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[Continued on next page]

(54) Title: STEPPING OPTICAL REDUCTION SYSTEM FOR A DNA ARRAY SYNTHESIZER

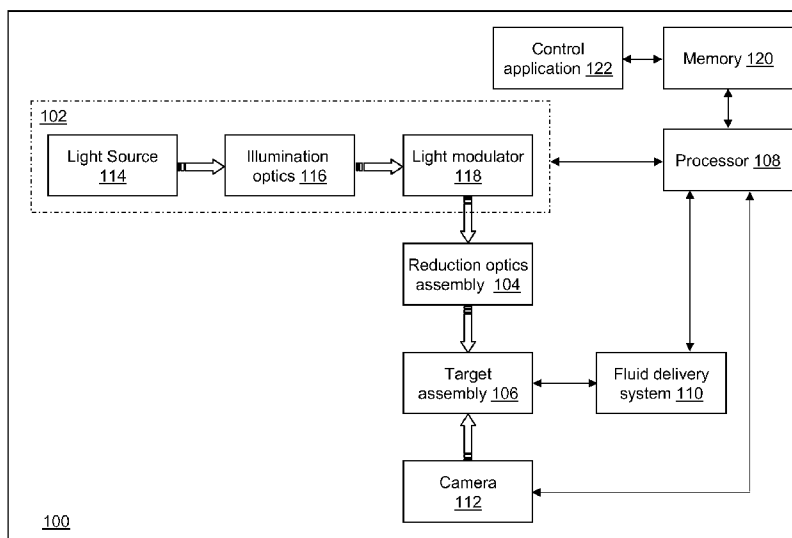


Fig. 1

(57) **Abstract:** A device and a method for synthesizing a microarray are provided. The device includes a reduction optics assembly and a target assembly. The reduction optics assembly is configured to receive a light array of selectable regions of light and dark areas, to reduce a size of the light array in two-dimensions, and to project a pattern of the light array on a target surface. The target assembly includes a first stage and a second stage. The first stage is configured to move the target surface in at least two directions in plane with the projected pattern with a first precision. The second stage is mounted to the first stage and is configured to move the target surface in the at least two directions in plane with the projected pattern with a second precision that is smaller than the first precision.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

INV. B01J19/00 G02B21/26 G02B26/10 G03F7/20

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)

B01J G02B G03F

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, INSPEC, 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	KESSELS M V ET AL: "Versatile stepper based maskless microlithography using a liquid crystal display for direct write of binary and multilevel microstructures" Journal of Microlithography, Microfabrication, and Microsystems SPIE - International Society for Optical Engineering USA, vol. 6, no. 3, July 2007 (2007-07), pages 1-12, XP002519615 ISSN: 1537-1646	1-10
Y	paragraph [0002]; figure 1	11-20
X	US 2003/190536 A1 (FRIES DAVID P [US]) 9 October 2003 (2003-10-09)	1-10
Y	paragraph [0049]; figure 1	11-20
	-/--	

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 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)
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- *&* document member of the same patent family

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005/200827 A1 (TANAKA HIDEO [JP]) 15 September 2005 (2005-09-15)	1-10
Y	paragraphs [0019], [0020], [0033]; figure 6	11-20
P,X	----- NEGRETE O D ET AL: "Step-and-scan maskless lithography for ultra large scale DNA chips" MICROELECTRONIC ENGINEERING, ELSEVIER PUBLISHERS BV., AMSTERDAM, NL, vol. 85, no. 5-6, 1 May 2008 (2008-05-01), pages 834-837, XP022678616 ISSN: 0167-9317 [retrieved on 2008-01-20] the whole document	1-10
Y	----- EP 0 267 766 A (COMPACT SPINDLE BEARING CORP [US]) 18 May 1988 (1988-05-18) figure 1	11-20
A	----- ANGEET SINGH-GASSON ET AL.: "Maskless fabrication of light-directed oligonucleotide microarrays using a digital micromirror array" NATURE BIOTECHNOLOGY, 1999, pages 974-978, XP002519616 figure 1	1-20
A	----- W. HUANG, F.CERRINA: "The con-focal method on verifying focal plane of MAS machine" OPTICS EXPRESS, February 2007 (2007-02), pages 872-877, XP002519617 figure 4	1-20
A	----- US 2007/183943 A1 (GOLOVKINA VIKTORIYA N [US] ET AL) 9 August 2007 (2007-08-09) paragraph [0025]; figure 5	1-20
A	----- US 2005/249396 A1 (CERRINA FRANCESCO [US] ET AL) 10 November 2005 (2005-11-10) the whole document	1-20

INTERNATIONAL SEARCH REPORT

International application No.
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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 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.

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

formation of the array pattern and its alignment with the target

2. claims: 11-20

details of the optical reduction assembly

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2008/076664
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