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

(10) **Patent No.:** **US 9,128,267 B2**  
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(54) **IMAGING LENS AND IMAGING APPARATUS INCLUDING THE IMAGING LENS**

(58) **Field of Classification Search**

CPC ..... G02B 13/0045

USPC ..... 359/714

See application file for complete search history.

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(56) **References Cited**

**U.S. PATENT DOCUMENTS**

8,310,768 B2	11/2012	Lin et al.	
2010/0253829 A1*	10/2010	Shinohara	348/340
2012/0087020 A1*	4/2012	Tang et al.	359/714
2013/0033765 A1	2/2013	Tsai et al.	

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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 0 days.

\* cited by examiner

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(21) Appl. No.: **14/226,172**

(74) *Attorney, Agent, or Firm* — Young & Thompson

(22) Filed: **Mar. 26, 2014**

(57) **ABSTRACT**

(65) **Prior Publication Data**

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An imaging lens substantially consists of, in order from an object side, five lenses of a first lens that has a positive refractive power and has a meniscus shape which is convex toward the object side, a second lens that has a biconcave shape, a third lens that has a meniscus shape which is convex toward the object side, a fourth lens that has a meniscus shape which is convex toward the image side; and a fifth lens that has a negative refractive power and has at least one inflection point on an image side surface. Further, the following conditional expression (1) is satisfied.

$$1.4 < f/f_1 < 4 \quad (1)$$

(30) **Foreign Application Priority Data**

Mar. 29, 2013 (JP) ..... 2013-072282

(51) **Int. Cl.**

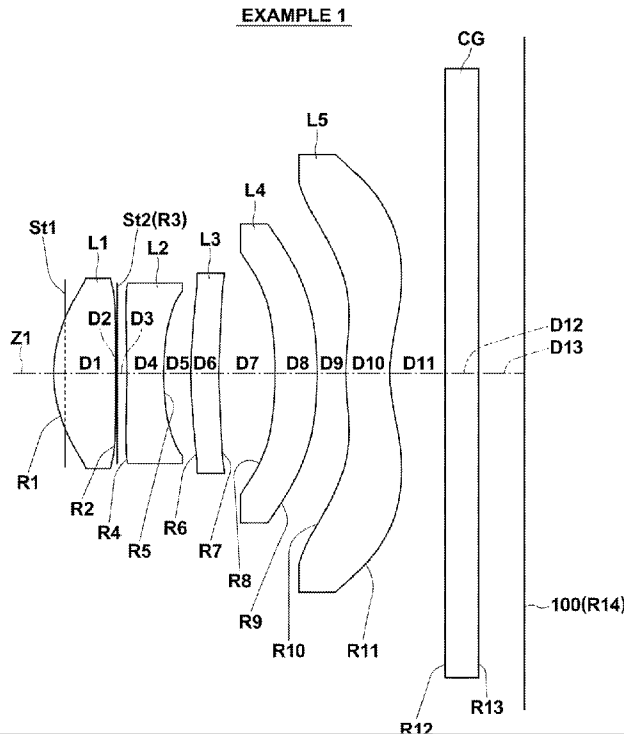
**G02B 3/02** (2006.01)

