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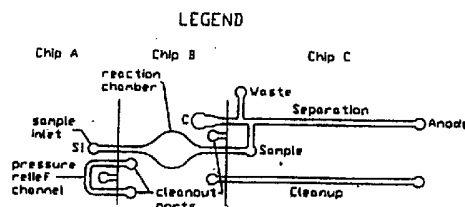
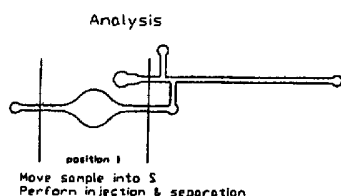
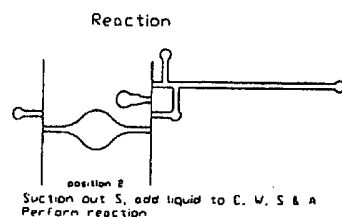
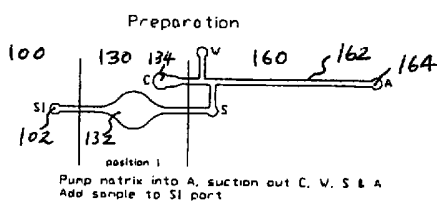
PCT

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- Published:**
- with international search report
 - before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: INTEGRATED MICROCHIP DESIGN



(57) Abstract: Structures and methods that facilitate integration and/or isolation of various functions in a microchip system are disclosed. In one embodiment, the integration of the functions is by a multi-chip, sliding linear valve approach. The chips are in continued physical contact. In a second embodiment, the chips are separated and rejoined when they are moved to the preferred position. Surface coating of the joining edges helps prevent leakage and keeps liquid in the capillary channels for both embodiments. Another embodiment relates to miniature valves. Several designs were disclosed, including the linear, edge-contact sliding valve approach. Method to fabricate very small, high aspect ratio holes in glass was also disclosed, which facilitates the above embodiments.



(88) Date of publication of the international search report:

5 August 2004

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/US 03/24376

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B01L3/00

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 B01L B01J F16B

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.
A	EP 1 221 617 A (TRINITY COLLEGE DUBLIN) 10 July 2002 (2002-07-10) abstract paragraphs [0078] - [0082]; claims 51-57; figures	1-10
A	----- WO 01/04613 A (LIU SHAORONG) 18 January 2001 (2001-01-18) abstract; figure 11	1-10
A	----- WO 02/02794 A (CAPITAL BIOCHIP COMPANY LTD) 10 January 2002 (2002-01-10) abstract; claims; figures	1-10
A	----- WO 01/70400 A (GELI FRANCOIS) 27 September 2001 (2001-09-27) the whole document	1-10
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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

"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.

"&" document member of the same patent family

Date of the actual completion of the international search

14 January 2004

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12.8.05.04

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 03/24376

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1 139 100 A (EBARA CORP) 4 October 2001 (2001-10-04) abstract; claims; figures -----	1-10
A	WOOLLEY A T ET AL: "FUNCTIONAL INTEGRATION OF PCR AMPLIFICATION AND CAPILLARY ELECTROPHORESIS IN A MICROFABRICATED DNA ANALYSIS DEVICE" ANALYTICAL CHEMISTRY, AMERICAN CHEMICAL SOCIETY, COLUMBUS, US, vol. 68, no. 23, 1 December 1996 (1996-12-01), pages 4081-4086, XP000642027 ISSN: 0003-2700 cited in the application the whole document -----	1-10

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 03/24376

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.:

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 - 10

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: 1-10

An integrated microchip system and a method for microchip system integration, whereby a plurality of microchips containing capillary channels are edge joined together and spring biased towards each other and whereby means are provided for linearly moving the microchips against one another, wherein the capillary channels in said microchips can be connected or disconnected by the movement.

2. claims: 11-19

An integrated microchip system comprising a microfabricated microchip containing capillary channels, at least one miniature valve, means for connecting said at least one valve to said microchip and an actuator, a method for microchip system integration comprising moving said valve

3. claim: 20

A method for fabricating very small holes with very high aspect ratios in glass

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 03/24376

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