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- (71) **Applicant (for all designated States except US):** DC DEVICES, INC. [US/US]; 300 Brickstone Square, Andover, MA 01810 (US).
- (72) **Inventors; and**
- (75) **Inventors/ Applicants (for US only):** CELERMAJER, David [AU/AU]; 45 Olola Avenue, Vaucluse, Sydney (AU). SUTHERLAND, Michael, J. [US/US]; 27 Jackson Street, Apt. 234, Lowell, MA 01852 (US). MCNA-
- (74) **Agent:** MONOCELLO, John, A., III; GTC Law Group LLP & Affiliates, P.O.Box 113237, Pittsburgh, PA 15241 (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, CL, 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, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
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[Continued on next page]

(54) **Title:** DEVICES AND METHODS FOR REDUCING VENOUS PRESSURE

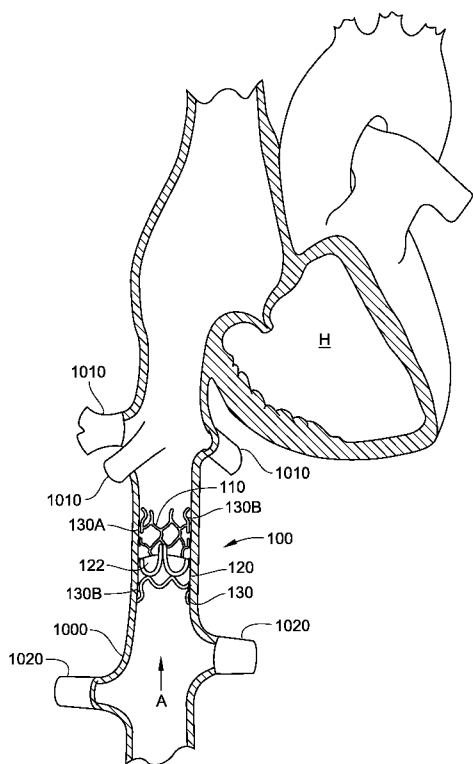


FIG. 1

(57) **Abstract:** Devices and method are disclosed for reducing pressure in a patient's vena cava and in the right atrium of a patient's heart. A valve is implanted in the inferior vena cava (IVC) between the patient's renal veins and hepatic veins. When pressure in a patient's IVC reaches high levels, i.e., the pressure differential across the valve reaches high levels, the valve automatically closes or begins to close. The closing is caused by the pressure of the patient's blood moving one or more flaps in the valve to a closed or near-closed position. This prevents excessive pressure in the upper or superior vena cava and the right atrium of the patient's heart. The device also includes a pressure relief feature that opens and allows retrograde flow of blood if the pressure differential exceeds a yet higher pressure.

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EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU,
LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,
SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, ML, MR, NE, SN, TD, TG).

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claims and to be republished in the event of receipt of
amendments (Rule 48.2(h))*

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2011/022895**A. CLASSIFICATION OF SUBJECT MATTER***A61F 2/82(2006.01)i, A61F 2/24(2006.01)i*

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)

A61F 2/82; A61F 2/24; A61F 2/06; A61B 17/10; A61B 19/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: stent,blood pressure,connector

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2008-0228264 A1 (LI et al.) 18 September 2008 See the whole document.	1-16
A	US 2008-0154351 A1 (LEEWOOD et al.) 26 June 2008 See the whole document.	1-16
A	US 2004-0044351 A1 (SEARLE) 04 March 2004 See the whole document.	1-16
A	US 2004-0206363 A1 (MCCARTHY et al.) 21 October 2004 See the whole document.	1-16

 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

"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 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

24 OCTOBER 2011 (24.10.2011)

Date of mailing of the international search report

24 OCTOBER 2011 (24.10.2011)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon, 189 Cheongsa-ro,
Seo-gu, Daejeon 302-701, Republic of Korea

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Authorized officer

HAN, SANG SOO

Telephone No. 82-42-481-8648



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.: **17-20**
because they relate to subject matter not required to be searched by this Authority, namely:
Claims 17-20 are the methods for treatment of the human body by surgery or therapy as well as diagnostic methods [Article 17(2)(a)(i), Rule 39.1(iv) PCT].
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:

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 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.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2011/022895

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