

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte DAVID ALUMOT, GAD NEUMANN,
RIVKA SHERMAN, and EHUD TIROSH

Appeal 2007-3705
Application 10/852,798
Technology Center 2800

Decided: January 28, 2008

Before JOSEPH L. DIXON, JAY P. LUCAS, and
SCOTT R. BOALICK, *Administrative Patent Judges*.

DIXON, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the
Examiner's final rejection of claims 103-110, 113-115, 133, 135-143, 145,

Appeal 2007-3705
Application 10/852,798

and 151. Claims 1-102, 111, 112, 116-132, 134, 144, 146-150, 152, and 153 have been canceled. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

BACKGROUND

Appellants' invention relates to an optical inspection apparatus for substrate defect detection. An understanding of the invention can be derived from a reading of exemplary claim 133, which is reproduced below.

133. A system for inspecting a semiconductor wafer of dies for a defect, the system comprising:

a pulsating light source for illuminating at least one area in at least one die;

a processor for selecting a comparison method from the group consisting of a die to die comparison method and a repetitive pattern comparison method and applying the selected comparison method to detect a defect; and

an opto-electric converter for acquiring at least one image of the at least one illuminated area, wherein the opto-electric converter is a CCD matrix.

PRIOR ART

The prior art references of record relied upon by the Examiner in rejecting the appealed claims are:

Levy (Levy '203)	4,247,203	Jan. 27, 1981
Levy (Levy '455)	4,579,455	Apr. 1, 1986
Ikenaga	JP360074625A	Apr. 26, 1985 (translation dated Nov. 27, 2006)

Appeal 2007-3705
Application 10/852,798

IBM Technical Disclosure Bulletin (IBM) "Sequencing Oblique Light," 2284-85 (Nov. 1, 1979)

REJECTIONS

Claims 103-105, 108-110, 114, 133, 135-138, 141, 143, 145, and 151 are rejected under 35 U.S.C. 103(a) as being unpatentable over Levy '203 in view of IBM and Ikenaga.

Claims 106, 107, 113, 115, 139, 140, and 142 are rejected under 35 U.S.C. 103(a) as being unpatentable over Levy '203, IBM, and Ikenaga as applied to claims 105, 108, and 133 above, and further in view of Levy '455.

Rather than reiterate the conflicting viewpoints advanced by the Examiner and the Appellants regarding the above-noted rejections, we make reference to the Examiner's Answer (mailed Nov. 27, 2006) for the reasoning in support of the rejections, and to Appellants' Brief (filed Jul. 14, 2006) and Reply Brief (filed Dec. 22, 2006) for the arguments thereagainst.

OPINION

In reaching our decision in this appeal, we have given careful consideration to Appellants' Specification and claims, to the applied prior art references, and to the respective positions articulated by Appellants and the Examiner. As a consequence of our review, we make the determinations that follow.

At the outset, we note that Appellants identify related case Application Number 10/852,996 as containing related claims. The Examiner should review those claims in this case, as deemed appropriate by the Examiner.

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the Examiner to establish a factual basis to support the legal conclusion of obviousness. *See In re Fine*, 837 F.2d 1071, 1073 (Fed. Cir. 1988). In so doing, the Examiner must make the factual determinations set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). “[T]he Examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a *prima facie* case of unpatentability.” *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992). Furthermore, “there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness’ . . . however, the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (2007)(quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

Appellants’ main contentions with respect to all of the independent claims on appeal are that the asserted combination does not teach or suggest including a pulsed light source in a system for inspecting a semiconductor wafer, or the system comprises an opto-electric converter for imaging, where in the opto-electric converter is a CCD matrix (Br. 12).

Appellants’ have elected to group all the independent claims as standing or falling together since no separate arguments for patentability are found for each independent claim (Br. 12).

The Examiner maintains that the rationale for the combination of the IBM reference with Levy '203 is that using such pulsated light would prevent interference between successive images received by the camera, thus

an accurate receipt of the measurement is obtained. Moreover, further use of a CCD camera would have been obvious to one of ordinary skill in the art at the time the invention was made (Answer 4). We agree with the Examiner that in the combination of Levy '203 with Ikenaga with the CCD camera, it would have been readily apparent to those skilled in the art that discrete images of the sample would have been desirable. Furthermore, we find that the use of a pulsed light source or flash light source as used in a typical COTS (Commercial Off The Shelf)-type camera would have been desirable for still images, as implied in the Examiner's rationale at page 4 of the Answer. Additionally, we note that Levy '203 at column 10 and in figure 4 teaches the use of modulated or pulsed light from a laser which is used to focus the lens on the image plane using laser light from laser 250 sent through chopper 251 and associated optics. While Levy '203 does not expressly teach the use of pulsating light in the image acquisition, we find the recognition of a pulsed light from laser 250 is a suggestion or recognition of pulsed light in the processing of semi-conductors.

