

(19) World Intellectual Property
Organization
International Bureau



(10) International Publication Number
WO 2014/202753 A9

(43) International Publication Date
24 December 2014 (24.12.2014)

- (51) International Patent Classification:
G01B 11/14 (2006.01) **H04R 23/00** (2006.01)
- (21) International Application Number:
PCT/EP2014/063025
- (22) International Filing Date:
20 June 2014 (20.06.2014)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
20130866 21 June 2013 (21.06.2013) NO
20130884 26 June 2013 (26.06.2013) NO
- (71) Applicant: **SINVENT AS** [NO/NO]; Postboks 4764 Sluppen, N-7465 Trondheim (NO).
- (72) Inventors: **LACOLLE, Matthieu**; Myrveien 22A, N-1397 Nesøya (NO). **JOHANSEN, Ib-Rune**; Svensenga 174, N-0882 Oslo (NO). **BAKKE, Thor**; Lysaker Brygge 14, NO-1366 Lysaker (NO). **BJOR, Ole-Hermann**; Gjellum Terrasse 9A, N-1389 Heggedal (NO).
- (74) Agent: **PROTECTOR IP CONSULTANTS AS**; Oscarsgate 20, N-0352 Oslo (NO).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,

HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

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))

(88) Date of publication of the revised international search report:

9 April 2015

(15) Information about Correction:
see Notice of 9 April 2015

(54) Title: OPTICAL DISPLACEMENT SENSOR ELEMENT

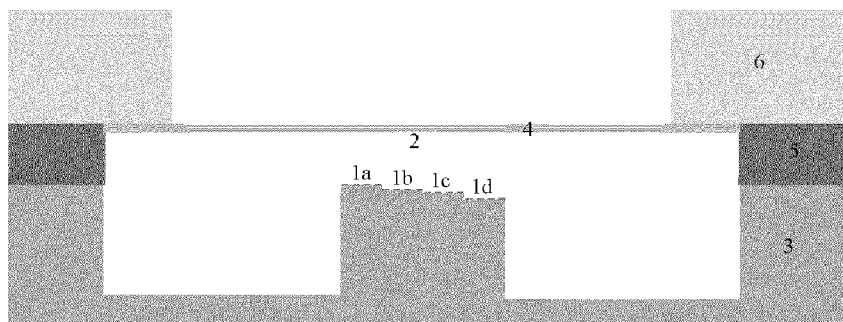


Fig. 3

(57) Abstract: The present invention relates to an optical displacement sensor comprising a first at least partially reflective surface and a second surface having a diffractive pattern, the surfaces being provided on elements having a variable distance between them, each surface pair defining a cavity between them. The sensor also comprising at least one light source transmitting light at least one a chosen wavelength range into said cavities and at least one light detector receiving light from the cavities, wherein said diffractive patterns are adapted to direct light toward at least one detector provided in a known position relative to said diffractive surfaces..



WO 2014/202753 A9

A. CLASSIFICATION OF SUBJECT MATTER
 INV. G01B11/14 H04R23/00
 ADD.
 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)
 G01B H04R

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 practicable, search terms used)
 EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005/018541 A1 (JOHANSEN IB-RUNE [NO] ET AL) 27 January 2005 (2005-01-27) cited in the application paragraph [0001] - paragraph [0061]; figures 1-6	1-18
A	----- US 7 355 720 B1 (CARR DUSTIN W [US]) 8 April 2008 (2008-04-08) cited in the application column 3, line 65 - column 8, line 7; figures 1-3	1-18
A	----- US 2009/268211 A1 (CARR DUSTIN WADE [US] ET AL) 29 October 2009 (2009-10-29) cited in the application abstract; figure 1 paragraph [0020]	1-18
	----- -/--	

Further documents are listed in the continuation of Box C.

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	"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
"E" earlier application or patent but published on or after the international filing date	"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
"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)	"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
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"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 29 January 2015	Date of mailing of the international search report 09/02/2015
----------------------------------------------------------------------------------	----------------------------------------------------------------------

Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Beyfuß, Martin
----------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2014/063025

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>DAVID A BROWN ET AL: "A symmetric 3*3 coupler based demodulator for fiber optic interferometric sensors", PROCEEDINGS OF SPIE; [INTELLIGENT VEHICLE HIGHWAY SYSTEMS], S P I E - INTERNATIONAL SOCIETY FOR OPTICAL ENGINEERING, US, vol. 1584, 1 December 1991 (1991-12-01), pages 328-335, XP002657535, ISSN: 0277-786X, DOI: 10.1117/12.50954 ISBN: 978-0-8194-1677-3 cited in the application the whole document</p> <p style="text-align: center;">-----</p>	1-18
A	<p>US 2007/165896 A1 (MILES RONALD N [US] ET AL) 19 July 2007 (2007-07-19) the whole document</p> <p style="text-align: center;">-----</p>	1-18

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2014/063025

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2005018541	A1	27-01-2005	CA 2465299 A1 22-05-2003 DE 60217535 T2 15-11-2007 DK 1446979 T3 14-05-2007 EP 1446979 A1 18-08-2004 ES 2279894 T3 01-09-2007 NO 20015552 A 14-05-2003 PT 1446979 E 30-04-2007 SI 1446979 T1 30-06-2007 US 2005018541 A1 27-01-2005 WO 03043377 A1 22-05-2003
US 7355720	B1	08-04-2008	NONE
US 2009268211	A1	29-10-2009	US 2009268211 A1 29-10-2009 US 2012099114 A1 26-04-2012
US 2007165896	A1	19-07-2007	US 2007165896 A1 19-07-2007 US 2011038492 A1 17-02-2011 WO 2007084653 A2 26-07-2007