Title: OPTICAL SENSING ELEMENT ARRANGEMENT WITH INTEGRAL PACKAGE

Abstract: A sensor assembly is disclosed that includes a hollow casing having a radiation entrance opening. A radiation-transmissive optic is at the radiation entrance opening. A substrate is inside and sealed against the hollow casing. An optical sensing element is coupled to the substrate and configured to sense radiation that has passed through the radiation-transmissive optic. A method of manufacturing the sensor assembly also is disclosed.
Published:
— with international search report (Art. 21(3))
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))
### INTERNATIONAL SEARCH REPORT

**International application No**

PCT/US2013/066482

**A. CLASSIFICATION OF SUBJECT MATTER**

INV. G01J5/Q4 G01J5/20 G01J5/02 G01J5/08 G01J5/24

According to International Patent Classification (IPC) or to both national classification and IPC

**B. MINIMUM CLASSIFICATION OF SUBJECT MATTER**

G01J

**DOCUMENTATION SEARCHED**

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
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<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<tr>
<td>X</td>
<td>US 2004/187904 AI (KRELLNER THEODORE J [US] ET AL) 30 September 2004 (2004-09-30) paragraphs [0015], [0016], [0022]; figure 1</td>
<td>1-3,6-9, 19-25 ,36</td>
</tr>
</tbody>
</table>

See patent family 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 application or patent 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

**Date of the actual completion of the international search**

7 April 2014

**Date of mailing of the international search report**

04/08/2014

**Name and mailing address of the ISA/ European Patent Office, P.B. 5018 Patentlaan 2 NL - 2280 HV Rijswijk Tel.: (+31-70) 340-2040, Fax: (+31-70) 340-3016**

**Authorized officer**

Hambach, Di rk

Form PCT/ISA/210 (second sheet) (April 2009)
INTERNATIONAL SEARCH REPORT

Box No. 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 No. 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 fees, this Authority did not invite payment of additional fees.

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.:

   1-3, 6-9, 19-25, 36

Remark on Protest

[ ] The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

[ ] The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

[ ] No protest accompanied the payment of additional search fees.
This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-3, 6-9, 19-25, 36
   Casing filled with inert gas

2. claims: 4, 5, 29-31 (completely); 17, 37 (partially)
   Contacting the actual sensing element with external circuitry

3. claims: 10-12, 18, 26-28 (completely); 17, 37 (partially)
   Attaching an optical element to the casing

4. claims: 13-16, 32-35
   Read-out circuitry for the sensor
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<th>Patent document cited in search report</th>
<th>Publication date</th>
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