

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
21 April 2005 (21.04.2005)

PCT

(10) International Publication Number
WO 2005/034723 A3

- (51) International Patent Classification:
A61B 17/03 (2006.01) A61B 17/08 (2006.01)
- (21) International Application Number:
PCT/US2004/026489
- (22) International Filing Date: 11 August 2004 (11.08.2004)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
10/666,081 18 September 2003 (18.09.2003) US
- (71) Applicant (for all designated States except US): **CARDIA, INC.** [US/US]; 13770 Frontier Court, Burnsville, MN 55337 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **MARINO, Joseph, A.** [US/US]; c/o Cardia, Inc., 13770 Frontier Court, Burnsville, MN 55337 (US). **CORCORAN, Michael,**

P. [US/US]; c/o Cardia, Inc., 13770 Frontier Court, Burnsville, MN 55337 (US).

(74) Agents: **BERGMAN, Alana, T.** et al.; Kinney & Lange, PA, Kinney & Lange Building, 312 South Third Street, Minneapolis, MN 55415-1002 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, 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,

[Continued on next page]

(54) Title: ASD CLOSURE DEVICE WITH SELF CENTERING ARM NETWORK

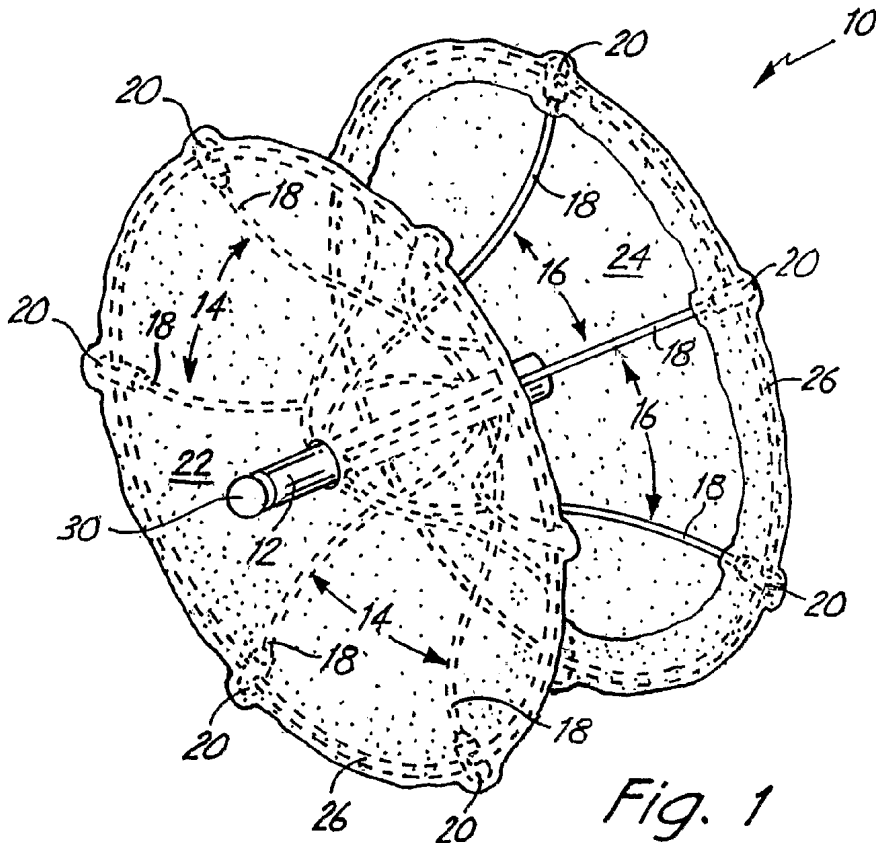


Fig. 1

(57) Abstract: The present invention provides an occluder (10) with a self centering system that keeps the occluder (10) properly centered in a defect which allows the center of the occluder (10) to remain properly positioned within the defect so that the left and right sides cover the entire defect which reduces the chance of blood shunting through the defect and increases the effectiveness of the occluder. The self centering system is comprised of a series of arms (14,16) that provide tension to hold the right and left sides in place. The arms (14,16) are shaped to provide a flexible intermediate zone (D) comprising a left and a right conical shaped network, wherein each network extends from the right and left sides and narrows at the center section. The flexible intermediate zone (D) centers the occluder (10) and helps to hold it in place.

WO 2005/034723 A3



FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE,
SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,
GQ, GW, ML, MR, NE, SN, TD, TG).

(88) Date of publication of the international search report:
16 April 2009

Published:

— *with international search report*

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/26489

A. CLASSIFICATION OF SUBJECT MATTER
 IPC: A61B 17/03(2006.01),17/08(2006.01)

USPC: 606/151,157,213;128/887
 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)
 U.S. : 606/151,157,213;128/887

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 5,350,399 A (ERLEBACHER et al) 27 September 1994 (27.09.1994), figures 8-10, column 5, lines 57-68.	1 ----- 2-4,13-16
X --- Y	US 5,853,422 A (HUEBSCH et al) 29 December 1998 (29.12.1998), column 3 line 64-column 4 line 27.	9,17,19 ----- 3,10-12,18,20
Y	US 5,944,738 A (AMPLATZ et al) 31 August 1999 (31.08.1999), column 5 lines 15-36 and column 10 lines 39-48.	2,10,11,14,15,18
Y	US 6,174,738 B1 (SCHNEIDT) 16 January 2001 (16.01.2001), column 9 lines 3-19.	4,12,16,20
Y	US 2002/0169475 A1 (GAINOR et al) 14 November 2002 (14.11.2002), paragraph 27.	13-16

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	"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
"E"	earlier application or patent published on or after the international filing date	"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
"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)	"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
"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	"&" document member of the same patent family

Date of the actual completion of the international search
 15 December 2007 (15.12.2007)

Date of mailing of the international search report
26 FEB 2008

Name and mailing address of the ISA/US
 Mail Stop PCT, Attn: ISA/US
 Commissioner for Patents
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 Facsimile No. (571) 273-3201

Authorized officer
 Kathleen Sonnett *Kathleen Sonnett*
 Telephone No. 571-272-5576 *Jan*