

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
15 March 2007 (15.03.2007)

PCT

(10) International Publication Number
WO 2007/029252 A3

(51) International Patent Classification:
A61F 2/24 (2006.01)

(21) International Application Number:
PCT/IL2006/001040

(22) International Filing Date:
6 September 2006 (06.09.2006)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/714,421 6 September 2005 (06.09.2005) US

(71) Applicant (for all designated States except US): **VITAL VALVE (ISRAEL) LTD.** [IL/IL]; Gut Levin Street, 9/31, 32922 Haifa (IL).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **SEGALESCU, Victor** [IL/IL]; 9 Gut Levin Street, Haifa 32, 32922 Haifa (IL). **SELA, Nathan** [IL/IL]; 73 Shimon Street, Modiin (IL).

(74) Agent: **KORAKH, Eliav**; 15th Floor, Atidim Tower, P.O. Box 58100, Kiryat Atidim, 61580 Tel Aviv (IL).

(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, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, 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, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

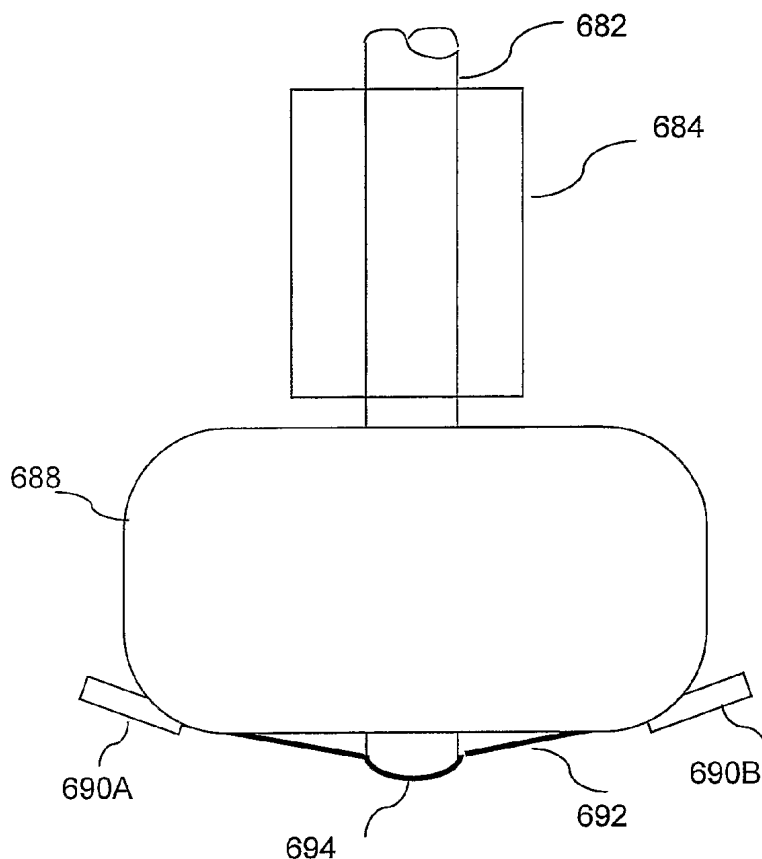
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, 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).

Published:

— with international search report

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

(54) Title: METHOD AND DEVICE FOR TREATMENT OF CONGESTIVE HEART FAILURE AND VALVE DYSFUNCTION



(57) Abstract: Device for reducing the antero posterior diameter of a heart valve annulus of a heart valve of the heart of the body of a patient, the device including at least one anterior heart tissue anchor, to be anchored to an anterior region of the heart valve annulus, at least one posterior heart tissue anchor, to be anchored to a posterior region of the heart valve annulus, and a displacement reduction mechanism, coupled with the anterior heart tissue anchor and with the posterior heart tissue anchor, the displacement reduction mechanism moving at least one of the anterior heart tissue anchor and the posterior heart tissue anchor, toward one another, when the displacement reduction mechanism is exposed to an energy emitted by an energy source located external to the heart.

WO 2007/029252 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL06/01040

A. CLASSIFICATION OF SUBJECT MATTER

IPC: A61F 2/24(2006.01)

USPC: 623/2.37

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. : 623/2.37

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 2005/0177228 A (Solem et al) 11 August 2005, Figs. 5, 20, paragraphs 8, 18, 25, 29, 137, 139, 171, 179, 183, 185, 202, 203.	1,13-16,18,19 ----- 2-6, 17
Y	US 2005/0049686 A (Gray et al) 3 March 2005, Figs.10,13,17, paragraphs 37, 41, 42, 113, 115, 118.	2-6
X --- Y	US 2004/0260317 A (Bloom et al) 23 December 2004, Figs. 1-3, paragraphs 15, 17, 39, 40, 47.	1,13-16,18,19 ----- 7-12
Y	US 5,972,029 A (Fuisz) 26 October 1999, Figs. 1,5, col. 4, lines 11-25, 47-56.	7-12
Y	US 6,475,235 B (Jayaraman) 05 November 2002, Fig. 7, col. 2, lines 52-55, col. 5, lines 35-47.	17

☐ 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 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

25 July 2008 (25.07.2008)

Date of mailing of the international search report

31 JUL 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

Brian Pellegrino

Telephone No. 571-272-4300

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL06/01040

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.: 146-153
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:
they refer to a multiple number of claims, but state as "substantially" described and adds no further limitations.
Additionally claims refer to drawings, which also is indefinite.

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:
Please See Continuation 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 additional fees, this Authority did not invite payment of any 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.: 1-19
- 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.

BOX III. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-19, drawn to a device for anchoring in tissue with an adjustable mechanism used between the anchors to reduce the distance as a result of application of an electrical energy.

Group II, claim(s) 20-29, drawn to a device with anchors that the dimension therebetween is adjustable by a degradable material disposed between them.

Group III, claim(s) 30-66, drawn to a device with anchors for tissue that uses an elastic member between to adjust the distance.

Group IV, claim(s) 67-100, drawn to a method of treating a heart valve annulus using anchors and electrically activating the adjusting mechanism.

Group V, claim(s) 101-129, drawn to a method of treating a heart valve annulus using a biodegradable material between to change the distance between the anchors.

Group VI, claim(s) 130-135, drawn to a method of repair for a heart valve annulus using anchors and an elastic adjustment disposed between the anchors.

Group VII, claim(s) 136-145, drawn to a method of repairing a heart valve annulus using anchors that are adjusted by a mechanism of having forces applied simultaneously to draw the anchors together.