６画素の混合は、垂直転送部内で３画素混合された信号電荷を各水平帰線期間内に２ライン数分水平転送部に転送する事によって行う事ができる。６画素混合を行うと撮像素子からの出力ライン数を１４４（＝８６４／６）ラインに減少する事ができる。１４４ラインに減少された撮像素子の出力信号を垂直補間回路８で補間処理によって２４０ラインの信号に変換することにより、テレビジョン方式に同期した信号を得る事ができる。ここで、１４４ラインの信号から２４０ラインの信号を生成する為には、３ラインから５ラインを生成する補間処理を行えば良い（１４４／２４０＝３／５）。

【００６５】

図１２に隣接２ラインの信号を用いて補間を行う場合について示す。撮像素子の３ラインの出力信号をｎ，ｎ＋１，ｎ＋２とすると、以下の演算によって５ラインの信号を生成する事ができる。

【００６６】

ｎ’＝ｎ

ｎ’＋１＝ｎ／２＋（ｎ＋１）／２

ｎ’＋２＝ｎ＋１

ｎ’＋３＝（ｎ＋１）／２＋（ｎ＋２）／２

ｎ’＋４＝ｎ＋２

尚、３ライン以上の複数ラインの信号を用いた補間処理を行う事もできる。以上により、静止画撮影モードでのモニタリング時にも、撮像素子の全画素領域の信号から、テレビジョン信号を生成する事ができる。

【００６７】

次に、記録ボタン１５によって記録の指示がなされた場合について説明する。記録する際には高精細な信号を得るために混合処理を行わずに、全画素の信号を独立で読み出す必要がある。これを実現するためには、まず絞り２を閉じ、次に

図１１に示したパルスタイミング図のＴ２期間において、Ｖ１パルスのみをハイレベルとしＶ１ゲートに隣接した画素の信号電荷のみを垂直転送部に転送し、その後垂直転送部、水平転送部を順次駆動して信号電荷を読み出す。同様にＶ３パルスをハイレベルとしてＶ３ゲートに隣接した画素の信号電荷を読み出し、最後にＶ５パルスをハイレベルとしてＶ５ゲートに隣接した画素の信号電荷を読み出す。以上により、全画素の電荷を３回に分けて独立に読み出す事ができる。読み出された信号電荷は、記録部１０に記録されるが、その際、撮像素子の受光面上での画素配列を再現するように適宜並べ替えを行う。

【００６８】

以上説明したように、本実施形態では、垂直方向の画素数がテレビジョン方式における走査線数の整数倍でない場合でも、画素混合および垂直方向の補間処理により全有効画素領域の信号からテレビジョン方式に準拠した信号の生成が可能である。

【００６９】

なお、本実施形態においても前記実施形態の場合と同様に、撮像素子の画素数、撮像素子の構造、テレビジョン方式等にかかわらず、フィールド有効走査線数Ｍの３倍以上の任意の垂直画素数Ｎをもち、かつ、ＮをＭで除した商の整数部より一つ以上大きい整数周期での垂直方向の混合または間引きを行うことのできる撮像素子を用いる事により、本実施形態と要旨を同一にする種々の構成を取る事ができる。

【００７０】

次に、本発明による他の実施形態について説明する。ここで説明する実施形態は、上述の各実施形態において撮像素子の色フィルタ配列を異ならせたものである。図１３に本実施形態における色フィルター配列を示す。いずれも縦ストライプ状に配置したものであり垂直方向の混合または間引きの周期にかかわらず一つの出力ラインの信号からＲ，Ｇ，Ｂの各原色信号を生成できる。図１３（ａ）は前述の実施形態の撮像素子の色フィルター配列に対して，緑（Ｇ）の代わりに白（Ｗ＝全色透過）フィルターを配したものであり、Ｒ，Ｇ，Ｂ信号は以下の演算によって得る事ができる。

【００７１】

Ｒ＝Ｗ－Ｃｙ

Ｇ＝Ｙｅ＋Ｃｙ－Ｗ

Ｂ＝Ｗ－Ｙｅ

本色フィルター配列を用いた場合には、前述の実施例の色フィルター配列を用いた場合に比べてより高感度化が可能である。また、図１３（ｂ）は、補色の代わりに原色Ｒ，Ｇ，Ｂを透過する色フィルターを配したものであり、原色信号Ｒ，Ｇ，Ｂを直接得る事ができる。本色フィルター配列を用いた場合には、色純度、色Ｓ／Ｎの良好な撮像装置を得る事ができる。

【００７２】

以上説明したような色フィルター配列とすることにより、いかなる画素周期で垂直方向の混合または間引きを行っても、常に各ラインの信号から３種類の色フィルターに対応する色信号を得ることができるため、容易にテレビジョン方式の色信号を生成することが可能である。

【００７３】

【発明の効果】

以上説明したように、本発明によれば、垂直方向の画素数に上限がなくなるため、静止画に対しても十分な画素数をもつ多画素の撮像素子を用いて、高精細な静止画に加えて、良好な動画撮影を可能とした撮像装置を提供することができる。

【図面の簡単な説明】

【図１】

図１は、本発明による撮像装置の一実施形態の構成を示す構成図である。

【図２】

図２は、本発明による撮像装置の一実施形態における撮像素子の構成図である。

【図３】

図３は、本発明による撮像装置の一実施形態における駆動パルスタイミング図である。

【図４】

図４は、本発明による撮像装置の一実施形態における混合動作を説明する図である。

【図５】

図５は、本発明による撮像装置の一実施形態における読み出し領域を説明する図である。

【図６】

図６は、本発明による撮像装置の一実施形態における混合動作を説明する図である。

【図７】

図７は、本発明による撮像装置の一実施形態の構成を示す構成図である。

【図８】

図８は、本発明による撮像装置の一実施形態における混合動作を説明する図である。

【図９】

図９は、本発明による撮像装置の一実施形態における読み出し領域を説明する図である。

【図１０】

図１０は、本発明による撮像装置の一実施形態における撮像素子の構成図である。

【図１１】

図１１は、本発明による撮像装置の一実施形態における駆動パルスタイミング図である。

【図１２】

図１２は、本発明による撮像装置の一実施形態における補間動作を説明する図である。

【図１３】

図１３は、本発明による撮像装置の一実施形態における撮像素子の色フィルター配列を示す図である。

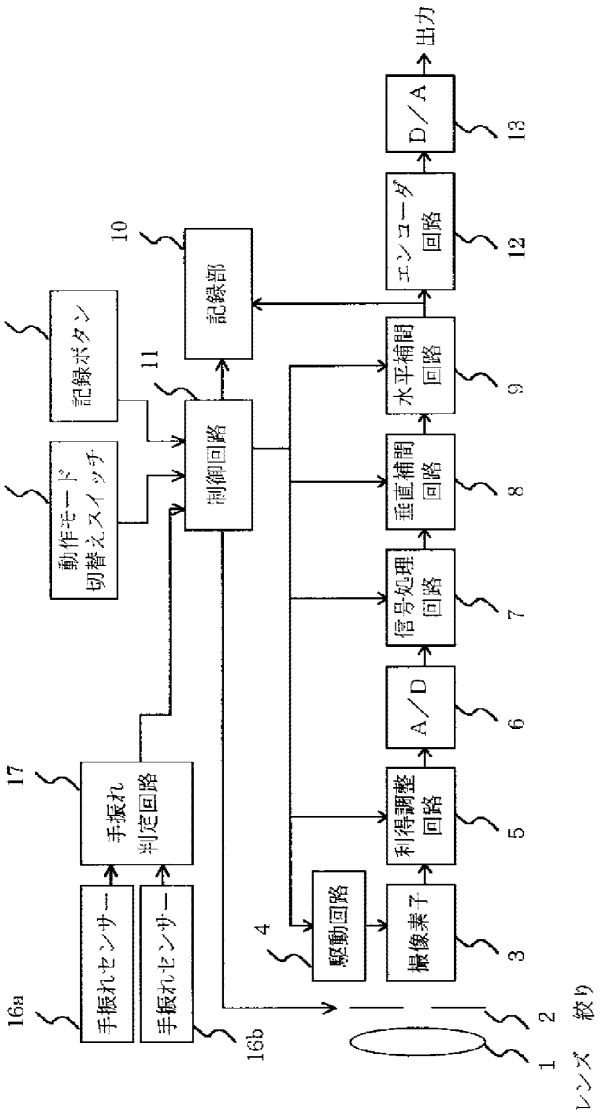
【符号の説明】

１…レンズ、２…絞り、３…撮像素子、４…駆動回路、５…利得調整回路、６…Ａ／Ｄ変換回路、７…信号処理回路、８…垂直補間回路、９…水平補間回路、１０…記録部、１１…制御回路、１２…エンコーダ回路、１３…Ｄ／Ａ変換回路、１４…モード切り替えスイッチ、１５…記録ボタン、１６ａ，１６ｂ…手振れセンサー、１７…手振れ判定回路、１８…画角変化指示スイッチ。

【書類名】　図面

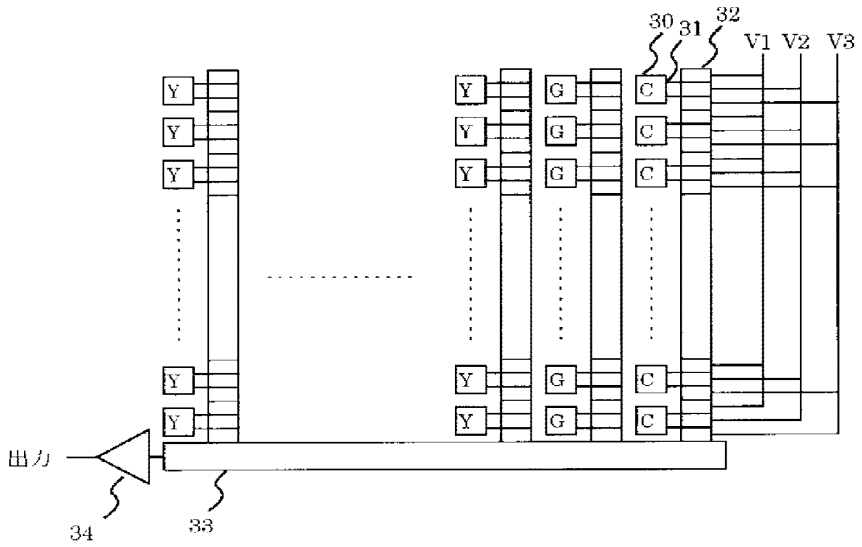
【図１】

【図１】


出力
D／A
13
エンコーダ回路
12
水平補間回路
9
垂直補間回路
8
信号処理回路
7
A／D
6
利得調整回路
5
撮像素子
3
駆動回路
4
制御回路
11
記録部
10
動作モード切替えスイッチ
14
記録ボタン
15
手振れ判定回路
17
手振れセンサー
手振れセンサー
16a
16b
レンズ
絞り
1
2

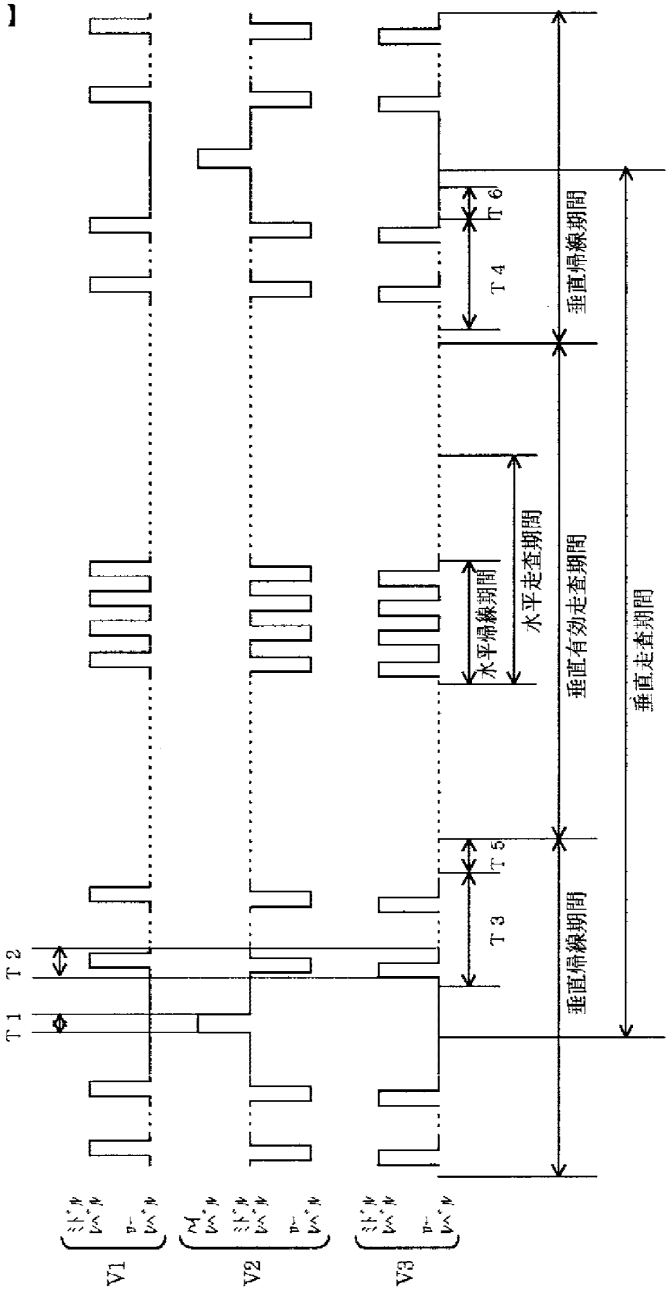
【図２】

【図２】



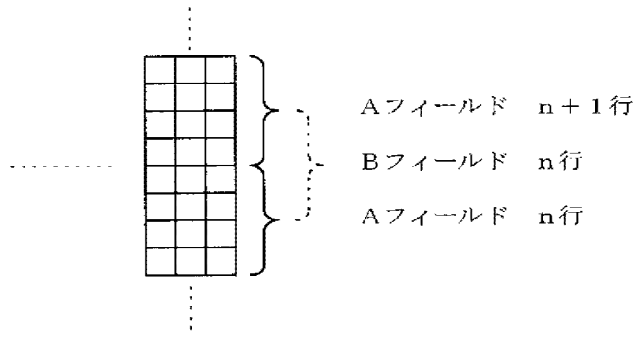
【図３】

【図３】


T1
T2
T3
T4
T5
T6
水平帰線期間
水平走査期間
垂直帰線期間
垂直有効走査期間
垂直走査期間
V1
V2
V3

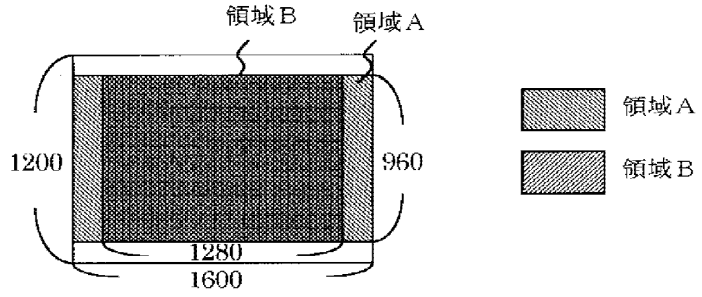
【図４】

【図４】


Aフィールド　n＋1行
Bフィールド　n行
Aフィールド　n行

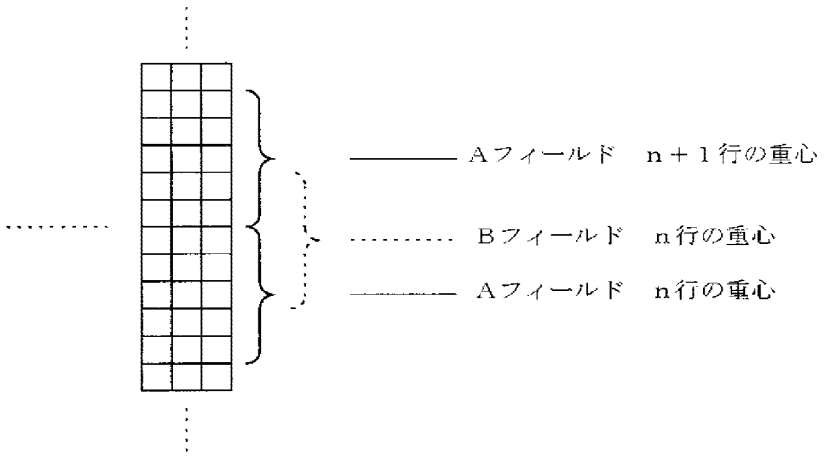
【図５】

【図５】


領域B
領域A
1200
960
1280
1600
領域A
領域B

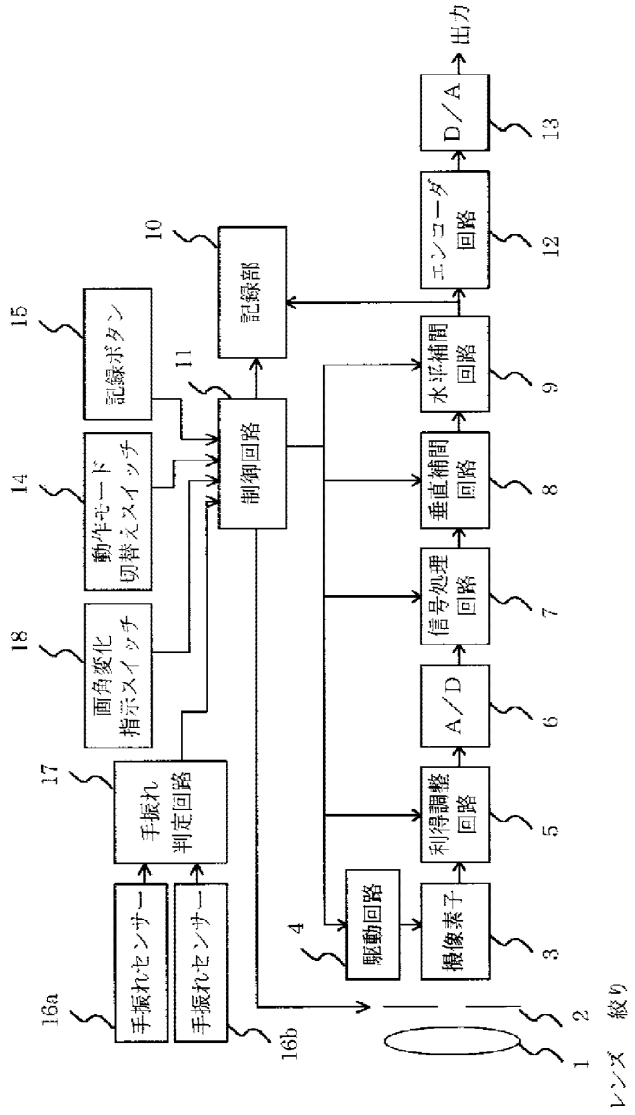
【図６】

【図６】



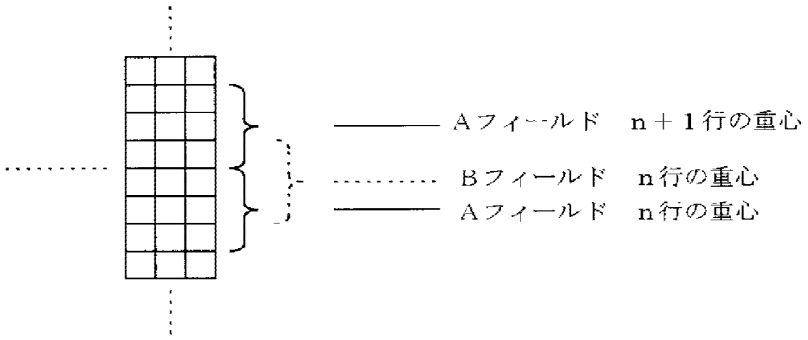
【図７】

【図７】


レンズ
絞り
撮像素子
駆動回路
利得調整回路
A／D
信号処理回路
垂直補間回路
水平補間回路
エンコーダ回路
D／A
出力
記録部
制御回路
動作モード切替えスイッチ
記録ボタン
画角変化指示スイッチ
手振れ判定回路
手振れセンサー
手振れセンサー
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16a
16b
17
18

