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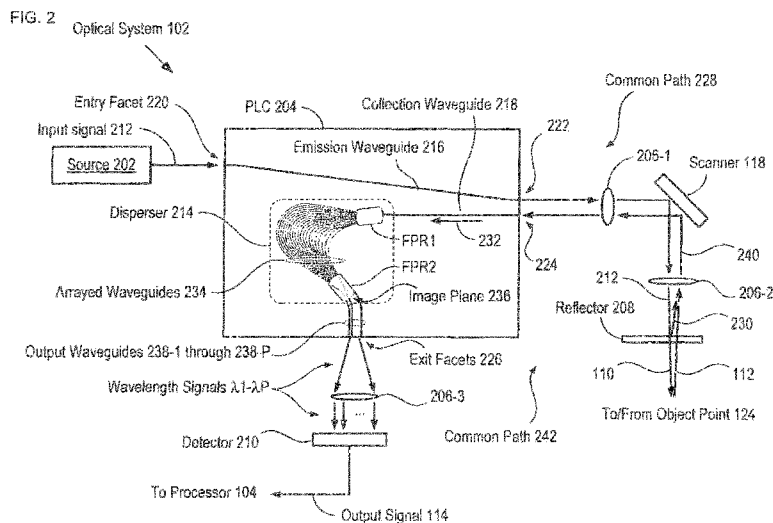
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Published:

- 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:
26 January 2017

(54) Title: COMMON-PATH INTEGRATED LOW COHERENCE INTERFEROMETRY SYSTEM AND METHOD THEREFOR



(57) Abstract: A low coherence interferometry Imaging system comprising a common-path Interferometer that is at least partially integrated as part of a planar lightwave circuit is disclosed. Imaging systems in accordance with the present invention are implemented in integrated optics without the inclusion of highly wavelength-sensitive components, as a result, they exhibit less wavelength dependence than PLC-based Interferometers of the prior art. Further, the common-path interferometer arrangement of the present invention avoids polarization and wavelength dispersion effects that plague prior-art PLC-based interferometers. Still further, an integrated common-path Interferometer is smaller and less complex than other integrated interferometers, which makes it possible to integrate multiple interferometers on a single chip, thereby enabling multi-signal systems, such as plane-wave parallel OCT systems.



WO 2016/202930 A3

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/063911

A. CLASSIFICATION OF SUBJECT MATTER
INV. G01B9/02
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 A61B

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	DUC NGUYEN V ET AL: "Integrated-optics-based swept-source optical coherence tomography", OPTICS LETTERS, OPTICAL SOCIETY OF AMERICA, US, vol. 37, no. 23, 1 December 2012 (2012-12-01), pages 4820-4822, XP001579074, ISSN: 0146-9592, DOI: 10.1364/OL.37.004820 [retrieved on 2012-11-16] cited in the application the whole document	1-10,13, 14
Y	US 2004/246490 A1 (WANG FEILING [US]) 9 December 2004 (2004-12-09) paragraph [0057] - paragraph [0075]; figures 2,3 ----- -/--	1-10,13, 14

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 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 10 October 2016	Date of mailing of the international search report 13/12/2016
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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 Gomez, Adriana
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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/063911

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6 144 449 A (KNUETTEL ALEXANDER [DE] ET AL) 7 November 2000 (2000-11-07) the whole document -----	1-10,13, 14

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2016/063911

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.:

1-10, 13, 14

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-10, 13, 14

directed to a low coherence interferometry system comprising a planar lightwave circuit module

2. claims: 11, 12, 15

directed to an optical system comprising a planar lightwave circuit module including a distribution network and a collection network which each includes a plurality of surface waveguides

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2016/063911

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
US 2004246490	A1	09-12-2004	CA 2528417 A1	06-01-2005
			JP 4756218 B2	24-08-2011
			JP 2006526790 A	24-11-2006
			US 2004246490 A1	09-12-2004
			US 2005018202 A1	27-01-2005
			US 2005286055 A1	29-12-2005
			US 2007103683 A1	10-05-2007
			US 2008030740 A1	07-02-2008
			US 2009073444 A1	19-03-2009
			US 2010014093 A1	21-01-2010
			US 2010091282 A1	15-04-2010
			US 2011063616 A1	17-03-2011
			US 2011285996 A1	24-11-2011
			US 2013100442 A1	25-04-2013
			WO 2005001522 A2	06-01-2005
US 6144449	A	07-11-2000	AU 2150297 A	20-08-1997
			EP 0876595 A1	11-11-1998
			US 6144449 A	07-11-2000
			US 6330063 B1	11-12-2001
			WO 9727468 A1	31-07-1997