**G02B 13/00** (2006.01)

(52) **U.S. Cl.**

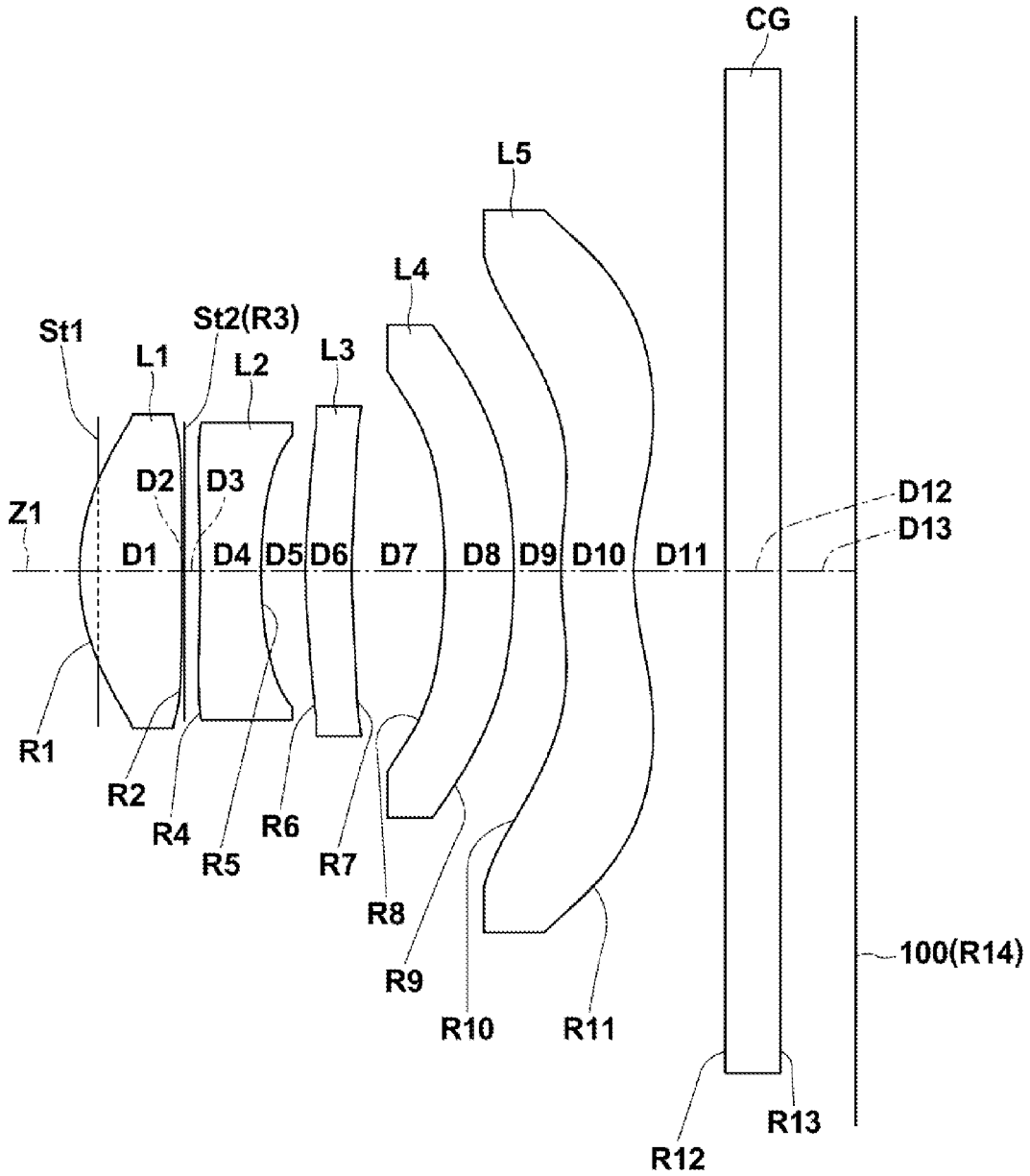
CPC ..... **G02B 13/0045** (2013.01)

