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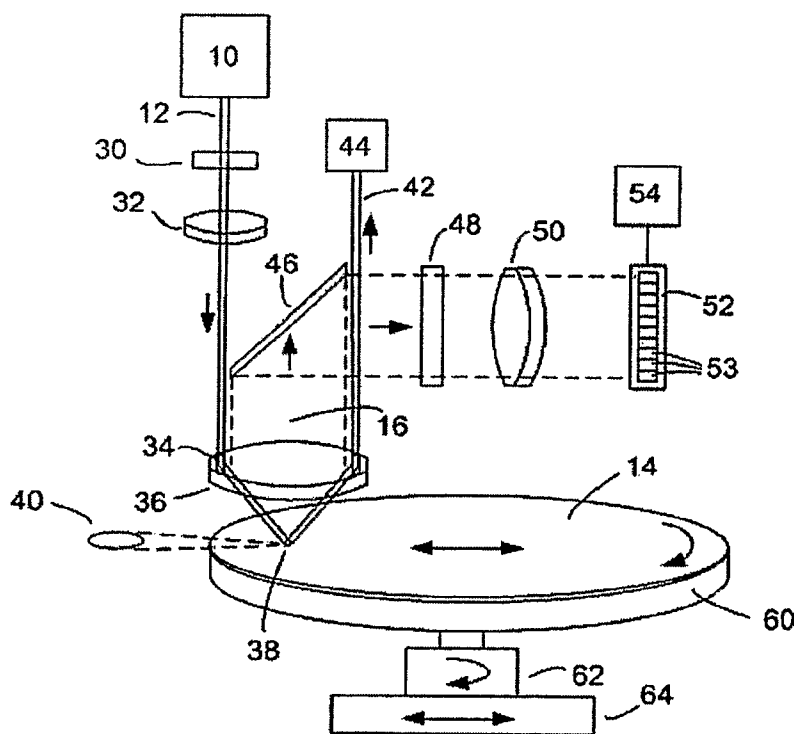
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[Continued on next page]

(54) Title: HIGH-SENSITIVITY SURFACE DETECTION SYSTEM AND METHOD



(57) Abstract: An inspection system and method for inspecting a sample surface, with a light source for generating a probe beam of light, a high NA lens for focusing the probe beam onto a sample surface, and collecting a scattered probe beam from the sample surface, optics for imaging the scattered probe beam onto a detector having a plurality of detector elements that generate output signals in response to the scattered probe beam, and a processor for analyzing the output signals to identify defects on the sample surface. Shaping the beam into a stripe shape increases intensity without sacrificing throughput. Offsetting the beam from the center of the high NA lens provides higher angle illumination. Crossed polarizers also improve signal quality. A homodyne or heterodyne reference beam (possibly using a frequency altering optical element) can be used to create an interferometric signal at the detector for improved signal to noise ratios.



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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - G01N 21/00 (2007.01)

USPC - 356/237.2

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(8) - G01N 21/00 (2007.01)

USPC - 356/237.2

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC - 356/237.1-237.5; 324/765-769, 500, 158.1 - see keyword below-

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

PubWEST(USPT,PGPB,EPAB,JPAB); Google Patent; Google Scholar

Search terms used: Surface, stage, optical, detector, lens, image, imaging, probe

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 2006/0030060 A1 (NOGUCHI et al.) 9 Feb. 2006 (09.02.2006) Abstract, Figure 3, Figure 9A; para [0025], [0120], [0209]	1, 4, 10, 13, 14, 48, 50, 54, 57 2, 3, 5-9, 11, 12, 15-20, 22-27, 30, 31, 37-43, 46, 47, 49, 51-53, 55, 56, 58, 59-61, 63, 64-67, 70-79, 80-83
X --- Y	US 2005/0200850 A1 (BORDEN et al.) 15 Sep 2005 (15.09.2005) Figure 4, Figure 5, para [0031], [0034], [0097], [0113], [0115], [0118], [0119], [0120]	21, 28, 29, 32-35, 44, 45, 62, 68, 69 2, 3, 5-7, 9, 11, 12, 15-20, 22-27, 30, 31, 36-43, 46, 47, 49, 51, 52, 55, 56, 58, 59-61, 63-67, 70-79, 81-83
Y	US 5,511,005 A (ABBE et al.) 23 Apr 1996 (23.04.1996) Abstract	8, 26, 42, 53, 66, 80
Y	US 6,381,015 B1 (SONEHARA et al.) 30 Apr 2002 (30.04.2002) col. 1, ln 29-34; col. 1, ln. 26-34	19, 20, 36, 60, 61, 75

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