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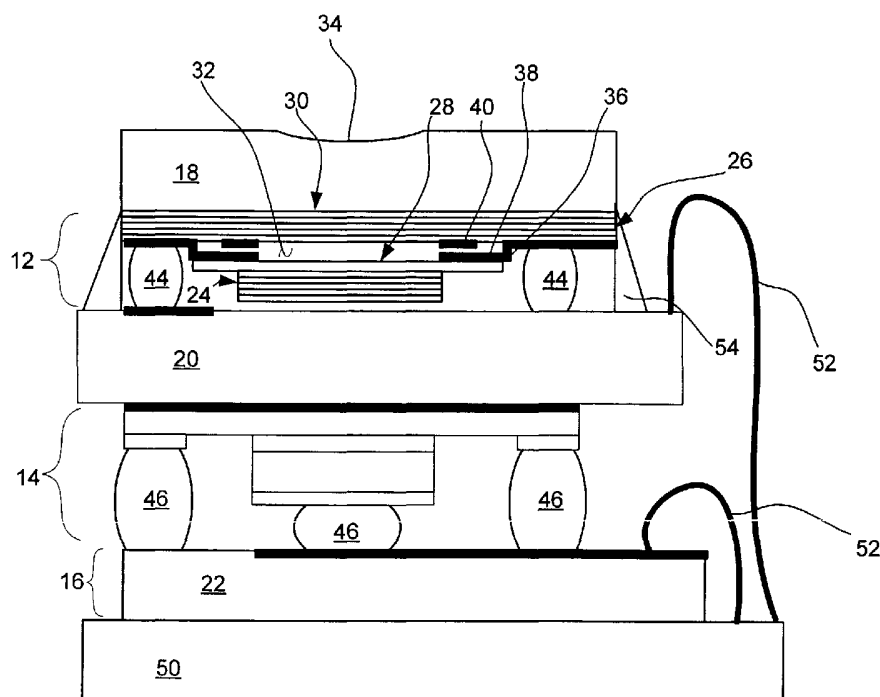
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- Published:  
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[Continued on next page]

(54) Title: SPECTRALLY TUNABLE DETECTOR



(57) Abstract: A spectrally tunable optical detector and methods of manufacture therefore are provided. In one illustrative embodiment, the tunable optical detector includes a tunable bandpass filter, a detector and readout electronics, each supported by a different substrate. The substrates are secured relative to one another to form the spectrally tunable optical detector.

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31 December 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.*

INTERNATIONAL SEARCH REPORT

Internal Application No  
PCT/US 03/08103

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 G01J5/20 G02B26/08

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 G01J 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, WPI Data, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No. |
|------------|---|-----------------------|
| X          | JERMAN J H ET AL: "A MINIATURE FABRY-PEROT INTERFEROMETER WITH A CORRUGATED SILICON DIAPHRAGM SUPPORT" SENSORS AND ACTUATORS A, ELSEVIER SEQUOIA S.A., LAUSANNE, CH, vol. A29, no. 2, November 1991 (1991-11), pages 151-158, XP000241462 ISSN: 0924-4247 abstract page 152, column 1, paragraph 4 -page 153, column 1, paragraph 1 page 156, column 2, paragraph 2 figure 1<br>---<br>-/-- | 1-31                  |

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
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- \*P\* document published prior to the international filing date but later than the priority date claimed

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- \*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

30 September 2003

Date of mailing of the international search report

09. 10. 03

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## INTERNATIONAL SEARCH REPORT

