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**Li et al.**

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(54) **INDICIA READING TERMINAL HAVING MULTIPLE SETTING IMAGING LENS**

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(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 375 days.

5,572,006 A	11/1996	Wang et al.
5,576,529 A	11/1996	Koenck et al.
5,591,955 A	1/1997	Laser
5,646,390 A	7/1997	Wang et al.
5,702,058 A	12/1997	Dobbs et al.
5,756,981 A	5/1998	Roustaei et al.
5,770,847 A	6/1998	Olmstead
5,784,102 A	7/1998	Hussey et al.
5,786,582 A	7/1998	Roustaei et al.
5,811,828 A	9/1998	Laser
5,815,200 A	9/1998	Ju et al.
5,821,518 A	10/1998	Sussmeier et al.
5,837,987 A	11/1998	Koenck et al.

(Continued)

**FOREIGN PATENT DOCUMENTS**

CN 101031930 9/2007

(Continued)

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**Int. Cl.**

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**G06K 15/12** (2006.01)

(52) **U.S. Cl.** ..... **235/462.41**; 235/462.11; 235/462.24

(58) **Field of Classification Search** ..... 235/462.41, 235/462.11, 462.24

See application file for complete search history.

**References Cited**

**U.S. PATENT DOCUMENTS**

4,877,949 A	10/1989	Danielson et al.
5,019,699 A	5/1991	Koenck
5,406,062 A	4/1995	Hasegawa et al.

**OTHER PUBLICATIONS**

Extended European Search Report for European Patent Application No. 08010217, Dated Oct. 17, 2008, 3 pages.

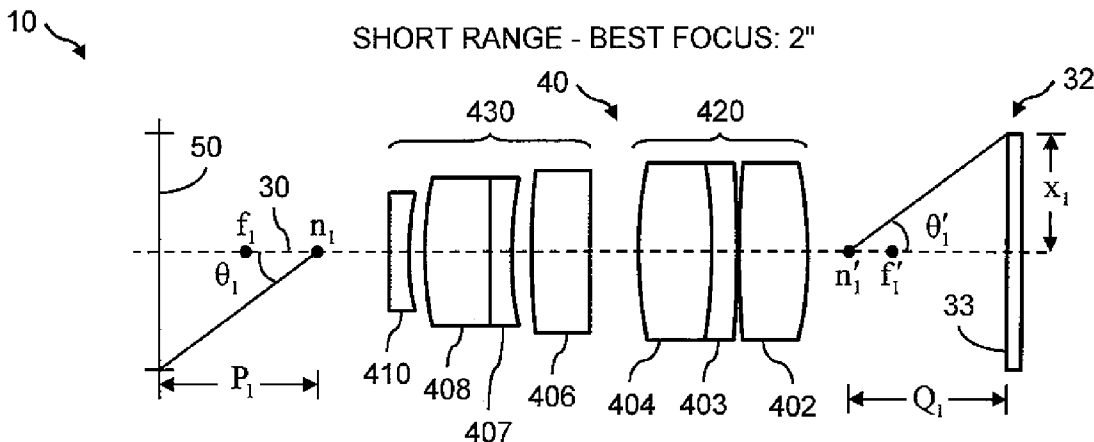
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**ABSTRACT**

An indicia reading terminal can include a multiple setting imaging lens assembly and an image sensor having an image sensor array. In one embodiment, an indicia reading terminal in an active reading state can cycle through a set of different lens settings, expose pixels of an image sensor array during an exposure period when each new lens setting is achieved, and attempt to decode decodable indicia represented in frames of image data captured corresponding to each exposure period. In one embodiment, movement of an imaging lens assembly lens element can be provided with use of a hollow stepper motor.

