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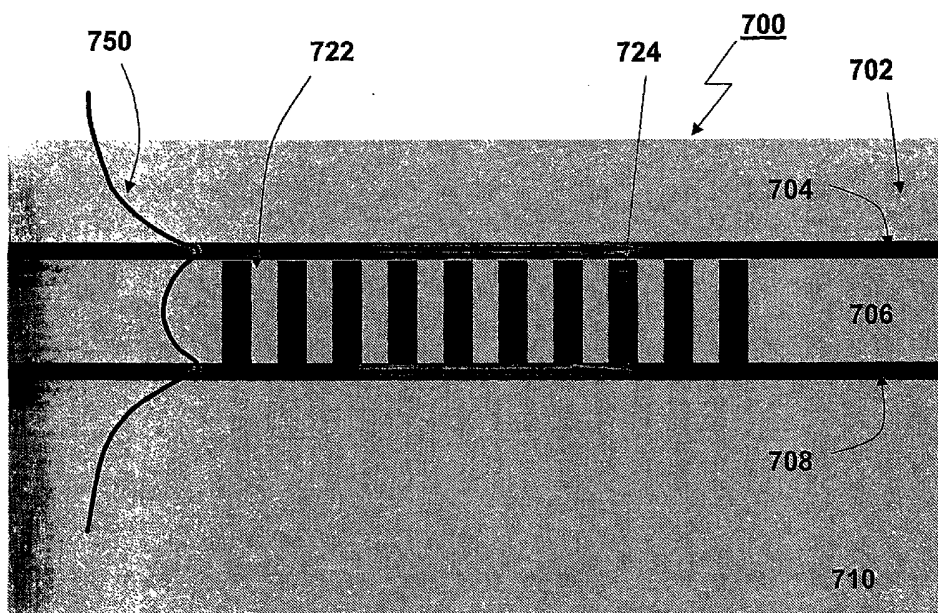
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- (71) Applicant: **MESOPHOTONICS LIMITED** [GB/GB]; Chilworth Business Incubator, 2 Venture Road, Chilworth Science Park, Southampton SO16 7NP (GB).
- (72) Inventors: **ZOOROB, Majd**; 54 Park View, 5 Handel Road, Southampton S015 2NY (GB). **CHARLTON, Martin**; 167 Manor Farm Road, Bitterne Park, Southampton SO18 1NY (GB). **PARKER, Greg**; 52 New Forest Drive, Brockenhurst, Hampshire SO42 7QW (GB).
- (74) Agent: **GILL JENNINGS & EVERY**; Broadgate House, 7 Eldon Street, London EC2M 7LH (GB).
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14 April 2005

[Continued on next page]

(54) Title: OPTICAL WAVEGUIDE STRUCTURE



(57) Abstract: There is provided a planar waveguide structure (700) having a first core layer (708), a second core layer (704) and a cladding layer (706), wherein the cladding layer (706) is disposed between the first core layer (708) and the second core layer (704) to form an inter-core cladding layer (706). The inter-core cladding layer (706) comprises a first region (722) having a first refractive index and an array of sub-regions (724) formed therein having a second refractive index. The subregions (724) do not extend into either the first or the second core layer, and they give rise to a photonic band structure region, which is effective to perturb an evanescent field of an optical signal propagating through the core layers.

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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/GB2004/002626

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 G02B6/12 G02B6/20 G02B6/22

"CORRECTED VERSION"

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 °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 130 969 A (JOANNOPOULOS JOHN D ET AL) 10 October 2000 (2000-10-10)  figure 21	1,2, 4-38, 43-68, 75,76
X	KOSHIBA M: "WAVELENGTH DIVISION MULTIPLEXING AND DEMULTIPLEXING WITH PHOTONIC CRYSTAL WAVEGUIDE COUPLERS" JOURNAL OF LIGHTWAVE TECHNOLOGY, IEEE. NEW YORK, US, vol. 19, no. 12, December 2001 (2001-12), pages 1970-1975, XP001159835 ISSN: 0733-8724 the whole document	1,2, 4-38, 43-68, 75,76

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

21 September 2004

Date of mailing of the international search report

29.12.2004

Name and mailing address of the ISA  
European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer  
  
Verbandt, Y

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/GB2004/002626

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>KOSHIBA M ET AL: "TIME-DOMAIN BEAM PROPAGATION METHOD AND ITS APPLICATION TO PHOTONICCRYSTAL CIRCUITS" JOURNAL OF LIGHTWAVE TECHNOLOGY, IEEE. NEW YORK, US, vol. 18, no. 1, 1 January 2000 (2000-01-01), pages 102-110, XP001003328 ISSN: 0733-8724 figure 9</p> <p style="text-align: center;">-----</p>	<p>1,2, 4-38, 43-68, 75,76</p>
A	<p style="text-align: center;">-----</p> <p>TSUJI Y ET AL: "FINITE ELEMENT METHOD USING PORT TRUNCATION BY PERFECTLY MATCHED LAYER BOUNDARY CONDITIONS FOR OPTICAL WAVEGUIDE DISCONTINUITY PROBLEMS" JOURNAL OF LIGHTWAVE TECHNOLOGY, IEEE. NEW YORK, US, vol. 20, no. 3, March 2002 (2002-03), pages 463-468, XP001130094 ISSN: 0733-8724</p> <p style="text-align: center;">-----</p>	

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/GB2004/002626

## Box 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 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 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.:  
  
1-38, 43-68, 75, 76

Remark on Protest

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

## INTERNATIONAL SEARCH REPORT

International Application No. PCT/ GB2004/ 002626

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-38,43-68,75,76

Planar waveguide coupler with photonic bandgap structure in cladding

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2. claims: 39-42,69-74,77

Double-core microstructured fiber

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No  
PCT/GB2004/002626

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6130969	A	10-10-2000	CA 2293660 A1 17-12-1998
			EP 0988569 A1 29-03-2000
			JP 2001508887 T 03-07-2001
			US 6101300 A 08-08-2000
			US 2002118923 A1 29-08-2002
			WO 9857207 A1 17-12-1998
			US 6512866 B1 28-01-2003
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