



- (51) **International Patent Classification:**
A61M 25/00 (2006.01) *A61M 29/02* (2006.01)
A61M 25/10 (2006.01)
- (21) **International Application Number:**
PCT/US2008/086270
- (22) **International Filing Date:**
10 December 2008 (10.12.2008)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
11/958,106 17 December 2007 (17.12.2007) US
- (71) **Applicant (for US only):** ABBOTT CARDIOVASCULAR SYSTEMS INC. [US/US]; 3200 Lakeside Drive, Santa Clara, CA 95054 (US).
- (72) **Inventors; and**
- (75) **Inventors/Applicants (for US only):** ARANA, Ramon [US/US]; 33822 Temecula Creek Road, Temecula, CA 92592 (US). BROWN, Daniel, G. [US/US]; 27147 Majello Court, Temecula, CA 92591 (US). NOVAK, Curt, A. [US/US]; 848 Cheyenne Road, Corona, CA 92880 (US). MANN, Justin, K. [US/US]; 24909 Madison Avenue, No. 714, Murrieta, CA 92562 (US). SIMPSON, John, A. [US/US]; 7647 Primavera Way, Carlsbad, CA 92009 (US). WILSON, Bruce, M. [US/US]; 31755 Via Telesio, Temecula, CA 92592 (US). BARBOD, Leonard, D. [US/US]; 17148 Patiha Street, San Diego, California 92127 (US).
- (74) **Agent:** GUNTHER, Hanke, O.; FULWIDER PATTON LLP, 6060 Center Drive, Tenth Floor, Los Angeles, CA 90045 (US).
- (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, 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, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, 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, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:**
- with international search report (Art. 21(3))
 - 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:**
13 August 2009

(54) **Title:** CATHETER HAVING TRANSITIONING SHAFT SEGMENTS

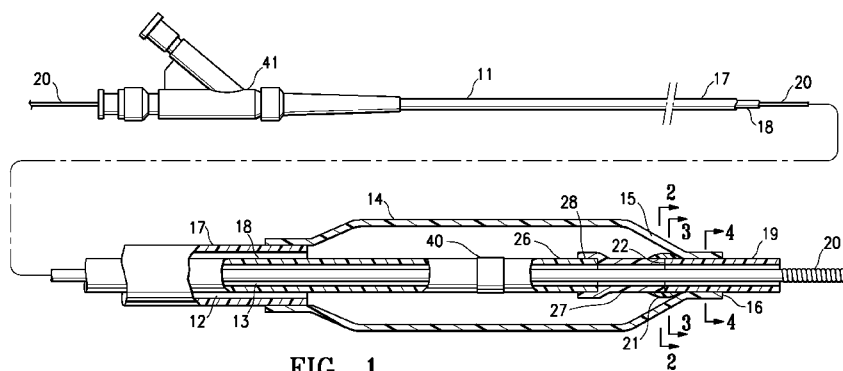


FIG. 1

(57) **Abstract:** A catheter having shaft segments which are joined together by a strong bond providing a low profile shaft section with a flexibility transition and/or a compositional transition. A balloon catheter embodying features of the invention has a distal tip member (19) and a coupling band member (21) surrounding a junction of an inner tubular member (18) of the shaft (11), and has a gradual change in bending stiffness along a distal end section of the shaft which extends distally from a location within the balloon interior. Another catheter embodying features of the invention has shaft segments joined together by a diagonal seam (120).



WO 2009/079305 A3

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2008/086270

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61M25/00 A61M25/10 A61M29/02

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)
A61M

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 277 368 A (ADVANCED CARDIOVASCULAR SYSTEM [US]) 10 August 1988 (1988-08-10) the whole document	1-10
A	EP 1 103 280 A (SMITHS INDUSTRIES PLC [GB]) 30 May 2001 (2001-05-30) the whole document	
A	WO 2007/054364 A (ABBOTT LAB VASCULAR ENTPR LTD [IE]; PAGEL CHRISTINE [DE]; SEEGER DOREE) 18 May 2007 (2007-05-18) figure 5 page 6, line 30 - page 7, line 5	1-10
P,A	WO 2007/146572 A (MEDTRONIC VASCULAR INC [US]; MUSHTAHA DURGHAM [IE]) 21 December 2007 (2007-12-21) the whole document	1-10

