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- (71) Applicant (for all designated States except US): PANAVISION INTERNATIONAL, L.P. [US/US]; 6219 De Soto Avenue, Woodlan Hills, CA 91367 (US).

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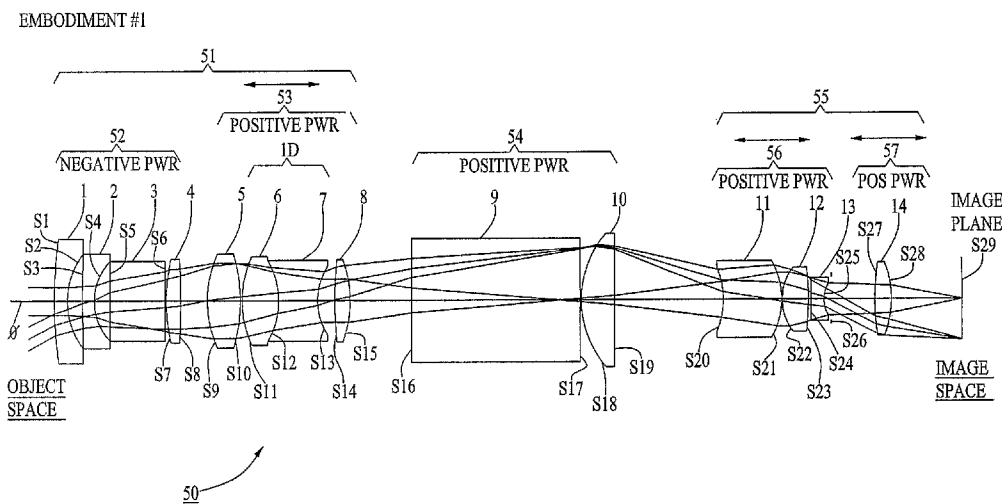
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): CALDWELL, James, Brian [US/US]; 209 High Street, Petersburg, VA 23803 (US). NEIL, Iain, A. [US/CH]; Via Tesserete 10, Villa Sassa #252, CH-6900 Lugano (CH).
- (74) Agents: KUBOTA, Glenn, M. et al.; Morrison & Foerster LLP, 555 West Fifth Street, Los Angeles, CA 90013-1024 (US).
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(54) Title: WIDE-RANGE, WIDE-ANGLE COMPOUND ZOOM WITH SIMPLIFIED ZOOMING STRUCTURE



(57) Abstract: A zoom lens is disclosed having a zoom ratio larger than four with a field of view at the short focal length position larger than 85 degrees and with a minimal number of moving groups. The zoom lens utilizes a compound zoom structure comprising an NP or NPP zoom kernel followed by a P or PP zoom relay, with only two or three moving groups that can be used for both zooming, focusing and athermalization. An overall compact package size is achieved by the use of prisms to fold the optical path in strategic locations. An optional variable power liquid cell can provide close focusing with little or no focus breathing.

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# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US06/10621

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC: **G02B 23/14**( 2006.01)

USPC: 359/432

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)

U.S. : 359/432, 680-682, 686-689, 715, 716, 726, 737, 740, 781, 665-667, 362, 363, 432, 434

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
EAST; US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM\_TDB; zoom\$3 adj3 lens\$2, intermediate with imag\$3

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4,147,410 A (SHIMOMURA et al) 03 April 1979 (03.04.1979) see entire document.	1-44
A,P	US 6,961,188 B2 (BETENSKY et al) 01 November 2005 (01.11.2005) see entire document.	1-44
A,P	US 7,142,370 B2 (SATO) 28 November 2006 (28.11.2006) see entire document.	1-44
A	US 2003/0133200 A1 (SATO) 17 July 2003 (17.07.2003) see entire document.	1-44

Further documents are listed in the continuation of Box C.

See patent family annex.

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Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Facsimile No. (571) 273-3201

Authorized officer

Jose Dees

*Nova M Chapman*

Telephone No. 571-272-1569