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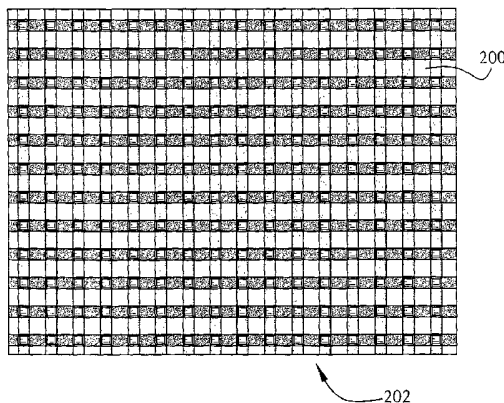
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[Continued on next page]

(54) Title: METHOD OF PATTERNING A MASK ON THE SURFACE OF A SUBSTRATE AND PRODUCT MANUFACTURED THEREBY



(57) Abstract: A system and method for forming one or more nanometer sized openings (118) in a detecting region of an object, such as a semiconductor device (102) that is used for identifying the individual mers of long-chain polymers, such as carbohydrates and proteins, as well as individual bases of deoxyribonucleic acid (DNA) or ribonucleic acid (RNA), to thus enable sequencing of the strand to be performed. The system and method employ the operations of positioning a mask pattern including a plurality of mask lines at a first orientation with respect to the mask (204) on the semiconductor (202), and imposing the mask pattern on the mask (204) to create first mask lines extending in a first direction along the mask (204). The system and method then move the mask pattern to a second orientation with respect to the mask (204) on the semiconductor, and impose the mask pattern on the mask (204) to create second mask lines extending in a second direction along the mask (204) which is transverse to the first direction and overlapping the first mask lines, such that said surface of said object is exposed at areas (200) of said mask (204) between said first and second mask lines. The system and method further remove portions of the semiconductor (202) at the removed portions of the mask (204) to form the openings (118) in the semiconductor (202).



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**B. FIELDS SEARCHED**

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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)  
 USPAT, USPGPUB, EPO, JPO, DEWENT, IBM-TDB

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category * | Citation of document, with indication, where appropriate, of the relevant passages                                      | Relevant to claim No. |
|------------|---|-----------------------|
| X          | US 6,133,986 A (JOHNSON) 17 October 2000 (17.10.2000), column 12, line 24 - column 13, line 7, figure 16                | 1-9                   |
| X          | US 6,087,274 A (TONUCCI et al.) 11 July 2000 (11.07.2000), fig. 3, column 4, line 38 - column 5, line 30                | 1-9                   |
| X          | US 5,868,952 A (HATAKEYAMA et al.) 09 February 1999 (19.02.1999), figs. 18, 19, column 12, line 11 - column 16, line 14 | 1-9                   |

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See patent family annex.

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