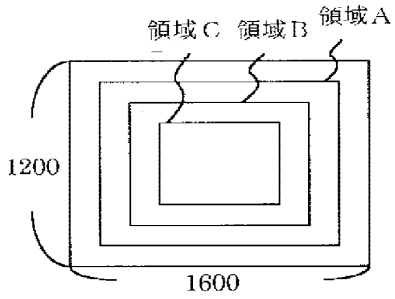
【図８】

【図８】




【図９】

【図９】



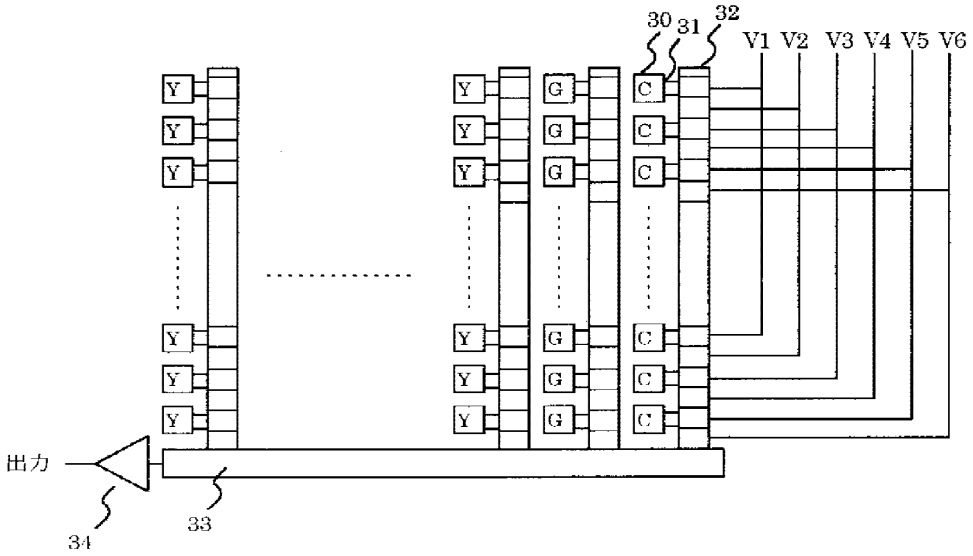

領域Ａ：垂直 960×水平 1280

領域Ｂ：垂直 720×水平 960

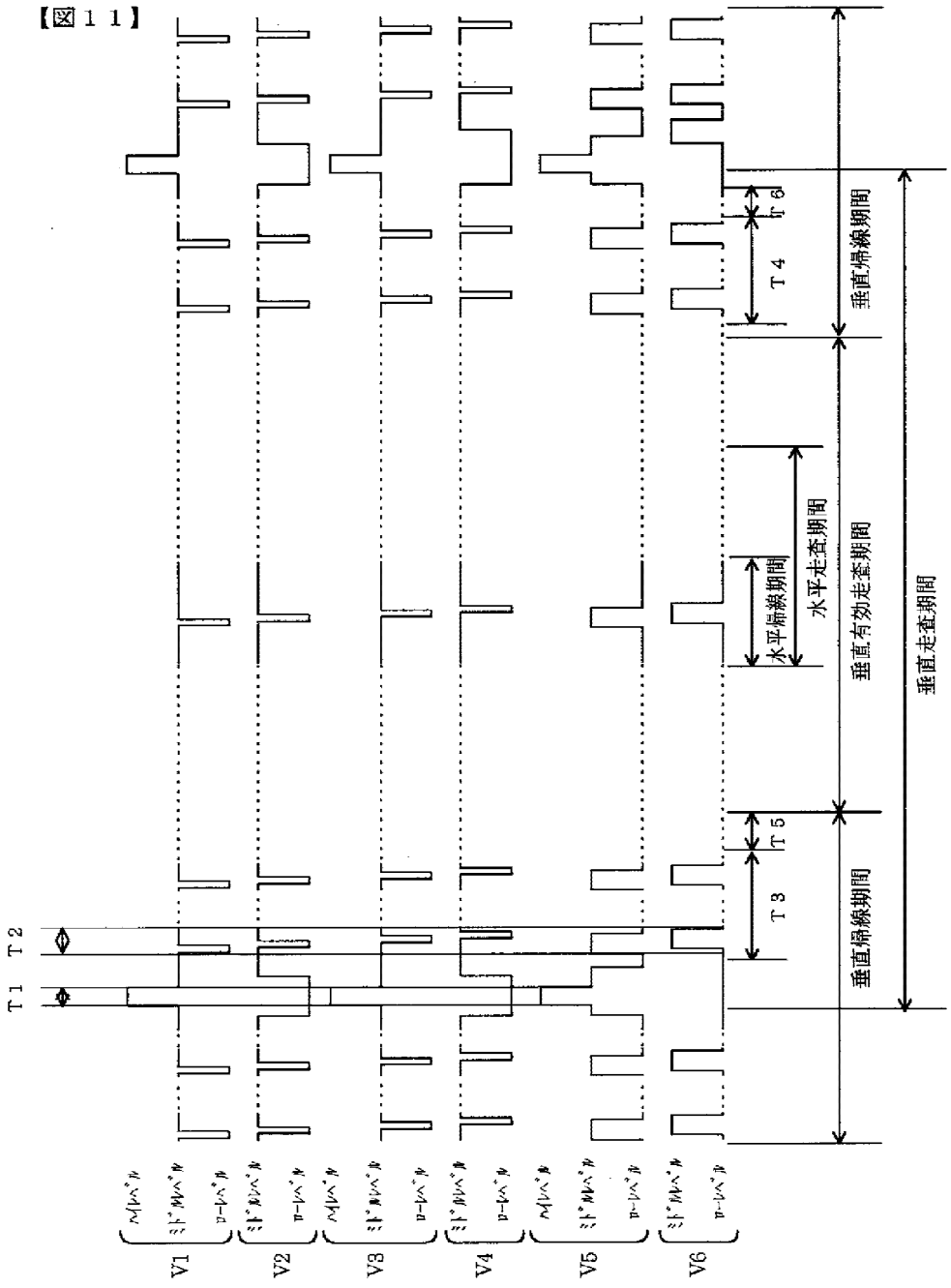
領域Ｃ：垂直 480×水平 640

【図１０】

【図１０】



【図１１】


【図１１】
T1
T2
V1
V2
V3
V4
V5
V6
T3
T4
T5
T6
垂直帰線期間
垂直有効走査期間
垂直走査期間
水平帰線期間
水平走査期間

【図１２】

【図１２】


【図１３】

【図１３】

| | | |
|---|---|---|
| Ye | W | Cy |
| Ye | W | Cy |
| Ye | W | Cy |
| Ye | W | Cy |
| Ye | W | Cy |

（a）

| | | |
|---|---|---|
| R | G | B |
| R | G | B |
| R | G | B |
| R | G | B |
| R | G | B |

（b）

【書類名】　要約書

【要約】

【課題】

静止画撮影に対して十分な画素数を持つ多画素の撮像素子を用いて良好な動画撮影および静止画撮影中のモニタリングを可能とすることを目的とする。

【解決手段】

テレビジョン方式の有効走査線数の３倍以上の任意の垂直方向の画素数を持つ撮像素子を用いて、動画撮影時および静止画撮影中のモニタリング時には、画素混合または間引き、垂直帰線期間中の信号読み出し、補間処理によりテレビジョン信号を生成し、静止画記録時には全画素の信号を独立に読み出して記録する。

【選択図】　図１

【書類名】　手続補正書
【あて先】　特許庁長官　殿
【事件の表示】
　【出願番号】　特願2000－　6064
【補正をする者】
　【識別番号】　000005108
　【氏名又は名称】　株式会社日立製作所
【代理人】
　【識別番号】　100100310
　【弁理士】
　【氏名又は名称】　井上　学
【発送番号】　366136
【手続補正1】
　【補正対象書類名】　明細書
　【補正対象項目名】　特許請求の範囲
　【補正方法】　変更
　【補正の内容】
【特許請求の範囲】
　【請求項１】
　テレビジョン方式の一表示画面の有効走査線数Ｍの３倍以上の数Ｎの画素を垂直方向に、任意の数の画素を水平方向に配した受光面であって、該受光面を構成する画素配列の各画素に対して、水平方向に第一、第二、および第三の各色を各々透過する色フィルターを三画素周期で周期的に配し、垂直方向には同一種類の色を透過する色フィルターを配した受光面を備えた撮像素子と、
　該画素配列の各画素に蓄積された信号電荷を、ＮをＭで除した商の整数部またはそれ以下の整数の内少なくとも一つの整数であるところのＫ画素周期で、垂直方向に混合または間引きを行い、前記有効走査線数Ｍに相当するライン数の出力信号を得るように該撮像素子を駆動する駆動手段と、
　前記撮像素子の出力信号を用いて画像信号を生成する信号処理手段と、
　該画像信号を、テレビジョン方式の表示画面を備えた表示手段に出力する出力手段と、
　を備え、
　該駆動手段は、静止画モニタ時の画像信号を該表示手段が表示する場合には、Ｋ１画素周期で垂直方向に混合または間引きを行い、動画時の画像信号を該表示手段が表示する場合には、Ｋ２画素周期で垂直方向に混合または間引きを行うことを特徴とする撮像装置。
　【請求項２】
　前記駆動手段は、前記撮像素子の垂直方向の画素数Ｎから前記混合または間引き周期Ｋと前記有効走査線数Ｍとの積Ｋ・Ｍを減じた数の垂直画素に対応する画素領域の信号電荷を前記テレビジョン方式の垂直帰線期間内に読み出しまたは掃き捨てることにより、前記テレビジョン方式の有効垂直走査期間内に、前記撮像素子の画素の内Ｋ・Ｍの垂直画素に相当する画素領域の信号電荷を切り出して、前記有効走査線数Ｍに相当するライン数の出力信号を得るように前記撮像素子を駆動することを特徴とする請求項１記載の撮像装置。
　【請求項３】
　前記信号処理手段は、該撮像素子の該受光面の内、該切り出した垂直領域に対して該テレビジョン方式の縦横比と略等しくなる水平領域部分に相当する出力信号期間のみを切り出して該テレビジョン方式の有効水平走査期間全体にわたって出力する機能を有することを特徴とする請求項１または２記載の撮像装置。
　【請求項４】
　前記駆動手段は、該テレビジョン方式の表示周期毎に該混合または間引きの画素位置をずらすことによりインターレース信号を出力するように該撮像素子を駆動することを特徴とする請求項１～３のいずれか１項に記載の撮像装置。

【請求項５】
前記信号処理手段は、該混合または間引きによって得られるインターレース出力信号の垂直方向の重心位置が表示周期毎に１８０度の位相差となるように補間する機能を有することを特徴とする請求項４記載の撮像装置。
【請求項６】
前記撮像素子の該駆動手段は、装置内部または外部に設けたズームスイッチ等の画角変化を指示するスイッチ手段からの入力情報に対応して、該混合または間引きの画素周期を変化させることを特徴とする請求項１ないし５のいずれかに記載の撮像装置。
【請求項７】
前記撮像素子の出力信号の利得を調整する利得調整手段を有し、該撮像素子の混合の画素周期が変化した時にも、該利得調整手段の出力信号レベルが同一になるように、混合画素周期に対応して該利得調整手段の利得を変化させることを特徴とする請求項１ないし６のいずれかに記載の撮像装置。
【請求項８】
前記撮像装置の手振れを検出する手振れ検出手段を有し、該手振れ検出手段で検出した手振れ量に応じて、該受光面内における垂直方向及び水平方向の切り出し位置を、該手振れを補正するように変化させることを特徴とする請求項１～７のいずれか１項に記載の撮像装置。
【請求項９】
テレビジョン方式の一表示画面の有効走査線数Ｍの３倍以上の数Ｎの画素を垂直方向に、任意の数の画素を水平方向に配した受光面であって、該受光面を構成する画素配列の各画素に対して、水平方向に第一、第二、および第三の各色を各々透過する色フィルターを三画素周期で周期的に配し、垂直方向には同一種類の色を透過する色フィルターを配した受光面を備えた撮像素子と、
該画素配列の各画素に蓄積された信号電荷を、ＮをＭで除した商の整数部より大きな整数であるところのＫ画素周期で、垂直方向に混合または間引きを行い、前記テレビジョン方式の有効垂直走査期間内に、前記撮像素子の垂直画素数ＮのＫ分の一のライン数の出力信号を得るように前記撮像素子を駆動する駆動手段と、
前記撮像素子の出力信号を用いて画像信号を生成する機能を有する信号処理手段と、
該画像信号を、テレビジョン方式の表示画面を備えた表示手段に出力する出力手段と、
を備え、
該駆動手段は、第１の画像信号を該表示手段が表示する場合には、Ｋ１画素周期で垂直方向に混合または間引きを行い、第２の画像信号を該表示手段が表示する場合には、Ｋ２画素周期で垂直方向に混合または間引きを行うことを特徴とする撮像装置。
【請求項１０】
テレビジョン方式の一表示画面の有効走査線数Ｍの３倍以上の数Ｎの画素を垂直方向に、任意の数の画素を水平方向に配した受光面であって、該受光面を構成する画素配列の各画素に対して、水平方向に第一、第二、および第三の各色を各々透過する色フィルターを三画素周期で周期的に配し、垂直方向には同一種類の色を透過する色フィルターを配した受光面を備えた撮像素子と、
該画素配列の各画素に蓄積された信号電荷を、ＮをＭで除した商の整数部またはそれ以下の整数の内少なくとも一つの整数であるところのＫ画素周期で、垂直方向に混合または間引きを行い、前記有効走査線数Ｍに相当するライン数の出力信号を得るように該撮像素子を駆動する第１の駆動手段と、
該画素配列の各画素に蓄積された信号電荷を、ＮをＭで除した商の整数部より大きな整数であるところのＫ画素周期で、垂直方向に混合または間引きを行い、前記テレビジョン方式の有効垂直走査期間内に、前記撮像素子の垂直画素数ＮのＫ分の一のライン数の出力信号を得るように前記撮像素子を駆動する第２の駆動手段と、
前記撮像素子の出力信号を用いて画像信号を生成する信号処理手段と、
該画像信号を、テレビジョン方式の表示画面を備えた表示手段に出力する出力手段と、

を備え、
前記第１の駆動手段は、第１の画像信号を該表示手段が表示する場合には、Ｋ１画素周期で垂直方向に混合または間引きを行い、第２の画像信号を該表示手段が表示する場合には、Ｋ２画素周期で垂直方向に混合または間引きを行い、
前記第１の駆動手段による駆動と前記第２の駆動手段による駆動とを、装置内部または外部に設けたスイッチ手段からの入力情報に対応して選択、切り替えを行うことを特徴とする撮像装置。

【請求項１１】
シャッターボタン等のトリガー手段を有し、該トリガー手段によりトリガーが発生した時には、該撮像素子の各画素に蓄積した信号電荷を混合せずに全画素独立で読み出すことを特徴とする請求項１～１０のいずれか１項に記載の撮像装置。

【請求項１２】
前記第一、第二、および第三の各色は各々黄色、緑、シアンであることを特徴とする請求項１ないし１１のいずれかに記載の撮像装置。

【請求項１３】
前記第一、第二、および第三の各色は各々黄色、白色、シアンであることを特徴とする請求項１ないし１１のいずれかに記載の撮像装置。

【請求項１４】
前記第一、第二、および第三の各色は各々赤、緑、青であることを特徴とする請求項１ないし１１のいずれかに記載の撮像装置。

【請求項１５】
請求項１ないし１４のいずれかにおいて、
前記Ｋ１は前記Ｋ２よりも小さい値であることを特徴とする撮像装置。

【書類名】　手続補正書
【あて先】　特許庁長官　殿
【事件の表示】
　【出願番号】　特願2000－　6064
【補正をする者】
　【識別番号】　000005108
　【氏名又は名称】　株式会社日立製作所
【代理人】
　【識別番号】　100100310
　【弁理士】
　【氏名又は名称】　井上　学
【発送番号】　156904
【手続補正1】
　【補正対象書類名】　明細書
　【補正対象項目名】　特許請求の範囲
　【補正方法】　変更
　【補正の内容】
【特許請求の範囲】
　【請求項１】
　テレビジョン方式の一表示画面の有効走査線数Ｍの３倍以上の数Ｎの画素を垂直方向に、任意の数の画素を水平方向に配した受光面であって、該受光面を構成する画素配列の各画素に対して、水平方向に第一、第二、および第三の各色を各々透過する色フィルターを三画素周期で周期的に配し、垂直方向には同一種類の色を透過する色フィルターを配した受光面を備えた撮像素子と、
　該画素配列の各画素に蓄積された信号電荷を、ＮをＭで除した商の整数部またはそれ以下の整数の内少なくとも一つの整数であるところのＫ１画素周期で、垂直方向に混合または間引きを行い、または、該画素配列の各画素に蓄積された信号電荷の一部を、ＮをＭで除した商の整数部またはそれ以下の整数の内少なくとも一つの整数であるところのＫ２（Ｋ１＞Ｋ２）画素周期で、垂直方向に混合または間引きを行い、前記有効走査線数Ｍに相当するライン数の出力信号を得るように該撮像素子を駆動し、または、該画素配列の各画素に蓄積された信号電荷を混合または間引きを行わないで該撮像素子を駆動する駆動手段と、
　前記撮像素子の出力信号を用いて画像信号を生成する信号処理手段と、
　該画像信号を、テレビジョン方式の表示画面を備えた表示手段に出力する出力手段と、
　を備え、
　該駆動手段は、静止画モニタ時の画像信号を該表示手段が表示する場合には、該画素配列の各画素に蓄積された信号電荷をＫ１画素周期で垂直方向に混合または間引きを行い、動画時の画像信号を該表示手段が表示する場合には、該画素配列の各画素に蓄積された信号電荷の一部をＫ２画素周期で垂直方向に混合または間引きを行い、静止画を撮像する場合には、混合または間引きを行わないことを特徴とする撮像装置。
　【請求項２】
　前記駆動手段は、前記撮像素子の垂直方向の画素数Ｎから前記混合または間引き周期Ｋと前記有効走査線数Ｍとの積Ｋ・Ｍを減じた数の垂直画素に対応する画素領域の信号電荷を前記テレビジョン方式の垂直帰線期間内に読み出しまたは掃き捨てることにより、前記テレビジョン方式の有効垂直走査期間内に、前記撮像素子の画素の内Ｋ・Ｍの垂直画素に相当する画素領域の信号電荷を切り出して、前記有効走査線数Ｍに相当するライン数の出力信号を得るように前記撮像素子を駆動することを特徴とする請求項１記載の撮像装置。
　【請求項３】
　前記信号処理手段は、該撮像素子の該受光面の内、該切り出した垂直領域に対して該テレビジョン方式の縦横比と略等しくなる水平領域部分に相当する出力信号期間のみを切り

