



US009128267B2

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

(10) **Patent No.:** **US 9,128,267 B2**

(45) **Date of Patent:** **Sep. 8, 2015**

(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.

(71) Applicant: **FUJIFILM Corporation**, Tokyo (JP)

(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.	

* cited by examiner

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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.

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

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

(65) **Prior Publication Data**

US 2014/0293453 A1 Oct. 2, 2014

(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)

(57) **ABSTRACT**

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.

$$1.4 < f/1 < 4 \tag{1}$$

21 Claims, 14 Drawing Sheets

EXAMPLE 1

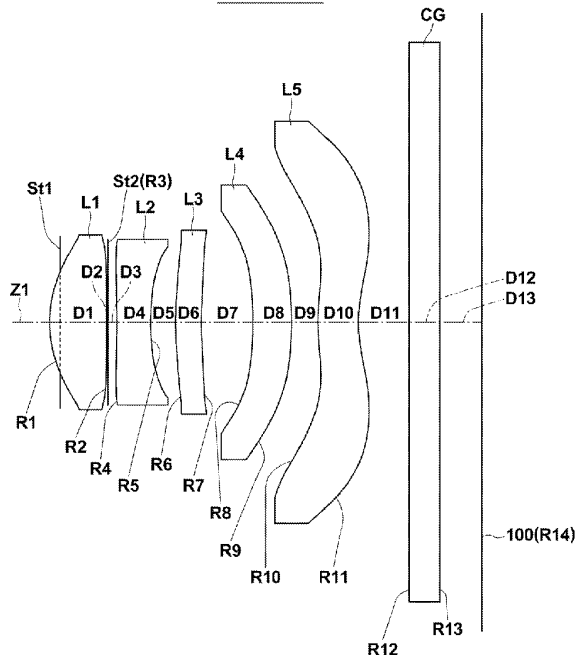


FIG. 1

