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[Continued on next page]

(54) Title: CELL CULTURE ARRAY SYSTEM FOR AUTOMATED ASSAYS AND METHODS OF OPERATION AND MANUFACTURE THEREOF

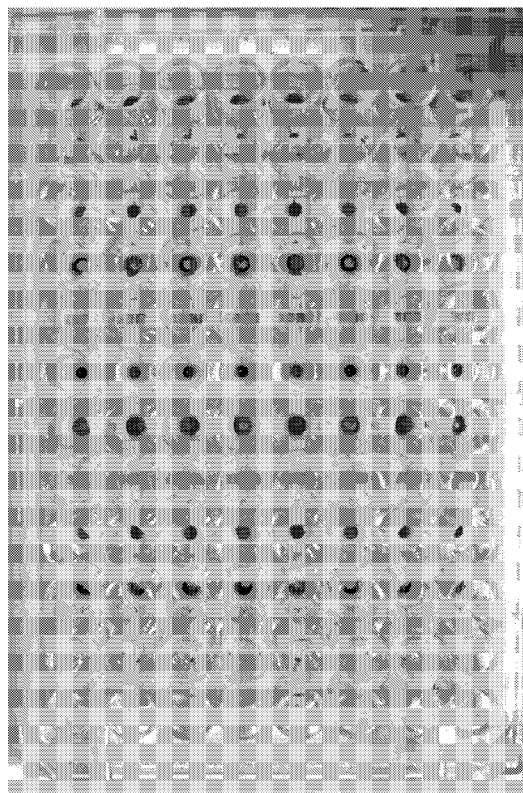


FIG. 1

(57) Abstract: A number of novel improved microfluidic configurations and systems and methods of manufacture and operation. In one embodiment, three wells are used for independent cell culture systems in a cell culture array. In a second aspect, artificial sinusoids with artificial epithelial barriers are provided with just one (optionally shared or multiplexed) fluidic inlet and one (optionally shared or multiplexed) fluidic output, where the medium output also functions as a cellular input. A pneumatic cell loader combined with other components provides a fully automated cell culture system. Magnetic alignment of plate molds provides advantages and ease of molded manufacture.



ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,
MC, MK, MT, NL, NO, 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 (Rule 48.2(h))*

Published:

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A. CLASSIFICATION OF SUBJECT MATTER*G01N 33/48(2006.01)i, G01N 35/00(2006.01)i, C12M 3/00(2006.01)i*

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 : G01N, C12M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Utility models and applications for Utility models since 1975

Japanese Utility models and applications for Utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal), "microfluidic cell culture system"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Philip J. Lee et al., "Microfluidic System for Automated Cell-Based Assays", JALA December 2007. see abstract, DESIGN AND METHODS and Figures 1-4	1-3, 17-19
A	US 2007/0275455 A1 (PAUL JU-SUNG HUNG, et al.) 29 November 2007. see abstract and claims 1-34	1-3, 17-28, 31-80
A	WO 2007/008609 A2 (THE REGENTS OF THE UNIVERSITY OF CALIFORNIA) 18 January 2007. see abstract and claims 1-57	1-3, 17-28, 31-80



Further documents are listed in the continuation of Box C.



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 application or patent 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 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

29 JULY 2009 (29.07.2009)

Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORTInternational application No.
PCT/US2009/030168**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.: **81-87**
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:

The claims rely on reference to the description or drawings instead of definite structure expressly stated in the claims.

3. ☒ Claims Nos.: **4-16, 29, 30**
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:

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 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.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2009/030168Patent document
cited in search reportPublication
datePatent family
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date

US 2007/0275455 A1

29.11.2007

None

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18.01.2007

EP 1904619 A2

02.04.2008