出して該テレビジョン方式の有効水平走査期間全体にわたって出力する機能を有することを特徴とする請求項１または２記載の撮像装置。

【請求項４】

前記駆動手段は、該テレビジョン方式の表示周期毎に該混合または間引きの画素位置をずらすことによりインターレース信号を出力するように該撮像素子を駆動することを特徴とする請求項１～３のいずれか１項に記載の撮像装置。

【請求項５】

前記信号処理手段は、該混合または間引きによって得られるインターレース出力信号の垂直方向の重心位置が表示周期毎に１８０度の位相差となるように補間する機能を有することを特徴とする請求項４記載の撮像装置。

【請求項６】

前記撮像素子の該駆動手段は、装置内部または外部に設けたズームスイッチ等の画角変化を指示するスイッチ手段からの入力情報に対応して、該混合または間引きの画素周期を変化させることを特徴とする請求項１ないし５のいずれかに記載の撮像装置。

【請求項７】

前記撮像素子の出力信号の利得を調整する利得調整手段を有し、該撮像素子の混合の画素周期が変化した時にも、該利得調整手段の出力信号レベルが同一になるように、混合画素周期に対応して該利得調整手段の利得を変化させることを特徴とする請求項１ないし６のいずれかに記載の撮像装置。

【請求項８】

前記撮像装置の手振れを検出する手振れ検出手段を有し、該手振れ検出手段で検出した手振れ量に応じて、該受光面内における垂直方向及び水平方向の切り出し位置を、該手振れを補正するように変化させることを特徴とする請求項１～７のいずれか１項に記載の撮像装置。

【請求項９】

テレビジョン方式の一表示画面の有効走査線数Ｍの３倍以上の数Ｎの画素を垂直方向に、任意の数の画素を水平方向に配した受光面であって、該受光面を構成する画素配列の各画素に対して、水平方向に第一、第二、および第三の各色を各々透過する色フィルターを三画素周期で周期的に配し、垂直方向には同一種類の色を透過する色フィルターを配した受光面を備えた撮像素子と、

該画素配列の各画素に蓄積された信号電荷を、ＮをＭで除した商の整数部より大きな整数であるところのＫ１画素周期で、垂直方向に混合または間引きを行い、または、該画素配列の各画素に蓄積された信号電荷の一部を、ＮをＭで除した商の整数部またはそれ以下の整数の内少なくとも一つの整数であるところのＫ２（Ｋ１＞Ｋ２）画素周期で、垂直方向に混合または間引きを行い、前記テレビジョン方式の有効垂直走査期間内に、前記撮像素子の垂直画素数ＮのＫ分の一のライン数の出力信号を得るように前記撮像素子を駆動し、または、該画素配列の各画素に蓄積された信号電荷を混合または間引きを行わないで該撮像素子を駆動する駆動手段と、

前記撮像素子の出力信号を用いて画像信号を生成する機能を有する信号処理手段と、

該画像信号を、テレビジョン方式の表示画面を備えた表示手段に出力する出力手段と、

を備え、

該駆動手段は、第１の画像信号を該表示手段が表示する場合には、該画素配列の各画素に蓄積された信号電荷をＫ１画素周期で垂直方向に混合または間引きを行い、第２の画像信号を該表示手段が表示する場合には、該画素配列の各画素に蓄積された信号電荷の一部をＫ２画素周期で垂直方向に混合または間引きを行い、第３の画像信号を撮像する場合には、混合または間引きを行わないことを特徴とする撮像装置。

【請求項１０】

テレビジョン方式の一表示画面の有効走査線数Ｍの３倍以上の数Ｎの画素を垂直方向に、任意の数の画素を水平方向に配した受光面であって、該受光面を構成する画素配列の各画素に対して、水平方向に第一、第二、および第三の各色を各々透過する色フィルターを

三画素周期で周期的に配し、垂直方向には同一種類の色を透過する色フィルターを配した受光面を備えた撮像素子と、
該画素配列の各画素に蓄積された信号電荷を、ＮをＭで除した商の整数部またはそれ以下の整数の内少なくとも一つの整数であるところのＫ１画素周期で、垂直方向に混合または間引きを行い、または、該画素配列の各画素に蓄積された信号電荷の一部を、ＮをＭで除した商の整数部またはそれ以下の整数の内少なくとも一つの整数であるところのＫ２（Ｋ１＞Ｋ２）画素周期で、垂直方向に混合または間引きを行い、前記有効走査線数Ｍに相当するライン数の出力信号を得るように該撮像素子を駆動し、または、該画素配列の各画素に蓄積された信号電荷を混合または間引きを行わないで該撮像素子を駆動する第１の駆動手段と、
該画素配列の各画素に蓄積された信号電荷を、ＮをＭで除した商の整数部より大きな整数であるところのＫ画素周期で、垂直方向に混合または間引きを行い、前記テレビジョン方式の有効垂直走査期間内に、前記撮像素子の垂直画素数ＮのＫ分の一のライン数の出力信号を得るように前記撮像素子を駆動する第２の駆動手段と、
前記撮像素子の出力信号を用いて画像信号を生成する信号処理手段と、
該画像信号を、テレビジョン方式の表示画面を備えた表示手段に出力する出力手段と、
を備え、
前記第１の駆動手段は、第１の画像信号を該表示手段が表示する場合には、該画素配列の各画素に蓄積された信号電荷をＫ１画素周期で垂直方向に混合または間引きを行い、第２の画像信号を該表示手段が表示する場合には、該画素配列の各画素に蓄積された信号電荷の一部をＫ２画素周期で垂直方向に混合または間引きを行い、第３の画像信号を撮像する場合には、混合または間引きを行わず、
前記第１の駆動手段による駆動と前記第２の駆動手段による駆動とを、装置内部または外部に設けたスイッチ手段からの入力情報に対応して選択、切り替えを行うことを特徴とする撮像装置。
【請求項１１】
シャッターボタン等のトリガー手段を有し、該トリガー手段によりトリガーが発生した時には、該撮像素子の各画素に蓄積した信号電荷を混合せずに全画素独立で読み出すことを特徴とする請求項１～１０のいずれか１項に記載の撮像装置。
【請求項１２】
前記第一、第二、および第三の各色は各々黄色、緑、シアンであることを特徴とする請求項１ないし１１のいずれかに記載の撮像装置。
【請求項１３】
前記第一、第二、および第三の各色は各々黄色、白色、シアンであることを特徴とする請求項１ないし１１のいずれかに記載の撮像装置。
【請求項１４】
前記第一、第二、および第三の各色は各々赤、緑、青であることを特徴とする請求項１ないし１１のいずれかに記載の撮像装置。

【手続補正2】
【補正対象書類名】　明細書
【補正対象項目名】　００１３
【補正方法】　変更
【補正の内容】
【００１３】
【課題を解決するための手段】
上記目的を達成するため、本発明では一例として、特許請求の範囲記載の構成を用いる。

出願人履歴

０００００５１０８

19900831

新規登録

５０８２７７８７４

東京都千代田区神田駿河台４丁目６番地

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０００００５１０８

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住所変更

５０８２７７８７４

東京都千代田区丸の内一丁目６番６号

株式会社日立製作所

500.38315CC5

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

| | |
|---|---|
| Applicant(s): | T. NAKANO, et al |
| Application No.: | 14/264,243 |
| Filed: | April 29, 2014 |
| For: | ELECTRIC CAMERA |
| Group AU: | 2673 |
| Conf. No.: | 1644 |

**RESPONSE TO INFORMATIONAL NOTICE TO APPLICANT**

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

June 10, 2014

Sir:

In response to the Informational Notice to Applicant dated May 14, 2014, in connection with the above-identified application, attached hereto are executed Declarations for the above-identified patent application, in compliance with 37 CFR 1.63.

Please charge any shortages in the fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 01-2135 (Docket No. 500.38315CC5) and please credit any excess fees to such deposit account.

Respectfully submitted,

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E5037-05

申請データシート(37 CFR 1.76)を使った実用及び意匠登録出願宣言書(37 CFR 1.63)
DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION
USING AN APPLICATION DATA SHEET (37 CFR 1.76)

| 発明の名称 Title of Invention | ELECTRIC CAMERA |
|---|---|

下記発明者である私は、つぎのことがらを宣言します。
As the below named inventor, I hereby declare that:
本宣言は
This declaration is directed to:

☐ 添付されている、あるいは
The attached application, or

_____に、米国出願あるいは PCT 国際出願番号_____として出願されているものに宛てられています。
☒ United States application or PCT international application
number 13/681495 filed on November 20, 2012 .

上記の出願は私自身、あるいは私が権限を譲与したものによって行われたものです。
The above-identified application was made or authorized to be made by me.

私は本出願書中にあらわれるもともとの発明者、あるいはもともとの共同発明者です。
I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

私は本宣言書において故意に虚偽の申し立てを行った場合は 18 U.S.C. 1001 により、罰金あるいは最高五(5)年の禁固刑、あるいはその両方による罰則の対象となることを認めます。
I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

私は、特許請求の範囲を含む上記の明細書を確認し内容を理解しています。
I have reviewed and understand the contents of the above-identified application, including the claims.

私は、連邦規則法典第 37 編規則 1.56 に定義されている、特許性について重要な情報を開示する義務があることを認めます。
I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

発明者の正式氏名:
LEGAL NAME OF INVENTOR: Takahiro NAKANO

署名:
Signature: Takahiro Nakano

日付(任意):
Date (Optional): Dec. 17, 2012

備考:出願データシート(PTO/AIA/14 あるいはその同等用紙)は、発明の自主独立体全体の命名を含め、本用紙に添付すること。なお残余の発明者ごとにこの用紙の写しを使用する。
Note: An application data sheet (PTO/AIA/14 or equivalent), including naming the entire inventive entity, must accompany this form. Use an additional copy of the present form for each additional inventor.

E 5037-05

申請データシート(37 CFR 1.76)を使った実用及び意匠登録出願宣言書(37 CFR 1.63)

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

| 発明の名称 Title of Invention | ELECTRIC CAMERA |
|---|---|

下記発明者である私は、つぎのことがらを宣言します。

As the below named inventor, I hereby declare that:

本宣言は

This declaration is directed to:

☐ 添付されている、あるいは
The attached application, or

☒ _____に、米国出願あるいは PCT 国際出願番号_____として出願されているものに宛てられています。
United States application or PCT international application number 13/681495 fled on November 20, 2012 .

上記の出願は私自身、あるいは私が権限を譲与したものによって行われたものです。

The above-identified application was made or authorized to be made by me.

私は本出願書中にあらわれるもともとの発明者、あるいはもともとの共同発明者です。

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I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

発明者の正式氏名:
LEGAL NAME OF INVENTOR: Ryuji NISHIMURA

署名:
Signature: Ryuji Nishimura

日付(任意):
Date (Optional): Dec. 18/2012

備考:出願データシート(PTO/AIA/14 あるいはその同等用紙)は、発明の自主独立体全体の命名を含め、本用紙に添付すること。なお残余の発明者ごとにこの用紙の写しを使用する。

Note: An application data sheet (PTO/AIA/14 or equivalent), including naming the entire inventive entity, must accompany this form. Use an additional copy of the present form for each additional inventor.

F5037105

申請データシート(37 CFR 1.76)を使った実用及び意匠登録出願宣言書(37 CFR 1.63)

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

| 発明の名称 Title of Invention | ELECTRIC CAMERA |
|---|---|

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The attached application, or

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I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

発明者の正式氏名:

LEGAL NAME OF INVENTOR: Toshiro KINUGASA

署名:

Signature: Toshiro Kinugasa

日付(任意):

Date (Optional): 12/19/12

備考:出願データシート(PTO/AIA/14 あるいはその同等用紙)は、発明の自主独立体全体の命名を含め、本用紙に添付すること。なお残余の発明者ごとにこの用紙の写しを使用する。

Note: An application data sheet (PTO/AIA/14 or equivalent), including naming the entire inventive entity, must accompany this form. Use an additional copy of the present form for each additional inventor.

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 19257328 |
| **Application Number:** | 14264243 |
| **International Application Number:** | |
| **Confirmation Number:** | 1644 |
| **Title of Invention:** | ELECTRIC CAMERA |
| **First Named Inventor/Applicant Name:** | Takahiro Nakano |
| **Customer Number:** | 20457 |
| **Filer:** | Ayal I. Sharon/Krista Hargrove |
| **Filer Authorized By:** | Ayal I. Sharon |
| **Attorney Docket Number:** | 500.38315CC5 |
| **Receipt Date:** | 10-JUN-2014 |
| **Filing Date:** | 29-APR-2014 |
| **Time Stamp:** | 11:43:56 |
| **Application Type:** | Utility under 35 USC 111(a) |

## 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 | Oath or Declaration filed | 38315CC5.pdf | 529451<br>c5b3f0cda8149e0246df2bf8a7cbf6d3c3b98863 | no | 4 |

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**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

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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 14/264,243 | 04/29/2014 | Takahiro Nakano | 500.38315CC5 | 1644 |

20457 7590 06/13/2014

ANTONELLI, TERRY, STOUT & KRAUS, LLP
1300 NORTH SEVENTEENTH STREET
SUITE 1800
ARLINGTON, VA 22209-3873

| EXAMINER | |
|---|---|
| NGUYEN, LUONG TRUNG | |
| ART UNIT | PAPER NUMBER |
| 2663 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 06/13/2014 | 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.

| Office Action Summary | Application No. 14/264,243 | Applicant(s) NAKANO ET AL. | |
|---|---|---|---|
| | Examiner LUONG T. NGUYEN | Art Unit 2663 | AIA (First Inventor to File) Status No |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☐ Responsive to communication(s) filed on _____.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims***

5)☒ Claim(s) *1* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

**Application Papers**

10)☐ The specification is objected to by the Examiner.

11)☒ The drawing(s) filed on *04/29/2014* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

a)☒ All b)☐ Some** c)☐ None of the:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

## DETAILED ACTION

1. The present application is being examined under the pre-AIA first to invent provisions.

### *Priority*

2. Receipt is acknowledged of certified copies of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### *Information Disclosure Statement*

3. The information disclosure statement (IDS), submitted on 04/29/2014, is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### *Claim Objections*

4. Claim 1 is objected to because of the following informalities:

Claim 1 (line 11), "the out put" should be changed to --the output--.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claim 1 is rejected under pre-AIA 35 U.S.C. 102(e) as being by anticipated by Kijima (US 6,661,451).

Regarding claim 1, Kijima et al. discloses an electric camera comprising:

an image sensing device (CCD 12, figure 1, column 3, lines 25-34; column 4, line 57 - column 5, line 42) with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than three times the number of effective scanning lines M of a display screen of a television system;

a driver (figure 1, column 3, lines 25-34; column 4, line 57 - column 5, line 42) to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce a number of lines of output signals which corresponds to the number of effective scanning lines M, K being at least one of integers equal to or less than an integral part of a quotient of N divided by M; and

a signal processing unit (image processing portion 26, figure 1, column 2, lines 62-67) to generate image signals by using the output signals of the image sensing device.

***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Noguchi et al. (US 5,402,173) discloses image pickup system.

Yamashita et al. (US 5,438,365) discloses solid-state imaging apparatus employing independently variable odd and even lines of photodiodes.

Hokari et al. (US 5,638,132) discloses image sensing and display system and image pickup and display system.

Hatakeyama (US 7,352,391) discloses method of controlling the display mode and the recording mode and the recording mode of an electric still camera.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LUONG T. NGUYEN whose telephone number is (571)272-7315. The examiner can normally be reached on 7:30AM - 5:00PM, MONDAY -THURSDAY.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, TWYLER HASKINS can be reached on (571) 272-7406. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/LUONG T NGUYEN/
Primary Examiner, Art Unit 2663
06/12/14

| Notice of References Cited | Application/Control No. 14/264,243 | Applicant(s)/Patent Under Reexamination NAKANO ET AL. | |
|---|---|---|---|
| | Examiner LUONG T. NGUYEN | Art Unit 2663 | Page 1 of 1 |

**U.S. PATENT DOCUMENTS**

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Name | Classification |
|---|---|---|---|---|---|
| * | A | US-5,402,173 | 03-1995 | Noguchi et al. | 348/322 |
| * | B | US-5,438,365 | 08-1995 | Yamashita et al. | 348/297 |
| * | C | US-5,638,132 | 06-1997 | Hokari et al. | 348/556 |
| * | D | US-7,352,391 | 04-2008 | Hatakeyama, Kouki | 348/223.1 |
| | 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 | | | | | |
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| | 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.

| Search Notes | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 14264243 | NAKANO ET AL. |
| | Examiner | Art Unit |
| | LUONG T NGUYEN | 2663 |

| CPC- SEARCHED | | |
|---|---|---|
| Symbol | Date | Examiner |
| | | |

| CPC COMBINATION SETS - SEARCHED | | |
|---|---|---|
| Symbol | Date | Examiner |
| | | |

| US CLASSIFICATION SEARCHED | | | |
|---|---|---|---|
| Class | Subclass | Date | Examiner |
| | | | |

| SEARCH NOTES | | |
|---|---|---|
| Search Notes | Date | Examiner |
| 348/302,294,311,312,332,272,280,281 | 6/12/2014 | LTN |
| EAST (USPAT; USPGPUB; JPO; EPO; DERWENT; IBM_TDB; USOCR; FPRS) | 6/12/2014 | LTN |

| INTERFERENCE SEARCH | | | |
|---|---|---|---|
| US Class/ CPC Symbol | US Subclass / CPC Group | Date | Examiner |
| | | | |

