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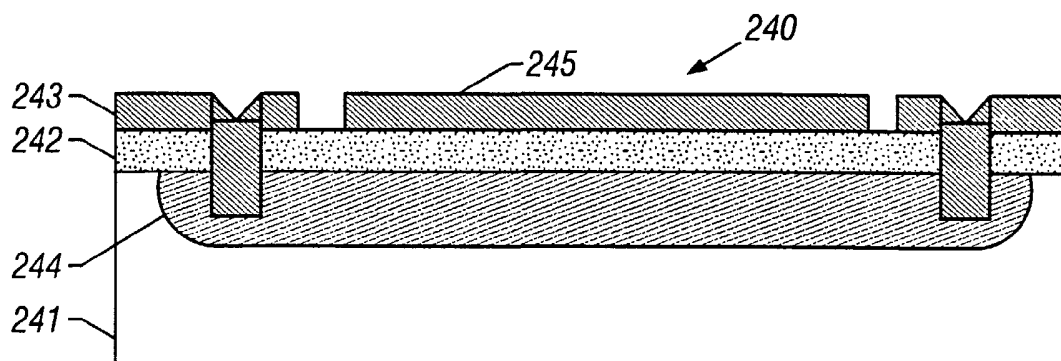
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- (63) Related by continuation (CON) or continuation-in-part (CIP) to earlier applications:
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| US | 60/183,246 (CIP) | |
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[Continued on next page]

(54) Title: TWO-DIMENSIONAL MICRO-MIRROR ARRAY ENHANCEMENTS



(57) Abstract: A micro-mirror strip assembly having a plurality of two-dimensional micro-mirror structures with improved deflection and other characteristics is presented. In the micro-mirror structures, electrodes for electrostatic deflection are disposed on conical or quasi-conical entities that are machined, attached or molded into a substrate. Torsion sensors (244) are provided along the axes of rotation to control deflection of the quadrant deflection electrodes. The shielded sensor structure (240) includes a silicon layer (241), an insulating layer (242) and a metal layer (243). The structure further includes a sensor implant resistor (244) in the silicon layer (241) and a shield (245) that is applied over the sensor implant resistor (244) to stabilise sensor output and eliminate light sensitivity.



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Published:

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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 01/05309

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G02B26/08 G02B26/02

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, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 629 790 A (NEUKERMANS ARMAND P ET AL) 13 May 1997 (1997-05-13) figures 1,3 column 2, line 38 - line 43 column 3, line 19 - column 4, line 51 column 7, line 40 - line 65 ---	1,4
A	US 5 648 618 A (NEUKERMANS ARMAND P ET AL) 15 July 1997 (1997-07-15) figures 1,3,4 column 3, line 38 - line 60 column 4, line 62 - column 5, line 35 column 6, line 61 - line 67 -----	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

19 August 2002

Date of mailing of the international search report

06. 03. 2003

Name and mailing address of the ISA

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SCHEU, M

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.:

1,4

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: 1,4

Torsional sensor for mirror structure comprising a shield and structure comprising such a sensor

2. Claims: 2,3

Shear sensor including current contacts of a particular shape

3. Claims: 5,6

Structure comprising electrodes made of a highly resistive material

4. Claim : 7

Structure comprising electrodes coated with an insulating material

5. Claim : 8

Method of determining an optical path to be traversed by an optical beam comprising determining an average deflection associated with a curvature of a mirror

6. Claims: 9-11

Micro mirror strip assembly comprising a frame, spacers and dam spacers

7. Claims: 12,13

A micro mirror strip assembly comprising a frame, two dimensional deflecting mirror structures oriented to direct away air movement produced by the deflecting mirror structure

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/05309

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