



US007859588B2

(12) **United States Patent**  
**Parulski et al.**

(10) **Patent No.:** **US 7,859,588 B2**  
(45) **Date of Patent:** **\*Dec. 28, 2010**

(54) **METHOD AND APPARATUS FOR OPERATING A DUAL LENS CAMERA TO AUGMENT AN IMAGE**

|                 |         |                           |
|-----------------|---------|---------------------------|
| 6,611,289 B1    | 8/2003  | Yu et al.                 |
| 6,864,474 B2    | 3/2005  | Misawa                    |
| 7,676,146 B2*   | 3/2010  | Border et al. .... 396/80 |
| 2003/0020814 A1 | 1/2003  | Ono                       |
| 2003/0160886 A1 | 8/2003  | Misawa et al.             |
| 2005/0046738 A1 | 3/2005  | Sato                      |
| 2005/0275747 A1 | 12/2005 | Nayar et al.              |
| 2006/0187312 A1 | 8/2006  | Labaziewicz et al.        |

(75) Inventors: **Kenneth A. Parulski**, Rochester, NY (US); **Wilbert F. Janson, Jr.**, Shortsville, NY (US); **John N. Border**, Walworth, NY (US); **John R. Fredlund**, Rochester, NY (US); **Joseph A. Manico**, Rochester, NY (US); **Robert J. Parada, Jr.**, Rochester, NY (US)

(73) Assignee: **Eastman Kodak Company**, Rochester, NY (US)

(Continued)

(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 882 days.

EP 0 858 208 8/1998

This patent is subject to a terminal disclaimer.

(Continued)

**FOREIGN PATENT DOCUMENTS**

(21) Appl. No.: **11/684,025**

*Primary Examiner*—Kelly L. Jerabek

(22) Filed: **Mar. 9, 2007**

(74) *Attorney, Agent, or Firm*—Thomas J. Strouse; Peyton C. Watkins

(65) **Prior Publication Data**

(57) **ABSTRACT**

US 2008/0218611 A1 Sep. 11, 2008

(51) **Int. Cl.**  
**H04N 5/232** (2006.01)  
**G03B 13/00** (2006.01)  
**G03B 17/00** (2006.01)

(52) **U.S. Cl.** ..... **348/349**; 396/79

(58) **Field of Classification Search** ..... 348/349;  
396/72, 79, 100

See application file for complete search history.

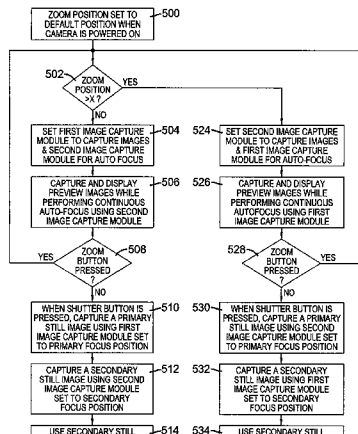
(56) **References Cited**

**U.S. PATENT DOCUMENTS**

|              |        |                 |
|--------------|--------|-----------------|
| 4,606,630 A  | 8/1986 | Haruki et al.   |
| 5,668,597 A  | 9/1997 | Parulski et al. |
| 5,874,994 A  | 2/1999 | Xie et al.      |
| 6,441,855 B1 | 8/2002 | Omata et al.    |

An electronic camera for producing an output image of a scene from a captured image signal includes a first imaging stage comprising a first image sensor for generating a first sensor output and a first lens for forming a first image of the scene on the first image sensor, and a second imaging stage comprising a second image sensor for generating a second sensor output and a second lens for forming a second image of the scene on the second image sensor. The sensor output from the first imaging stage is used as a primary output image for forming the captured image signal and the sensor output from the second imaging stage is used as a secondary output image for modifying the primary output image, thereby generating an enhanced, captured image signal.