**EAST Search History**

**EAST Search History (Prior Art)**

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|---|---|---|---|---|---|---|
| S1 | 2 | 13/681495 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/06/12 09:13 |
| S2 | 93 | vertical$2 with (add$3 or mix$3 or cull$3 or combin$4) with (pixel$1 or charge$1) same standard same (television or TV or NTSC) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/06/12 14:25 |
| S3 | 9 | ("4707744" \| "4750041" \| "4752829" \| "4758895" \| "4774586" \| "4972254" \| "4996600" \| "5051832" \| "5287192").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2014/06/12 14:46 |
| S4 | 8 | ("4054915" \| "5170249" \| "5187569" \| "5828406" \| "6195125" \| "6661451" \| "7154539" \| "7403226").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2014/06/12 14:50 |
| S5 | 668 | vertical$2 with (add$3 or mix$3 or cull$3 or combin$4) with (pixel$1 or charge$1) and (standard with (television or TV or NTSC)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/06/12 15:19 |
| S6 | 344 | S5 and (@ad<="20000111" or @rlad<="20000111") | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/06/12 15:20 |
| S7 | 5901 | 348/302,294,312,332.ccls. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/06/12 15:21 |
| S8 | 15 | S6 and S7 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/06/12 15:21 |
| S9 | 3 | ("4426664" \| "4879601" \| "4996000").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2014/06/12 15:29 |
| S10 | 920 | 348/272.ccls. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; | OR | ON | 2014/06/12 15:31 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | IBM_TDB | | | |
| S11 | 4 | S5 and S10 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/06/12 15:31 |
| S12 | 682 | 348/280,281.ccls. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/06/12 15:32 |
| S13 | 2 | S5 and S12 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/06/12 15:33 |
| S14 | 8 | ("4339775" \| "4791308" \| "4858020" \| "5027217" \| "5412422" \| "5452004" \| "5668597" \| "5929910").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2014/06/12 15:33 |
| S15 | 4 | ("3885090" \| "4339775" \| "5146340" \| "5153731").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2014/06/12 15:36 |
| S16 | 8912 | vertical$2 with (add$3 or mix$3 or cull$3 or combin$4) with (pixel$1 or charge$1) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/06/12 15:39 |
| S17 | 157 | S16 and (S10 or S12) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/06/12 15:40 |
| S18 | 30 | S17 and (@ad<="20000111" or @rlad<="20000111") | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/06/12 15:40 |
| S19 | 1287 | 348/311.ccls. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/06/12 15:48 |
| S20 | 3788 | 348/308.ccls. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/06/12 15:48 |
| S21 | 349 | S16 and (S19 or S20) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/06/12 15:48 |

| | | | | | | |
|---|---|---|---|---|---|---|
| S22 | 60 | S21 and (@ad<="20000111" or @rlad<="20000111") | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/06/12 15:49 |
| S23 | 9 | ("20010043275" \| "5166799" \| "5287192" \| "5719624" \| "5847758" \| "5966174" \| "6169577" \| "6441849" \| "7034876").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2014/06/12 15:49 |
| S24 | 3 | ("4426664" \| "4879601" \| "4996000").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2014/06/12 15:50 |
| S25 | 326 | vertical$2 with (add$3 or mix$3 or cull$3 or combin$4) with (pixel$1 or charge$1) same (scan$4 adj4 line$1) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/06/12 16:00 |
| S26 | 153 | S25 and (@ad<="20000111" or @rlad<="20000111") | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/06/12 16:00 |
| S27 | 12 | ("4054915" \| "4570178" \| "4746988" \| "4837628" \| "4924316" \| "4929824" \| "5239380" \| "5444482" \| "5508739" \| "5592575" \| "5828406" \| "5847756").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2014/06/12 16:02 |
| S28 | 3432 | (scan$4 adj4 line$1) with (display or screen or monitor) with (TV or television) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/06/12 16:08 |
| S29 | 77 | S16 and S28 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/06/12 16:09 |
| S30 | 49 | S29 and (@ad<="20000111" or @rlad<="20000111") | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/06/12 16:09 |
| S31 | 43 | S5 and S28 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/06/12 16:28 |

**EAST Search History (Interference)**

<This search history is empty>

**6/12/2014 5:21:57 PM**
**C:\Users\lnguyen2\Documents\EAST\Workspaces\14264243.wsp**

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# BIB DATA SHEET

**CONFIRMATION NO. 1644**

| SERIAL NUMBER | FILING or 371(c) DATE | CLASS | GROUP ART UNIT | ATTORNEY DOCKET NO. |
|---|---|---|---|---|
| 14/264,243 | 04/29/2014<br>RULE | 348 | 2663 | 500.38315CC5 |

**APPLICANTS**
Hitachi Consumer Electronics Co., Ltd., Tokyo, JAPAN, Assignee (with 37 CFR 1.172 Interest);

**INVENTORS**
Takahiro Nakano, Tokyo, JAPAN;
Ryuji Nishimura, Tokyo, JAPAN;
Toshiro Kinugasa, Tokyo, JAPAN;

**** CONTINUING DATA ***************************
This application is a CON of 13/681,495 11/20/2012 PAT 8736729
which is a CON of 12/845,266 07/28/2010 PAT 8339493
which is a CON of 10/660,710 09/12/2003 PAT 8059177
which is a DIV of 09/520,836 03/08/2000 PAT 6765616

**** FOREIGN APPLICATIONS ***************************
JAPAN 00-006064 01/11/2000

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****
05/13/2014

| Foreign Priority claimed | 35 USC 119(a-d) conditions met | Verified and Acknowledged | Met after Allowance | STATE OR COUNTRY | SHEETS DRAWINGS | TOTAL CLAIMS | INDEPENDENT CLAIMS |
|---|---|---|---|---|---|---|---|
| ☑ Yes ☐ No | ☑ Yes ☐ No | /LUONG TRUNG NGUYEN/ Examiner's Signature | ☐ Initials | JAPAN | 8 | 1 | 1 |

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ARLINGTON, VA 22209-3873
UNITED STATES

**TITLE**
ELECTRIC CAMERA

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|---|---|
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☐ All Fees
☐ 1.16 Fees (Filing)
☐ 1.17 Fees (Processing Ext. of time)
☐ 1.18 Fees (Issue)
☐ Other _____
☐ Credit

Receipt date: 04/29/2014

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U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
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Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE STATEMENT BY APPLICANT**

*(use as many sheets as necessary)*

Sheet 1 of 2

| *Complete if Known* | |
|---|---|
| Application Number | **To be assigned** |
| Filing Date | **April 29, 2014** |
| First Named Inventor | **T. NAKANO, et al.** |
| Art Unit (expected) | **2663** |
| Examiner Name (expected) | **Luong Trung Nguyen** |
| Attorney Docket Number | **500.38315CC5** |

**U.S. PATENT DOCUMENTS**

| Examiner Initials' | Cite No.[1] | Document Number Number-Kind Code[2] (if known) | | Publication Date MM-DD-YYYY | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear |
|---|---|---|---|---|---|---|
| | | **US- 6,661,451** | | 12-2003 | Kijima, et al. | |
| | | **US- 7,154,539** | | 12-2006 | Nishimura, et al. | |
| | | **US- 5.828,406** | | 10-1998 | Parulski et al. | |
| | | **US- 4,054,915** | | 10-1977 | Sugihara, Yasumasa | |
| | | **US- 5,170,249** | | 12-1992 | Ohtsubo, et al. | |
| | | **US- 5,187,569** | | 02-1993 | Tani, Nobuhiro | |
| | | **US- 7,403,226** | | 07-2008 | Nakano, et al. | |
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| | | **US-6,765,616** | | 07-2004 | Nakano et al. | |
| | | **US-6,906,746** | | 06-2005 | Hijishiri et al. | |
| | | **US-6,519,000** | | 02-2003 | Udagawa, Yoshirou | |
| | | **US-5,847,758** | | 12-1998 | Iizuka, Tetsuya | |

**FOREIGN PATENT DOCUMENTS**

| Examiner Initials' | Cite No.[1] | Foreign Patent Document Country Code[3]–Number[4]–Kind Code[5] (if known) | Publication Date MM-DD-YYYY | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear | T[6] |
|---|---|---|---|---|---|---|
| | | JP 9-270959 | 10-97 | | | |
| | | JP 11-187306 | 07-99 | | | |
| | | JP 04-323973 | 11/13/1992 | Hitachi, Ltd. | | |
| | | JP 11-004456 | 01/06/1999 | Fuji Photo Film Co., Ltd. | | |
| | | JP 11-355665 | 12/24/1999 | Fuji Photo Film Co., Ltd. | | |
| | | | | | | |

| Examiner Signature | /Luong Nguyen/ | Date Considered | 06/12/2014 |
|---|---|---|---|

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1.14. This collection is estimated to take 2 hours 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.**

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Receipt date: 04/29/2014

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**INFORMATION DISCLOSURE STATEMENT BY APPLICANT**

*(use as many sheets as necessary)*

Sheet 2` of **2**

| *Complete if Known* | |
|---|---|
| Application Number | **To be assigned** |
| Filing Date | **April 29, 2014** |
| First Named Inventor | **T. NAKANO, et al.** |
| Art Unit (expected) | **2663** |
| Examiner Name (expected) | **Luong Trung Nguyen** |
| Attorney Docket Number | **500.38315CC5** |

**U.S. PATENT DOCUMENTS**

| Examiner Initials' | Cite No.[1] | Document Number Number-Kind Code[2] (*if known*) | | Publication Date MM-DD-YYYY | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear |
|---|---|---|---|---|---|---|
| | | **US - 6,970,191** | | 11-2005 | Sase et al. | |
| | | US - 5,374,424 | | 03-1998 | Sasaki, Takashi | |
| | | **US - 6,798,448** | | 09-2004 | Motono et al. | |
| | | **US - 5,287,192** | | 02-1994 | Iizuka, Tetsuya | |
| | | **US - 6,765,616** | | 07-2004 | Nakano et al. | |
| | | **US - 8,059,177** | | 11-2011 | Nakano et al. | |
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**FOREIGN PATENT DOCUMENTS**

| Examiner Initials' | Cite No.[1] | Foreign Patent Document Country Code[3]–Number[4]–Kind Code[5] (*if known*) | Publication Date MM-DD-YYYY | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear | T[6] |
|---|---|---|---|---|---|---|
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| | | | | | | |

| Examiner Signature | /Luong Nguyen/ | Date Considered | 06/12/2014 |
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This collection of information is required by 37 CFR 1.97 and 1.98. 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 1.14. This collection is estimated to take 2 hours 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.*

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /LN/

Receipt date: 04/29/2014

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /LN/

| Index of Claims | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 14264243 | NAKANO ET AL. |
| | **Examiner** | **Art Unit** |
| | LUONG T NGUYEN | 2663 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ✓ | Rejected | - | Cancelled | N | Non-Elected | A | Appeal |
| = | Allowed | ÷ | Restricted | I | Interference | O | Objected |

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

| CLAIM | | DATE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Final | Original | 06/12/2014 | | | | | | | | |
| | 1 | ✓ | | | | | | | | |

500.38315CC5

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

Applicant(s): NAKANO, et al

Application No.: 14/264,243

Filed: April 29, 2014

For: ELECTRIC CAMERA

Conf. No.: 1644

**SUBMISSION OF APPLICATION DATA SHEET AND REQUEST FOR CORRECTED FILING RECEIPT**

Mail Stop:
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

June 18, 2014

Sir:

Attached hereto is a corrected Application Data Sheet, to include the correct the Foreign Application number. Applicants respectfully request issuance of a corrected filing receipt which indicates the updated information.

Foreign Application number should read:

JAPAN **2000**-006064 01/11/2000

Please charge any shortages in the fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 01-2135 (Docket No. **500.38315CC5**) and please credit any excess fees to such deposit account.

Respectfully submitted,

/Ayal I. Sharon/
Ayal I. Sharon
Registration No. 55,986

AIS/rp
(703) 312-6600

PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE


| Application Data Sheet 37 CFR 1.76 | Attorney Docket Number | 500.38315CC5 |
|---|---|---|
| | Application Number | 14/264,243 |
| Title of Invention | ELECTRIC CAMERA | |

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

## Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

## Inventor Information:

**Inventor 1** Remove

**Legal Name**

| Prefix | Given Name | Middle Name | Family Name | Suffix |
|---|---|---|---|---|
| | Takahiro | | Nakano | |

**Residence Information (Select One)** ○ US Residency ◉ Non US Residency ○ Active US Military Service

| City | Tokyo | Country of Residence [i] | JP |
|---|---|---|---|

**Mailing Address of Inventor:**

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| **Address 1** | c/o Hitachi, Ltd, Intellectual Property Group | | |
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| **City** | Tokyo | **State/Province** | |
| **Postal Code** | 100-8220 | **Country** [i] | JP |

**Inventor 2** Remove

**Legal Name**

| Prefix | Given Name | Middle Name | Family Name | Suffix |
|---|---|---|---|---|
| | Ryuji | | Nishimura | |

**Residence Information (Select One)** ○ US Residency ◉ Non US Residency ○ Active US Military Service

| City | Tokyo | Country of Residence [i] | JP |
|---|---|---|---|

**Mailing Address of Inventor:**

| | | | |
|---|---|---|---|
| **Address 1** | c/o Hitachi, Ltd, Intellectual Property Group | | |
| **Address 2** | 6-1, Marunouchi 1-chome, Chiyoda-ku | | |
| **City** | Tokyo | **State/Province** | |
| **Postal Code** | 100-8220 | **Country** [i] | JP |

**Inventor 3** Remove

**Legal Name**

PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE


| Application Data Sheet 37 CFR 1.76 | Attorney Docket Number | 500.38315CC5 |
|---|---|---|
| | Application Number | 14/264,243 |
| Title of Invention | ELECTRIC CAMERA | |

| Prefix | Given Name | Middle Name | Family Name | Suffix |
|---|---|---|---|---|
| | Toshiro | | Kinugasa | |

**Residence Information (Select One)** ○ US Residency ◉ Non US Residency ○ Active US Military Service

| City | Tokyo | Country of Residence [i] | JP |
|---|---|---|---|

**Mailing Address of Inventor:**

| | | | |
|---|---|---|---|
| **Address 1** | c/o Hitachi, Ltd, Intellectual Property Group | | |
| **Address 2** | 6-1, Marunouchi 1-chome, Chiyoda-ku | | |
| **City** | Tokyo | **State/Province** | |
| **Postal Code** | 100-8220 | **Country** [i] | JP |

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

## Correspondence Information:

**Enter either Customer Number or complete the Correspondence Information section below.**
**For further information see 37 CFR 1.33(a).**

☐ **An Address is being provided for the correspondence Information of this application.**

| | | | |
|---|---|---|---|
| **Customer Number** | 020457 | | |
| **Email Address** | | Add Email | Remove Email |

## Application Information:

| | | | |
|---|---|---|---|
| **Title of the Invention** | ELECTRIC CAMERA | | |
| **Attorney Docket Number** | 500.38315CC5 | **Small Entity Status Claimed** | ☐ |
| **Application Type** | Nonprovisional | | |
| **Subject Matter** | Utility | | |
| **Total Number of Drawing Sheets (if any)** | 8 | **Suggested Figure for Publication (if any)** | |

## Filing By Reference :

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

| Application number of the previously filed application | Filing date (YYYY-MM-DD) | Intellectual Property Authority or Country [i] |
|---|---|---|
| | | |

PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE


| Application Data Sheet 37 CFR 1.76 | Attorney Docket Number | 500.38315CC5 |
|---|---|---|
| | Application Number | 14/264,243 |
| Title of Invention | ELECTRIC CAMERA | |

## Publication Information:

| |
|---|
| ☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219) |
| ☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing. |

## Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

| Please Select One: | ◉ Customer Number | ○ US Patent Practitioner | ○ Limited Recognition (37 CFR 11.9) |
|---|---|---|---|
| Customer Number | 020457 | | |

## Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the application number blank.

| Prior Application Status | Pending | | Remove |
|---|---|---|---|
| Application Number | Continuity Type | Prior Application Number | Filing Date (YYYY-MM-DD) |
| | Continuation of | 13681495 | 2012-11-20 |

| Prior Application Status | Patented | | | | Remove |
|---|---|---|---|---|---|
| Application Number | Continuity Type | Prior Application Number | Filing Date (YYYY-MM-DD) | Patent Number | Issue Date (YYYY-MM-DD) |
| 13681495 | Continuation of | 12845266 | 2010-07-28 | 8339493 | 2012-12-25 |

| Prior Application Status | Patented | | | | Remove |
|---|---|---|---|---|---|
| Application Number | Continuity Type | Prior Application Number | Filing Date (YYYY-MM-DD) | Patent Number | Issue Date (YYYY-MM-DD) |
| 12845266 | Continuation of | 10660710 | 2003-09-12 | 8059177 | 2011-11-15 |

| Prior Application Status | Patented | | | | Remove |
|---|---|---|---|---|---|
| Application Number | Continuity Type | Prior Application Number | Filing Date (YYYY-MM-DD) | Patent Number | Issue Date (YYYY-MM-DD) |
| 10660710 | Division of | 09520836 | 2000-03-08 | 6765616 | 2004-07-20 |

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

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| Application Data Sheet 37 CFR 1.76 | Attorney Docket Number | 500.38315CC5 |
|---|---|---|
| | Application Number | 14/264,243 |
| Title of Invention | ELECTRIC CAMERA | |

## Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

| Application Number | Country[i] | Filing Date (YYYY-MM-DD) | Access Code[i] (if applicable) |
|---|---|---|---|
| ~~00-006064~~ 2000-006064 | JP | 2000-01-11 | |

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

## Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

## Authorization to Permit Access:

☒ Authorization to Permit Access to the Instant Application by the Participating Offices

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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE


| Application Data Sheet 37 CFR 1.76 | Attorney Docket Number | 500.38315CC5 |
|---|---|---|
| | Application Number | 14/264,243 |
| Title of Invention | ELECTRIC CAMERA | |

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date o f filing this Authorization.

## Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

**Applicant 1**

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

| | | |
|---|---|---|
| (•) Assignee | ( ) Legal Representative under 35 U.S.C. 117 | ( ) Joint Inventor |
| ( ) Person to whom the inventor is obligated to assign. | ( ) Person who shows sufficient proprietary interest | |

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

| | | | |
|---|---|---|---|
| Name of the Deceased or Legally Incapacitated Inventor : | | | |
| If the Applicant is an Organization check here. ☒ | | | |
| Organization Name | Hitachi Consumer Electronics Co., Ltd. | | |
| **Mailing Address Information For Applicant:** | | | |
| **Address 1** | 2-1, Otemachi 2-chome, Chiyoda-ku | | |
| Address 2 | | | |
| **City** | Tokyo | **State/Province** | |
| **Country** | JP | Postal Code | 100-0004 |
| Phone Number | | Fax Number | |

PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE


| Application Data Sheet 37 CFR 1.76 | Attorney Docket Number | 500.38315CC5 |
|---|---|---|
| | Application Number | 14/264,243 |
| Title of Invention | ELECTRIC CAMERA | |

| Email Address | |
|---|---|

Additional Applicant Data may be generated within this form by selecting the Add button.

## Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not subsitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

**Assignee 1**

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication . An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

| Prefix | **Given Name** | Middle Name | **Family Name** | Suffix |
|---|---|---|---|---|
| | | | | |

**Mailing Address Information For Assignee including Non-Applicant Assignee:**

| **Address 1** | | | |
|---|---|---|---|
| Address 2 | | | |
| **City** | | **State/Province** | |
| **Country** i | | Postal Code | |
| Phone Number | | Fax Number | |
| Email Address | | | |

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.

## Signature:

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications.

| **Signature** | /Ayal I. Sharon/ | | | Date (YYYY-MM-DD) | ~~2014-04-29~~ 06/18/2014 |
|---|---|---|---|---|---|
| First Name | Ayal | Last Name | Sharon | Registration Number | 55986 |

Additional Signature may be generated within this form by selecting the Add button.

PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE


| Application Data Sheet 37 CFR 1.76 | | Attorney Docket Number | 500.38315CC5 |
|---|---|---|---|
| | | Application Number | 14/264,243 |
| Title of Invention | ELECTRIC CAMERA | | |

This collection of information is required by 37 CFR 1.76. 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 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet 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.**

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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.

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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.

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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 C o o p eration Treaty.

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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 inspections or an issued patent.