**13 Claims, 10 Drawing Sheets**



U.S. PATENT DOCUMENTS

5,841,121 A 11/1998 Koenck  
6,010,070 A 1/2000 Mizuochi et al.  
6,073,851 A 6/2000 Olmstead et al.  
6,223,988 B1 5/2001 Batterman et al.  
6,230,975 B1 5/2001 Colley et al.  
6,254,003 B1 7/2001 Pettinelli et al.  
6,315,203 B1 11/2001 Ikeda et al.  
6,386,452 B1 5/2002 Kawamura et al.  
6,522,441 B1 2/2003 Rudeen  
6,598,797 B2 7/2003 Lee  
6,681,994 B1 1/2004 Koenck  
6,695,209 B1 2/2004 La  
6,880,759 B2 4/2005 Wilde et al.  
7,044,378 B2 5/2006 Patel et al.  
7,055,747 B2 6/2006 Havens et al.  
7,073,715 B2 7/2006 Patel et al.  
7,083,098 B2 8/2006 Joseph et al.  
7,148,923 B2 12/2006 Harper et al.  
7,287,696 B2 10/2007 Attia et al.  
7,303,126 B2 12/2007 Patel et al.  
7,568,628 B2 8/2009 Wang et al.  
7,611,060 B2 11/2009 Wang et al.  
2001/0003346 A1 6/2001 Feng  
2004/0206825 A1 10/2004 Schmidt et al.

2005/0001035 A1 1/2005 Hawley et al.  
2005/0103854 A1 5/2005 Zhu et al.  
2006/0011724 A1 1/2006 Joseph et al.  
2006/0043194 A1 3/2006 Barkan et al.  
2006/0113386 A1 6/2006 Olmstead  
2006/0163355 A1 7/2006 Olmstead et al.  
2006/0202038 A1 9/2006 Wang et al.  
2006/0249581 A1 11/2006 Smith  
2007/0181692 A1 8/2007 Barkan et al.  
2008/0223933 A1 9/2008 Smith  
2008/0265034 A1 \* 10/2008 Gibson ..... 235/462.25  
2009/0108071 A1 4/2009 Carlson  
2010/0044440 A1 2/2010 Wang et al.  
2010/0090007 A1 4/2010 Wang et al.

FOREIGN PATENT DOCUMENTS

CN 101147157 3/2008  
EP 1784761 5/2007  
EP 1828957 9/2007  
EP 1856651 11/2007  
JP 2008511917 4/2008  
WO WO-2006026141 3/2006  
WO WO-2006065450 6/2006  
WO WO-2006081466 8/2006

