



(43) International Publication Date
28 January 2016 (28.01.2016)

(51) International Patent Classification:

A61M 37/00 (2006.01) A61B 34/00 (2016.01)
A61N 1/372 (2006.01)

(21) International Application Number:

PCT/US2015/042077

(22) International Filing Date:

24 July 2015 (24.07.2015)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

62/028,463 24 July 2014 (24.07.2014) US

(71) Applicant: THOMAS JEFFERSON UNIVERSITY
[US/US]; 1020 Walnut Street, Suite 630, Philadelphia, PA
19107 (US).

(72) Inventors: JOSEPH, Jeffrey, I.; 1335 June Lane, Penn
Valley, PA 19072 (US). JOSEPH, Amanda, L.; 1335
June Lane, Penn Valley, PA 19072 (US).

(74) Agent: VOS STRACHE, Kyle; Cozen O'Connor, One
Liberty Place, 1900 Market Street, Philadelphia,
Pennsylvania 19103 (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, BN, 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, IR, IS, JP, KE, KG, KN, KP, KR,
KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG,
MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM,
PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, 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, ST, SZ,
TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, 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, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— of inventorship (Rule 4.17(iv))

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:

26 May 2016

(54) Title: LONG-TERM IMPLANTABLE MONITORING SYSTEM & METHODS OF USE

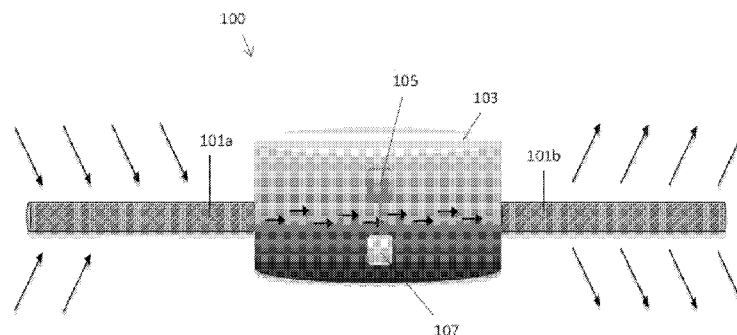


FIG. 1

(57) Abstract: Methods and systems include a long-term implantable ultra-filtrate monitoring system that uses micro-porous membranes to produce an ultra-filtrate of tissue interstitial fluid or blood plasma. The ultra-filtrate is transported through a sensor to detect a level of analyte in the ultra-filtrate. The long-term implantable fluid monitoring system thus includes a first porous catheter, a second porous catheter, a sensor configured to measure an amount of analyte in fluid, and a pump configured to move fluid through the first porous catheter to the sensor and from the sensor through the second porous catheter.



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2015/042077**A. CLASSIFICATION OF SUBJECT MATTER****A61M 37/00(2006.01)i, A61N 1/372(2006.01)i, A61B 34/00(2016.01)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 37/00; A61B 5/05; C02F 1/48; A61M 5/14; C02F 1/44; B01D 29/25; A61B 5/00; A61N 1/372; A61B 34/00

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: catheter, porous, sensor, pump, multilayer

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2004-0124147 A1 (FISSELL IV, W. H. et al.) 1 July 2004 See paragraphs [0016], [0082], [0111], [0133]-[0135]; figure 4.	1,5-16,48
Y		2-4
A		33-45
Y	US 2012-0046651 A1 (BEYER, U. et al.) 23 February 2012 See paragraph [0099]; figure 3e.	2-4
A	US 2011-0049040 A1 (O'CONNELL, M. T. et al.) 3 March 2011 See entire document.	1-16,33-45,48
A	US 4777953 A (ASH, S. R. et al.) 18 October 1988 See entire document.	1-16,33-45,48
A	US 6102872 A (DONEEN, B. A. et al.) 15 August 2000 See entire document.	1-16,33-45,48



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 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

01 April 2016 (01.04.2016)

Date of mailing of the international search report

06 April 2016 (06.04.2016)

Name and mailing address of the ISA/KR

International Application Division

Korean Intellectual Property Office

189 Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea



Facsimile No. +82-42-481-8578

Authorized officer

Han, Inho

Telephone No. +82-42-481-3362



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2015/042077

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.: 17-32, 46, 47, 49
because they relate to subject matter not required to be searched by this Authority, namely:
Claims 17-32, 46, 47, 49 pertain to diagnostic methods of the human body and thus relate to a subject-matter which this International Searching Authority is not required under PCT Article 17(2)(a)(i) and PCT Rule 39.1(iv) to search.
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 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.:

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/US2015/042077

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2004-0124147 A1	01/07/2004	EP 1545749 A1 US 2006-0213836 A1 US 7048856 B2 US 7540963 B2 WO 2004-024300 A1	29/06/2005 28/09/2006 23/05/2006 02/06/2009 25/03/2004
US 2012-0046651 A1	23/02/2012	EP 2419008 A1 WO 2010-119409 A1	22/02/2012 21/10/2010
US 2011-0049040 A1	03/03/2011	EP 2254639 A1 US 8961791 B2 WO 2009-101386 A1	01/12/2010 24/02/2015 20/08/2009
US 4777953 A	18/10/1988	JP 63-309243 A US 4854322 A US 5002054 A	16/12/1988 08/08/1989 26/03/1991
US 6102872 A	15/08/2000	WO 99-22639 A1	14/05/1999