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# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 19340578 |
| **Application Number:** | 14264243 |
| **International Application Number:** | |
| **Confirmation Number:** | 1644 |
| **Title of Invention:** | ELECTRIC CAMERA |
| **First Named Inventor/Applicant Name:** | Takahiro Nakano |
| **Customer Number:** | 20457 |
| **Filer:** | Ayal I. Sharon/Ricardo Perez |
| **Filer Authorized By:** | Ayal I. Sharon |
| **Attorney Docket Number:** | 500.38315CC5 |
| **Receipt Date:** | 18-JUN-2014 |
| **Filing Date:** | 29-APR-2014 |
| **Time Stamp:** | 14:39:48 |
| **Application Type:** | Utility under 35 USC 111(a) |

## 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 | Transmittal Letter | Letter.pdf | 69791<br>44d854b12ee502e0c7e53243155f58b48ef3369f | no | 1 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |

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|---|---|---|---|---|---|
| 2 | Application Data Sheet | ApplicationDataSheet.pdf | 1230387<br>777ba9df018eb88fb2a7b48f7786b6edb854c7e5 | no | 8 |

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| **Warnings:** | |
| **Information:** | |
| This is not an USPTO supplied ADS fillable form | |
| **Total Files Size (in bytes):** | 1300178 |

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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.**

**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

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| APPLICATION NUMBER | FILING OR 371(C) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|---|---|---|---|
| 14/264,243 | 04/29/2014 | Takahiro Nakano | 500.38315CC5 |

**CONFIRMATION NO. 1644**

20457
ANTONELLI, TERRY, STOUT & KRAUS, LLP
1300 NORTH SEVENTEENTH STREET
SUITE 1800
ARLINGTON, VA 22209-3873

**PUBLICATION NOTICE**

*OC000000070317905*

**Title:**ELECTRIC CAMERA

**Publication No.**US-2014-0232915-A1
**Publication Date:**08/21/2014

## NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

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Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

500.38315CC5

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

| | |
|---|---|
| Applicant(s): | T. NAKANO, et al |
| Application No.: | 14/264,243 |
| Filed: | April 29, 2014 |
| For: | ELECTRIC CAMERA |
| Group AU: | 2663 |
| Examiner: | Luong Trung Nguyen |
| **Conf. No.:** | **1644** |

**AMENDMENT**

**MS: Amendment (Fee)** **October 14, 2014**
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Office Action dated June 13, 2014, please amend the above-identified application as listed below and as set forth on the following pages:

**Amendments to the Claims;**

**Remarks** are included following the amendments.

**Amendments to the Claims**

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (Currently Amended) An electric camera comprising:

an image sensing device, with a light receiving surface having a quantity N of vertically arranged pixels, and an arbitrary ~~number~~quantity of pixels arranged horizontally, wherein N ~~being~~ is greater than or equal to ~~or more than~~ three times ~~the numbera~~ quantity M of effective scanning lines ~~M~~ of a display screen of a television system;

a driver configured to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels, at intervals of ~~every K~~ a quantity K of pixels, in order to produce a ~~number~~quantity of lines of output signals which corresponds to the ~~number~~quantity M of effective scanning lines, ~~M, K being at least one of integers equal to or less than an integral part~~ wherein the quantity K is an integer less than or equal to an integer portion of a quotient of N divided by M; ~~and~~

a view angle change switch configured to input a request to change the view angle of the moving image; and

a signal processing unit configured to generate image signals by using the ~~out put~~output signals of the image sensing device;

wherein when the request to change the view angle is to magnify the output image by the view angle change switch, the driver changes the quantity of K from a first value (K1) to a second value (K2), in order to read out image signals with the

same quantity of output lines from different areas on the imaging sensing device wherein the first value K1 is larger than the second value K2;

wherein the signal processing unit generates image signals with the same scanning lines.

2. (New) An electric camera according to the claim 1,

wherein the view angle change switch is configured to input a request to continuously change the view angle of the moving image,

wherein the signal processing unit is configured to generate magnified image signals with interpolation processing, according to a magnification factor set by the view angle switch.

3. (New) An electric camera according to the claim 2,

wherein the view angle switch includes a zoom switch interlocked with an optical zoom mechanism.

4. (New) An electric camera comprising:

an image sensing device, with a light receiving surface having a quantity N of pixels arranged vertically, and an arbitrary quantity of pixels arranged horizontally, wherein N is greater than three times a quantity M of effective vertical lines of a television system;

a signal processing unit configured to generate and output image signals with the quantity M of effective vertical lines of a television system, by using output signals of the image sensing device,

a zoom switch configured to enable a user to input zooming operation information,

wherein the signal processing unit generates image signals, read out with mixing or culling vertical pixel lines of signals, at pixel intervals of a quantity K of lines, from different areas of the imaging device, the areas being continuously changed, and the quantity K being discontinuously changed according to magnification factors.

5. (New) An electric camera according to the claim 4,

wherein the zoom switch is interlocked with an optical zoom mechanism.

## REMARKS

This Amendment is in response to the Office Action dated June 13, 2014. In the Office Action, claim 1 was objected to due to a minor informality, and claim 1 was rejected under pre-AIA 35 U.S.C. §102(e) as being anticipated by Kijima (U.S. 6,661,451).

By the present amendment, claim 1 has been amended, and new claims 2-5 have been added. At entry of this paper, claims 1-5 will be pending for further consideration and examination in the application. All rejections are traversed regarding the claims as previously presented, and are also traversed in so far as the rejections are applicable to the present claims. Reconsideration and allowance of this application, as amended, is respectfully requested.

Support for the amendments and new claims can be found, for example, in Figures 7 and 8, and in the specification at page 24, line 21 through page 29, line 19 (corresponding to paragraphs [0062]-[0072] of the application's U.S. PG-PUB 2014/0232915).

### RE: OBJECTIONS

In the Office Action, claim 1 was objected to due to a minor informality. By the present response, the claim has been amended to correct the minor informality. Therefore, the objection should be withdrawn.

### RE: 35 U.S.C. §102 REJECTIONS

In the Office Action, claim 1 was rejected under pre-AIA 35 U.S.C. §102(e) as being anticipated by Kijima (U.S. 6,661,451). The 35 USC §102 rejection is traversed.

In order to properly support a §102 anticipatory-type rejection, "each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." In re Robertson, 169 F.3d 743 (Fed. Cir. 1999). The applied art does not adequately support a §102 anticipatory-type rejection because, at minimum, such applied art does not disclose (or suggest) the following discussed features of Applicant's claims.

In regards to independent claim 1, the rejection should be withdrawn, at minimum, because the Kijima reference fails to disclose the following claimed features:

> wherein when the request to change the view angle is to magnify the output image by the view angle change switch, the driver changes the quantity of K from a first value (K1) to a second value (K2), in order to read out image signals with the same quantity of output lines from different areas on the imaging sensing device wherein the first value K1 is larger than the second value K2;

In regards to new independent claim 4, the rejection should not be applied, at minimum, because the Kijima reference fails to disclose the following claimed features:

> a zoom switch configured to enable a user to input zooming operation information,
> wherein the signal processing unit generates image signals, read out with mixing or culling vertical pixel lines of signals, at pixel intervals of a quantity K of lines, from different areas of the imaging device, the areas being continuously changed, and the quantity K being discontinuously changed according to magnification factors.

In regards to all dependent claims, they are allowable at the very least because they depend from allowable independent claims .

In view of the foregoing amendments and remarks, the Applicant respectfully submits that the claims listed above as presently being under consideration in the application are now in condition for allowance.

**EXAMINER INVITED TO TELEPHONE**

The Examiner is herein invited to telephone the undersigned attorneys at the local Washington, D.C. area telephone quantity of 703/312-6600 for discussing any Examiner's Amendments or other suggested actions for accelerating prosecution and moving the present application to allowance.

**CONCLUSION**

In view of the foregoing amendments and remarks, Applicant respectfully submits that the claims listed above as presently being under consideration in the application are now in condition for allowance.

To the extent necessary, Applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to the Antonelli, Terry, Stout & Kraus, LLP Deposit Account No. 01-2135 (Docket No. 500.38315CC5), and please credit any excess fees to such deposit account.

Respectfully submitted,

**ANTONELLI, TERRY, STOUT & KRAUS, LLP**

By /Inna S Shestul/
Inna S. Shestul
Registration No. 55,616

AIS/ISS/kmh/kej
1300 North Seventeenth Street, Suite 550
Arlington, Virginia 22209
Telephone: (703) 312-6600
Facsimile: (703) 312-6666

# Electronic Patent Application Fee Transmittal

| | |
|---|---|
| **Application Number:** | 14264243 |
| **Filing Date:** | 29-Apr-2014 |
| **Title of Invention:** | ELECTRIC CAMERA |
| **First Named Inventor/Applicant Name:** | Takahiro Nakano |
| **Filer:** | Inna S. Shestul/Karen Jones |
| **Attorney Docket Number:** | 500.38315CC5 |

Filed as Large Entity

## Utility under 35 USC 111(a) Filing Fees

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Basic Filing:** | | | | |
| **Pages:** | | | | |
| **Claims:** | | | | |
| **Miscellaneous-Filing:** | | | | |
| **Petition:** | | | | |
| **Patent-Appeals-and-Interference:** | | | | |
| **Post-Allowance-and-Post-Issuance:** | | | | |
| **Extension-of-Time:** | | | | |
| Extension - 1 month with $0 paid | 1251 | 1 | 200 | 200 |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Miscellaneous:** | | | | |
| | | **Total in USD ($)** | | **200** |

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 20403034 |
| **Application Number:** | 14264243 |
| **International Application Number:** | |
| **Confirmation Number:** | 1644 |
| **Title of Invention:** | ELECTRIC CAMERA |
| **First Named Inventor/Applicant Name:** | Takahiro Nakano |
| **Customer Number:** | 20457 |
| **Filer:** | Inna S. Shestul/Karen Jones |
| **Filer Authorized By:** | Inna S. Shestul |
| **Attorney Docket Number:** | 500.38315CC5 |
| **Receipt Date:** | 14-OCT-2014 |
| **Filing Date:** | 29-APR-2014 |
| **Time Stamp:** | 08:26:16 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

| | |
|---|---|
| Submitted with Payment | yes |
| Payment Type | Credit Card |
| Payment was successfully received in RAM | $200 |
| RAM confirmation Number | 13915 |
| Deposit Account | |
| Authorized User | |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| 1 | | 38315cc5-10-14-2014Amend.pdf | 69566<br>28c5e64c40688d10efb4025724ed27d848cfda5e | yes | 7 |

| | Multipart Description/PDF files in .zip description | | |
|---|---|---|---|
| | **Document Description** | **Start** | **End** |
| | Amendment/Req. Reconsideration-After Non-Final Reject | 1 | 1 |
| | Claims | 2 | 4 |
| | Applicant Arguments/Remarks Made in an Amendment | 5 | 7 |

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| **Information:** | | | | | |
| 2 | Fee Worksheet (SB06) | fee-info.pdf | 30031<br>55448cab986e1c7ef80337b7c2ccc1da9351143e | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| | | **Total Files Size (in bytes):** | 99597 | | |

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**<u>New Applications Under 35 U.S.C. 111</u>**
**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.**

PTO/SB/06 (09-11)
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| PATENT APPLICATION FEE DETERMINATION RECORD<br>Substitute for Form PTO-875 | Application or Docket Number<br>14/264,243 | Filing Date<br>04/29/2014 | ☒ To be Mailed |
|---|---|---|---|

**ENTITY**: ☒ LARGE ☐ SMALL ☐ MICRO

## APPLICATION AS FILED – PART I

| FOR | (Column 1) NUMBER FILED | (Column 2) NUMBER EXTRA | RATE ($) | FEE ($) |
|---|---|---|---|---|
| ☐ BASIC FEE (37 CFR 1.16(a), (b), or (c)) | N/A | N/A | N/A | |
| ☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m)) | N/A | N/A | N/A | |
| ☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | N/A | N/A | N/A | |
| TOTAL CLAIMS (37 CFR 1.16(i)) | minus 20 = | * | X $ = | |
| INDEPENDENT CLAIMS (37 CFR 1.16(h)) | minus 3 = | * | X $ = | |
| ☐ APPLICATION SIZE FEE (37 CFR 1.16(s)) | If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | |
| ☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | | | |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | |

## APPLICATION AS AMENDED – PART II

| AMENDMENT | 10/14/2014 | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE ($) | ADDITIONAL FEE ($) |
|---|---|---|---|---|---|---|---|
| | Total (37 CFR 1.16(i)) | * 5 | Minus | ** 20 | = 0 | X $80 = | 0 |
| | Independent (37 CFR 1.16(h)) | * 2 | Minus | ***3 | = 0 | X $420 = | 0 |
| | ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | |
| | ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | |
| | | | | | | TOTAL ADD'L FEE | 0 |

| AMENDMENT | | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE ($) | ADDITIONAL FEE ($) |
|---|---|---|---|---|---|---|---|
| | Total (37 CFR 1.16(i)) | * | Minus | ** | = | X $ = | |
| | Independent (37 CFR 1.16(h)) | * | Minus | *** | = | X $ = | |
| | ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | |
| | ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | |
| | | | | | | TOTAL ADD'L FEE | |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/ANGELA JOHNSON/

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. |
|---|---|---|---|---|
| 14/264,243 | 04/29/2014 | Takahiro Nakano | 500.38315CC5 | 1644 |

20457 7590 12/09/2014

ANTONELLI, TERRY, STOUT & KRAUS, LLP
1300 NORTH SEVENTEENTH STREET
SUITE 550
ARLINGTON, VA 22209-3873

| EXAMINER | |
|---|---|
| NGUYEN, LUONG TRUNG | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2663 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 12/09/2014 | 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.

| Office Action Summary | Application No. 14/264,243 | Applicant(s) NAKANO ET AL. | |
|---|---|---|---|
| | Examiner LUONG T. NGUYEN | Art Unit 2663 | AIA (First Inventor to File) Status No |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *10/14/2014*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims***

5)☒ Claim(s) *1-5* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-5* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

**Application Papers**

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

## DETAILED ACTION

1. The present application is being examined under the pre-AIA first to invent provisions.

### *Response to Arguments*

2. Applicant's arguments with respect to claim 1 and newly added claims 2-5 filed on 10/14/2014 have been considered but are moot because the arguments do not apply to any of the references being used in the current rejection.

### *Claim Objections*

3. Claims 1-5 are objected to because of the following informalities:

Claim 1 (lines 13-14), "to change the view angle of the moving image" should be changed to --to change a view angle of a moving image--.

Claim 1 (lines 17-18), "to magnify the output image" should be changed to --to magnify an output image--.

Claim 1 (line 19), "first value (K1) to a second value (K2)" should be changed to --first value K1 to a second value K2--.

Claim 1 (lines 19, 22), "image signals" should be changed to --the image signals--.

Claim 2 (line 2), "a request" should be changed to --the request--.

Claim 4 (line 7), "a television system" should be changed to --the television system--.

Claim 4 (line 11), "image signals" should be changed to --the image signals--.

Claims 2-3 are objected as being dependent from claim 1.

Claim 5 is objected as being dependent from claim 4.

Appropriate correction is required.

***Double Patenting***

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the claims at issue are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the reference application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO internet Web site contains terminal disclaimer forms which may be used. Please visit http://www.uspto.gov/forms/. The filing date of the application will determine what form should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to http://www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

5. Claims 1-2 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1, 6, 13, 18 of U.S. Patent No. 6,765,616. Although the claims at issue are not identical, they are not patentably distinct from each other because of the following reasons.

Claim 1 of the instant application is anticipated by patent claims 1 and 6 in that patent claims 1 and 6 contain all the limitations of claim 1 of the instant application. Patent Claims 1 and 6 does not disclose a view angle change switch configured to input a request to change a view angle of the moving image. However, Patent Claims 1 and 6 discloses moving image. It would have been obvious to an ordinary skill in the art at the time the invention was made to include such view angle change switch into the device of Patent Claims 1 and 6 in order to change view angle (zooming) of a moving image.

Claim 1 of the instant application therefore is not patently distinct from the earlier patent claims 1, 6 and as such is unpatentable for obvious-type double patenting.

Regarding Claim 2 of the instant application, see Examiner's comments regarding instant applicant claim 1 above, except for feature "wherein the signal processing unit is configured to generate magnified image signals with interpolation processing, according to a magnification factor set by the view angle switch," which is well known in the art. It would have been obvious to an ordinary skill in the art at the time the invention was made to include such signal processing unit into the device of Patent Claims 1 and 6 in order to generate magnified image signals with interpolation processing.

Claim 2 of the instant application therefore is not patently distinct from the earlier patent claims 1, 6 and as such is unpatentable for obvious-type double patenting.

Claim 1 of the instant application is anticipated by patent claims 13 and 18 in that patent claims 13 and 18 contain all the limitations of claim 1 of the instant application. Patent Claims

13 and 18 does not disclose a view angle change switch configured to input a request to change a view angle of the moving image. However, Patent Claims 13 and 18 discloses moving image. It would have been obvious to an ordinary skill in the art at the time the invention was made to include such view angle change switch into the device of Patent Claims 13 and 18 in order to change view angle (zooming) of a moving image.

Claim 1 of the instant application therefore is not patently distinct from the earlier patent claims 13, 18 and as such is unpatentable for obvious-type double patenting.

Regarding Claim 2 of the instant application, see Examiner's comments regarding instant applicant claim 1 above, except for feature "wherein the signal processing unit is configured to generate magnified image signals with interpolation processing, according to a magnification factor set by the view angle switch," which is well known in the art. It would have been obvious to an ordinary skill in the art at the time the invention was made to include such signal processing unit into the device of Patent Claims 13 and 18 in order to generate magnified image signals with interpolation processing.

Claim 2 of the instant application therefore is not patently distinct from the earlier patent claims 13, 18 and as such is unpatentable for obvious-type double patenting.

6. Claim 4 rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1, 7 of U.S. Patent No. 7,403,226. Although the claims at issue are not identical, they are not patentably distinct from each other because of the following reasons.

Claim 4 of the instant application is anticipated by patent claims 1 and 7 in that patent claims 1 and 7 contain all the limitations of claim 4 of the instant application. Claim 1 of the instant application therefore is not patently distinct from the earlier patent claims 1, 7 and as such is unpatentable for obvious-type double patenting.

7. Claim 3 is rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1, 6, 13, 18 of U.S. Patent No. 6,765,616 in view of Shiozaki et al. (US 6,781,634).

Regarding instant application claim 3, Patent Claims 1 and 6 fail to disclose wherein the view angle switch includes a zoom switch interlocked with an optical zoom mechanism.

However, Shiozaki et al. discloses an electronic camera which discloses an internal zoom switch 8-b causes interlock control of a zoom focus mechanism 35 (figure 12, column 7, lines 1-10). Therefore, it would have been obvious to an ordinary skill in the art at the time the invention was made to modify the device in Patent Claims 1 and 6 by the teaching of Shiozaki et al. in order to pick up the object image in focus even during the zoom operation.

Regarding instant application claim 3, Patent Claims 13 and 18 fail to disclose wherein the view angle switch includes a zoom switch interlocked with an optical zoom mechanism.

However, Shiozaki et al. discloses an electronic camera which discloses an internal zoom switch 8-b causes interlock control of a zoom focus mechanism 35 (figure 12, column 7, lines 1-10). Therefore, it would have been obvious to an ordinary skill in the art at the time the invention was made to modify the device in Patent Claims 13 and 18 by the teaching of Shiozaki et al. in order to pick up the object image in focus even during the zoom operation.

8. Claim 5 is rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1, 7 of U.S. Patent No. 7,403,226 in view of Shiozaki et al. (US 6,781,634).

Regarding instant application claim 5, Patent Claims 1 and 7 fail to disclose wherein the zoom switch interlocked with an optical zoom mechanism.