\* cited by examiner

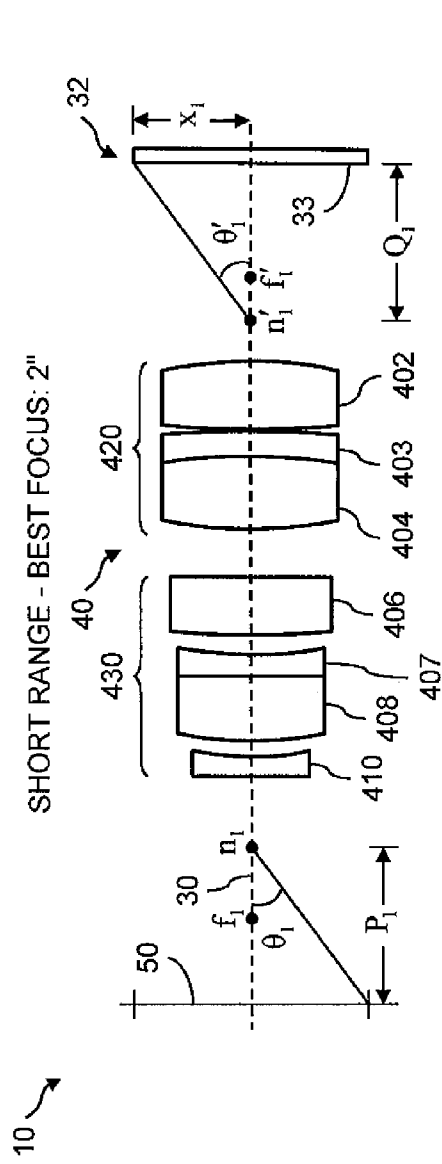


FIG. 1

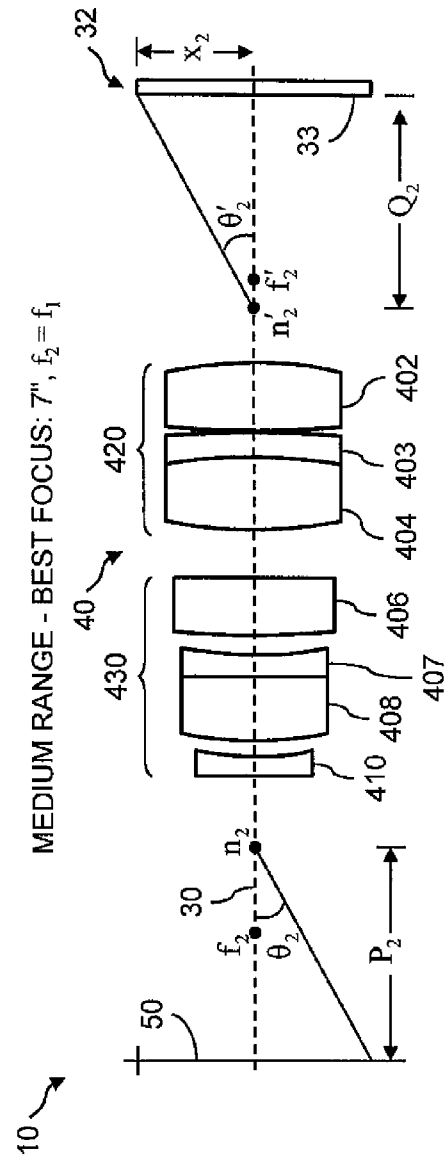


FIG. 2

