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(71) Applicant (for all designated States except US):
MEDTRONIC VASCULAR, INC. [US/US]; IP LEGAL DEPARTMENT, 3576 Unocal Place, Santa Rosa, California 95403 (US).

(72) Inventors: **THORNTON, Ronan**; Corcullen, Co., Galway (IE). **SEMEDO, Anthony**; 4970 Lakepointe Circle, Santa Rosa, California 95403 (US).

(74) Agent: **MARESH, Catherine**; IP Legal Department, 3576 Unocal Place, Santa Rosa, California 95403 (US).

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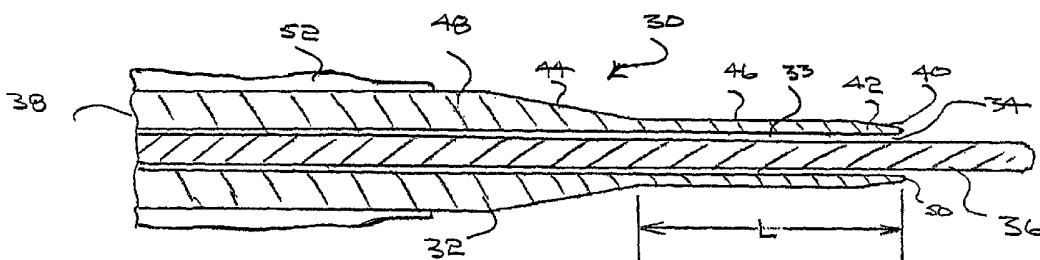
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(54) Title: APPARATUS AND METHODS FOR THE TREATMENT OF CHRONIC TOTAL OCCLUSIONS



(57) Abstract: According to a first aspect of the invention there is provided a catheter assembly (30). A lumen (33) extends through the catheter assembly and terminates with an exit port (34). The lumen being configured to receive a guide wire (36) therein. The catheter assembly comprises a flexible distal segment (46) having a predetermined length and a first predetermined outer diameter, a proximal segment (48) having a second outer diameter greater than that of the first outer diameter, and an intermediate tapered section (44) between the first proximal segment and the distal segment.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61M25/00

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)
IPC 7 A61M 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 practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 402 720 B1 (MILLER JAY FREDERICK ET AL) 11 June 2002 (2002-06-11)	1-3
Y	column 5, lines 7-23; figures 4-7 column 6, lines 42-48	4-11
X	US 5 759 173 A (PREISSMAN ET AL) 2 June 1998 (1998-06-02) column 4, line 66 - column 7, line 47; figures 1-3	1,3
X	US 5 599 319 A (STEVENS ET AL) 4 February 1997 (1997-02-04) column 4, lines 22-49; figures 3,4	1,3
X	EP 0 808 637 A (TARGET THERAPEUTICS, INC) 26 November 1997 (1997-11-26) column 9, lines 26-42; figures 1-3	1,2
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Further documents are listed in the continuation of box C.

Patent family members are listed in 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)
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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.
- *Z* document member of the same patent family

Date of the actual completion of the international search

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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, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Rosenblatt, T

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.
Y	US 2001/037084 A1 (NARDEO MAHASE) 1 November 2001 (2001-11-01) paragraphs '0020!, '0025!, '0029!; figures 1-5	4-11
A	WO 03/015638 A (HEARTSTENT CORPORATION) 27 February 2003 (2003-02-27) page 13, line 28 - page 15, line 23	6
X	US 5 833 644 A (ZADNO-AZIZI ET AL) 10 November 1998 (1998-11-10)	12,13
Y	column 13, line 48 - column 14, last line ; figure 18B	14
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X	US 6 533 753 B1 (HAARSTAD PHILIP ET AL) 18 March 2003 (2003-03-18) cited in the application column 5, lines 17-30; figure 15	12,13
A	US 5 336 234 A (VIGIL ET AL) 9 August 1994 (1994-08-09) column 5, lines 14-17; figure 5	14

INTERNATIONAL SEARCH REPORT

International application No.
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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.:
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 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.:
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: 1-11

catheter assembly having distal segment with smaller diameter than proximal segment and intermediate tapered section therebetween for providing improved flexibility

2. claims: 12-14

catheter assembly having first and second relatively slidable tubes, where the outer tube is provided with an expandable membrane for centering of the assembly.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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