However, Shiozaki et al. discloses an electronic camera which discloses an internal zoom switch 8-b causes interlock control of a zoom focus mechanism 35 (figure 12, column 7, lines 1-10). Therefore, it would have been obvious to an ordinary skill in the art at the time the invention was made to modify the device in Patent Claims 1 and 7 by the teaching of Shiozaki et al. in order to pick up the object image in focus even during the zoom operation.

***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LUONG T. NGUYEN whose telephone number is (571)272-7315. The examiner can normally be reached on 7:30AM - 5:00PM, MONDAY -THURSDAY.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, TWYLER HASKINS can be reached on (571) 272-7406. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/LUONG T NGUYEN/
Primary Examiner, Art Unit 2663
12/08/14

| Notice of References Cited | Application/Control No. 14/264,243 | Applicant(s)/Patent Under Reexamination NAKANO ET AL. | |
|---|---|---|---|
| | Examiner LUONG T. NGUYEN | Art Unit 2663 | Page 1 of 1 |

**U.S. PATENT DOCUMENTS**

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Name | Classification |
|---|---|---|---|---|---|
| * | A | US-6,765,616 | 07-2004 | Nakano et al. | 348/322 |
| * | B | US-7,403,226 | 07-2008 | Nakano et al. | 348/294 |
| * | C | US-6,781,634 | 08-2004 | Shiozaki et al. | 348/374 |
| | 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 |
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| | N | | | | | |
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| | P | | | | | |
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| | R | | | | | |
| | S | | | | | |
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**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.

**EAST Search History**

**EAST Search History (Prior Art)**

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|---|---|---|---|---|---|---|
| S39 | 24 | (zoom$3 near switch) with interlock$2 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/12/08 16:07 |
| S40 | 686 | vertical$2 with (add$3 or mix$3 or cull$3 or combin$4) with (pixel$1 or charge$1) and (standard with (television or TV or NTSC)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/12/08 17:08 |
| S41 | 2162 | 348/302.ccls. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/12/08 17:09 |
| S42 | 8 | S40 and S41 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/12/08 17:09 |
| S43 | 1350 | 348/311.ccls. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/12/08 17:10 |
| S44 | 12 | S40 and S43 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/12/08 17:10 |
| S45 | 334 | S40 and interpolat$3 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/12/08 17:12 |
| S46 | 61 | (vertical$2 with (add$3 or mix$3 or cull$3 or combin$4) with (pixel$1 or charge$1) and (standard with (television or TV or NTSC))) same interpolat$3 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/12/08 17:12 |
| S48 | 170 | S45 and (@ad<="20000308" or @rlad<="20000308") | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/12/08 17:17 |
| S49 | 44 | zoom$3 with interlock$2 with focus$3 with (operation or function) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2014/12/08 18:15 |

**EAST Search History (Interference)**

<This search history is empty>

**12/8/2014 7:11:35 PM**
**C:\Users\lnguyen2\Documents\EAST\Workspaces\14264243.wsp**

| Index of Claims | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 14264243 | NAKANO ET AL. |
| | **Examiner** | **Art Unit** |
| | LUONG T NGUYEN | 2663 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ✓ | Rejected | - | Cancelled | N | Non-Elected | A | Appeal |
| = | Allowed | ÷ | Restricted | I | Interference | O | Objected |

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

| CLAIM | | DATE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Final | Original | 06/12/2014 | 12/08/2014 | | | | | | | |
| | 1 | ✓ | ✓ | | | | | | | |
| | 2 | | ✓ | | | | | | | |
| | 3 | | ✓ | | | | | | | |
| | 4 | | ✓ | | | | | | | |
| | 5 | | ✓ | | | | | | | |

| Search Notes | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 14264243 | NAKANO ET AL. |
| | Examiner | Art Unit |
| | LUONG T NGUYEN | 2663 |

| CPC- SEARCHED | | |
|---|---|---|
| Symbol | Date | Examiner |
| | | |

| CPC COMBINATION SETS - SEARCHED | | |
|---|---|---|
| Symbol | Date | Examiner |
| | | |

| US CLASSIFICATION SEARCHED | | | |
|---|---|---|---|
| Class | Subclass | Date | Examiner |
| | | | |

| SEARCH NOTES | | |
|---|---|---|
| Search Notes | Date | Examiner |
| 348/302,294,311,312,332,272,280,281 | 6/12/2014 | LTN |
| EAST (USPAT; USPGPUB; JPO; EPO; DERWENT; IBM_TDB; USOCR; FPRS) | 6/12/2014 | LTN |
| 348/302, 311 | 12/8/2014 | LTN |
| EAST (USPAT; USPGPUB; JPO; EPO; DERWENT; IBM_TDB; USOCR; FPRS) | 12/8/2014 | LTN |

| INTERFERENCE SEARCH | | | |
|---|---|---|---|
| US Class/ CPC Symbol | US Subclass / CPC Group | Date | Examiner |
| | | | |

| | |
|---|---|
| | |

PTO/AIA/80 (07-12)
Approved for use through 11/30/2014. OMB 0651-0035
U.S. Patent and Trademark Office; U.S DEPARTMENT OF COMMERCE


# POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

☑ Practitioners associated with Customer Number: 24956

**OR**

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

| Name | Registration Number | Name | Registration Number |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignments documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

☑ The address associated with Customer Number: 24956

**OR**

| | | | |
|---|---|---|---|
| ☐ | Firm or Individual Name | | |
| | Address | | |
| | City | | |
| | Country | | |
| | Telephone | | Email |

Assignee Name and Address: HITACHI MAXELL, LTD.
1-88, Ushitora 1-chome, Ibaraki-shi, Osaka 567-8567, Japan

**A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/SB/96 or equivalent) is required to be Filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of The practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.**

**SIGNATURE of Assignee of Record**
The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

| | | | |
|---|---|---|---|
| Signature | Yoshihiro Senzai | Date | 27/08/2014 |
| Name | Yoshihiro SENZAI | Telephone | |
| Title | President & Chief Executive Officer, HITACHI MAXELL, LTD. | | |

PTO/AIA/96 (08-12)
Approved for use through 01/31/2013. OMB 0651-0031
U.S. Patent and Trademark Office;U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of1995, no persons arerequired to respond to a collection of information unless it displays a valid OMB control number.

# STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: T. NAKANO

Application No./Patent No.: 14/264,243 Filed/Issue Date: April 29, 2014

Titled: ELECTRIC CAMERA

HITACHI MAXELL, LTD., a Corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☑ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

   ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

   ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

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 thereof is attached.

B. ☑ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Takahiro NAKANO To: HITACHI, LTD.

   The document was recorded in the United States Patent and Trademark Office at
   Reel 10631, Frame 900, or for which a copy thereof is attached.

2. From: HITACHI, LTD. To: HITACHI CONSUMER ELECTRONICS CO., LTD.

   The document was recorded in the United States Patent and Trademark Office at
   Reel 30648, Frame 217, or for which a copy thereof is attached.

PTO/AIA/96 (08-12)
Approved for use through 01/31/2013. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE


## STATEMENT UNDER 37 CFR 3.73(c)

3. From: HITACHI CONSUMER ELECTRONICS CO., LTD. To: HITACHI MAXELL, LTD.

The document was recorded in the United States Patent and Trademark Office at
Reel 33685, Frame 883, or for which a copy thereof is attached.

4. 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.

5. 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.

6. 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(c)(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.

| /John R. Mattingly/ | January 16, 2015 |
|---|---|
| Signature | Date |
| John R. Mattingly | 30,293 |
| Printed or Typed Name | Title or Registration Number |

# Privacy Act Statement

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

The informationprovided 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 informationin 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 InternationalApplication 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, arecord 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 thissystem 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.

PTO/AIA/14 (08-12)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE


| Application Data Sheet 37 CFR 1.76 | Attorney Docket Number | ASA-9606-06 |
|---|---|---|
| | Application Number | 14/264,243 |
| Title of Invention | ELECTRIC CAMERA | |

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

## Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

## Inventor Information:

**Inventor 1** Remove

**Legal Name**

| Prefix | Given Name | Middle Name | Family Name | Suffix |
|---|---|---|---|---|
| | | | | |

**Residence Information (Select One)** ◉ US Residency ○ Non US Residency ○ Active US Military Service

| City | | State/Province | | Country of Residence | |
|---|---|---|---|---|---|

**Mailing Address of Inventor:**

| | |
|---|---|
| Address 1 | |
| Address 2 | |

| City | | State/Province | |
|---|---|---|---|
| Postal Code | | Country | |

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

## Correspondence Information:

**Enter either Customer Number or complete the Correspondence Information section below.**
**For further information see 37 CFR 1.33(a).**

☐ **An Address is being provided for the correspondence Information of this application.**

| | | | |
|---|---|---|---|
| Customer Number | | | |
| Email Address | | Add Email | Remove Email |

## Application Information:

| | | | |
|---|---|---|---|
| Title of the Invention | | | |
| Attorney Docket Number | | Small Entity Status Claimed | ☐ |
| Application Type | | | |
| Subject Matter | | | |
| Suggested Class (if any) | | Sub Class (if any) | |
| Suggested Technology Center (if any) | | | |
| Total Number of Drawing Sheets (if any) | | Suggested Figure for Publication (if any) | |

PTO/AIA/14 (08-12)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE


| **Application Data Sheet 37 CFR 1.76** | Attorney Docket Number | ASA-9606-06 |
|---|---|---|
| | Application Number | 14/264,243 |
| Title of Invention | ELECTRIC CAMERA | |

## Publication Information:

| | |
|---|---|
| ☐ | Request Early Publication (Fee required at time of Request 37 CFR 1.219) |
| ☐ | **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing. |

## Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

| Please Select One: | ◉ Customer Number | ○ US Patent Practitioner | ○ Limited Recognition (37 CFR 11.9) |
|---|---|---|---|
| Customer Number | | | |

## Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

| Prior Application Status | | Remove | |
|---|---|---|---|
| Application Number | Continuity Type | Prior Application Number | Filing Date (YYYY-MM-DD) |
| | | | |

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

## Foreign Priority Information:

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

| | | Remove | |
|---|---|---|---|
| Application Number | Country[i] | Filing Date (YYYY-MM-DD) | Priority Claimed |
| | | | ◉ Yes ○ No |

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

PTO/AIA/14 (08-12)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

| Application Data Sheet 37 CFR 1.76 | Attorney Docket Number | ASA-9606-06 |
|---|---|---|
| | Application Number | 14/264,243 |
| Title of Invention | ELECTRIC CAMERA | |

## Authorization to Permit Access:

☐ Authorization to Permit Access to the Instant Application by the Participating Offices

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.

## Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

**Applicant 1**

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

| | | |
|---|---|---|
| ◉ Assignee | ○ Legal Representative under 35 U.S.C. 117 | ○ Joint Inventor |
| ○ Person to whom the inventor is obligated to assign. | ○ Person who shows sufficient proprietary interest | |

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor :

If the Applicant is an Organization check here. ☒

| Organization Name | ~~Hitachi Consumer Electronics Co., Ltd.~~ HITACHI MAXELL, LTD. |
|---|---|

PTO/AIA/14 (08-12)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE


| **Application Data Sheet 37 CFR 1.76** | Attorney Docket Number | ASA-9606-06 |
|---|---|---|
| | Application Number | 14/264,243 |
| Title of Invention | ELECTRIC CAMERA | |

| **Mailing Address Information:** | | | |
|---|---|---|---|
| **Address 1** | ~~2-1, Otemachi 2-chome, Chiyoda-ku~~ 1-88, Ushitora 1-Chome, Ibaraki-shi | | |
| Address 2 | | | |
| **City** | ~~Tokyo~~ Osaka | **State/Province** | |
| **Country** i JP | | Postal Code | ~~100-0004~~ 567-8567 |
| Phone Number | | Fax Number | |
| Email Address | | | |

Additional Applicant Data may be generated within this form by selecting the Add button.

## Non-Applicant Assignee Information:

Providing assignment information in this section does not subsitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

**Assignee 1**

Complete this section only if non-applicant assignee information is desired to be included on the patent application publication in accordance with 37 CFR 1.215(b). Do not include in this section an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest), as the patent application publication will include the name of the applicant(s).

If the Assignee is an Organization check here. ☐

| Prefix | **Given Name** | Middle Name | **Family Name** | Suffix |
|---|---|---|---|---|
| | | | | |

| **Mailing Address Information:** | | | |
|---|---|---|---|
| **Address 1** | | | |
| Address 2 | | | |
| **City** | | **State/Province** | |
| **Country** i | | Postal Code | |
| Phone Number | | Fax Number | |
| Email Address | | | |

Additional Assignee Data may be generated within this form by selecting the Add button.

PTO/AIA/14 (08-12)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE


| **Application Data Sheet 37 CFR 1.76** | Attorney Docket Number | ASA-9606-06 |
|---|---|---|
| | Application Number | 14/264,243 |
| Title of Invention | ELECTRIC CAMERA | |

## Signature:

| NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications | | | | | |
|---|---|---|---|---|---|
| **Signature** | /John R. Mattingly/ | | | Date (YYYY-MM-DD) | 2015-01-16 |
| First Name | John | Last Name | Mattingly | Registration Number | 30293 |
| Additional Signature may be generated within this form by selecting the Add button. | | | | | |

This collection of information is required by 37 CFR 1.76. 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 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet 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.**

# 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 the Freedom of Information Act requires disclosure of these records.

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 inspections 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**

| | | |
|---|---|---|
| Inventor(s) | : | T. NAKANO et al. |
| | | Confirmation No.: 1644 |
| Serial No. | : | 14/264,243 |
| Filed | : | April 29, 2014 |
| For | : | ELECTRIC CAMERA |
| Group | : | 2663 |
| Examiner | : | L.T. NGUYEN |
| Docket No. | : | ASA-9606-06 |
| Customer No.: | | 24956 |

**REQUEST TO CHANGE APPLICANT**
**AND PETITION UNDER 37 CFR 1.46(c)**

Mail Stop: Petitions
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

January 16, 2015

Madam:

The applicant requests that the applicant be changed in the above-identified application from HITACHI CONSUMER ELECTRONICS CO., LTD. to HITACHI MAXELL, LTD.

An updated Application Data Sheet with only the "Applicant Information" section filled in and showing the changes with strikethrough and underlining is submitted herewith.

Consideration of the Request to Change Applicant and the issuance of a Corrected Filing Receipt showing the change are respectfully requested.

The Commissioner is authorized to charge any fees due to Deposit Account No. 50-1417 (ASA-9606-06).

Respectfully submitted,

MATTINGLY & MALUR, PC

/John R. Mattingly/
John R. Mattingly
Registration No. 30,293
(703) 684-1120

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 21229929 |
| **Application Number:** | 14264243 |
| **International Application Number:** | |
| **Confirmation Number:** | 1644 |
| **Title of Invention:** | ELECTRIC CAMERA |
| **First Named Inventor/Applicant Name:** | Takahiro Nakano |
| **Customer Number:** | 20457 |
| **Filer:** | John Roberts Mattingly |
| **Filer Authorized By:** | |
| **Attorney Docket Number:** | 500.38315CC5 |
| **Receipt Date:** | 16-JAN-2015 |
| **Filing Date:** | 29-APR-2014 |
| **Time Stamp:** | 15:44:00 |
| **Application Type:** | Utility under 35 USC 111(a) |

## 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 | Power of Attorney | 9606-06-Hitachi-Maxell-Ltd-PTO-AIA-80.pdf | 42988<br>6265e789a2d75a1afec95aa7d3ab32b9d8285eb0 | no | 1 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 2 | Assignee showing of ownership per 37 CFR 3.73. | 9606-06-PTO-373c.pdf | 135414<br>a2720b0726b71965d474a1fd07546d20b5fc7284 | no | 3 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 3 | Application Data Sheet | 9606-06-ADS-change-applicant.pdf | 985329<br>bada295457d8e37b24526cb7aaacd2df55a37442 | no | 6 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| This is not an USPTO supplied ADS fillable form | | | | | |
| 4 | Transmittal Letter | 9606-06-request-change-applicant.pdf | 13559<br>c62edafffe7384fff72ea64885ccfcbbe2559f68 | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| | | **Total Files Size (in bytes):** | 1177290 | | |

**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.**

**<u>New Applications Under 35 U.S.C. 111</u>**
**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.**

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 NUMBER | FILING OR 371(C) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|---|---|---|---|
| 14/264,243 | 04/29/2014 | Takahiro Nakano | ASA-9606-06 |

**CONFIRMATION NO. 1644**

24956
MATTINGLY & MALUR, PC
1800 DIAGONAL ROAD
SUITE 370
ALEXANDRIA, VA 22314

**POA ACCEPTANCE LETTER**

*OC000000073011412*

Date Mailed: 01/27/2015

## NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/16/2015.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/cnguyen/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

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 NUMBER | FILING OR 371(C) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|---|---|---|---|
| 14/264,243 | 04/29/2014 | Takahiro Nakano | 500.38315CC5 |

**CONFIRMATION NO. 1644**

20457
ANTONELLI, TERRY, STOUT & KRAUS, LLP
1300 NORTH SEVENTEENTH STREET
SUITE 550
ARLINGTON, VA 22209-3873

**POWER OF ATTORNEY NOTICE**

*OC00000073011387*

Date Mailed: 01/27/2015

## NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/16/2015.

- The Power of Attorney to you in this application has been revoked by the applicant. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/cnguyen/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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| APPLICATION NUMBER | FILING or 371(c) DATE | GRP ART UNIT | FIL FEE REC'D | ATTY.DOCKET.NO | TOT CLAIMS | IND CLAIMS |
|---|---|---|---|---|---|---|
| 14/264,243 | 04/29/2014 | 2663 | 1740 | ASA-9606-06 | 1 | 1 |

**CONFIRMATION NO. 1644**

**REPLACEMENT FILING RECEIPT**

24956
MATTINGLY & MALUR, PC
1800 DIAGONAL ROAD
SUITE 370
ALEXANDRIA, VA 22314

*OC000000073011493*

Date Mailed: 01/27/2015

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

**Inventor(s)**

Takahiro Nakano, Tokyo, JAPAN;
Ryuji Nishimura, Tokyo, JAPAN;
Toshiro Kinugasa, Tokyo, JAPAN;

**Applicant(s)**

HITACHI MAXELL, LTD., Osaka, JAPAN

**Assignment For Published Patent Application**

HITACHI MAXELL, LTD., Osaka, JAPAN

**Power of Attorney:** The patent practitioners associated with Customer Number 24956

**Domestic Priority data as claimed by applicant**

This application is a CON of 13/681,495 11/20/2012 PAT 8736729
which is a CON of 12/845,266 07/28/2010 PAT 8339493
which is a CON of 10/660,710 09/12/2003 PAT 8059177
which is a DIV of 09/520,836 03/08/2000 PAT 6765616

**Foreign Applications** (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)
JAPAN 00-006064 01/11/2000

Permission to Access - A proper **Authorization to Permit Access to Application by Participating Offices** (PTO/SB/39 or its equivalent) has been received by the USPTO.

Request to Retrieve - This application either claims priority to one or more applications filed in an intellectual property Office that participates in the Priority Document Exchange (PDX) program or contains a proper **Request to Retrieve Electronic Priority Application(s)** (PTO/SB/38 or its equivalent). Consequently, the USPTO will attempt to electronically retrieve these priority documents.