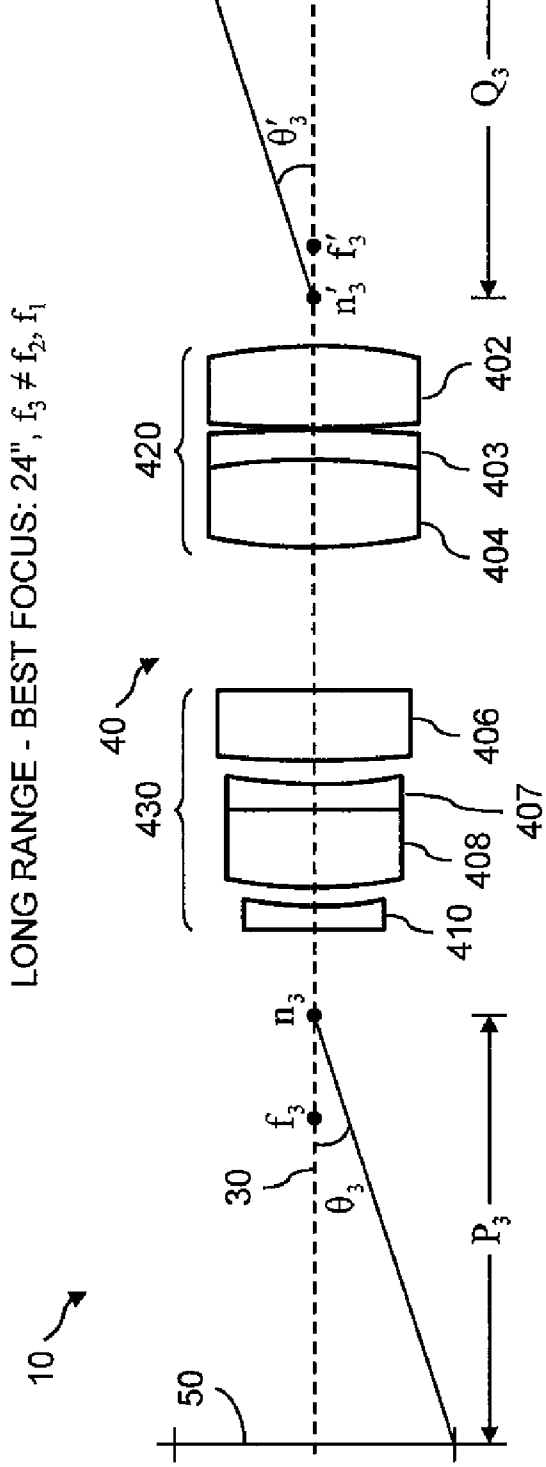


FIG. 3

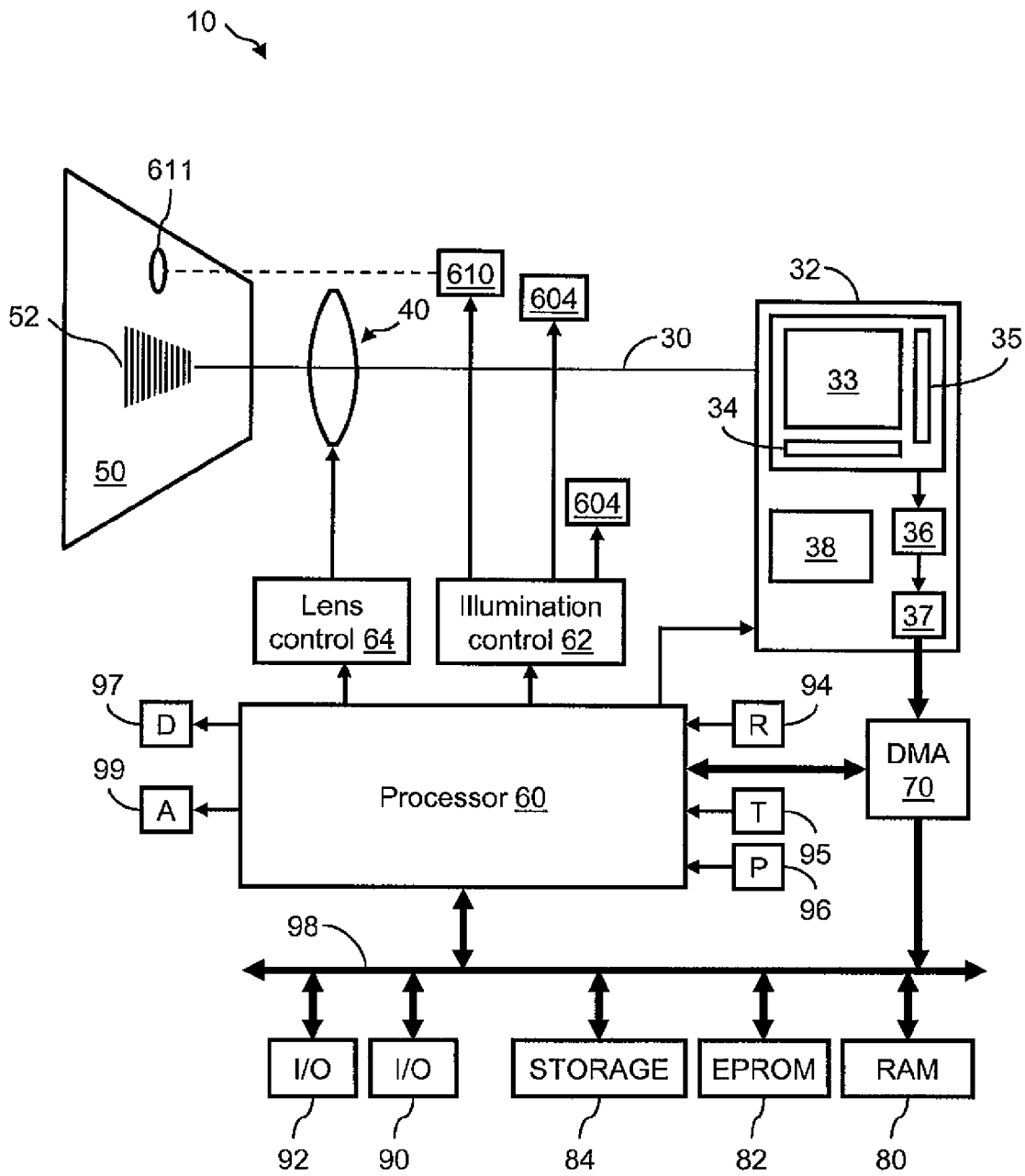


FIG. 4

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