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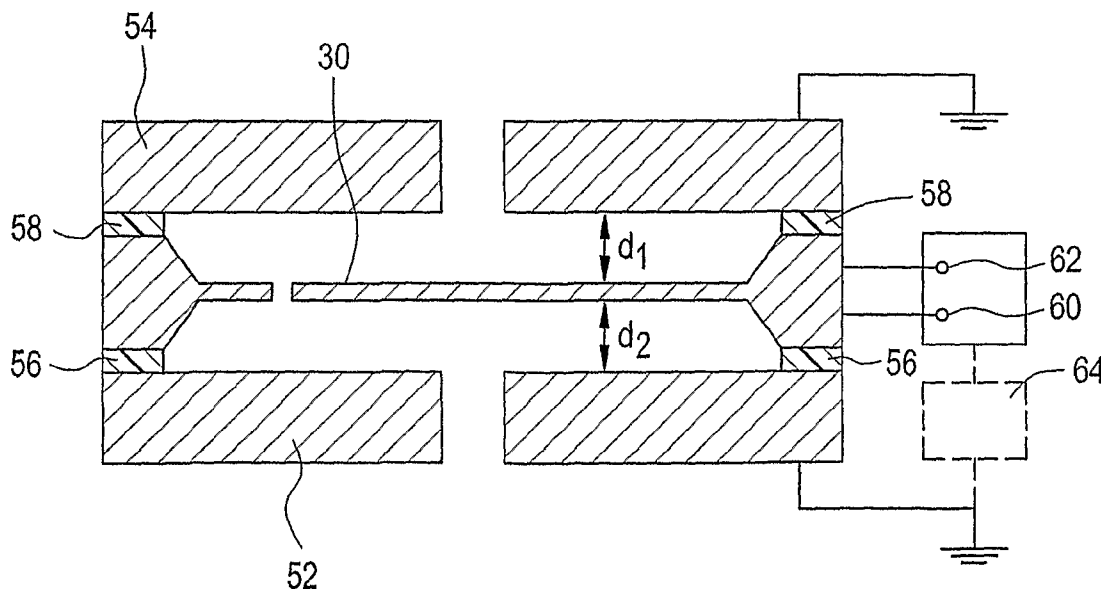
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1 March 2007

[Continued on next page]

(54) Title: WAVEFORM SENSING AND REGULATING FLUID FLOW VALVE



(57) Abstract: Microfluidic shunt valves are disclosed having a deflectable element capable of being held in a closed position to occlude the passage of fluid between an inlet and outlet and, when not held in the closed position, the deflectable element is adapted to oscillate in response to fluid pressure pulses and thereby facilitate fluid passage through the valve. Controls for activating the deflectable element to permit fluid passage are also included.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/014857

<p>A. CLASSIFICATION OF SUBJECT MATTER INV. A61M27/00 F15C5/00</p>		
<p>According to International Patent Classification (IPC) or to both national classification and IPC</p>		
<p>B. FIELDS SEARCHED</p>		
<p>Minimum documentation searched (classification system followed by classification symbols) A61M F15C F16K</p>		
<p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched</p>		
<p>Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, WPI Data, PAJ</p>		
<p>C. DOCUMENTS CONSIDERED TO BE RELEVANT</p>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>DE 199 15 558 A1 (JONAS, JOST; STEEGER, GERHARD HEINRICH) 26 October 2000 (2000-10-26) column 1, line 1 - column 1, line 17 column 3, line 30 - column 4, line 61; figures 1-3</p> <p style="text-align: center;">----- -/--</p>	1-4,6
<p><input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.</p>		
<p>* Special categories of cited documents :</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"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</p> <p>"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</p> <p>"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.</p> <p>"&" document member of the same patent family</p>		
<p>Date of the actual completion of the international search 17 August 2006</p>		<p>Date of mailing of the international search report 28. 11. 2006</p>
<p>Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016</p>		<p>Authorized officer Rolland, Philippe</p>

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2006/014857

Box 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.: 22-32
because they relate to subject matter not required to be searched by this Authority, namely:
Rule 39.1(iv) PCT - Method for treatment of the human or animal body by therapy
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 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 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.:

see annex

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- 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: 1-6,8

directed to an arrangement of electrodes to control fluid flow

2. claims: 1,7,11-21

directed to the measurement of impedance

3. claims: 9-10

directed to the control of a plurality of valves

4. claims: 33-40

directed to a method of fabricating a MEMS valve assembly

5. claims: 41-48

directed to a method of controlling pulsatile fluid flow.

6. claims: 49-50

directed to a shunt valve comprising at least one pressure sensitive valve and at least one microfluidic valve.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/014857

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/080442 A1 (UNGER MARK ET AL) 1 May 2003 (2003-05-01)	8
A	page 1, paragraph 6 - page 1, paragraph 7 page 4, paragraph 79 page 4, paragraph 81 - page 5, paragraph 100 page 7, paragraph 133 - page 7, paragraph 137; figures 8A,8B page 8, paragraph 142 - page 8, paragraph 146 page 9, paragraph 156 - page 9, paragraph 158 page 10, paragraph 173 - page 10, paragraph 175 page 17, paragraph 270 - page 18, paragraph 281 figures 1,7B,7H,16,27	1-4,6
X	----- DE 196 54 990 A1 (LEONHARDT, STEFFEN, DR.-ING., 60439 FRANKFURT, DE; ISERMANN, ROLF, PRO) 18 June 1998 (1998-06-18) column 1, line 1 - column 1, line 13 column 8, line 39 - column 8, line 51; figures 2,7	1-4,6
X	----- US 5 322 258 A (BOSCH ET AL) 21 June 1994 (1994-06-21)	8
A	the whole document	1-6
A	----- DE 196 45 725 C1 (SICAN F&E GMBH , 30419 HANNOVER, DE) 11 December 1997 (1997-12-11) column 1, line 1 - column 1, line 6 column 2, line 35 - column 2, line 39 column 3, line 1 - column 3, line 51; figure 1	1-3

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 19915558	A1	26-10-2000	NONE	
US 2003080442	A1	01-05-2003	US 2006118895 A1	08-06-2006
DE 19654990	A1	18-06-1998	NONE	
US 5322258	A	21-06-1994	AT 117054 T DE 3914031 A1 WO 9013750 A1 EP 0425612 A1	15-01-1995 31-10-1990 15-11-1990 08-05-1991
DE 19645725	C1	11-12-1997	NONE	