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.
- * & * document member of the same patent family

Date of the actual completion of the international search

15 May 2009

Date of mailing of the international search report

03/06/2009

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

Authorized officer

Rodrigues, Elodie

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2008/086270

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,A	US 7 341 571 B1 (HARRIS MARK E [US] ET AL) 11 March 2008 (2008-03-11) figure 1	1-10
A	WO 89/02763 A (LEOCOR INC [US]) 6 April 1989 (1989-04-06) figures 1-6,8	1-10
A	US 5 769 819 A (SCHWAB SHARON [US] ET AL) 23 June 1998 (1998-06-23) the whole document	1-10
A	WO 03/037419 A (ADVANCED CARDIOVASCULAR SYSTEM [US]) 8 May 2003 (2003-05-08) the whole document	1-10
A	US 2003/032920 A1 (WANTINK KENNETH L [US]) 13 February 2003 (2003-02-13) the whole document	1-10
X	US 6 168 588 B1 (WILSON JAMES C [US]) 2 January 2001 (2001-01-02) column 1; figures 7,8 column 3, lines 21-33	11-19
X	US 6 197 015 B1 (WILSON JAMES C [US]) 6 March 2001 (2001-03-06) figure 6 columns 1,2 column 3, line 42 - column 5, line 15	11-19
X	US 2004/167441 A1 (REYNOLDS BRIAN R [US] ET AL) 26 August 2004 (2004-08-26) figures 1,2 paragraphs [0002], [0018], [0002], [0023]	11-19
A	EP 1 287 846 A (TARGET THERAPEUTICS INC [US]) 5 March 2003 (2003-03-05) figure 5a paragraphs [0040], [0041]	11-19

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2008/086270

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 allsearchable 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.:

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: 1-10

Balloon catheter whose inner tubular member is made of different segments, the last two distal segments being joined by a distal coupling band member abutting the inner surface of the balloon.

2. claims: 11-19

Catheter having shaft segments joined by a diagonal seam.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2008/086270

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0277368	A	10-08-1988	AU 611874 B2 AU 1006888 A CA 1281967 C JP 63288169 A US 4782834 A	27-06-1991 07-07-1988 26-03-1991 25-11-1988 08-11-1988
EP 1103280	A	30-05-2001	GB 2356571 A	30-05-2001
WO 2007054364	A	18-05-2007	EP 1948288 A2 US 2009036829 A1	30-07-2008 05-02-2009
WO 2007146572	A	21-12-2007	US 2008255507 A1	16-10-2008
US 7341571	B1	11-03-2008	NONE	
WO 8902763	A	06-04-1989	AT 106761 T AU 2543288 A CA 1323273 C CN 1036333 A DE 3850116 D1 DE 3850116 T2 DE 3856397 D1 DE 3856397 T2 DK 74690 A EP 0383794 A1 ES 2015351 A6 JP 2501712 T JP 5011996 B	15-06-1994 18-04-1989 19-10-1993 18-10-1989 14-07-1994 15-09-1994 16-03-2000 21-09-2000 22-03-1990 29-08-1990 16-08-1990 14-06-1990 16-02-1993
US 5769819	A	23-06-1998	NONE	
WO 03037419	A	08-05-2003	US 6918920 B1 US 2005240214 A1 US 2009062835 A1	19-07-2005 27-10-2005 05-03-2009
US 2003032920	A1	13-02-2003	EP 1414510 A2 WO 03013639 A2	06-05-2004 20-02-2003
US 6168588	B1	02-01-2001	NONE	
US 6197015	B1	06-03-2001	NONE	
US 2004167441	A1	26-08-2004	AT 331539 T CA 2515383 A1 DE 602004001394 T2 EP 1596894 A1 ES 2267054 T3 JP 2006519059 T WO 2004075941 A1	15-07-2006 10-09-2004 06-06-2007 23-11-2005 01-03-2007 24-08-2006 10-09-2004
EP 1287846	A	05-03-2003	NONE	