**21 Claims, 14 Drawing Sheets**



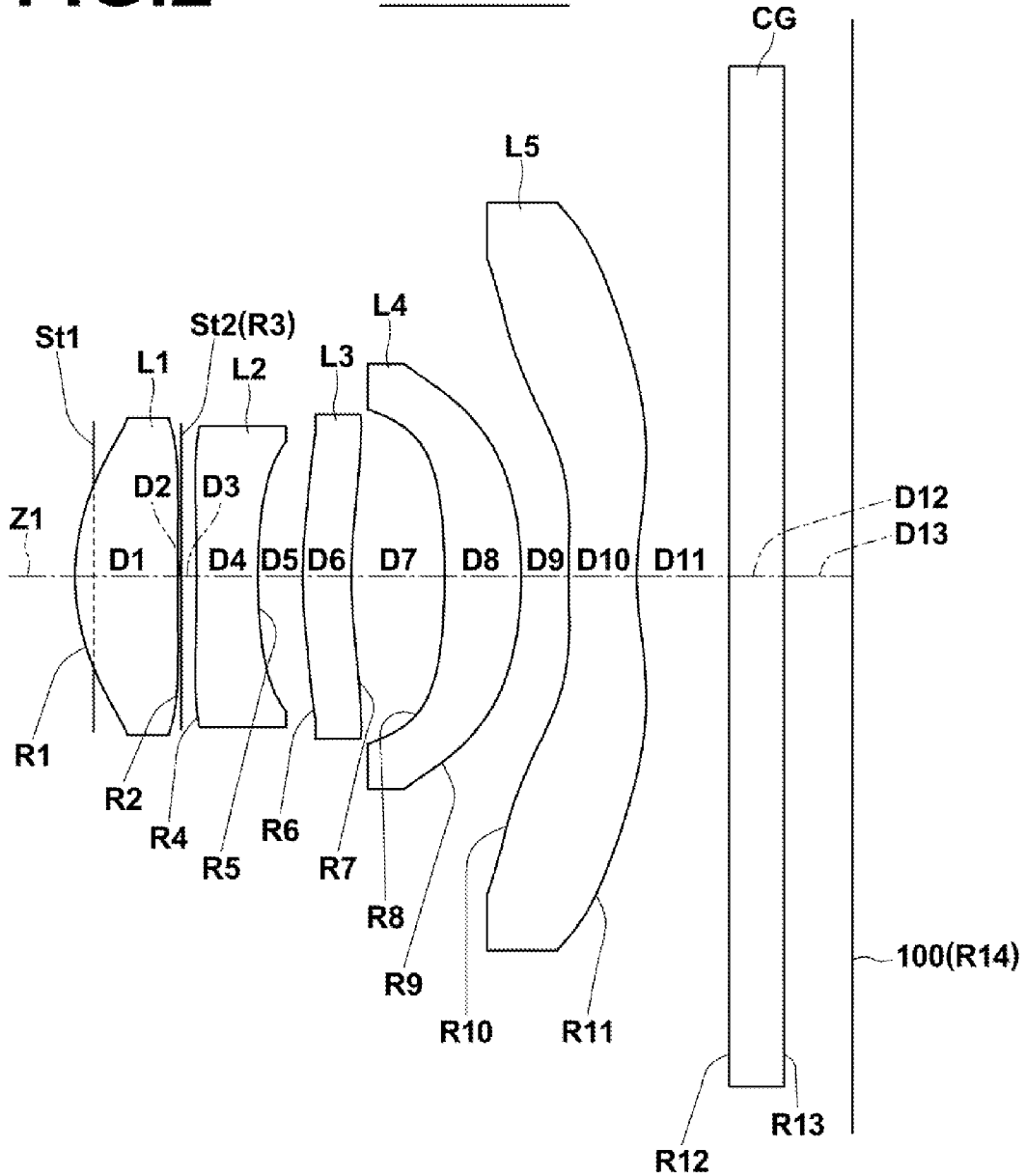
# FIG. 1

## EXAMPLE 1



# FIG. 2

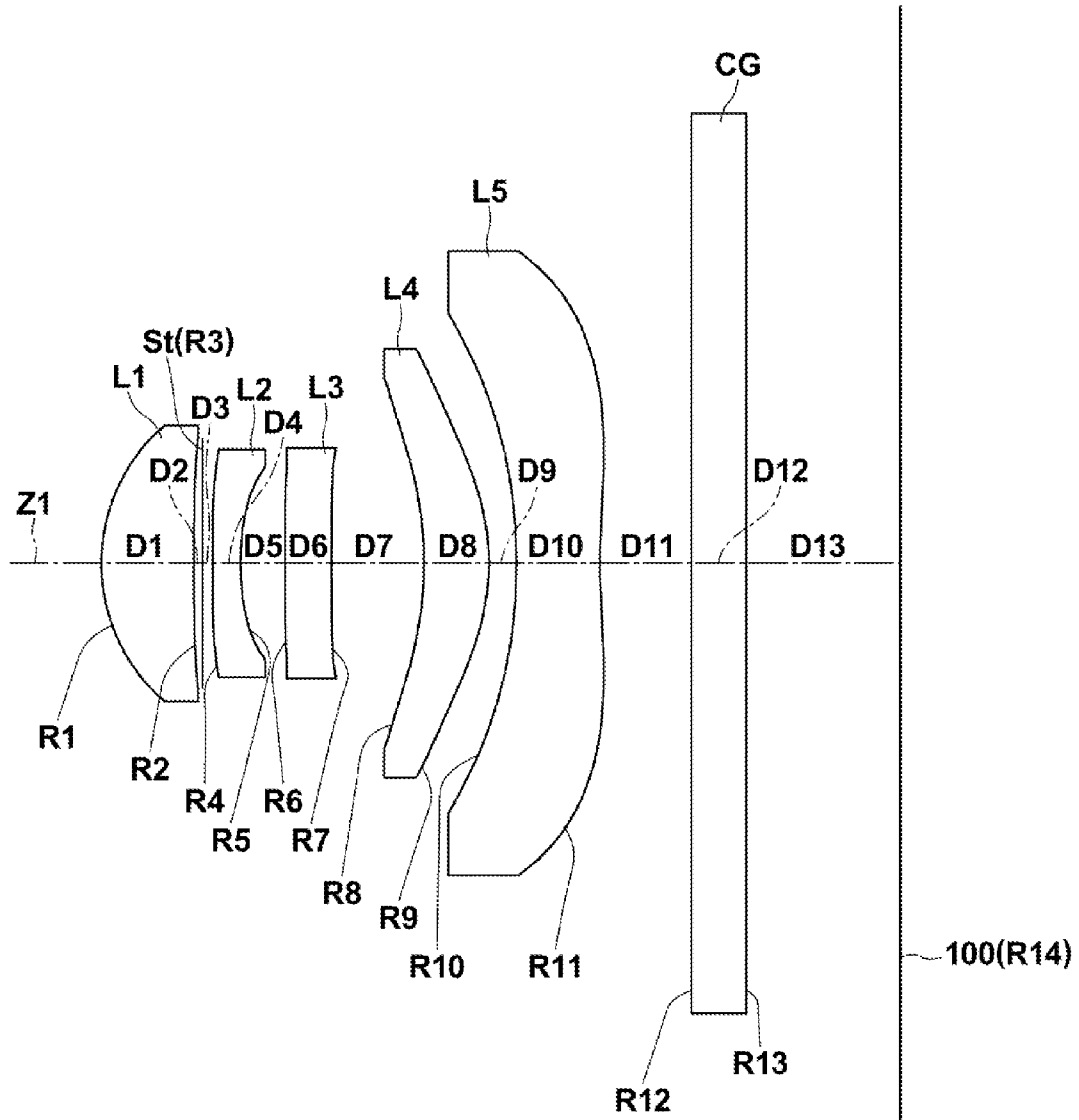
## EXAMPLE 2





# FIG. 4

## EXAMPLE 4



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