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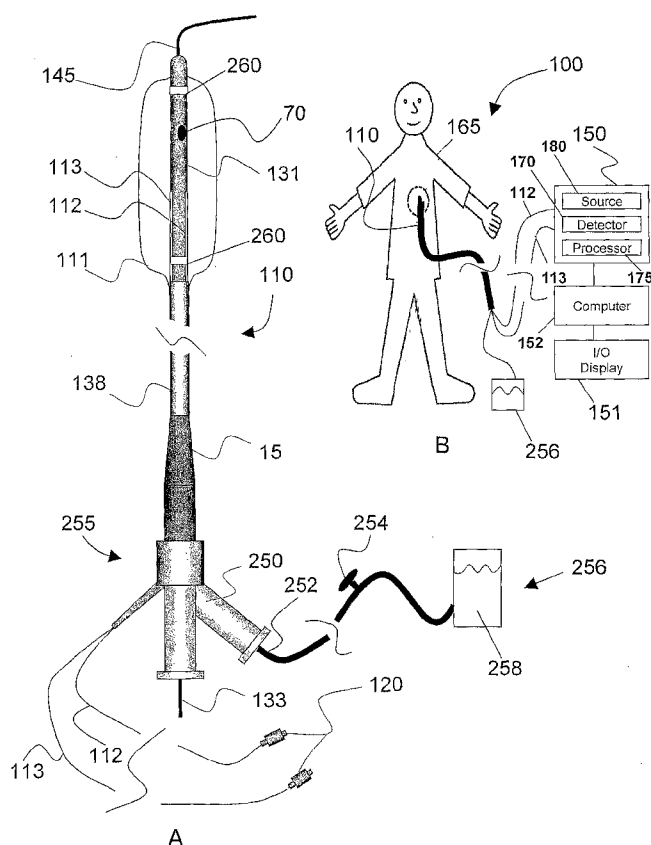
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(54) Title: SYSTEMS AND METHODS FOR ANALYSIS AND TREATMENT OF A BODY LUMEN



(57) Abstract: In a system and method for analyzing and treating a body lumen, a lumen-expanding balloon catheter with integrated one or more delivery waveguides and one or more collection waveguides is used to perform optical analysis of the tissues surrounding the lumen during expansion. The catheter can comprise an angioplasty catheter with integrated delivery waveguides and collection waveguides to perform spectroscopy of a stenotic plaque during angioplasty.



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INTERNATIONAL SEARCH REPORT

International application No

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A. CLASSIFICATION OF SUBJECT MATTER

INV. A61B5/00 A61F2/06 A61M25/10

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)

A61B A61F A61M G01K

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 practical, 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.
X	US 2004/093044 A1 (RYCHNOVSKY STEVEN J [US] ET AL) 13 May 2004 (2004-05-13) abstract; figures 1A,1B,8A,10A paragraphs [0002] - [0004], [0016], [0063] - [0066], [0086], [0088]	1-4,11, 12,20, 21,29, 30,58,59
X	US 5 411 016 A (KUME STEWART M [US] ET AL) 2 May 1995 (1995-05-02) abstract; figure 2	1,58
X	US 5 662 712 A (PATHAK CHANDRASHEKHAR P [US] ET AL) 2 September 1997 (1997-09-02) column 11, lines 28-56; figure 1 ----- -/-	1,58

☒ 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 document 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.

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INTERNATIONAL SEARCH REPORT

International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/004430 A1 (CASSCELLS S WARD [US] ET AL) 2 January 2003 (2003-01-02) abstract; figures 1,3 -----	1,58
X	US 6 741 884 B1 (FREEMAN JENNY E [US] ET AL) 25 May 2004 (2004-05-25) abstract; figure 1 column 6, line 26 - column 8, line 19 -----	41-50
X	US 2003/191398 A1 (MOTZ JASON T [US] ET AL) 9 October 2003 (2003-10-09) abstract; figures 15,21,22 paragraphs [0013] - [0015], [0088] -----	41-50
X	US 2002/111558 A1 (KOKATE JAYDEEP Y [US] ET AL KOKATE JAYDEEP Y [IN] ET AL) 15 August 2002 (2002-08-15) abstract; figures 5,6 paragraphs [0001], [0002], [0033] - [0036], [0040] -----	41
X	US 4 669 467 A (WILLETT ROBERT L [US] ET AL) 2 June 1987 (1987-06-02) abstract; figures 1,4,7,20,24 column 7, lines 40-67 column 10, line 57 - column 11, line 6 column 18, lines 10-60 column 21, lines 49-51 column 24, lines 56,57 column 25, lines 1-13 -----	41,53-55
A	US 2002/156380 A1 (FELD MICHAEL S [US] ET AL) 24 October 2002 (2002-10-24) paragraphs [0042] - [0045]; figure 1 -----	53-57
A	WO 90/05563 A (MCM LAB INC [US]) 31 May 1990 (1990-05-31) abstract; figure 1 page 15, line 25 - page 16, line 36 -----	53-57

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2006/038547

Box 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.: 65-100
because they relate to subject matter not required to be searched by this Authority, namely:
Rule 39.1(iv) PCT - Method for treatment of the human or animal body by therapy; Rule 39.1(iv) PCT - Method for treatment of the human or animal body by surgery.
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 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 fee, this Authority did not invite payment of any additional fee.
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.:
1-12, 20, 21, 29, 30, 41-59
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.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ 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: 1-12, 20, 21, 29, 30, 58, 59

A catheter for placement within a body lumen comprising:
a flexible conduit;
at least one delivery waveguide and
at least one collection waveguide; and
a lumen-expanding inflatable balloon with at least one
delivery waveguide and a transmission input of the at least
one collection waveguide located within the balloon.

1.1. claims: 2, 20, 21, 29, 30

As in 1, further comprising an angioplasty balloon

1.2. claims: 3-12, 58, 59

As in 1, further comprising a fiber holder

2. claims: 13-19, 28

As in 1, further comprising means to redirect radiation

3. claims: 22-25

As in 1, further comprising a plurality of delivery
waveguides

4. claims: 26, 27, 35-39, 60-64

As in 1, further comprising specific waveguides

5. claims: 31-34, 40

As in 1, further comprising a guidewire sheath

6. claims: 41-52

A system comprising a catheter as in 1, further comprising
an optical detector

7. claims: 53-57

A system comprising a catheter as in 1, and further
comprising an optical detector and a switch to select
multiple radiation sources

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

8. claims: 101-117

A method of forming a catheter as set out in claim 1.

9. claims: 118-122

A catheter as in 1, further comprising a ring

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2006/038547

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