Internati      Application No  
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| C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT |   |                       |
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| Category °   | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No. |
| X  | TAYEBATI P ET AL: "Microelectromechanical tunable filter with stable half symmetric cavity"<br>ELECTRONICS LETTERS, IEE STEVENAGE, GB,<br>vol. 34, no. 20,<br>1 October 1998 (1998-10-01), pages<br>1967-1968, XP006010390<br>ISSN: 0013-5194<br>abstract<br>the whole document   | 1-28                  |
| Y  | ---   | 32-38                 |
| Y  | CHUNG S-W ET AL: "Design and fabrication of 10x10 micro-spatial light modulator array for phase and amplitude modulation"<br>SENSORS AND ACTUATORS A, ELSEVIER SEQUOIA S.A., LAUSANNE, CH,<br>vol. 78, no. 1, January 1999 (1999-01),<br>pages 63-70, XP004244582<br>ISSN: 0924-4247<br>abstract<br>page 66, column 2, paragraph 2 -page 68,<br>column 1, paragraph 1<br>figure 6   | 32-38                 |
| X  | CHITICA N ET AL: "MONOLITHIC INP-BASED TUNABLE FILTER WITH 10-NM BANDWIDTH FOR OPTICAL DATA INTERCONNECTS IN THE 1500-NM BAND"<br>IEEE PHOTONICS TECHNOLOGY LETTERS, IEEE INC. NEW YORK, US,<br>vol. 11, no. 5, May 1999 (1999-05), pages<br>584-586, XP000830421<br>ISSN: 1041-1135<br>abstract<br>page 584, column 2, paragraph 3 -page 585,<br>column 2, paragraph 1<br>figure 1 | 1,12,23               |
| X  | US 6 324 192 B1 (TAYEBATI PARVIZ)<br>27 November 2001 (2001-11-27)<br>abstract<br>column 4, line 44 - line 67<br>column 6, line 10 -column 8, line 34<br>figures 5,7  | 1,12,23               |
| A  | US 5 550 373 A (COLE BARRETT E ET AL)<br>27 August 1996 (1996-08-27)<br>abstract<br>column 3, line 26 -column 4, line 12<br>figure 6  | 11                    |
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## INTERNATIONAL SEARCH REPORT

Internati      pplication No  
PCT/US 03/08103

| C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT |   |                       |
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| Category °   | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No. |
| A  | US 6 080 988 A (AKAGAWA KEIICHI ET AL)<br>27 June 2000 (2000-06-27)<br>abstract<br>column 19, line 54 -column 23, line 22<br>figures 2-4  | 29-31                 |
| X  | US 2002/031155 A1 (VAKHSHOORI DARYOOSH ET AL)<br>14 March 2002 (2002-03-14)<br>abstract<br>paragraphs '0036!-'0040!, '0086!-'0094!<br>figures 3,4,6   | 39-41                 |
| X  | EP 0 667 548 A (AT & T CORP)<br>16 August 1995 (1995-08-16)<br>abstract<br>column 4, line 54 -column 6, line 49<br>figures 1,2,7  | 39-41                 |
| A  | TAYEBATI P ET AL: "Widely tunable<br>Fabry-Perot filters using<br>high-index-contrast DBRs"<br>DESIGN AND MANUFACTURING OF WDM DEVICES,<br>DALLAS, TX, USA, 4-5 NOV. 1997,<br>vol. 3234, pages 206-218, XP009014426<br>Proceedings of the SPIE - The<br>International Society for Optical<br>Engineering, 1998, SPIE-Int. Soc. Opt.<br>Eng, USA<br>ISSN: 0277-786X<br>page 208, paragraph 1<br>figure 1 | 40,41                 |
| A  | US 6 296 779 B1 (JUNEAU THOR ET AL)<br>2 October 2001 (2001-10-02)<br>abstract<br>column 4, line 18 -column 5, line 35<br>figure 3  | 42,44                 |

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US 03/08103

## 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: 1-38

A spectrally tunable bandpass filter comprising upper and lower reflective plates separated by a gap, the filter being tuned to a bandpass wavelength by electrostatically moving the plates and thus adjusting the separation gap, and methods for making a spectrally tunable bandpass filter involving the provision of sacrificial layers.

(Though not explicitly mentioned in claims 1 and 12, it is clear from the description on page 1, l. 24 - p. 6, l. 6 that it is essential to the invention that the separation gap between two reflective plates is adjusted electrostatically in order to tune the filter - i.e. that the filter should be constructed so that a voltage can be applied between one or more upper and lower electrodes (see, for instance, fig. 1)).

2. Claims: 39-47

An electrostatically actuated structure comprising a substrate, upper and lower electrodes wherein an upper electrode is secured to a supporting post via elongated legs.

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

Internat. Application No  
**PCT/US 03/08103**

| Patent document cited in search report |    | Publication date | Patent family member(s) | Publication date |
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