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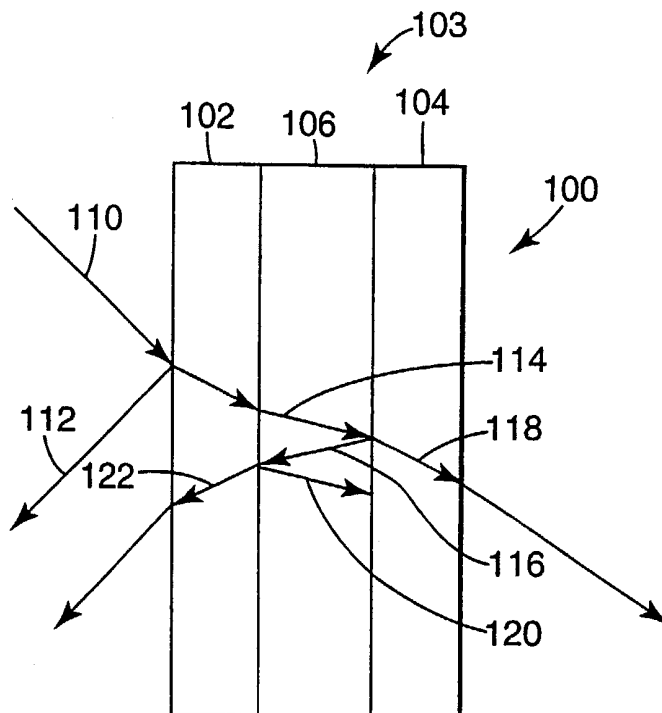
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09/642,717 21 August 2000 (21.08.2000) US
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- Published:  
— with international search report

[Continued on next page]

(54) Title: LOSS ENHANCED REFLECTIVE OPTICAL FILTERS



(57) Abstract: Optical filters and their manufacture, as well as the use of the optical filters in optical devices, such as polarizers and mirrors are described. The optical filters typically include a first reflective multilayer film, a second reflective multilayer film, and a lossy element disposed between the first and second reflective multilayer films.

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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.*

**INTERNATIONAL SEARCH REPORT**

International Application No

PCT/US 01/03830

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC 7 G02B5/28 G02B5/30 G02B5/22 G02B5/26

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)

EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category	Date of the document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 021 001 A (TURNER AARON N) 1 February 2000 (2000-02-01) abstract column 2, line 36 - line 56 ---	1-3,5-7, 23
X	FR 2 626 981 A (LEFEVRE ANNE MARIE) 11 August 1989 (1989-08-11) claims 2,4,6 ---	1-3,5-7
X	US 5 493 442 A (BUCHHOLZ JUERGEN ET AL) 20 February 1996 (1996-02-20) column 7, line 64 -column 9, line 53 ---	1-3,5-7
X	DE 36 20 989 A (FOMIN AGNETA) 7 January 1988 (1988-01-07) column 4, line 17 - line 62; figure 2 --- -/--	1,4

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

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Date of mailing of the international search report

13.03.02

Name and mailing address of the ISA

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/03830

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 43 32 042 C (FRAUNHOFER GES FORSCHUNG) 30 March 1995 (1995-03-30) abstract page 4, line 52 -page 5, line 2 -----	1,4
X	EP 0 609 593 A (BARR & STROUD LTD) 10 August 1994 (1994-08-10)	1,3,4,6, 7,9, 12-23, 25,26,29
Y	page 4, line 7 - line 41 figures; tables -----	24,28
X	GB 1 305 700 A (STANLEY WILLIAM WARREN) 7 February 1973 (1973-02-07)  page 1, line 65 - line 74 page 2, line 5 - line 29 page 2, line 82 -page 3, line 14 -----	1,3,4,6, 7,9, 12-17, 19,21, 23,29
Y	FR 2 645 971 A (GIRERD RENE) 19 October 1990 (1990-10-19) page 19, line 19 -page 21, line 16 -----	24,28
X	DE 39 20 043 A (ZEISS CARL FA) 3 January 1991 (1991-01-03) column 2, line 13 - line 32 column 3, line 37 - line 55 -----	23,25
X	CORION CATALOGUE: OPTICAL FILTERS AND COATINGS, 2ND EDITION, - 1998 XP002191767 page 51 -----	1,2,4-7, 9,12, 14-18,23

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US 01/03830

## 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:
  
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:

see additional sheet

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**

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-8,23

optical filter with first and second multilayer reflective films and lossy element disposed in between them, the reflective films being polarisers over a wavelength range

2. Claims: 9-22,29

optical filter with first and second multilayer reflective films and lossy element disposed in between them, the reflective films each having a minimum optical density over a specified wavelength range and the lossy element causing a specified amount of loss in the same wavelength range

3. Claims: 24,28

an article comprising at least one transparent lens used as substrate for a first and second multilayer reflective films and a lossy element disposed in between them

4. Claims: 25-27

an article comprising at least one transparent substrate with first and second multilayer reflective films and a lossy element disposed in between them, first and second reflective films reflecting at least a portion of infrared light

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/03830

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6021001	A	01-02-2000	NONE	
FR 2626981	A	11-08-1989	FR 2626981 A1	11-08-1989
US 5493442	A	20-02-1996	DE 4410275 A1 IT 1273382 B JP 6308323 A	06-10-1994 08-07-1997 04-11-1994
DE 3620989	A	07-01-1988	DE 3620989 A1	07-01-1988
DE 4332042	C	30-03-1995	DE 4332042 C1	30-03-1995
EP 0609593	A	10-08-1994	GB 2261523 A , B NO 930435 A EP 0609593 A1 DE 69301085 D1 DE 69301085 T2 US 5399298 A	19-05-1993 09-08-1994 10-08-1994 01-02-1996 25-07-1996 21-03-1995
GB 1305700	A	07-02-1973	NONE	
FR 2645971	A	19-10-1990	FR 2645971 A1 US 5083858 A	19-10-1990 28-01-1992
DE 3920043	A	03-01-1991	DE 3920043 A1	03-01-1991