

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
20 September 2007 (20.09.2007)

PCT

(10) International Publication Number
WO 2007/106579 A3

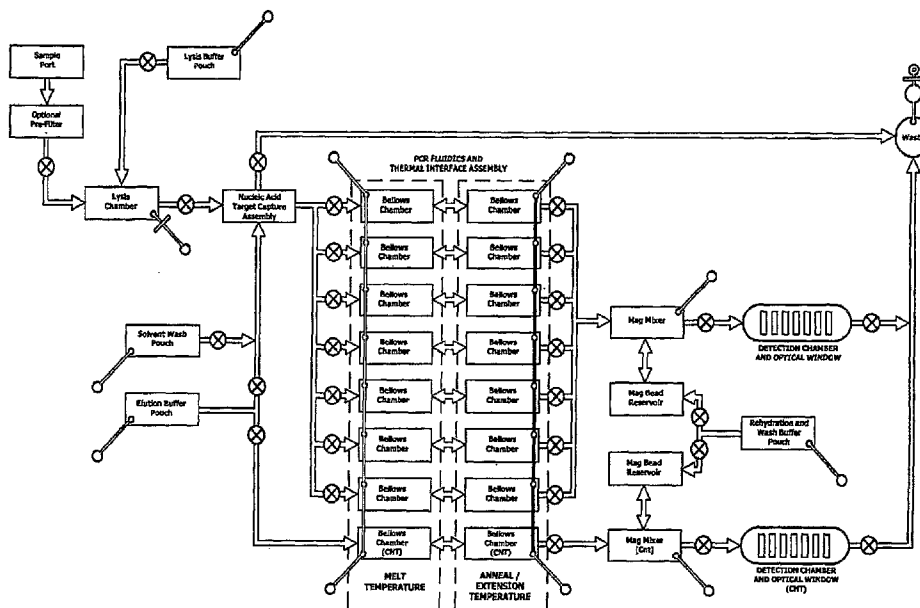
- (51) International Patent Classification:
C12Q 1/68 (2006.01) B01L 3/00 (2006.01)
- (21) International Application Number:
PCT/US2007/006584
- (22) International Filing Date: 15 March 2007 (15.03.2007)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/782,649 15 March 2006 (15.03.2006) US
60/844,811 14 September 2006 (14.09.2006) US
- (71) Applicant (for all designated States except US): MI-
CRONICS, INC. [US/US]; 8463 154th Avenue Northeast,
Redmond, Washington 98052 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): BATTRELL,
C. Frederick [US/US]; 18247 Northeast 28th Street,
Redmond, Washington 98052 (US). GERDES, John
[US/US]; 11 Club Lane, Columbine Valley, Colorado
80123 (US). WILLIFORD, John R. [US/US]; 18718
Northeast 55th Street, Sammamish, Washington 98074
(US). HOEKSTRA, Denise Maxine [US/US]; 16322
224th Street Southeast, Monroe, Washington 98272 (US).
BREIDFORD, Wayne L. [US/US]; 5027 46th Avenue

South, Seattle, Washington 98118 (US). MORDUE,
Stephen [US/US]; 254 4th Avenue, Apt. 3, Kirkland,
WA 98033 (US). CLEMMENS, John [US/US]; 2554
174th Avenue Northeast, Redmond, Washington 98052
(US). NABAVI, Melud [US/US]; 2040 Waverly Place
North #104, Seattle, Washington 98019 (US). KOKORIS,
Mark [US/US]; 10535 Northeast 196th Street, Bothell,
Washington 98011 (US).

- (74) Agents: WAGNER, Emily, W. et al.; Seed Intellectual
Property Law Group PLLC, Suite 5400, 701 Fifth Avenue,
Seattle, Washington 98104-7064 (US).
- (81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS,
JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS,
LT, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ,
NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU,
SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR,
TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,

[Continued on next page]

(54) Title: INTEGRATED MICROFLUIDIC CARTRIDGES FOR NUCLEIC ACID ASSAYS



(57) Abstract: Integrated microfluidic cartridges for nucleic acid extraction, amplification, and detection from clinical samples are disclosed. The devices are single-entry, sanitary, and disposable. The devices enable simplex or multiplex nucleic acid target detection, as for example: assay panels for multiple infectious agents, or assay panels for cancerous cell types. Methods for use of microfluidic cartridges in a fully automated, pneumatically controlled apparatus are also disclosed.

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ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL,
PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— *before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments*

Published:

— *with international search report*

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

28 February 2008

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2007/006584

A. CLASSIFICATION OF SUBJECT MATTER INV. C12Q1/68 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) C12Q B01L		
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		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 587 128 A (WILDING PETER [US] ET AL) 24 December 1996 (1996-12-24) column 4, line 10 - column 10, line 35 figure 12; example 2 column 13, lines 9-65 column 14, lines 8-62 column 18, line 61 - column 20, line 12 column 22, line 19 - column 23, line 27 column 25, lines 12-24 column 3, line 37 - column 4, line 6	1,2
X	WO 2005/106024 A (SIEMENS AG [DE]; GUMBRECHT WALTER [DE]; PAULICKA PETER [DE]; STANZEL M) 10 November 2005 (2005-11-10) page 5, line 16 - page 6, line 25; figure 1	1,2
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> 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. *&* document member of the same patent family		
Date of the actual completion of the international search 21 September 2007		Date of mailing of the international search report 18/01/2008
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		Authorized officer Tiede, Ralph

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2007/006584

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.:
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 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 reportcovers 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 (part), 2

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(part), 2

A microfluidic cartridge comprising a fluidic subcircuit for extracting nucleic acids from a biosample, a fluidic subcircuit for synthesizing amplicons, a fluidic subcircuit with means for detecting amplicons and wherein said fluidic subcircuits are formed within a single integrated member, further comprising a sanitary waste receptacle

2. claims: 1 (part), 3,

A microfluidic cartridge comprising a fluidic subcircuit for extracting nucleic acids from a biosample, a fluidic subcircuit for synthesizing amplicons, a fluidic subcircuit with means for detecting amplicons and wherein said fluidic subcircuits are formed within a single integrated member, further comprising a multiplex detection chamber with a test chamber comprising antibodies bound to test pads

3. claims: 1(part), 4,26-37,50

A molecular detection complex and devices and methods comprising such a complex which comprise a two-tailed amplicon and wherein said complex is immobilized on a solid phase

4. claims: 1(part), 5-25, 38-49, 51

A microfluidic cartridge comprising a fluidic subcircuit for extracting nucleic acids from a biosample, a fluidic subcircuit for synthesizing amplicons, a fluidic subcircuit with means for detecting amplicons and wherein said fluidic subcircuits are formed within a single integrated member, further multiple channels and chambers for processing a sample and internal pneumatic control elements comprising diaphragm operated valves and bellows chambers

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2007/006584

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5587128	A	24-12-1996	US 5955029 A	21-09-1999
WO 2005106024	A	10-11-2005	CN 1950520 A	18-04-2007
			DE 102004021780 A1	24-11-2005
			EP 1740722 A1	10-01-2007
			US 2007219366 A1	20-09-2007