**22 Claims, 29 Drawing Sheets**



# US 7,859,588 B2

Page 2

---

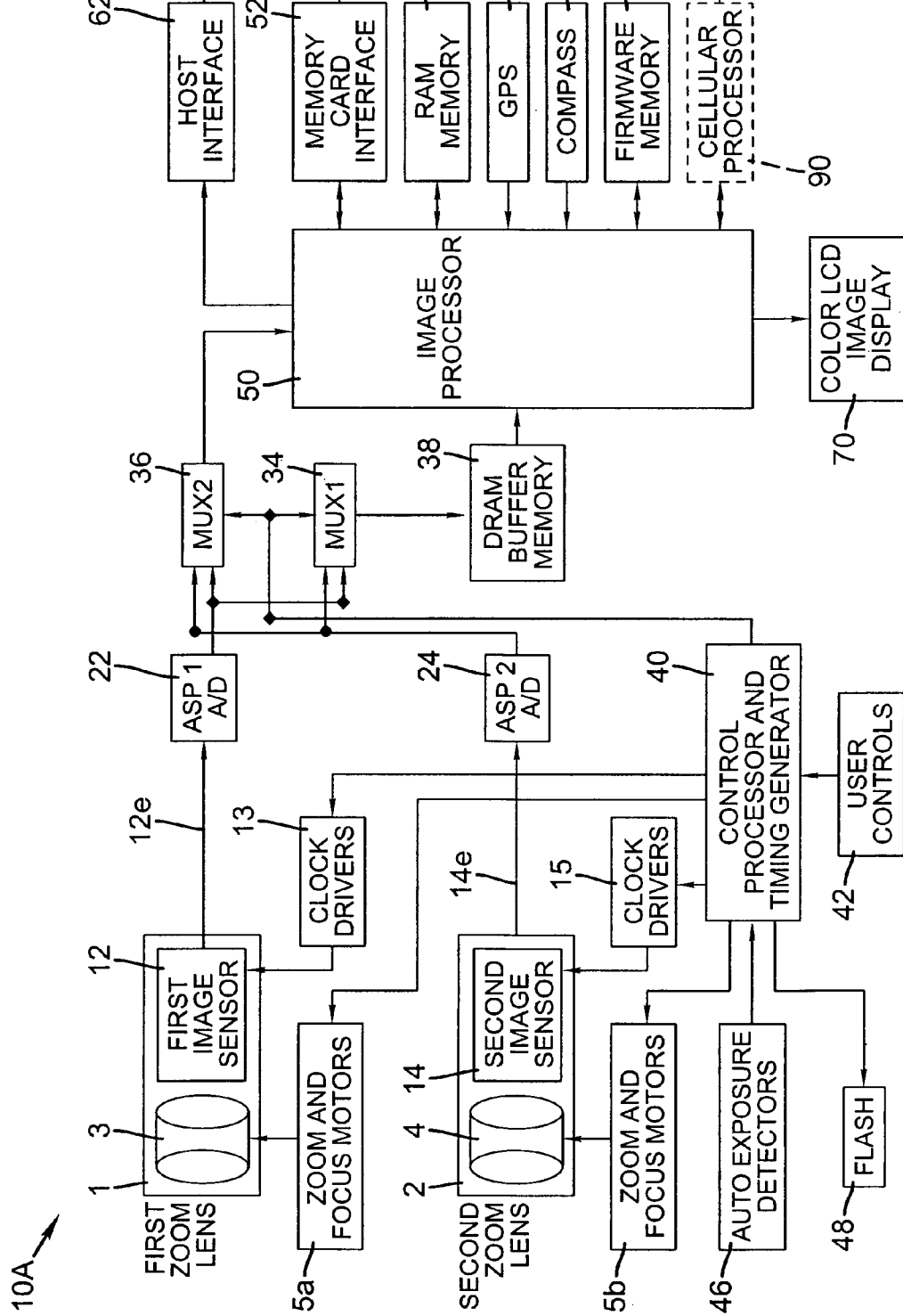
## U.S. PATENT DOCUMENTS

|              |     |        |                    |         |
|--------------|-----|--------|--------------------|---------|
| 2006/0193509 | A1  | 8/2006 | Criminisi et al.   |         |
| 2008/0013941 | A1* | 1/2008 | Daley .....        | 396/121 |
| 2008/0218612 | A1* | 9/2008 | Border et al. .... | 348/262 |
| 2008/0218613 | A1* | 9/2008 | Janson et al. .... | 348/262 |