EXAMPLE 1

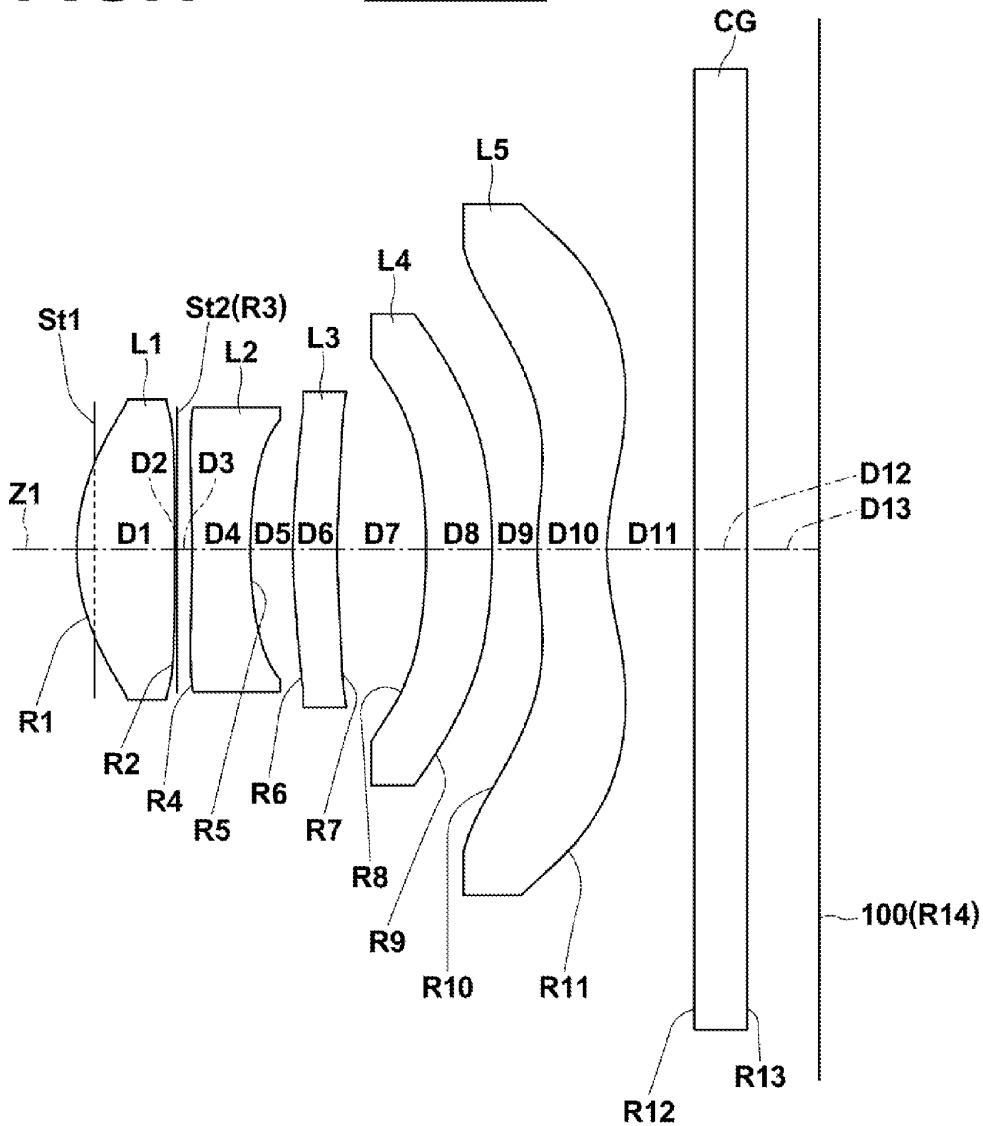


FIG. 2

EXAMPLE 2

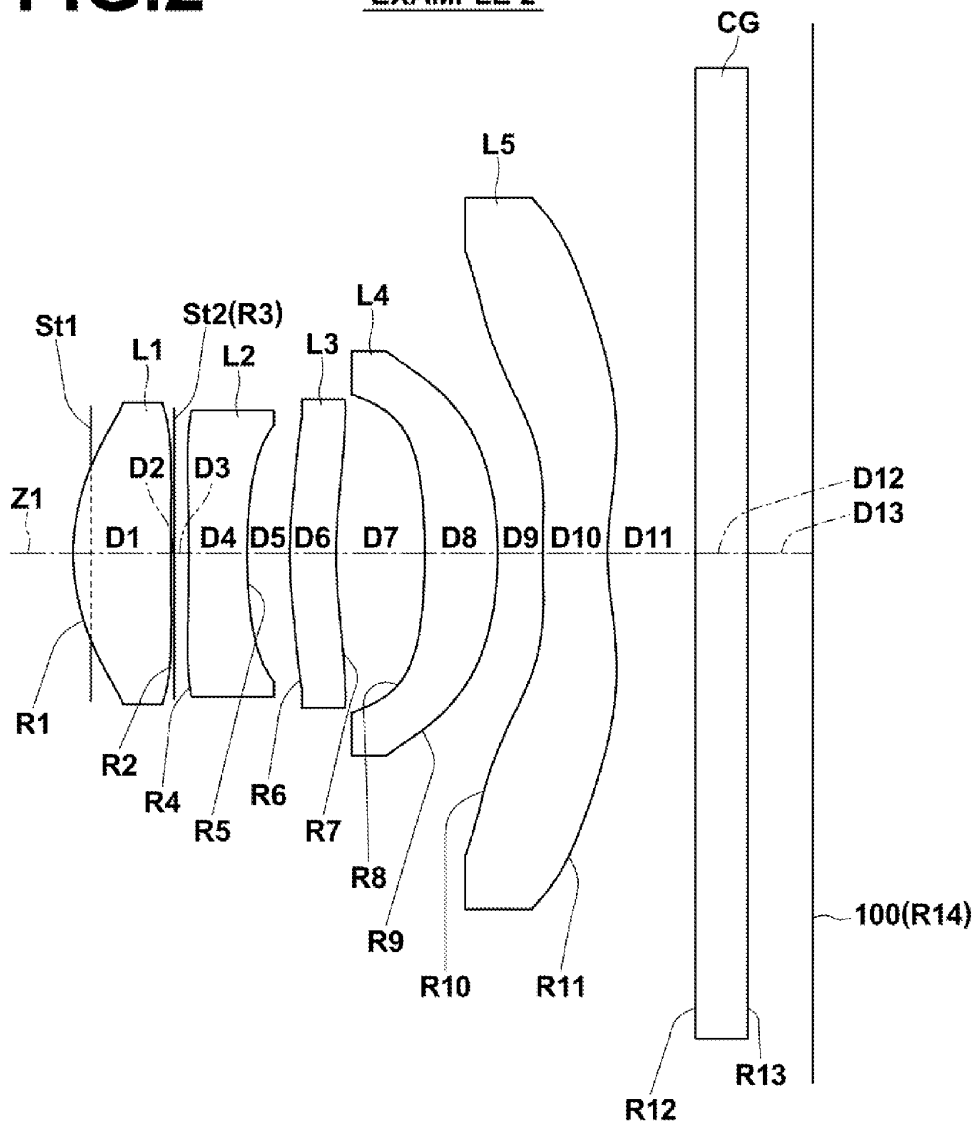


FIG.3

EXAMPLE 3

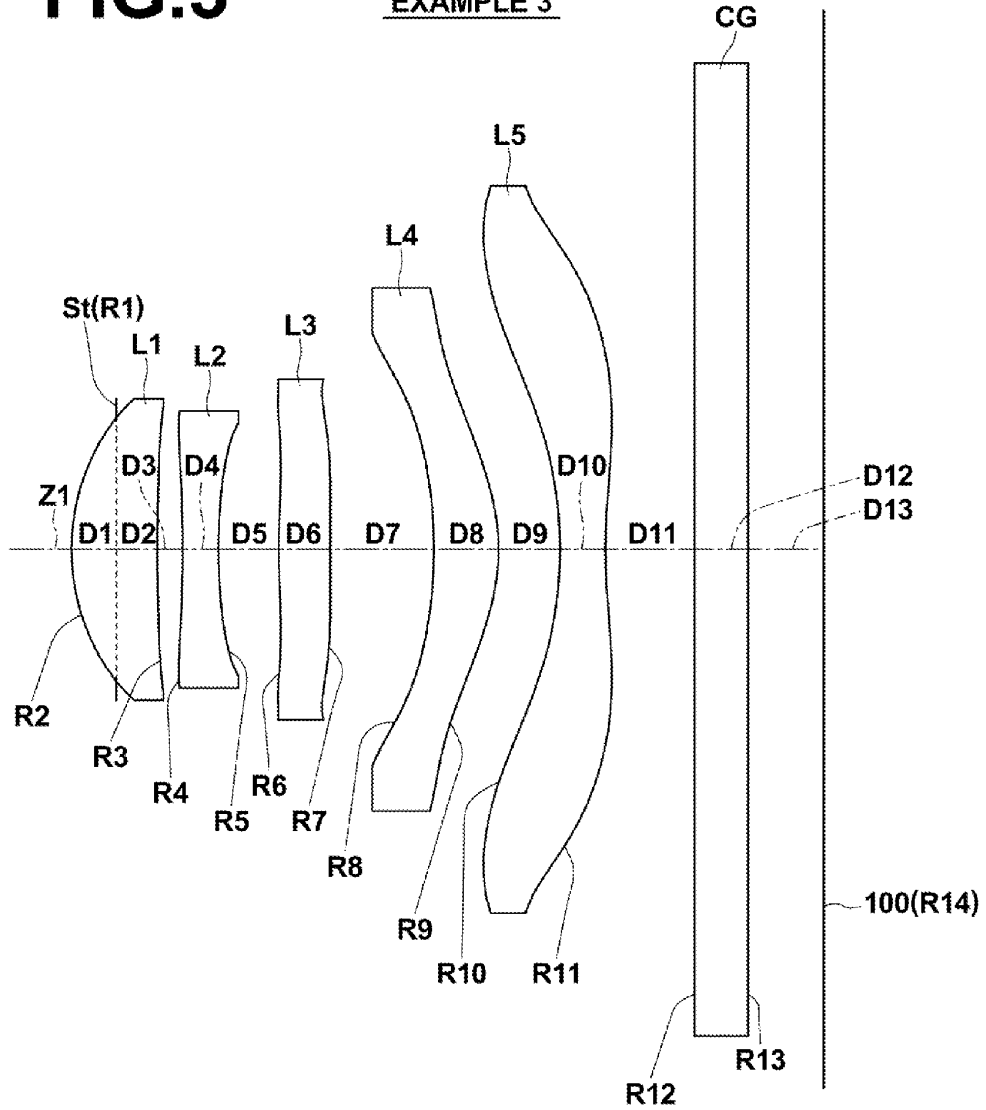
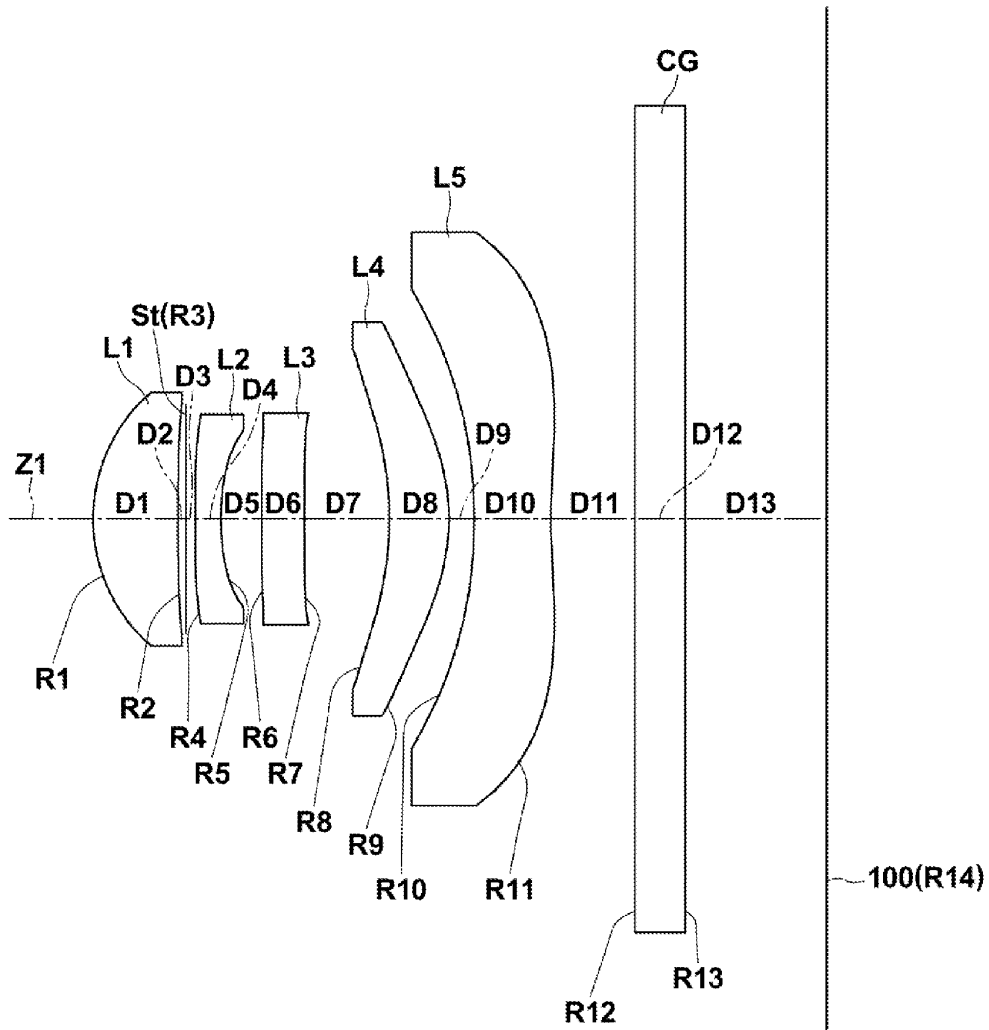


FIG.4

EXAMPLE 4



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