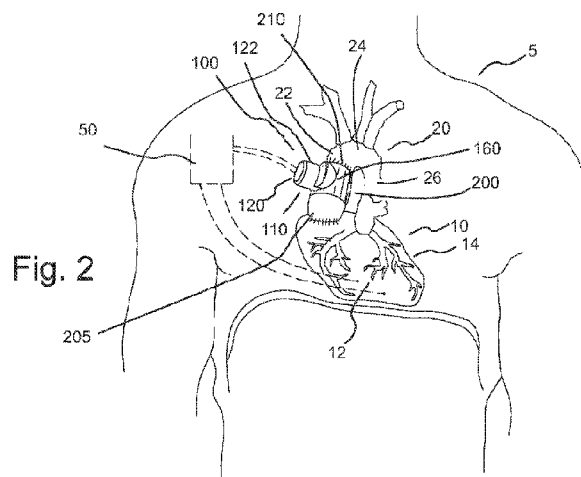


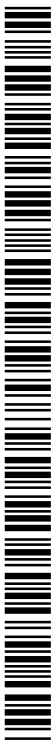


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A61M 1/12 (2006.01) *F04C 2/00* (2006.01)
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- (74) Agent: **BARTONY, Henry, E., Jr.**; Bartony & Associates, LLC., P.O. Box 910, Butler, PA 16003-0910 (US).
- (81) Designated States (unless otherwise 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, QA, RO, RS, RU, RW, 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.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, 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).
- Published:
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- (88) Date of publication of the international search report:
31 January 2013

(54) Title: BLOOD FLOW ASSIST SYSTEMS



(57) Abstract: An implantable pump system for assisting blood flow in a patient includes a blood flow path comprising a flexible conduit, at least one valve in fluid connection with the flexible conduit, a drive system in operative connection with the valve to move the valve in a reciprocating manner, an implantable control system and at least one sensor in communicative connection with the control system. The sensor is adapted to measure at least one property of blood. The control system is adapted to control movement of the valve on the basis of data regarding position of the valve with respect to time or a derivative thereof (that is, position, velocity, acceleration or a derivative thereof) in combination with data of the measured at least one property of blood from the sensor.



A. CLASSIFICATION OF SUBJECT MATTER*A61M 1/12(2006.01)i, A61M 39/22(2006.01)i, F04C 2/00(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)

A61M 1/12; A61F 1/24; F16D 55/08

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: implantable pump, flexible duct, valve, drive system, rotary motor, speed reducer, converter, control system,

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 05108426 A (BIRO, J. C. et al.) 28 April 1992 See abstract; figure 1; column 4.	12, 13 1-7, 14-39, 47
X A	US 05722930 A (LARSON, JR., C. O. et al.) 03 March 1998 See abstract; figures 1 and 11; column 26, line 53-column 27, line 20.	35-39 1-7, 12-34, 47
A	US 2003-0233143 A1 (GHARIB, M. et al.) 18 December 2003 See the whole document.	1-7, 12-39, 47
A	EP 1129736 A1 (LEVRAM MEDICAL DEVICES, LTD.) 05 September 2001 See the whole document.	1-7, 12-39, 47
A	US 03911897 A (LEACHMAN, JR., F. A.) 14 October 1975 See the whole document.	1-7, 12-39, 47
A	US 05348123 A (TAKAHASHI, K. et al.) 20 September 1994 See the whole document.	1-7, 12-39, 47

 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

21 SEPTEMBER 2012 (21.09.2012)

Date of mailing of the international search report

24 SEPTEMBER 2012 (24.09.2012)

Name and mailing address of the ISA/KR

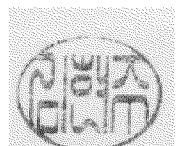
Korean Intellectual Property Office
189 Cheongsu-ro, Seo-gu, Daejeon Metropolitan
City, 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

Kim, Hyun Ju

Telephone No. 82-42-481-8734



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.: 40-46
because they relate to subject matter not required to be searched by this Authority, namely:
Said claims pertain to methods for treatment of the human body, thus relate to a subject-matter which International Searching Authority is not required to search under PCT Art. 17(2)(a)(i) and Rule 39.1(iv).
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.: 8-11
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/US2012/024572

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