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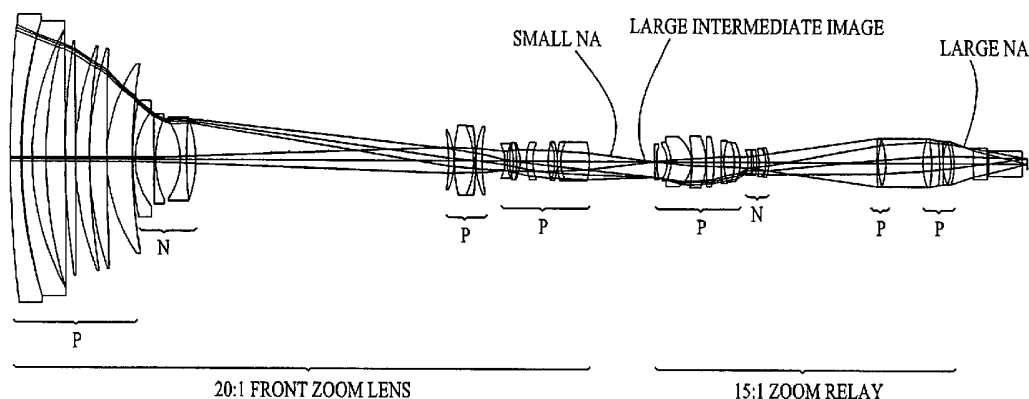
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(88) Date of publication of the international search report:
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: ZOOM LENS SYSTEM



(57) Abstract: A zoom lens system is disclosed. The zoom lens system forms a final image of an object and a first intermediate real image between the object and the final image. The zoom lens system includes a first optical unit located between the object and the first intermediate real image. The first optical unit comprises at least one optical subunit which is moved to change the size (magnification) of the first intermediate real image. The zoom lens system also includes a second optical unit located between the first intermediate real image and the final image, at least a portion of which is moved to change the size (magnification) of the final image. The zoom lens system provides a wide zoom range of focal lengths with continuous zooming between the focal lengths and optional image stabilization.

WO 2004/010199 A3

INTERNATIONAL SEARCH REPORT

Int. Application No
PCT/US 03/22418

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G02B15/14 G02B27/64

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)
IPC 7 G02B

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

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

EP0-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 970 366 A (SEKIGUCHI TAKESHI) 20 July 1976 (1976-07-20) abstract; figures 1,3 column 1, line 13 - line 20 column 2, line 2 - line 6 column 3, line 12 - line 19 ---	1-78
A	US 3 192 829 A (KEIZO YAMAJI) 6 July 1965 (1965-07-06) the whole document ---	1-78
A	US 4 033 674 A (SEKIGUCHI TAKESHI) 5 July 1977 (1977-07-05) the whole document ---	1-78
A	US 4 971 428 A (MOSKOVICH JACOB) 20 November 1990 (1990-11-20) the whole document ---	1-78
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "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)
- "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

- "T" 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
- "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
- "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.
- "&" document member of the same patent family

Date of the actual completion of the international search

4 February 2004

Date of mailing of the international search report

19/02/2004

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INTERNATIONAL SEARCH REPORT

Int onal Application No PCT/US 03/22418

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 835 272 A (KODAMA NAKO) 10 November 1998 (1998-11-10) the whole document ---	1-78
A	US 6 157 494 A (NAGATA TETSUO) 5 December 2000 (2000-12-05) the whole document ---	24
A	US 5 771 123 A (HAMANO HIROYUKI) 23 June 1998 (1998-06-23) the whole document ---	2,10, 14-16
A	US 5 721 641 A (AOKI MASAYUKI) 24 February 1998 (1998-02-24) the whole document ---	2,10, 14-16
A	US 5 790 309 A (OHTAKE MOTOYUKI) 4 August 1998 (1998-08-04) the whole document -----	1-78

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 03/22418

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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:
see FURTHER INFORMATION sheet PCT/ISA/210
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 II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

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 an additional fee, this Authority did not invite payment of any additional fee.
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.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

In view of the large number and also the phrasing of the claims presently on file, which render it difficult, if not impossible, to determine the matter for which protection is sought, the present application fails to comply with the clarity and conciseness requirements of Art.6 PCT (see also R.6.1(a) PCT) to such an extent that a meaningful search is impossible. Consequently, the search has been carried out for those parts of the application which do appear to be clear (and concise), namely as far as functions and technical requirements are concerned with a zoom, based on the description:

- double zoom system with ultra-high zoom ratio
- pupil re-imaging between sub-units
- aberration correction (aspherical surfaces, diffractive surfaces, materials, ...)
- image stabilisation.

The main origin of unclarity is that the object of the invention is stated to be the provision of a zoom with ultra-high zoom-ratio (i.e. higher than 100:1) and to overcome inefficiencies of such prior-art zooms (see e.g. the description page 3 line 28 - page 4 line 27 "Summary of the Invention"). However, these ultra-high zoom-ratio aspects are only claimed in claims 77-78 (of 78) as result to be achieved (lack of structural features).

Claims 1-76 relate to standard aspects for zooms such as group motions, pupil imaging, image stabilisation, geometric and chromatic aberration correction.

Also, the initial phase of the search revealed a very large number of documents relevant to the issue of novelty. So many documents were retrieved that it is impossible to determine which parts of the claim(s) may be said to define subject-matter for which protection might legitimately be sought (Art.6 PCT). For these reasons, a meaningful search over the whole breadth of the claim(s) is impossible. Consequently, the search has been restricted to the parts mentioned above.

Formally speaking, the nine independent claims lack unity (4 groups).

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/US 03/22418

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