

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
14 August 2003 (14.08.2003)

PCT

(10) International Publication Number
WO 2003/067355 A3

(51) International Patent Classification⁷: **G05D 16/20**,
G01N 30/02, G01L 9/00

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(21) International Application Number:
PCT/US2003/001878

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(22) International Filing Date: 21 January 2003 (21.01.2003)

(81) Designated State (*national*): JP.

(25) Filing Language: English

(84) Designated States (*regional*): European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR).

(26) Publication Language: English

(30) Priority Data:
10/061,985 1 February 2002 (01.02.2002) US

Published:
— with international search report

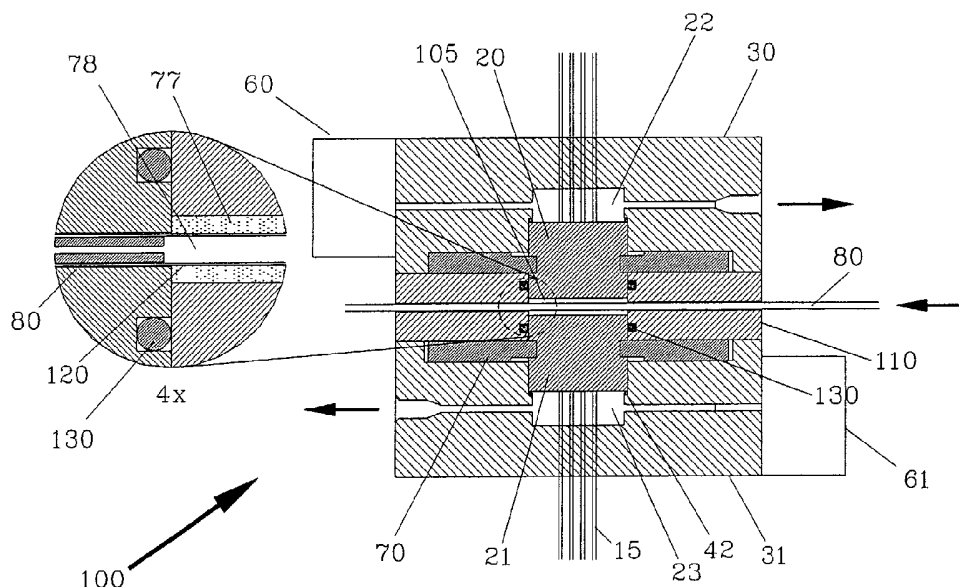
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(88) Date of publication of the international search report:
4 March 2004

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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.

(54) Title: PROGRAMMABLE TRACKING PRESSURE REGULATOR FOR CONTROL OF HIGHER PRESSURES IN MICROFLUIDIC CIRCUITS



(57) Abstract: Regulator for precision control of pressure based on a means of measuring pressure differentials. More specifically, the present invention provides a pressure control that tracks a relatively high background pressure, and applies a positive or negative offset to create the small pressure differentials that can be utilized to transport fluids within a capillary network. The present invention is also directed to a method of controlling microfluidic elements (such as donut cavities) with a high degree of precision. In high performance liquid chromatography applications, this is accomplished using tracking pressure regulators to measure and respond to the difference between the liquid pump pressure and the regulated pneumatic pressure.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 03/01878

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G05D16/20 G01N30/02 G01L9/00

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)

IPC 7 G05D G01N B01L G01L

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, PAJ, 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	EP 0 317 809 A (BECTON DICKINSON CO) 31 May 1989 (1989-05-31) column 11, line 15 -column 13, line 5; claims; figures 4,5 ---	1,4-8
X	WO 91 07712 A (SUNDSTRAND CORP) 30 May 1991 (1991-05-30) abstract; figures ---	1
X	US 6 070 607 A (CASEY GARY L) 6 June 2000 (2000-06-06) column 3, line 2 -column 4, line 42; figures --- -/--	2

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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"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

17 July 2003

Date of mailing of the international search report

29.07.03

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 03/01878

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 01 63270 A (CHOW ANDREA W ;CHIEN RING LING (US); KOPF SILL ANNE (US); PARCE J) 30 August 2001 (2001-08-30) page 5, line 6-15 page 17, line 7 -page 18, line 7 ---	3,9-11
A	US 6 193 471 B1 (PAUL CARLTON H) 27 February 2001 (2001-02-27) cited in the application the whole document ---	3,9-11
A	US 4 218 925 A (DIDOMIZIO ROBERT A JR) 26 August 1980 (1980-08-26) abstract; figures ---	12-17
A	US 5 939 640 A (HAUSER JEAN-LUC) 17 August 1999 (1999-08-17) abstract; figures ---	12-17
A,P	DE 101 01 180 A (ENDRESS & HAUSER GMBH & CO KG) 12 September 2002 (2002-09-12) abstract; figures -----	12-17

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 03/01878

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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.:
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 II Observations where unity of invention is lacking (Continuation of item 2 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.:
1-17
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.
- ☒ 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: 1-11

A tracking pressure regulator comprising a controller, a first pressure transducer in communication with the controller, the pressure transducer being positioned to measure differential pressure between first and second fluid streams, the transducer adapted to send a signal to the controller indicative of the differential pressure, a valve through which the first fluid stream flows, the valve being responsive to the controller, whereby the flow of the first fluid stream out of the valve is regulated based upon the differential pressure.

2. Claims: 12-17

A differential pressure transducer comprising a pressure transducer enclosed in a sealed housing such that a first pressure input is separated from a second pressure input, method using the transducer in its sealed housing

3. Claim : 18

Differential pressure sensor comprising first and second pressure transducers

4. Claim : 19

Differential pressure sensor comprising a plurality of pressure transducers.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 03/01878

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