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- (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, LT, 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.

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Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.1 7(H))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.1 7(in))

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:

13 November 2014

(54) **Title:** MEMBRANE-BASED FLUID-FLOW CONTROL DEVICES

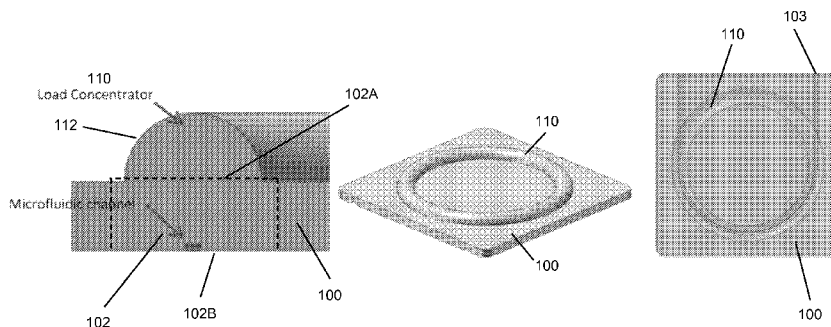


FIG. 1

(57) **Abstract:** Described herein are fluid-flow control devices for transferring a fluid from a place to another and/or controlling a fluid flow. In some embodiments, fluid-flow control devices described herein can be used as pumping devices to transfer a fluid by peristaltic motion and/or as valve devices to control fluid flow for various applications, e.g., in a microfluidic platform.



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/074123**A. CLASSIFICATION OF SUBJECT MATTER****G05D 7/00(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)

G05D 7/00; BOIL 3/02; G01N 31/20; F16L 39/00; BOIL 3/00; C40B 30/10; C40B 60/12

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: fluid-flow, deformable, load concentrator, fluidic, conduits and engageable

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 7182371 B1 (RONALD F. RENZI) 27 February 2007 See column 4, lines 35-38; claims 1-9; and figures 1-2.	29
A		1-4, 30-32, 49-52
Y	US 6602472 B1 (HANS-PETER ZIMMERMANN et al.) 05 August 2003 See column 5, lines 55-58; claims 1-19; and figures 2-3b.	29
A	US 2011-0287976 A1 (JEFF TZA-HUEI WANG et al.) 24 November 2011 See paragraphs [0027]-[0042]; claim 10; and figure 1A.	1-4, 29-32, 49-52
A	JP 4312950 B2 (YSI INCOPERATED) 12 August 2009 See paragraphs [0010H0029]; claims 1-6.	1-4, 29-32, 49-52
A	US 2004-0175298 A1 (KONSTANIN CHOIKHET) 09 September 2004 See paragraphs [0033]-[0039]; claims 1-10; and figure 1.	1-4, 29-32, 49-52

 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

23 September 2014 (23.09.2014)

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24 September 2014 (24.09.2014)

Name and mailing address of the ISA/KR



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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. : 9, 11, 15, 17-19, 23, 26, 35, 38, 40, 45-47, 58-60 and 62-63
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 :
Claims 9, 11, 15, 17-19, 23, 26, 35, 38, 40, 45-47, 58-60 and 62-63 are unclear because they are directly or indirectly referring to multiple dependent claims which do not comply with PCT Rule 6.4(a).

3. Claims Nos. : 5-8,10, 12-14, 16,20-22,24-25,27-28,33-34,36-37,39,41-44,48,53-57,61 and 64-69
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/US2013/074123

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
us 7182371 B1	27/02/2007	us 6832787 B1	21/12/2004
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