



(51) International Patent Classification:

G01C 19/72 (2006.01) G01C 19/64 (2006.01)
G01B 9/02 (2006.01)

(21) International Application Number:

PCT/US2009/034140

(22) International Filing Date:

13 February 2009 (13.02.2009)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/028,688 14 February 2008 (14.02.2008) US

(71) Applicant and

(72) Inventor: BERGH, Ralph A. [US/US]; 4257 E. Nisbet Rd., Phoenix, Arizona 85032 (US).

(74) Agent: LEONE, George A.; 1117 Broadway, Suite 401, Tacoma, Washington 98402 (US).

(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, BR, BW, BY, BZ, CA, CH, 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, IS, JP, KE, KG, KM, 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, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, 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, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (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, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, 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 international search report:

22 October 2009

(54) Title: AN INTERFEROMETER EMPLOYING A MULTI-WAVEGUIDE OPTICAL LOOP PATH AND FIBER OPTIC ROTATION RATE SENSOR EMPLOYING SAME

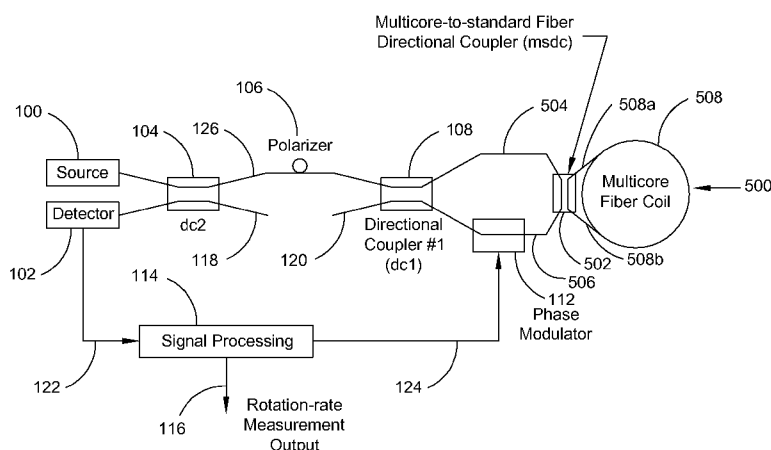


Figure 5

(57) Abstract: An interferometer employed, in part, as a Sagnac interferometer or fiber optic gyro (FOG) includes a light source (100) that provides a source light wave that is split into first and second light waves that are directed to traverse a defined optical loop path (508, 500) in opposite directions. The defined optical loop path (508, 500) in accordance with the present invention is provided by multiple waveguides wound into a coil such that the opposite traveling first and second light waves serially travel through all of the waveguides in opposite directions around the optical loop path.

A. CLASSIFICATION OF SUBJECT MATTER*G01C 19/72(2006.01)i, G01B 9/02(2006.01)i, G01C 19/64(2006.01)i*

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 8: G01C 19

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

Korean utility models and applications for utility models since 1975

Japanese utility models and applications for utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKIPASS (KIPO internet) & Keywords: "multi", "core", and "waveguide"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 04634282 A (HERBERT J. SHAW, et al.) 06 JANUARY 1987 See the whole document.	1-15
A	US 04702600 A (EBERHARD HANDRICH, et al.) 27 OCTOBER 1987 See the whole document.	1-15
A	WO 2002-016985 A1 (CORNING INC.) 28 FEBRUARY 2002 See the whole document.	1-15
A	US 2002-146226 A1 (MICHAEL A. DAVIS, et al.) 10 OCTOBER 2002 See the whole document.	1-15
A	WO 2007-143369 A1 (BAKER HUGHES INC.) 13. DECEMBER 2007 See the whole document.	1-15



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

"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 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

31 AUGUST 2009 (31.08.2009)

Date of mailing of the international search report

01 SEPTEMBER 2009 (01.09.2009)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon, 139 Seonsa-ro, Seo-
gu, Daejeon 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

LEE Byung Kyul

Telephone No. 82-42-481-8436



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2009/034140

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 04634282 A	06.01.1987	EP 0093170 A4	30.07.1985
		EP 0093170 B1	15.03.1989
		EP 0093170 A1	09.11.1983
		JP 07-006798 B2	30.01.1995
		US 04456377 A	26.06.1984
		US 04634282 A	06.01.1987
		WO 1983-001683 A1	11.05.1983
US 04702600 A	27.10.1987	EP 0172390 A2	26.02.1986
		EP 0172390 A3	28.05.1986
		EP 0172390 B1	14.12.1988
WO 2002-016985 A1	28.02.2002	AU 7002201 A	04.03.2002
		AU 2001-70022 A1	21.06.2001
US 2002-146226 A1	10.10.2002	US 06826343 B2	30.11.2004
WO 2007-143369 A1	13.12.2007	CA 2654268 A1	12.12.2007
		EP 2024708 A1	18.02.2009
		US 2007-0297711 A1	27.12.2007