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Published:

— *with international search report (Art. 21(3))*

[Continued on next page]

(54) Title: RENAL NERVE MODULATION AND ABLATION CATHETER ELECTRODE DESIGN

(57) Abstract: An intravascular nerve modulation or tissue/ablation heating system comprising an elongate shaft having a proximal end region and a distal end region, a plurality of electrodes disposed adjacent the distal end region, wherein the plurality of electrodes are configured to operate in phase.

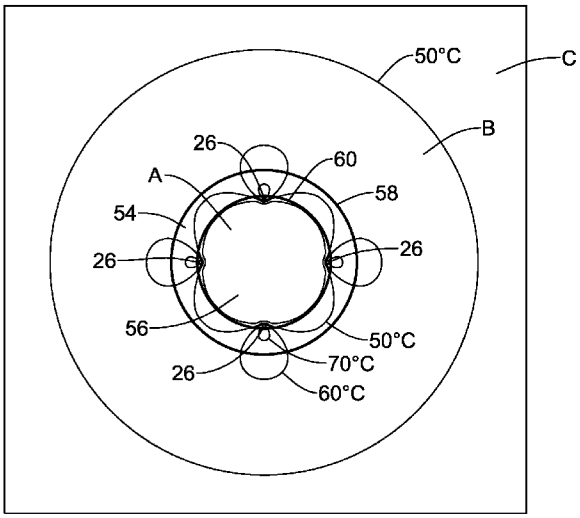

Figure 7

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— *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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5 June 2014

INTERNATIONAL SEARCH REPORT

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

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	US 5 931 835 A (MACKEY SEAN [US]) 3 August 1999 (1999-08-03) column 1, line 9 - line 50 column 5, line 58 - column 6, line 27; figure 2 column 3, line 60 - line 67 -----	1-3,13, 14
X	WO 2008/141104 A2 (ABLATION FRONTIERS INC [US]; SHERMAN MARSHALL L [US]; WERNETH RANDELL) 20 November 2008 (2008-11-20) paragraph [0162] paragraph [0124] - paragraph [0125]; figure 1 paragraph [0141] - paragraph [0142]; figure 4a ----- -/--	1-4,13, 14

[X] Further documents are listed in the continuation of Box C.

[X] 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	Date of mailing of the international search report
5 February 2014	25/04/2014

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Ekstrand, Vilhelm

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/057119

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.:

4, 13, 14(completely); 1-3(partially)

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.

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

1. claims: 4, 13, 14(completely); 1-3(partially)

   An intravascular nerve modulation system, wherein the first electrode and the second electrode are positioned the same longitudinal distance from the proximal end region and at different radial locations

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2. claims: 5(completely); 1-3(partially)

   An intravascular nerve modulation system, wherein the first electrode and the second electrode are positioned at different longitudinal locations

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3. claims: 6(completely); 1-3(partially)

   An intravascular nerve modulation system, wherein the distal end region includes a plurality of electrodes that are helically arranged about the shaft

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4. claims: 7, 8(completely); 1-3, 15(partially)

   An intravascular nerve modulation system, wherein the shaft includes a plurality of struts and wherein the first electrode, the second electrode, or both are disposed along the struts or wherein the shaft includes an expandable balloon and wherein the first electrode, the second electrode, or both are disposed along the balloon

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5. claims: 9(completely); 1-3, 15(partially)

   An intravascular nerve modulation system, wherein the shaft includes a helical balloon

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6. claims: 10-12(completely); 1-3(partially)

   An intravascular nerve modulation system, further comprising an ultrasonic transducer disposed adjacent to the shaft

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2013/057119

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 2002/128643 A1 (SIMPSON JOHN A [US] ET AL) 12 September 2002 (2002-09-12) paragraph [0085] - paragraph [0087]; figure 9a -----	1-3
X	US 2007/129760 A1 (DEMARAIS DENISE [US] ET AL) 7 June 2007 (2007-06-07) paragraph [0049]; figures 4A-B paragraph [0021] -----	1-4,13

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
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