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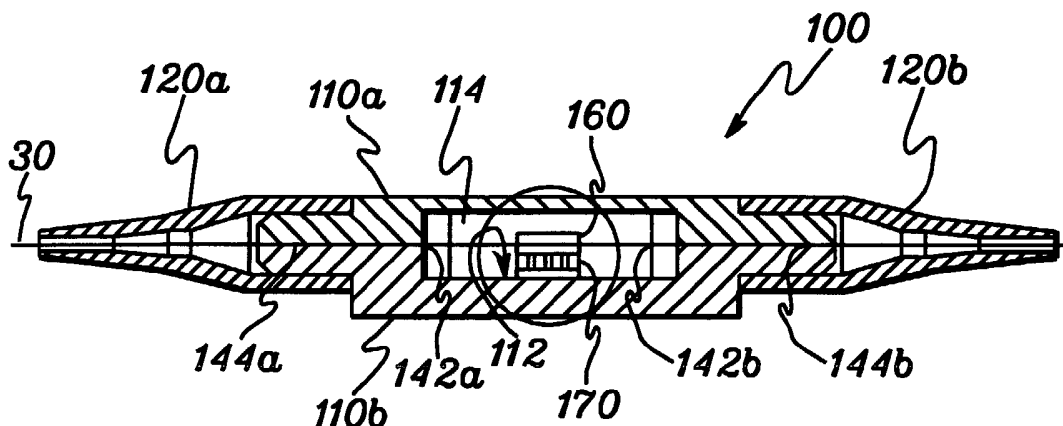
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- (71) Applicant (for all designated States except US): MOLECULAR OPTOELECTRONICS CORPORATION [US/US]; 877 25th Street, Watervliet, NY 12189 (US).
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- Published: — with international search report
- (88) Date of publication of the international search report: 23 October 2003

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: VARIABLE OPTICAL ATTENUATOR EMPLOYING POLARIZATION MAINTAINING FIBER



(57) Abstract: An electrically controllable, variable optical attenuator (VOA) is disclosed, in which polarization maintaining fiber (30) is employed. The fiber (30) is modified to expose the evanescent field of optical energy transmitted therein, by removing material therefrom in a direction parallel to either the fast or slow axis of the fiber (30), while preserving the polarization maintaining property of the fiber (30). A controllable material (160) is formed over the modified portion, to remove optical energy in response to a changeable stimulus applied, which changes the refractive index of the material. Related packaging, material composition and system aspects of the attenuator are also disclosed.

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INTERNATIONAL SEARCH REPORT

Intern: Application No
PCT/US 02/08629

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G02B6/26 G02F1/01 G02B6/28

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 G02F

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, WPI Data, PAJ, INSPEC, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 00 49434 A (GILES IAN PETER ;MONDANOS MIKALIS (GB); PROTODEL INTERNATIONAL LIM) 24 August 2000 (2000-08-24) page 2, line 16 - line 33	1-3,6, 30-32,35
Y	page 5, paragraph 2	7-11, 36-40
A	page 6, line 25 -page 7, line 26; figures 1,3	4,5
Y	--- US 6 191 224 B1 (WAGONER GREGORY A ET AL) 20 February 2001 (2001-02-20) figure 5; example 4	7-11, 36-40
A	--- DE 40 05 557 A (DAIMLER BENZ AG) 29 August 1991 (1991-08-29) column 2, line 7-33 column 3, line 52-55; figure 1 --- -/--	1,30

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

16 January 2003

Date of mailing of the international search report

07. 05. 2003

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VON MOERS, F

INTERNATIONAL SEARCH REPORT

Intern..... Application No
PCT/US 02/08629

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CHEN ZHE ET AL: "Thermally poled PANDA fibre device with microstrip electrode" ELECTRONICS LETTERS, IEE STEVENAGE, GB, vol. 36, no. 22, 26 October 2000 (2000-10-26), pages 1839-1840, XP006015881 ISSN: 0013-5194 page 1839; figures 1,2	4,33
A	US 6 002 823 A (KUCK VALERIE JEANNE ET AL) 14 December 1999 (1999-12-14) column 4, line 24 - line 35	12,41

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 02/08629

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.:

1-12, 30-41

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: 1-12,30-41

Optical fiber attenuator having a side surface covered by a controllable material. Light energy is extracted according to a changeable stimulus and the attenuator comprises a thermally insulating housing. The fiber is a panda fiber.

2. Claims: 13-29,42-58

Optical fiber attenuator having a side surface covered by a controllable material. The optical dispersion properties of the controllable material are adapted to those of the fiber.

INTERNATIONAL SEARCH REPORT

Information on patent family members

Internat Application No
PCT/US 02/08629

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0049434	A	24-08-2000	AU 2563400 A	04-09-2000
			EP 1177466 A1	06-02-2002
			WO 0049434 A1	24-08-2000
			GB 2348295 A	27-09-2000

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			US 6268435 B1	31-07-2001
			US 2001053822 A1	20-12-2001

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