## FOREIGN PATENT DOCUMENTS

|    |             |        |
|----|-------------|--------|
| JP | 2005045511  | 2/2005 |
| WO | 01/06449    | 1/2001 |
| WO | 2005/057278 | 6/2005 |

\* cited by examiner



**FIG. 1**

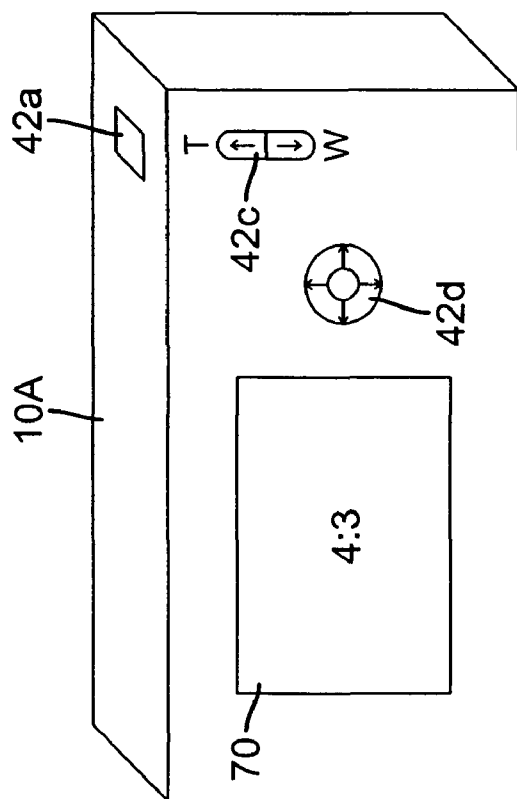


FIG. 2B

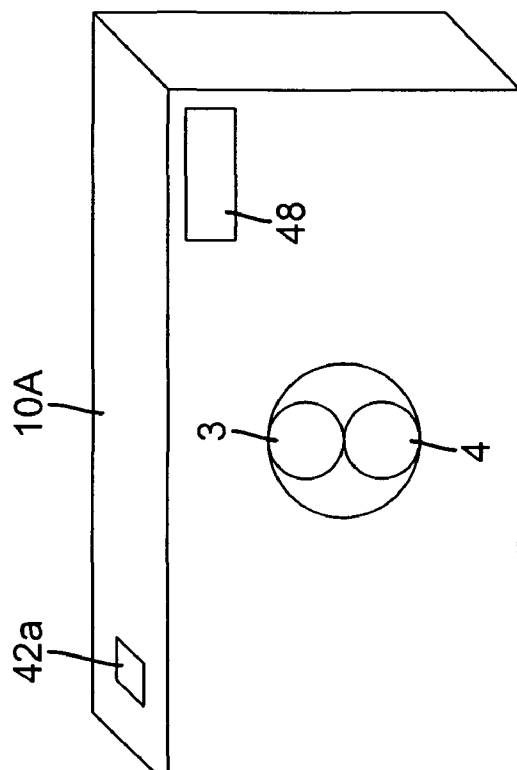


FIG. 2A

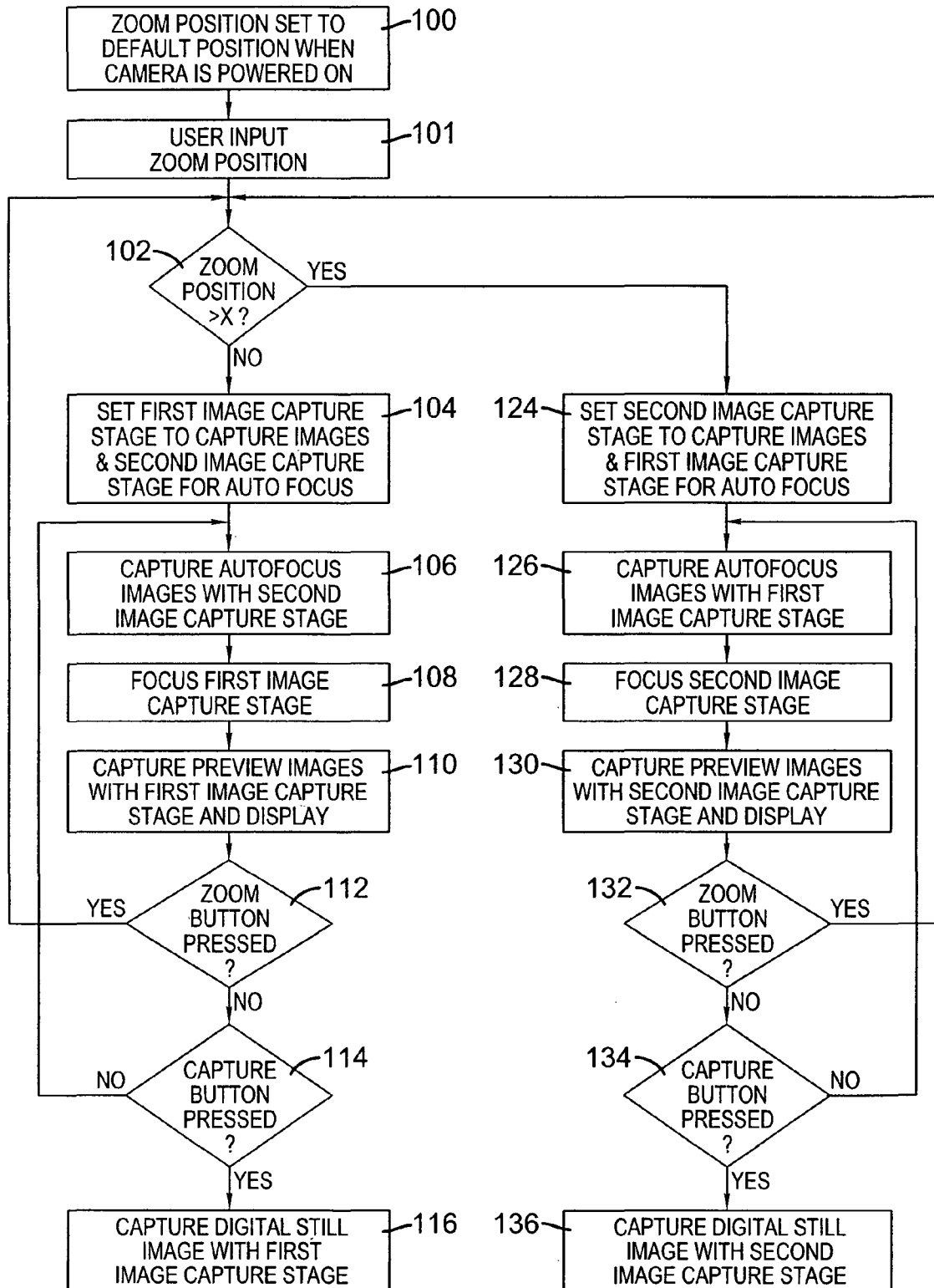


FIG. 3

# Explore Litigation Insights

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

## Real-Time Litigation Alerts



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

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

## Advanced Docket Research



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

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

## Analytics At Your Fingertips



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

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

## API

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

## LAW FIRMS

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

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

## FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

## E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.