**If Required, Foreign Filing License Granted:** 05/13/2014

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/264,243**

**Projected Publication Date:** Not Applicable

**Non-Publication Request:** No

**Early Publication Request:** No

**Title**

ELECTRIC CAMERA

**Preliminary Class**

348

**Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications:** No

## PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

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Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

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## Title 37, Code of Federal Regulations, 5.11 & 5.15

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| Doc Code: DIST.E.FILE<br>Document Description: Electronic Terminal Disclaimer - Filed | PTO/SB/26<br>U.S. Patent and Trademark Office<br>Department of Commerce |
|---|---|

| | |
|---|---|
| Electronic Petition Request | **TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT** |
| Application Number | 14264243 |
| Filing Date | 29-Apr-2014 |
| First Named Inventor | Takahiro Nakano |
| Attorney Docket Number | ASA-9606-06 |
| Title of Invention | ELECTRIC CAMERA |

☒ Filing of terminal disclaimer does not obviate requirement for response under 37 CFR 1.111 to outstanding Office Action

☒ This electronic Terminal Disclaimer is not being used for a Joint Research Agreement.

| Owner | Percent Interest |
|---|---|
| HITACHI MAXELL, LTD. | 100% |

The owner(s) with percent interest listed above in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of prior patent number(s)

6765616

7403226

as the term of said prior patent is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the prior patent, "as the term of said prior patent is presently shortened by any terminal disclaimer," in the event that said prior patent later:
- expires for failure to pay a maintenance fee;
- is held unenforceable;
- is found invalid by a court of competent jurisdiction;
- is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
- has all claims canceled by a reexamination certificate;
- is reissued; or
- is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

| | |
|---|---|
| ◉ Terminal disclaimer fee under 37 CFR 1.20(d) is included with Electronic Terminal Disclaimer request.<br><br>○ I certify, in accordance with 37 CFR 1.4(d)(4), that the terminal disclaimer fee under 37 CFR 1.20(d) required for this terminal disclaimer has already been paid in the above-identified application. | |
| Applicant claims the following fee status:<br><br>○ Small Entity<br><br>○ Micro Entity<br><br>◉ Regular Undiscounted<br><br>I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon. | |
| THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES<br><br>I certify, in accordance with 37 CFR 1.4(d)(4) that I am:<br><br>◉ An attorney or agent registered to practice before the Patent and Trademark Office who is of record in this application<br><br>Registration Number 30293<br><br>○ A sole inventor<br><br>○ A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application<br><br>○ A joint inventor; all of whom are signing this request | |
| Signature | /John R. Mattingly/ |
| Name | John R. Mattingly |

*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).
Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

# Electronic Patent Application Fee Transmittal

| | |
|---|---|
| **Application Number:** | 14264243 |
| **Filing Date:** | 29-Apr-2014 |
| **Title of Invention:** | ELECTRIC CAMERA |
| **First Named Inventor/Applicant Name:** | Takahiro Nakano |
| **Filer:** | John Roberts Mattingly/C Sam |
| **Attorney Docket Number:** | ASA-9606-06 |

Filed as Large Entity

**Filing Fees for Utility under 35 USC 111(a)**

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Basic Filing:** | | | | |
| Statutory or Terminal Disclaimer | 1814 | 1 | 160 | 160 |
| **Pages:** | | | | |
| **Claims:** | | | | |
| **Miscellaneous-Filing:** | | | | |
| **Petition:** | | | | |
| **Patent-Appeals-and-Interference:** | | | | |
| **Post-Allowance-and-Post-Issuance:** | | | | |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Extension-of-Time:** | | | | |
| **Miscellaneous:** | | | | |
| | | **Total in USD ($)** | | **160** |

Doc Code: DISQ.E.FILE
Document Description: Electronic Terminal Disclaimer – Approved

Application No.: 14264243

Filing Date: 29-Apr-2014

Applicant/Patent under Reexamination: Nakano et al.

Electronic Terminal Disclaimer filed on March 18, 2015

☒ APPROVED

**This patent is subject to a terminal disclaimer**

☐ DISAPPROVED

Approved/Disapproved by: Electronic Terminal Disclaimer automatically approved by EFS-Web

U.S. Patent and Trademark Office

| Electronic Acknowledgement Receipt | |
|---|---|
| **EFS ID:** | 21803060 |
| **Application Number:** | 14264243 |
| **International Application Number:** | |
| **Confirmation Number:** | 1644 |
| **Title of Invention:** | ELECTRIC CAMERA |
| **First Named Inventor/Applicant Name:** | Takahiro Nakano |
| **Customer Number:** | 24956 |
| **Filer:** | John Roberts Mattingly/C Sam |
| **Filer Authorized By:** | John Roberts Mattingly |
| **Attorney Docket Number:** | ASA-9606-06 |
| **Receipt Date:** | 18-MAR-2015 |
| **Filing Date:** | 29-APR-2014 |
| **Time Stamp:** | 13:15:02 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

| | |
|---|---|
| Submitted with Payment | yes |
| Payment Type | Credit Card |
| Payment was successfully received in RAM | $160 |
| RAM confirmation Number | 9959 |
| Deposit Account | |
| Authorized User | |
| The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: | |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | Electronic Terminal Disclaimer-Filed | eTerminal-Disclaimer.pdf | 33474<br>3c703c459d97752061a24984ffd29d38a3cb8771 | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 2 | Fee Worksheet (SB06) | fee-info.pdf | 30116<br>c1ca61f7218fa653d42221925 1600b4a290c5590 | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| | | **Total Files Size (in bytes):** | 63590 | | |

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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.**

**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.**

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

| | | |
|---|---|---|
| Inventor(s) | : | T. NAKANO et al. |
| | | Confirmation No.: 1644 |
| Serial No. | : | 14/264,243 |
| Filed | : | April 29, 2014 |
| For | : | ELECTRIC CAMERA |
| Group | : | 2663 |
| Examiner | : | L. T. Nguyen |
| Docket No. | : | ASA-9606-06 |
| Customer No.: | | 24956 |

**AMENDMENT AFTER FINAL REJECTION**

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

March 18, 2015

Madam:

In response to the Final Office Action mailed December 9, 2014, please amend the above-identified patent application as follows.

**Amendments to the Claims** begin on page 2 of this paper.

**Remarks** begin on page 5 of this paper.

**Amendments to the Claims**:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1. (currently amended) An electric camera comprising:

an image sensing device, with a light receiving surface having a quantity N of vertically arranged pixels, and an arbitrary quantity of pixels arranged horizontally, wherein N is greater than or equal to three times a quantity M of effective scanning lines of a display screen of a television system;

a driver configured to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels, at intervals of a quantity K of pixels, in order to produce a quantity of lines of output signals which corresponds to the quantity M of effective scanning lines, wherein the quantity K is an integer less than or equal to an integer portion of a quotient of N divided by M;

a view angle change switch configured to input a request to change ~~the~~ a view angle of ~~the~~ a moving image; and

a signal processing unit configured to generate image signals by using the output signals of the image sensing device;

wherein when the request to change the view angle is to magnify ~~the~~ an output image by the view angle change switch. the driver changes the quantity of K from a

first value ~~(K1)~~ K1 to a second value ~~(K2)~~ K2, in order to read out image signals with the same quantity of output lines from different areas on the imaging sensing device wherein the first value K1 is larger than the second value K2;

wherein the signal processing unit generates the image signals with the same scanning lines.

2. (currently amended) An electric camera according to the claim 1,

wherein the view angle change switch is configured to input ~~a~~ the request to continuously change the view angle of the moving image,

wherein the signal processing unit is configured to generate magnified image signals with interpolation processing, according to a magnification factor set by the view angle switch.

3. (previously presented) An electric camera according to the claim 2,

wherein the view angle switch includes a zoom switch interlocked with an optical zoom mechanism.

4. (currently amended) An electric camera comprising:

an image sensing device, with a light receiving surface having a quantity N of pixels arranged vertically, and an arbitrary quantity of pixels arranged horizontally, wherein N is greater than three times a quantity M of effective vertical lines of a television system;

a signal processing unit configured to generate and output image signals with the quantity M of effective vertical lines of ~~a~~ the television system, by using output signals of the image sensing device,

a zoom switch configured to enable a user to input zooming operation information,

wherein the signal processing unit generates the image signals, read out with mixing or culling vertical pixel lines of signals, at pixel intervals of a quantity K of lines, from different areas of the imaging device, the areas being continuously changed, and the quantity K being discontinuously changed according to magnification factors.

5. (previously presented) An electric camera according to the claim 4,

wherein the zoom switch is interlocked with an optical zoom mechanism.

## REMARKS

Claims 1-5 are pending in this application. Claims 1, 2 and 4 have been amended. No new matter has been added.

### Claim Objections

Claims 1, 2 and 4 have been amended as required by the Examiner in order to overcome the objections to claims 1-5.

### Double Patenting Rejections

Claims 1 and 2 are rejected on the ground of nonstatutory type double patenting as being unpatentable over claims 1, 6, 13 and 18 of U.S. Patent No. 6,765,616.

Claim 4 is rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1 and 7 of U.S. Patent No. 7,403,226.

Claim 3 is rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1, 6, 13 and 18 of U.S. Patent No. 6,765,616 in view of Shiozaki et al. (U.S. Patent No. 6,781,634).

Claim 5 is rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1 and 7 of U.S. Patent No. 7,403,226 in view of Shiozaki et al.

The Examiner states that the rejected pending claims and the patented claims relied upon in the rejection are not patentably distinct from each other. Applicant disagrees. Accordingly Applicant, without admitting to the propriety of the rejection, and solely for the purpose of expediting prosecution of the application to allowance, submits herewith a Terminal Disclaimer to render moot the Double Patenting rejection.

**Conclusion**

In view of the foregoing amendments and remarks, Applicant requests reconsideration of the rejection and allowance of the claims.

The Commissioner is authorized to charge any shortage in the fees due, or credit any overpayment, to Deposit Account No. 50-1417 (referencing Attorney Docket No. ASA-9606-06).

Respectfully submitted,

MATTINGLY & MALUR, PC

/John R. Mattingly/
John R. Mattingly
Registration No. 30,293
703-684-1120

# Electronic Patent Application Fee Transmittal

| | |
|---|---|
| **Application Number:** | 14264243 |
| **Filing Date:** | 29-Apr-2014 |
| **Title of Invention:** | ELECTRIC CAMERA |
| **First Named Inventor/Applicant Name:** | Takahiro Nakano |
| **Filer:** | John Roberts Mattingly/C Sam |
| **Attorney Docket Number:** | ASA-9606-06 |

Filed as Large Entity

**Filing Fees for Utility under 35 USC 111(a)**

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Basic Filing:** | | | | |
| **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($) |
|---|---|---|---|---|
| Extension - 1 month with $0 paid | 1251 | 1 | 200 | 200 |
| **Miscellaneous:** | | | | |
| | | **Total in USD ($)** | | **200** |

| Electronic Acknowledgement Receipt | |
|---|---|
| **EFS ID:** | 21802751 |
| **Application Number:** | 14264243 |
| **International Application Number:** | |
| **Confirmation Number:** | 1644 |
| **Title of Invention:** | ELECTRIC CAMERA |
| **First Named Inventor/Applicant Name:** | Takahiro Nakano |
| **Customer Number:** | 24956 |
| **Filer:** | John Roberts Mattingly/C Sam |
| **Filer Authorized By:** | John Roberts Mattingly |
| **Attorney Docket Number:** | ASA-9606-06 |
| **Receipt Date:** | 18-MAR-2015 |
| **Filing Date:** | 29-APR-2014 |
| **Time Stamp:** | 13:16:20 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

| | |
|---|---|
| Submitted with Payment | yes |
| Payment Type | Credit Card |
| Payment was successfully received in RAM | $200 |
| RAM confirmation Number | 9984 |
| Deposit Account | |
| Authorized User | |
| The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: | |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | | 9606-06amd02.pdf | 27409<br>a048ccf22df2bbda702033a222b2e2a21e98b421 | yes | 6 |

| | Multipart Description/PDF files in .zip description | | |
|---|---|---|---|
| | **Document Description** | **Start** | **End** |
| | Response After Final Action | 1 | 1 |
| | Claims | 2 | 4 |
| | Applicant Arguments/Remarks Made in an Amendment | 5 | 6 |

**Warnings:**

**Information:**

| | | | | | |
|---|---|---|---|---|---|
| 2 | Fee Worksheet (SB06) | fee-info.pdf | 30158<br>108a5bedfdd558281291970c8e2c5b072eeedb8e | no | 2 |

**Warnings:**

**Information:**

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|---|---|

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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.**

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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.

| PATENT APPLICATION FEE DETERMINATION RECORD<br>Substitute for Form PTO-875 | Application or Docket Number<br>14/264,243 | Filing Date<br>04/29/2014 | ☐ To be Mailed |
|---|---|---|---|

**ENTITY**: ☒ LARGE ☐ SMALL ☐ MICRO

## APPLICATION AS FILED – PART I

| FOR | (Column 1) NUMBER FILED | (Column 2) NUMBER EXTRA | RATE ($) | FEE ($) |
|---|---|---|---|---|
| ☐ BASIC FEE (37 CFR 1.16(a), (b), or (c)) | N/A | N/A | N/A | |
| ☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m)) | N/A | N/A | N/A | |
| ☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | N/A | N/A | N/A | |
| TOTAL CLAIMS (37 CFR 1.16(i)) | minus 20 = | * | X $ = | |
| INDEPENDENT CLAIMS (37 CFR 1.16(h)) | minus 3 = | * | X $ = | |
| ☐ APPLICATION SIZE FEE (37 CFR 1.16(s)) | If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | |
| ☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | | | |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | |

## APPLICATION AS AMENDED – PART II

| AMENDMENT | 03/18/2015 | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE ($) | ADDITIONAL FEE ($) |
|---|---|---|---|---|---|---|---|
| | Total (37 CFR 1.16(i)) | * 5 | Minus | ** 20 | = 0 | X $80 = | 0 |
| | Independent (37 CFR 1.16(h)) | * 2 | Minus | ***3 | = 0 | X $420 = | 0 |
| | ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | |
| | ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | |
| | | | | | | TOTAL ADD'L FEE | 0 |

| AMENDMENT | | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE ($) | ADDITIONAL FEE ($) |
|---|---|---|---|---|---|---|---|
| | Total (37 CFR 1.16(i)) | * | Minus | ** | = | X $ = | |
| | Independent (37 CFR 1.16(h)) | * | Minus | *** | = | X $ = | |
| | ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | |
| | ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | |
| | | | | | | TOTAL ADD'L FEE | |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/MARCIA GORDON/

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

# NOTICE OF ALLOWANCE AND FEE(S) DUE

24956 7590 03/30/2015

MATTINGLY & MALUR, PC
1800 DIAGONAL ROAD
SUITE 370
ALEXANDRIA, VA 22314

| EXAMINER |
|---|
| NGUYEN, LUONG TRUNG |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2663 | |

DATE MAILED: 03/30/2015

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 14/264,243 | 04/29/2014 | Takahiro Nakano | ASA-9606-06 | 1644 |

TITLE OF INVENTION: ELECTRIC CAMERA

| APPLN. TYPE | ENTITY STATUS | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE |
|---|---|---|---|---|---|---|
| nonprovisional | UNDISCOUNTED | $960 | $0 | $0 | $960 | 06/30/2015 |

**THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.**

**THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.**

**HOW TO REPLY TO THIS NOTICE:**

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.**



PTOL-85 (Rev. 02/11)

## PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail** **Mail Stop ISSUE FEE**
**Commissioner for Patents**
**P.O. Box 1450**
**Alexandria, Virginia 22313-1450**
**or Fax (571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

24956 7590 03/30/2015
MATTINGLY & MALUR, PC
1800 DIAGONAL ROAD
SUITE 370
ALEXANDRIA, VA 22314

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

**Certificate of Mailing or Transmission**
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

| |
|---|
| (Depositor's name) |
| (Signature) |
| (Date) |

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 14/264,243 | 04/29/2014 | Takahiro Nakano | ASA-9606-06 | 1644 |

TITLE OF INVENTION: ELECTRIC CAMERA

| APPLN. TYPE | ENTITY STATUS | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE |
|---|---|---|---|---|---|---|
| nonprovisional | UNDISCOUNTED | $960 | $0 | $0 | $960 | 06/30/2015 |

| EXAMINER | ART UNIT | CLASS-SUBCLASS |
|---|---|---|
| NGUYEN, LUONG TRUNG | 2663 | 348-302000 |

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
- ❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:
- ❑ Issue Fee
- ❑ Publication Fee (No small entity discount permitted)
- ❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
- ❑ A check is enclosed.
- ❑ Payment by credit card. Form PTO-2038 is attached.
- ❑ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
- ❑ Applicant certifying micro entity status. See 37 CFR 1.29 — NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
- ❑ Applicant asserting small entity status. See 37 CFR 1.27 — NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
- ❑ Applicant changing to regular undiscounted fee status. — NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____



PTOL-85 Part B (10-13) Approved for use through 10/31/2013. OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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. |
|---|---|---|---|---|
| 14/264,243 | 04/29/2014 | Takahiro Nakano | ASA-9606-06 | 1644 |

24956 7590 03/30/2015

MATTINGLY & MALUR, PC
1800 DIAGONAL ROAD
SUITE 370
ALEXANDRIA, VA 22314

| EXAMINER | |
|---|---|
| NGUYEN, LUONG TRUNG | |
| ART UNIT | PAPER NUMBER |
| 2663 | |

DATE MAILED: 03/30/2015

**Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)**
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

## OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. 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 1.14. 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, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. 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.

## 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.

| Notice of Allowability | Application No. 14/264,243 | Applicant(s) NAKANO ET AL. | |
|---|---|---|---|
| | Examiner LUONG T. NGUYEN | Art Unit 2663 | AIA (First Inventor to File) Status No |

***-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--***

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *Amendment After Final and Terminal Disclaimer filed on 03/18/2015*.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on_____.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are *1-5*. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov .
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   **Certified copies:**

   a) ☒ All b) ☐ Some *c) ☐ None of the:
   1. ☒ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE**.

