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G02B 6/04 (2006.01) *A61B 8/00* (2006.01)
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- (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, 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, 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, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, 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, MD, 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, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) **Title:** OPTICAL FIBRE BEING VISIBLE IN MEDICAL IMAGING APPLICATIONS

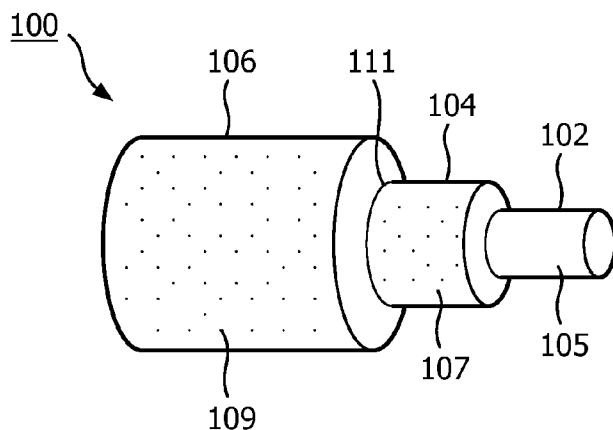


FIG. 1

(57) **Abstract:** An optical fiber or fiber assemblies include a core (102), cladding (104) surrounding the core and a coating (106) over the cladding. The core, the cladding and/or the coating includes an opaque material (105, 107, 109) to render the fiber visible in internal medical images.

**Declarations under Rule 4.17:**

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))
- 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:

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- with international search report (Art. 21(3))

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2012/051971

A. CLASSIFICATION OF SUBJECT MATTER
INV. G02B6/02 G02B6/04
ADD. A61B6/00 A61B8/00

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)

G02B A61B G01R

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)

EP0-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	JP 57 020703 A (TOKYO SHIBAURA ELECTRIC CO) 3 February 1982 (1982-02-03)	1,2,6,8
Y	abstract figures 1-4	22,25,27
X	PALEY M ET AL: "High magnetic susceptibility coatings for visualisation of optical fibres on a specialised interventional MRI system", EUROPEAN RADIOLOGY, SPRINGER INTERNATIONAL, BERLIN, DE, vol. 7, no. 8, 1 September 1997 (1997-09-01), pages 1341-1342, XP002564824, ISSN: 0938-7994, DOI: 10.1007/S003300050300 the whole document	1,8
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☒ 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

28 August 2012

Date of mailing of the international search report

20/11/2012

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2012/051971

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.: 28, 29
because they relate to subject matter not required to be searched by this Authority, namely:
Claims 28 and 29, which depends on claim 28, are directed to a diagnostic method on the human body (see also page 1 of the description). Thus, in accordance with Rule 39.1(iv) PCT no search has been carried out related to these claims.
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, 2, 6, 8, 22, 25, 27

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.

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2012/051971

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 250 045 A (BOHLEY THOMAS K [US]) 5 October 1993 (1993-10-05) abstract figures 1-7	22,25,27
Y	----- US 2008/262359 A1 (TEARNEY GUILLERMO J [US] ET AL) 23 October 2008 (2008-10-23) figures 10A-21 -----	22,25,27

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2012/051971

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
JP 57020703	A	03-02-1982	JP 1711506 C	11-11-1992
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			WO 2008121844 A1	09-10-2008

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, 2, 6, 8, 22, 25, 27

An optical fibre coated with metal to render it visible in medical images and a fibre bundle comprised of such fibres.

2. claims: 3-5, 23, 24

An optical fibre coated with X-ray opaque contrast dyes or X-ray opaque polymers and a fibre bundle comprised of such fibres.

3. claims: 7, 26

An optical fibre comprising a coating with microbubbles.

4. claims: 9-13

An optical fibre bundle wherein the glue combining the fibres to the bundle includes a radiopaque material.

5. claims: 14-17

An optical fibre assembly comprising a wire including a radiopaque material.

6. claims: 18-21

A medical device having one or more optical fibres with an opaque material applied on the device wall.
