

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2015/001717

A. CLASSIFICATION OF SUBJECT MATTER

G02B15/20 (2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G02B15/20

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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Kokai Jitsuyo Shinan Koho	1971-2015	Toroku Jitsuyo Shinan Koho	1994-2015

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	JP 63-278013 A (Olympus Optical Co., Ltd.), 15 November 1988 (15.11.1988), entire text; all drawings; particularly, examples 1 to 4 (Family: none)	1-2, 4-6, 10-11, 14-17, 42-45 3, 7-9, 12-13, 18-21, 46-47
X A	JP 2005-141056 A (Canon Inc.), 02 June 2005 (02.06.2005), entire text; all drawings; particularly, example 4 (numerical example 4) & US 2005/0099699 A1 & EP 1530072 A1	1-2, 4-6, 8-11, 17, 42-45 3, 7, 12-16, 18-21, 46-47
X A	JP 7-27978 A (Nikon Corp.), 31 January 1995 (31.01.1995), entire text; all drawings; particularly, example 1 & US 5760957 A & JP 3371917 B2	1-2, 4, 10-21, 42-43, 46-47 3, 5-9, 44-45

Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:	"I" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search
10 June 2015 (10.06.15)

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23 June 2015 (23.06.15)

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2009-251118 A (Panasonic Corp.), 29 October 2009 (29.10.2009), entire text; all drawings; particularly, carrying-out mode 1 (numerical examples) to carrying-out mode 7 (numerical example 7); carrying-out mode 10 (numerical example 10) to carrying-out mode 11 (numerical example 11) & US 2010/0091174 A1 & US 8004585 B2	1-21, 42-47
X	JP 59-219711 A (Nippon Kogaku Kogyo Kabushiki Kaisha), 11 December 1984 (11.12.1984),	1-2, 4, 6, 10-11, 14, 17, 42-43, 45
A	entire text; all drawings; particularly, 1st to 3rd examples & US 4576445 A & JP 3-60410 B2	3, 5, 7-9, 12-13, 15-16, 18-21, 44, 46-47

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Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
See extra sheet (continuation of Box No. III).

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-21 and 42-47

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

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Continuation of Box No.III of continuation of first sheet(2)

The inventions of claims 1, 18, 42, and 46, the inventions of claims 22 and 48, and the inventions of claims 38 and 54 have a technical feature as a common technical feature (hereafter referred to as "Feature 1"), i.e., "a zoom lens including sequentially in the following order from an object: a first lens group having positive refractive power; a second lens group having negative refractive power; a third lens group having negative refractive power; and a fourth lens group having positive refractive power.

However, the above-said technical feature cannot be considered to be a special technical feature, since the technical feature does not make a contribution over the prior art in the light of the contents disclosed in the document 1 (JP 2009-251118 A (Panasonic Corp.), 29 October 2009 (29.10.2009), entire text; all drawings; particularly, carrying-out mode (numerical example) 1 to carrying-out mode (numerical example) 11) which is disclosed as a prior-art document in this PCT application by the applicant.

Further, there is no other same or corresponding special technical feature among these inventions.

On the basis of special technical features at the time of the order for payment of fees, claims are classified into three inventions each of which has a special technical feature indicated below.

(Invention 1) claims 1-21 and 42-47

A zoom lens satisfying Feature 1, wherein the zoom lens is varied in power by varying an air gap between the first lens group and the second lens group and satisfies the conditional expression below:

$$0.60 < f4/fw < 1.15,$$

where $f4$ is the focal distance of the fourth lens group, and fw is the focal distance of the entire system in a wide-angle end state when focus is achieved at infinity.

(Invention 2) claims 22-37 and 48-53

A zoom lens satisfying Feature 1, wherein the zoom lens allows at least part of the third lens group to be displaced in the direction of an optical axis and thereby achieve focus and satisfies the conditional expression below:

$$0.249 < fw/f1 < 2.00,$$

where fw is the focal distance of the entire system in a wide-angle end state, and $f1$ is the focal distance of the first lens group.

Invention 2 is not relevant to inventions which involve all of the matters to define the invention in claim 1, 18, 42 or 46 and which have a same category.

Further, there is no other reason for that it can be considered that it is efficient to carry out a search on Invention 2 together with Invention 1 at the time of the order for payment of fees, and therefore, Invention 2 cannot be classified into Invention 1.

(Invention 3) claims 38-41 and 54

A zoom lens satisfying Feature 1, wherein the zoom lens allows at least part of the fourth lens group to be movably provided, as a vibration-proof lens group for correcting an image blur, so as to have a component perpendicular to the optical axis, and displaces the first lens group along the optical axis to vary power, satisfying the conditional expression below:

$$1.00 < f1/f4 < 3.55,$$

where $f1$ is the focal distance of the first lens group, and $f4$ is the focal distance of the fourth lens group.

(Continued to next extra sheet)

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Invention 3 are not relevant to inventions which involve all of the matters to define the invention in claim 1, 18, 22, 42, 46 or 48 and which have a same category.

Further, there is no other reason for that it can be considered that it is efficient to carry out a search on Invention 3 together with Invention 1 or 2 at the time of the order for payment of fees, and therefore, Invention 3 cannot be classified into Invention 1 or 2.

Claims 1, 18, 42, and 46 specify the configuration of the lens groups of the zoom lens as "having..., and the fourth lens group, ..." (or "having..., and the fourth lens group.") The claims state that the zoom lens can include any lens group other than the first lens group to the fourth lens group.

However, what is disclosed within the meaning of PCT Article 5 is only the zoom lens which is made up of the first lens group to the fourth lens group as disclosed in the specification. Thus, the inventions of claims 1, 18, 42, and 46 are not fully supported within the meaning of PCT Article 6.

Further, the above-said opinion may be also applied to claims dependent on claims 1, 18, 32 and 46.

This international search therefore covers the scope supported and disclosed in the description, namely, the zoom lens that is specifically described in the description in which the lens groups are configured to include the first lens group to the fourth lens group.