5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   **Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/LUONG T NGUYEN/
Primary Examiner, Art Unit 2663

| Issue Classification | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 14264243 | NAKANO ET AL. |
| | **Examiner** | **Art Unit** |
| | LUONG T NGUYEN | 2663 |

| CPC | | | | | | |
|---|---|---|---|---|---|---|
| **Symbol** | | | | | **Type** | **Version** |
| H04N | | 5 | / | 3741 | F | 2013-01-01 |
| H04N | | 5 | / | 23248 | I | 2013-01-01 |
| H04N | | 5 | / | 23258 | I | 2013-01-01 |
| H04N | | 5 | / | 23274 | I | 2013-01-01 |
| H04N | | 9 | / | 045 | I | 2013-01-01 |
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| CPC Combination Sets | | | | | | | |
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| **Symbol** | | | | | **Type** | **Set** | **Ranking** | **Version** |
| | | | / | | | | | |
| | | | / | | | | | |

| NONE | | Total Claims Allowed: | |
|---|---|---|---|
| (Assistant Examiner) | (Date) | 5 | |
| /LUONG T NGUYEN/<br>Primary Examiner.Art Unit 2663 | 3/20/2015 | O.G. Print Claim(s) | O.G. Print Figure |
| (Primary Examiner) | (Date) | 1 | 1 |

| Issue Classification | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 14264243 | NAKANO ET AL. |
| | **Examiner** | **Art Unit** |
| | LUONG T NGUYEN | 2663 |

| US ORIGINAL CLASSIFICATION | | INTERNATIONAL CLASSIFICATION | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CLASS | SUBCLASS | CLAIMED | | | | | NON-CLAIMED | | | | | |
| 348 | 302 | H | 0 | 4 | N | 5 / 374 (2011.0) | | | | | | |
| CROSS REFERENCE(S) | | | | | | | | | | | | |
| CLASS | SUBCLASS (ONE SUBCLASS PER BLOCK) | | | | | | | | | | | |
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| NONE | | **Total Claims Allowed:** | |
| (Assistant Examiner) | (Date) | 5 | |
| /LUONG T NGUYEN/<br>Primary Examiner.Art Unit 2663 | 3/20/2015 | O.G. Print Claim(s) | O.G. Print Figure |
| (Primary Examiner) | (Date) | 1 | 1 |

| Issue Classification | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 14264243 | NAKANO ET AL. |
| | **Examiner** | **Art Unit** |
| | LUONG T NGUYEN | 2663 |

☒ **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 | Final | Original |
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|---|---|---|---|
| NONE<br><br>(Assistant Examiner) | (Date) | **Total Claims Allowed:**<br>5 | |
| /LUONG T NGUYEN/<br>Primary Examiner.Art Unit 2663<br><br>(Primary Examiner) | 3/20/2015<br><br>(Date) | O.G. Print Claim(s)<br>1 | O.G. Print Figure<br>1 |

| Index of Claims | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 14264243 | NAKANO ET AL. |
| | **Examiner** | **Art Unit** |
| | LUONG T NGUYEN | 2663 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ✓ | Rejected | - | Cancelled | N | Non-Elected | A | Appeal |
| = | Allowed | ÷ | Restricted | I | Interference | O | Objected |

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

| CLAIM | | DATE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Final | Original | 06/12/2014 | 12/08/2014 | 03/20/2015 | | | | | | |
| | 1 | ✓ | ✓ | = | | | | | | |
| | 2 | | ✓ | = | | | | | | |
| | 3 | | ✓ | = | | | | | | |
| | 4 | | ✓ | = | | | | | | |
| | 5 | | ✓ | = | | | | | | |

| Search Notes | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 14264243 | NAKANO ET AL. |
| | Examiner | Art Unit |
| | LUONG T NGUYEN | 2663 |

| CPC- SEARCHED | | |
|---|---|---|
| Symbol | Date | Examiner |
| H04N 5/335, 5/3741, 5/23248, 5/23258, 5/23274, 5/3454 | 3/20/2015 | LTN |
| H04N 9/045, 3/155 | 3/20/2015 | LTN |

| CPC COMBINATION SETS - SEARCHED | | |
|---|---|---|
| Symbol | Date | Examiner |
| | | |

| US CLASSIFICATION SEARCHED | | | |
|---|---|---|---|
| Class | Subclass | Date | Examiner |
| | | | |

| SEARCH NOTES | | |
|---|---|---|
| Search Notes | Date | Examiner |
| 348/302,294,311,312,332,272,280,281 | 6/12/2014 | LTN |
| EAST (USPAT; USPGPUB; JPO; EPO; DERWENT; IBM_TDB; USOCR; FPRS) | 6/12/2014 | LTN |
| 348/302, 311 | 12/8/2014 | LTN |
| EAST (USPAT; USPGPUB; JPO; EPO; DERWENT; IBM_TDB; USOCR; FPRS) | 12/8/2014 | LTN |
| 348/302, 294, 308, 312, 332 | 3/20/2015 | LTN |
| EAST (USPAT; USPGPUB; JPO; EPO; DERWENT; IBM_TDB; USOCR; FPRS) | 3/20/2015 | LTN |
| Inventorship search | 3/20/2015 | LTN |

| INTERFERENCE SEARCH | | | |
|---|---|---|---|
| US Class/ CPC Symbol | US Subclass / CPC Group | Date | Examiner |
| | USPAT; UPAD; USPGPUB text search, see interference search | 3/20/2015 | LTN |

| | |
|---|---|
| | /L.T.N./<br>Primary Examiner.Art Unit 2663 |

**EAST Search History**

**EAST Search History (Prior Art)**

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
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| S50 | 1 | 14/264243 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 19:56 |
| S51 | 2 | "6765616".pn. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 20:06 |
| S52 | 10 | "7403226".pn. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 20:06 |
| S53 | 238 | ((Takahiro) near2 (Nakano)).INV. | US-PGPUB; USPAT; USOCR | OR | OFF | 2015/03/20 20:37 |
| S54 | 33 | ((Ryuji) near2 (Nishimura)).INV. | US-PGPUB; USPAT; USOCR | OR | OFF | 2015/03/20 20:40 |
| S55 | 38 | ((Toshiro) near2 (Kinugasa)).INV. | US-PGPUB; USPAT; USOCR | OR | OFF | 2015/03/20 20:43 |
| S56 | 692 | vertical$2 with (add$3 or mix$3 or cull$3 or combin$4) with (pixel$1 or charge$1) and (standard with (television or TV or NTSC)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 20:53 |
| S58 | 10001 | 348/302,294,312,332,308.ccls. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 20:53 |
| S59 | 46 | S56 and S58 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 20:54 |
| S60 | 9498 | vertical$2 with (add$3 or mix$3 or cull$3 or combin$4) with (pixel$1 or charge$1) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 20:57 |
| S61 | 506 | S60 and S58 | US-PGPUB; | OR | ON | 2015/03/20 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | | | 20:57 |
| S62 | 91 | S61 and interpolat$3 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 20:58 |
| S63 | 2324 | vertical$2 with (add$3 or mix$3 or cull$3 or combin$4) with (pixel$1 or charge$1) and interpolat$3 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 21:01 |
| S64 | 91 | S63 and S58 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 21:01 |
| S65 | 338 | S56 and interpolat$3 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 21:03 |
| S66 | 161 | S65 and (@ad<="20000111" or @rlad<="20000111") | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 21:03 |
| S67 | 762 | H04N5/3741.cpc. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 21:05 |
| S68 | 10 | S67 and S56 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 21:06 |
| S69 | 12 | S67 and S63 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 21:06 |
| S70 | 23 | S67 and S60 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 21:07 |
| S71 | 469 | H04N5/23274.cpc. | US-PGPUB; | OR | ON | 2015/03/20 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | | | 21:08 |
| S72 | 29 | S71 and (S56 or S60 or S63) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 21:09 |
| S73 | 4520 | H04N5/23258.cpc. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 21:09 |
| S74 | 46 | S73 and (S56 or S60 or S63) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 21:09 |
| S75 | 9489 | H04N5/23248.cpc. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 21:11 |
| S76 | 96 | S75 and (S56 or S60 or S63) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 21:11 |
| S77 | 31 | S76 and (@ad<="20000111" or @rlad<="20000111") | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 21:12 |
| S78 | 667 | H04N5/3454.cpc. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 21:27 |
| S79 | 27 | S78 and (S56 or S60 or S63) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 21:28 |
| S80 | 8961 | H04N5/335.cpc. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 21:28 |
| S81 | 201 | S80 and (S56 or S60 or S63) | US-PGPUB; | OR | ON | 2015/03/20 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | | | 21:29 |
| S82 | 41 | S81 and (@ad<="20000111" or @rlad<="20000111") | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 21:29 |
| S83 | 16598 | H04N9/045.cpc. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 21:31 |
| S84 | 790 | S83 and (S56 or S60 or S63) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 21:31 |
| S85 | 431 | S83 and (S56 or S60 or S63) and interpolat$3 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 21:31 |
| S86 | 89 | S85 and (@ad<="20000111" or @rlad<="20000111") | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 21:31 |
| S87 | 4703 | H04N3/155.cpc. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 21:33 |
| S88 | 125 | S87 and (S56 or S60 or S63) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 21:34 |
| S89 | 33 | S88 and (@ad<="20000111" or @rlad<="20000111") | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2015/03/20 21:34 |

**EAST Search History (Interference)**

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|---|---|---|---|---|---|---|
| S90 | 1 | ((vertical$2 with (add$3 or mix$3 or cull$3 or combin$4) with (pixel$1 or charge$1) and | US-PGPUB; | OR | ON | 2015/03/20 21:40 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | (standard with (television or TV or NTSC))) same interpolat$3).clm. | USPAT; UPAD | | | |
| S91 | 27 | ((vertical$2 with (add$3 or mix$3 or cull$3 or combin$4) with (pixel$1 or charge$1)) and (mov$3 near image)).clm. | US-PGPUB; USPAT; UPAD | OR | ON | 2015/03/20 21:43 |
| S92 | 18 | ((vertical$2 with (add$3 or mix$3 or cull$3 or combin$4) with (pixel$1 or charge$1)) and (zoom$3)).clm. | US-PGPUB; USPAT; UPAD | OR | ON | 2015/03/20 21:45 |
| S93 | 5 | ((vertical$2 with (add$3 or mix$3 or cull$3 or combin$4) with (pixel$1 or charge$1)) and (view near angle)).clm. | US-PGPUB; USPAT; UPAD | OR | ON | 2015/03/20 21:46 |

**3/20/2015 9:48:53 PM**
**C:\Users\lnguyen2\Documents\EAST\Workspaces\14264243.wsp**

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United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

# BIB DATA SHEET

**CONFIRMATION NO. 1644**

| SERIAL NUMBER | FILING or 371(c) DATE<br>RULE | CLASS | GROUP ART UNIT | ATTORNEY DOCKET NO. |
|---|---|---|---|---|
| 14/264,243 | 04/29/2014 | 348 | 2663 | ASA-9606-06 |

**APPLICANTS**
HITACHI MAXELL, LTD., Osaka, JAPAN, Assignee (with 37 CFR 1.172 Interest);

**INVENTORS**
Takahiro Nakano, Tokyo, JAPAN;
Ryuji Nishimura, Tokyo, JAPAN;
Toshiro Kinugasa, Tokyo, JAPAN;

**** CONTINUING DATA ***************************
This application is a CON of 13/681,495 11/20/2012 PAT 8736729
which is a CON of 12/845,266 07/28/2010 PAT 8339493
which is a CON of 10/660,710 09/12/2003 PAT 8059177
which is a DIV of 09/520,836 03/08/2000 PAT 6765616

**** FOREIGN APPLICATIONS ***************************
JAPAN 00-006064 01/11/2000

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****
05/13/2014

| Foreign Priority claimed ☑ Yes ☐ No<br>35 USC 119(a-d) conditions met ☑ Yes ☐ No<br>Verified and Acknowledged /LUONG TRUNG NGUYEN/ Examiner's Signature | ☐ Met after Allowance<br>Initials | STATE OR COUNTRY | SHEETS DRAWINGS | TOTAL CLAIMS | INDEPENDENT CLAIMS |
|---|---|---|---|---|---|
| | | JAPAN | 8 | 1 | 1 |

**ADDRESS**
MATTINGLY & MALUR, PC
1800 DIAGONAL ROAD
SUITE 370
ALEXANDRIA, VA 22314
UNITED STATES

**TITLE**
ELECTRIC CAMERA

| FILING FEE RECEIVED | | |
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| 1740 | 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 |

It's OK to enter
/L.T.N./
03/20/2015

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

| | | |
|---|---|---|
| Inventor(s) | : | T. NAKANO et al. |
| | | Confirmation No.: 1644 |
| Serial No. | : | 14/264,243 |
| Filed | : | April 29, 2014 |
| For | : | ELECTRIC CAMERA |
| Group | : | 2663 |
| Examiner | : | L. T. Nguyen |
| Docket No. | : | ASA-9606-06 |
| Customer No.: | | 24956 |

**AMENDMENT AFTER FINAL REJECTION**

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

March 18, 2015

Madam:

In response to the Final Office Action mailed December 9, 2014, please amend the above-identified patent application as follows.

**Amendments to the Claims** begin on page 2 of this paper.

**Remarks** begin on page 5 of this paper.

UNITED STATES PATENT AND TRADEMARK OFFICE

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| APPLICATION NUMBER | FILING or 371(c) DATE | GRP ART UNIT | FIL FEE REC'D | ATTY.DOCKET.NO | TOT CLAIMS | IND CLAIMS |
|---|---|---|---|---|---|---|
| 14/264,243 | 04/29/2014 | 2663 | 1740 | ASA-9606-06 | 1 | 1 |

**CONFIRMATION NO. 1644**

**CORRECTED FILING RECEIPT**

24956
MATTINGLY & MALUR, PC
1800 DIAGONAL ROAD
SUITE 370
ALEXANDRIA, VA 22314

*OC000000074930233*

Date Mailed: 05/01/2015

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

**Inventor(s)**

Takahiro Nakano, Tokyo, JAPAN;
Ryuji Nishimura, Tokyo, JAPAN;
Toshiro Kinugasa, Tokyo, JAPAN;

**Applicant(s)**

HITACHI MAXELL, LTD., Osaka, JAPAN

**Assignment For Published Patent Application**

HITACHI MAXELL, LTD., Osaka, JAPAN

**Power of Attorney:** The patent practitioners associated with Customer Number 24956

**Domestic Priority data as claimed by applicant**

This application is a CON of 13/681,495 11/20/2012 PAT 8736729
which is a CON of 12/845,266 07/28/2010 PAT 8339493
which is a CON of 10/660,710 09/12/2003 PAT 8059177
which is a DIV of 09/520,836 03/08/2000 PAT 6765616

**Foreign Applications** (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)
JAPAN 2000-006064 01/11/2000

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**If Required, Foreign Filing License Granted:** 05/13/2014

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/264,243**

**Projected Publication Date:** Not Applicable

**Non-Publication Request:** No

**Early Publication Request:** No

**Title**

ELECTRIC CAMERA

**Preliminary Class**

348

**Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications:** No

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| (Signature) |
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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 14/264,243 | 04/29/2014 | Takahiro Nakano | ASA-9606-06 | 1644 |

TITLE OF INVENTION: ELECTRIC CAMERA

| APPLN. TYPE | ENTITY STATUS | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE |
|---|---|---|---|---|---|---|
| nonprovisional | UNDISCOUNTED | $960 | $0 | $0 | $960 | 06/30/2015 |

| EXAMINER | ART UNIT | CLASS-SUBCLASS |
|---|---|---|
| NGUYEN, LUONG TRUNG | 2663 | 348-302000 |

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

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1 MATTINGLY & MALUR, PC
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: HITACHI MAXELL, LTD.

(B) RESIDENCE: (CITY and STATE OR COUNTRY): OSAKA, JAPAN

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
- ☒ Issue Fee
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4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
- ☐ A check is enclosed.
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5. **Change in Entity Status** (from status indicated above)
- ☐ Applicant certifying micro entity status. See 37 CFR 1.29 — NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
- ☐ Applicant asserting small entity status. See 37 CFR 1.27 — NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
- ☐ Applicant changing to regular undiscounted fee status. — NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /JOHN R. MATTINGLY/ Date June 29, 2015

Typed or printed name JOHN R. MATTINGLY Registration No. 30293



PTOL-85 Part B (10-13) Approved for use through 10/31/2013. OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

# Electronic Patent Application Fee Transmittal

| | |
|---|---|
| **Application Number:** | 14264243 |
| **Filing Date:** | 29-Apr-2014 |
| **Title of Invention:** | ELECTRIC CAMERA |
| **First Named Inventor/Applicant Name:** | Takahiro Nakano |
| **Filer:** | John Roberts Mattingly/Krista Hargrove |
| **Attorney Docket Number:** | ASA-9606-06 |

Filed as Large Entity

**Filing Fees for Utility under 35 USC 111(a)**

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Basic Filing:** | | | | |
| **Pages:** | | | | |
| **Claims:** | | | | |
| **Miscellaneous-Filing:** | | | | |
| **Petition:** | | | | |
| **Patent-Appeals-and-Interference:** | | | | |
| **Post-Allowance-and-Post-Issuance:** | | | | |
| Utility Appl Issue Fee | 1501 | 1 | 960 | 960 |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Extension-of-Time:** | | | | |
| **Miscellaneous:** | | | | |
| | | **Total in USD ($)** | | **960** |

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 22766768 |
| **Application Number:** | 14264243 |
| **International Application Number:** | |
| **Confirmation Number:** | 1644 |
| **Title of Invention:** | ELECTRIC CAMERA |
| **First Named Inventor/Applicant Name:** | Takahiro Nakano |
| **Customer Number:** | 24956 |
| **Filer:** | John Roberts Mattingly |
| **Filer Authorized By:** | |
| **Attorney Docket Number:** | ASA-9606-06 |
| **Receipt Date:** | 29-JUN-2015 |
| **Filing Date:** | 29-APR-2014 |
| **Time Stamp:** | 14:21:45 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

| | |
|---|---|
| Submitted with Payment | yes |
| Payment Type | Credit Card |
| Payment was successfully received in RAM | $960 |
| RAM confirmation Number | 657 |
| Deposit Account | 501417 |
| Authorized User | MATTINGLY, JOHN R |
| The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:<br>Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)<br>Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees) | |

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## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | Issue Fee Payment (PTO-85B) | 960606IssueFeeTransmittal.pdf | 993744<br>bc8e24d930a5bde6a347c36836a6529f7f8e4373 | no | 1 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 2 | Fee Worksheet (SB06) | fee-info.pdf | 30122<br>788be7ae9b8c724458824b0de733637814 41d51e | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| | | **Total Files Size (in bytes):** | 1023866 | | |

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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.**

Receipt date: 04/29/2014

PTO/SB/08A (08-03)
Approved for use through 07/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
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Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE STATEMENT BY APPLICANT**

*(use as many sheets as necessary)*

Sheet 2` of **2**

| *Complete if Known* | |
|---|---|
| Application Number | **To be assigned** |
| Filing Date | **April 29, 2014** |
| First Named Inventor | **T. NAKANO, et al.** |
| Art Unit (expected) | **2663** |
| Examiner Name (expected) | **Luong Trung Nguyen** |
| Attorney Docket Number | **500.38315CC5** |

**U.S. PATENT DOCUMENTS**

| Examiner Initials' | Cite No.[1] | Document Number Number-Kind Code[2] (*if known*) | | Publication Date MM-DD-YYYY | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear |
|---|---|---|---|---|---|---|
| | | **US - 6,970,191** | | 11-2005 | Sase et al. | |
| | | US ~~5,074,424~~ | | 03-1998 | Sasaki, Takashi | 5,734,424 |
| | | **US - 6,798,448** | | 09-2004 | Motono et al. | |
| | | **US - 5,287,192** | | 02-1994 | Iizuka, Tetsuya | |
| | | **US - 6,765,616** | | 07-2004 | Nakano et al. | |
| | | **US - 8,059,177** | | 11-2011 | Nakano et al. | |
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Change(s) applied to document, /D.D./ 5/5/2015

**FOREIGN PATENT DOCUMENTS**

| Examiner Initials' | Cite No.[1] | Foreign Patent Document Country Code[3]–Number[4]–Kind Code[5] (*if known*) | Publication Date MM-DD-YYYY | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear | T[6] |
|---|---|---|---|---|---|---|
| | | | | | | |
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| | | | | | | |

| Examiner Signature | /Luong Nguyen/ | Date Considered | 06/12/2014 |
|---|---|---|---|

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1.14. This collection is estimated to take 2 hours 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.**

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /LN/

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| APPLICATION NO. | ISSUE DATE | PATENT NO. | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 14/264,243 | 08/04/2015 | 9100604 | ASA-9606-06 | 1644 |

24956 7590 07/15/2015

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ALEXANDRIA, VA 22314

# ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

**Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)**
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

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