

**PATENT COOPERATION TREATY**

**TRANSLATION**

From the  
INTERNATIONAL SEARCHING AUTHORITY

**PCT**

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

Date of mailing (day/month/year)	<b>26 May 2015 (26.05.2015)</b>
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Applicant's or agent's file reference <b>208725</b>	<b>FOR FURTHER ACTION</b> See paragraph 2 below
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International application No. <b>PCT/JP2015/060719</b>	International filing date (day/month/year) <b>06.04.2015</b>	Priority date (day/month/year) <b>23.05.2014</b>
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International Patent Classification (IPC) or both national classification and IPC  
**H01L21/68 (2006.01) i**

Applicant  
**TOKYO ELECTRON LIMITED**

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/JP	Date of completion of this opinion	Authorized officer
Facsimile No.		Telephone No.

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**Box No. I**      **Basis of this opinion**

1. With regard to the **language**, this opinion has been established on the basis of:
  - the international application in the language in which it was filed
  - a translation of the international application into \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
  
2.  This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))
  
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:
  - a. (means)
    - on paper
    - in electronic form
  
  - b. (time)
    - in the international application as filed
    - together with the international application in electronic form
    - subsequently to this Authority for the purposes of search
  
4.  In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
  
5. Additional comments:

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<b>Box No. V</b>	<b>Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</b>						
1. Statement							
Novelty (N)	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Claims</td> <td style="width: 70%; border-bottom: 1px solid black;">1-19</td> <td style="width: 15%; text-align: right;">YES</td> </tr> <tr> <td>Claims</td> <td style="border-bottom: 1px solid black;"> </td> <td style="text-align: right;">NO</td> </tr> </table>	Claims	1-19	YES	Claims		NO
Claims	1-19	YES					
Claims		NO					
Inventive step (IS)	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Claims</td> <td style="width: 70%; border-bottom: 1px solid black;"> </td> <td style="width: 15%; text-align: right;">YES</td> </tr> <tr> <td>Claims</td> <td style="border-bottom: 1px solid black;">1-19</td> <td style="text-align: right;">NO</td> </tr> </table>	Claims		YES	Claims	1-19	NO
Claims		YES					
Claims	1-19	NO					
Industrial applicability (IA)	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Claims</td> <td style="width: 70%; border-bottom: 1px solid black;">1-19</td> <td style="width: 15%; text-align: right;">YES</td> </tr> <tr> <td>Claims</td> <td style="border-bottom: 1px solid black;"> </td> <td style="text-align: right;">NO</td> </tr> </table>	Claims	1-19	YES	Claims		NO
Claims	1-19	YES					
Claims		NO					
2. Citations and explanations:							
<p>Document 1: JP 8-306763 A (NIKON CORP.) 22 November 1996, fig. 1-10 and descriptions thereof</p> <p>Document 2: JP 2010-251484 A (CANON INC.) 4 November 2010, fig. 1-7, 12, 13 and descriptions thereof</p> <p>Document 3: JP 8-94315 A (CANON INC.) 12 April 1996, fig. 1-3 and descriptions thereof</p> <p>Document 4: JP 9-321125 A (JEOL LTD.) 12 December 1997, fig. 3-10 and descriptions thereof</p> <p>Document 5: JP 2-31443 A (HITACHI, LTD.) 1 February 1990, fig. 1-6 and descriptions thereof</p> <p>Document 6: JP 2010-171448 A (ASML NETHERLANDS B.V.) 5 August 2010, paragraph [0031], fig. 4</p> <p>Document 7: JP 2009-54737 A (NIKON CORP.) 12 March 2009, paragraph [0061]</p> <p style="margin-top: 20px;">The invention as in claims 1, 2, 10-12, and 19 does not involve an inventive step in the light of documents 1-3.</p> <p style="margin-top: 20px;">The invention as in claims 1, 2, 10-12, and 19 differs from the invention disclosed in document 1 in</p>							

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**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

that a line sensor is used as a light-receiving region for reflected light in claims 1, 2, 10-12, and 19, whereas document 1 contains no descriptions about using a line sensor as a photoreceiver 520.

However, it is a well-known feature to use a line sensor when detecting reflected light from a mark formed on a wafer, as described in documents 2 and 3, and employing this well-known feature in the invention disclosed in document 1 is a matter that could be easily addressed by a person skilled in the art.

The invention as in claims 3-5, 7, 8, 13-15, and 17 does not involve an inventive step in the light of documents 1-5.

It is a well-known feature to measure the center position of a wafer and the size of the wafer by detecting the perimeter position of the wafer at each position in the wafer rotation direction by the use of a line sensor, as described in documents 4 and 5, and employing this well-known feature in the invention disclosed in document 1 is a matter that could be easily addressed by a person skilled in the art.

The invention as in claims 6 and 16 does not involve an inventive step in the light of documents 1-7.

It is a well-known feature to detect a mark through comparison with a preset signal value, as disclosed in documents 6 and 7, and employing this well-known feature in the invention disclosed in document 1 is a matter that could be easily addressed by a person skilled in the art.

The invention as in claims 9 and 18 does not involve

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an inventive step in the light of documents 1-3.

It is a well-known feature to use, as a substance forming a mark, a substance having an optical reflectance different from that of the substance forming the surroundings of the mark, as described in paragraph [0034] of document 3, and employing this well-known feature in the invention disclosed in document 1 is a matter that could be easily addressed by a person skilled in the art. In this case, it is not considered to be particularly difficult to make the optical reflectance of the mark smaller than the optical reflectance of the wafer forming the surroundings of the mark.