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[Continued on next page]

(54) Title: MEMBRANE-BASED FLUID CONTROL IN MICROFLUIDIC DEVICES

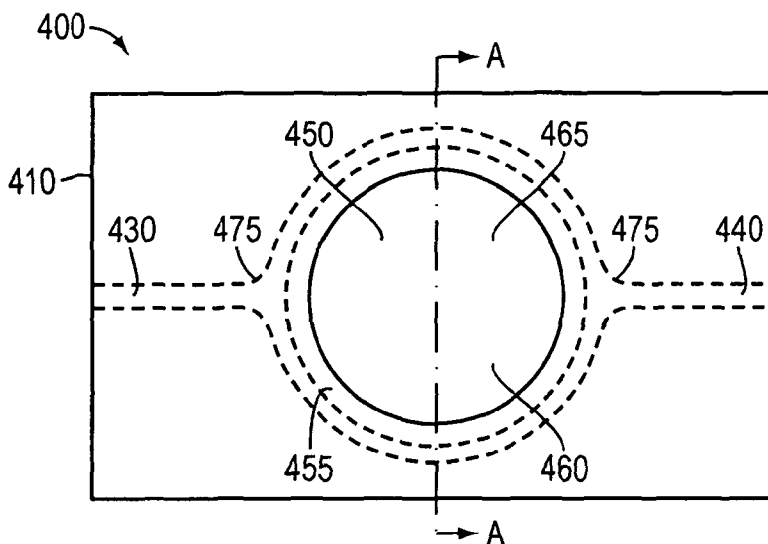


FIG.4A

(57) Abstract: A microfluidic device may include a substrate (410) that defines a flow-control cavity (420) and first (430) and second (440) channels in fluid communication with the flow-control cavity. A compliant membrane (450) for regulating fluid flow through the flow-control cavity may surround at least a portion of the flow-control cavity.



WO 2008/094672 A3



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A. CLASSIFICATION OF SUBJECT MATTER

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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)

B01L A61M G05D F15C F16K F04B

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 practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2002/127736 A1 (CHOU HOU-PU [US] ET AL) 12 September 2002 (2002-09-12) paragraphs [0096] - [0102] paragraphs [0169] - [0171]	1-5, 7, 8
Y	paragraphs [0239] - [0247]; figures 26-29	6, 9-12
X	US 5 839 467 A (SAASKI ELRIC W [US] ET AL) 24 November 1998 (1998-11-24) column 25, lines 11-38; figures 1, 2 column 42, lines 51-62; figures 13-15 column 45, lines 38-57 column 38, line 57 - column 39, line 33	1-8
X	WO 99/38552 A (MEDTRONIC INC [US]) 5 August 1999 (1999-08-05) page 5, line 21 - page 6, line 11; figures 4, 8	1-8
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 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 document 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.

Z document member of the same patent family

Date of the actual completion of the international search

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30/09/2008

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6 527 003 B1 (WEBSTER JAMES RUSSELL [TW]) 4 March 2003 (2003-03-04) column 2, lines 56-58 column 4, lines 28-32.	6
Y	EP 1 331 019 A (CODMAN & SHURTLEFF [US]) 30 July 2003 (2003-07-30) paragraph [0033]	6
Y	US 5 759 014 A (VAN LINTEL HARALD [CH]) 2 June 1998 (1998-06-02) column 8, lines 19-25; figures 1-7 column 9, lines 9-13	9-12
Y	US 3 386 469 A (KELLY SAMUEL T) 4 June 1968 (1968-06-04) column 2, paragraph 46 - column 3, paragraph 14; figures 1-6	9-12
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A	US 4 181 245 A (GARRETT SCOTT T [US] ET AL) 1 January 1980 (1980-01-01) column 12, lines 19-31; figures 1-12	1
P,X	WO 2007/024829 A (UNIV VIRGINIA [US]; EASLEY CHRISTOPHER J [US]; KARLINSEY JAMES M [US];) 1 March 2007 (2007-03-01) page 7, line 21 - page 8, line 13 page 18, line 9 - page 19, line 12 page 21, line 24 - page 24, line 20; figures 4,5	1-12

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2008/001324

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.: 24-25
because they relate to subject matter not required to be searched by this Authority, namely:
see FURTHER INFORMATION sheet PCT/ISA/210
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:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable claims.
2. As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of 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.:

1-12

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-12

Claims 1-12 essentially define a capacitive element for a microfluidic device comprising a substrate defining a flow-control cavity, a membrane surrounding the cavity and a bypass structure.

2. claims: 13-17

Claims 13-17 essentially define a microfluidic device comprising a discharge line, a pump and a capacitive element having a membrane surrounding a cavity in the capacitive element.

3. claims: 18-23

Claims 18-23 essentially define a microfluidic valve system comprising a substrate with two channels therein, a valve seat a compliant membrane and a mechanically actuatable displacement element to bring the membrane into a sealing contact with the valve seat.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.1

Claims Nos.: 24-25

The methods defined in claims 24-25 comprise the steps of passing fluid through a microfluidic device. As described in paragraph [0043] of the description, this method delivers drug to a patient. The subject-matter of claims therefore implicitly define Methods for treatment of the human or animal body by therapy under Rule 39.1(iv) PCT.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2008/001324

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Information on patent family members

International application No

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