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[Continued on next page]

(54) Title: ABLATION CATHETER WITH ULTRASONIC LESION MONITORING CAPABILITY

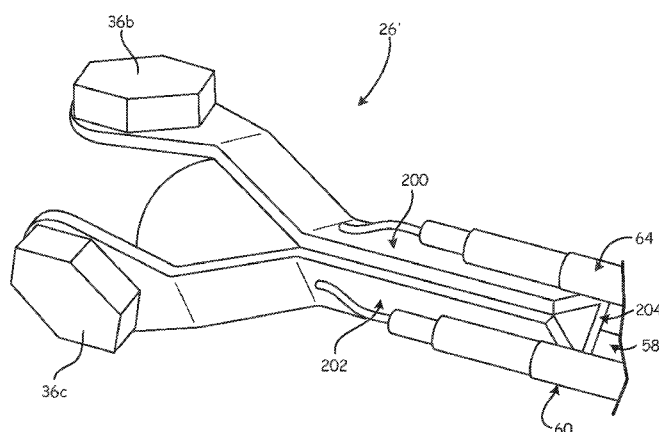


Fig. 13

(57) Abstract: An ablation probe for treating and imaging body tissue includes an ablation electrode tip including an ablation electrode configured for delivering ablation energy to body tissue. A plurality of acoustic openings are disposed through the ablation electrode tip. A plurality of ultrasonic imaging sensors are positioned inside the ablation electrode tip. The ultrasonic imaging sensors are configured to transmit ultrasonic waves through the acoustic openings. A plurality of flex circuits are each electrically connected to one of the plurality of ultrasonic imaging sensors.



— *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))*

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INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
INV. A61B18/14 A61B8/12
ADD. A61B17/00

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)
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, 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	WO 2012/066430 A1 (KONINKL PHILIPS ELECTRONICS NV [NL]; DELADI SZABOLCS [NL]; VAN DER VLE) 24 May 2012 (2012-05-24)	1,2,4-6
Y	page 8, lines 1-10; figures 3a,5 page 9, lines 11-16; figures 9,10 page 7, lines 23-26; figure 1	3
X	US 2009/030312 A1 (HADJICOSTIS ANDREAS [US]) 29 January 2009 (2009-01-29)	1
Y	paragraphs [0042], [0043], [0045], [0051], [0052], [0063]; figure 2	3
X	US 2009/292209 A1 (HADJICOSTIS ANDREAS [US]) 26 November 2009 (2009-11-26)	1
	paragraphs [0029], [0031] - [0033]; figures 2,3	
	----- -/-	



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

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"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

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"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

22 July 2014

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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 2011/144491 A1 (SLIWA JOHN W [US] ET AL) 16 June 2011 (2011-06-16) paragraphs [0039], [0042]; figure 1 -----	1
A	US 2012/136351 A1 (WEEKAMP JOHANNES WILHELMUS [NL] ET AL) 31 May 2012 (2012-05-31) paragraphs [0054], [0058], [0063], [0065] -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2014/027491

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2012066430 A1	24-05-2012	CN 103220996 A	24-07-2013
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		WO 2011024133 A1	03-03-2011

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/027491

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.:

1-6

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: 1-6

ablation probe with a flex circuit

2. claims: 10-15, 20

ablation probe with acoustic cups

3. claims: 7-9, 16-19

ablation probe with a proximal and a distal insert