From our review of figure 4 and its corresponding discussion at columns 8-11 (especially column 10) of Levy '203, it is clear that the modulated light from laser 250 is used to illuminate a point of the periphery of the field and to detect this position relative to a known position. Once this position is known, it can be used to detect or determine the spacing between the objective and the object. Levy' 203 teaches that the modulated/chopped light is processed through the microscope lens and associated image processing. We find that the modulated or pulsed light is processed by a processor. Therefore, the modulated or pulsed light would have been part of the larger illuminated area from the light 156 which would

be processed. Furthermore, we find that each illuminated area may be deemed to be made up of multiple illuminated areas wherein the area of the periphery of the larger illuminated area where the modulated light would have been located is one such sub-area of illumination.

Therefore, we find that Levy' 203 teaches and fairly suggests the use of a pulsed light source. Additionally, we agree with the Examiner's rationale concerning the use of a pulsating light source for differentiating separate and distinct images or frames for analysis and processing. Therefore, we do not find Appellants' arguments to be persuasive.

Appellants argue that while Levy '203, Ikenaga, and IBM all relate to optical inspection systems for inspecting articles in the semi-conductor field (Br. 13-14), Appellants dispute the combination of all three references since IBM directed the use of oblique light for scattered light integration rather than a normal light for acquiring an image as in Levy '203 and Ikenaga (*id.*).

Appellants argue that the Examiner's rationale for replacing the continuous light source of Levy '203 with the pulsating light source of IBM to prevent interference between images received by camera is not supported and taught or suggested by the combined teachings of the applied references. Appellants argue that IBM does not teach or suggest that the pulsed light source described IBM would prevent interference between images received by a camera such as an opto-electric electric converter that is a CCD matrix (Br. 14). Appellants argue that the only evidence the Examiner provided for support of the assertion that pulsed light would prevent interference between images received by a camera is Japanese Patent JP-401210348A, but the Examiner explicitly stated that this reference was not included in the rejection of the claims (Br. 14). Since the Examiner has not relied upon this

reference we have not considered it in our decision,¹ and we note our above discussion of the use of pulsating/chopped light in the teachings of Levy '203.

Appellants argue that the Examiner has not demonstrated a reasonable expectation of success for using the pulsed light of IBM which provides an oblique light in a system with the human eye as the detector versus the computer-based detector of Levy '203 and Ikenaga (Br. 15). Again, we do not find this argument persuasive in view of the limited teachings of IBM upon which the rejection relies. As discussed above with respect to the combination of Levy '203, Ikenaga, and IBM, we find that the combination would have suggested a photomask inspection system that includes a pulsed light source and opto-electric converter, wherein the opto-electric converter is any CCD matrix, and a processor for detecting a wafer defect. Therefore, we find that Appellants have not shown error in the Examiner's combination used for obviousness, and we will sustain the rejection of independent claim 133. Since Appellants have not set forth separate arguments for patentability of independent claims 103, 104, 105, 108, 135, and 143, we will sustain the rejection of those claims and their respective dependent claims 109, 110, 114, 136-138, 141, 145, and 151.

With respect to dependent claims 106, 107, 113, 115, 139, 140, and 142, Appellants rely upon the same argument advanced with respect to

¹ If the citation of a new prior art reference is necessary to support a rejection, it must be included in the statement of rejection, which would be considered to introduce a new ground of rejection. Even if the prior art reference is cited to support the rejection in a minor capacity, it should be positively included in the statement of rejection. *In re Hoch*, 428 F.2d 1341, 1342 n.3 (CCPA 1970).

Appeal 2007-3705
Application 10/852,798

independent claim 133 wherein the additional teachings of Levy '445 do not remedy the asserted deficiency and the base combination (Br. 16-17). Since we found no deficiency in the base combination discussed above, we will sustain the rejection of dependent claims 106, 107, 113, 115, 139, 140, and 142.

CONCLUSION

To summarize, we have sustained the rejection of claims 103-110, 113-115, 133, 135-143, 145, and 151 under 35 U.S.C. § 103(a).

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED

clj

Patent Counsel, MS/2061
Legal Affairs Department
APPLIED MATERIALS, INC.
P.O. Box 450A
Santa Clara, CA 95052