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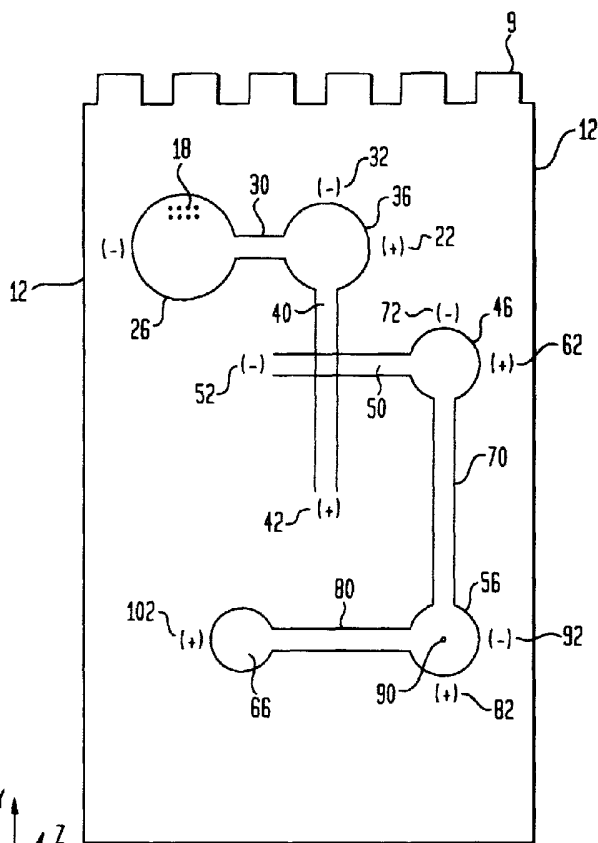
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[Continued on next page]

(54) Title: MICROFLUIDIC DEVICE FOR MOLECULAR ANALYSIS



(57) Abstract: An improved microfluidic device for the detection and analysis of desired chemical or biochemical components. The device allows molecular biological analysis and diagnosis using multistep reactions conducted on a small scale, with such reactions being conducted on or preferably within an electronic chip (12) containing biochemical components that enable the detection of desired materials in an applied sample. Preferably, the device includes a sample chamber (26) for lysis of sample cells using an applied AC field, a signal delivery chamber (46) wherein signal delivery molecules are bound to desired target molecules of interest, and/or electrodes (90) for detecting signal produced by the signal delivery molecules.



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European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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30 May 2003

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— with international search report

*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/US02/24316

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(7) : C02F 1/40; G01N 27/00, 33/53; C12M 1/34, 3/00  
 US CL : 422/82.01; 435/287.1, 287.2, 287.9, 288., 288.6, 962, 971; 204/600, 601

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)  
 U.S. : 422/82.01; 435/287.1, 287.2, 287.9, 288., 288.6, 962, 971; 204/600, 601

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 practicable, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A —	US 6,406,893 B1 (KNAPP et al.) 18 June 2002, see col.20, lines 15-21 and description of figure 2.	1-3
A —	US 6,174,675 B1 (CHOW et al.) 16 January 2001, see col.17, lines 48-62, figure 2, claims 9 and 10.	1-3
X,P —	US 6,344,326 B1 (NELSON et al.) see col. 17, lines 35-67.	4,6-9,11-13,15-17
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A		18-31
X,P —	US 6,264,825 B1 (BLACKBURN et al.) see col.5, lines 63-65; col.6, lines 8-10; col.7; col. 10, lines 1-5, lines 46-51; col.12, lines 5-42; col.15, lines 12-31; col.19-20; and description of figure 13.	4-31

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:	"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
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"E" earlier application or patent published on or after the international filing date	"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
"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)	"&"	document member of the same patent family
"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		

Date of the actual completion of the international search

27 November 2002 (27.11.2002)

Date of mailing of the international search report

13 JAN 2003

Name and mailing address of the ISA/US

Commissioner of Patents and Trademarks  
 Box PCT  
 Washington, D.C. 20231

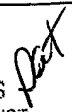
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# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US02/24316

## Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claim Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claim 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.  Claim 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:  
Please See Continuation 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.:

**Remark on Protest**  The additional search fees were accompanied by the applicant's protest.  
 No protest accompanied the payment of additional search fees.

**BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING**

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-3, drawn to a microfluidic device comprising lysing chamber.

Group II, claim(s) 4-31, drawn to a microfluidic device comprising signal delivery well with signal delivery molecules.

The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: group I claims do not include a signal delivery well with signal delivery molecules.