THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 40

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KLA INSTRUMENTS CORP.

Appeal No. 96-1740
Reexamination No. 90/002,732[1]

HEARD: August 5, 1996

Before THOMAS, KRASS and JERRY SMITH, Administrative Patent Judges.[2]

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[1] Reexamination proceeding filed June 1, 1992. According to the appellant, this application is a reexamination of 06/885,197, filed July 14, 1986, now U.S. Patent No. 4,805,123.

[2] The original panel of this Board which heard the oral arguments on August 5, 1996, comprised Administrative Patent Judges Thomas, Cardillo and Fleming. Due to the

THOMAS, Administrative Patent Judge.

DECISION ON APPEAL

Appellant has appealed to the Board from the examiner's final rejection of claims 1 to 6, 12 to 15, 17, 23, 28 to 34, 36, 38, 40, 41, 43, 51 and 52. The examiner has confirmed the patentability of claims 7 to 11, 16, 18 to 22, 24 to 27, 35, 37, 39, 42 and 44 to 50.

Representative claim 29 is reproduced below:

29. An apparatus for inspecting and detecting defects in realtime in objects selected from the group consisting of photomasks, reticles, wafers and printed circuit boards comprising:

means for inspecting a selected surface area of an object and for generating a first stream of data having signal values representing the image content of each pixel thereof;

means for generating a second stream of data having signal values representing the image content of each pixel of an image corresponding to that of said selected surface area;

memory means for temporarily storing first and second corresponding portions of said first and second streams of data;

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unavailability of Administrative Patent Judges Cardillo and Fleming, the Chief Administrative Patent Judge has redesignated the panel as indicated above. Note In re Bose, 772 F.2d 866, 227 USPQ 1 (Fed. Cir. 1995) and MPEP § 1203.

first detector means for detecting with resolution to a fraction of a pixel any misalignment between the temporarily stored first and second portions of data;

alignment means using subpixel interpolation to correct any detected misalignment in the stored first and second portions of data; and

second detector means for comparing corresponding subportions of the aligned first and second portions of data to detect any difference therebetween, and upon detecting such difference, for indicating the presence of a defect at a particular pixel location on the inspected object.

The following references are relied on by the examiner:

Levy et al. (Levy) 4,579,455 Apr. 01, 1986

Rosenfeld et al., (Rosenfeld), "Digital Picture Processing," 2d ed., ***Academic Press, Inc.***, vol. 2, ch. 9, pp. 10-41 (1982).

Claims 1 to 6, 12 to 15, 17, 23, 28 to 34, 36, 38, 40, 41, 43, 51 and 52 stand rejected under 35 U.S.C. § 103. As evidence of obviousness, the examiner relies upon Levy in view of Rosenfeld.

Rather than repeat the positions of the appellant and the examiner, reference is made to the briefs and the answers for the respective details thereof.[3]

OPINION

We reverse the stated rejection of the claims on appeal under 35 U.S.C. § 103.

Independent claims 1 and 29 on appeal are respective method and apparatus claims which appear to claim substantially the same subject matter. Both set forth either a step or a means for detecting with resolution to a fraction of a pixel any misalignment between the first stored and second stored portions of data. Additionally, these claims require a step or a means for using subpixel interpolation to correct any detected misalignment in this stored data.

[3] Our deliberations begin with the consideration of the corrected brief filed on August 18, 1994. Inasmuch as the examiner's answers have made it clear that the examiner has not entered the proposed amendments to the claims on appeal, this decision and the rejection are based upon the unamended, originally patented claims, as noted by the examiner. Therefore, we have not considered the arguments raised as to the amended claims beginning at the bottom of page 15 of the brief through the end of it.

The Office action issued on February 2, 1993 indicated at the bottom of page 3 that the examiner recognized Levy did not disclose both detecting subpixel misalignment and correcting for misalignment using subpixel interpolation. On the other hand, the statement of the rejection in the answer of the present claims on appeal beginning at the bottom of page 4 through the top of page 6 indicates that the examiner appears to consider Levy only as differing from the patented claims in the subpixel interpolation feature. In other words, the examiner's position in the answer appears to take the position or assume that Levy does in fact teach the feature of detecting with a resolution to a fraction of the pixel any misalignment between the stored first and second portions of data.

Column 1, line 66 through col. 2., line 38 of the issued patent associated with this reexamination proceeding makes reference to this Levy patent relied upon by the examiner and characterizes it at col. 2, lines 19 through 23, as relating to misalignment determinations between the two representations or data streams of data being less than approximately two pixels in magnitude. Our reading of Levy itself is consistent

with this characterization. The fine alignment correction circuit 73 in Fig. 1 of Levy is discussed briefly at col. 5, lines 47 through 50, indicating that this circuit effects fine adjustment of left and right pixel data to within plus or minus two pixels. Similar misalignment correction capabilities are characterized at col. 8, line 14 through col. 9, line 16.

In view of these latter considerations, we do not understand Levy as teaching or suggesting the capability of detecting with the resolution to a fraction of the pixel any misalignment between the stored first and second portions of data as required by independent claims 1 and 29 on appeal. Even though we find that it would have been highly desirable in the art to have sought a resolution finer than two pixels for correcting misalignment problems, we have no evidence that such capability was known or existed in the art based upon the applied art to reject the claims on appeal.

At least with respect to the independent claims on appeal, the examiner relies upon the secondary reference to Rosenfeld as teaching or suggesting to the artisan the existence of various capabilities or techniques known in the

art to perform interpolation techniques, the second stated feature of each independent claim 1 and 29 on appeal. Based upon the collective teachings and suggestions of both references, taken together, and assuming for the sake of argument a proper combinability of them within 35 U.S.C. § 103, we are not convinced that the artisan would have utilized subpixel interpolation of the type broadly set forth in each independent claim 1 and 29 on appeal to correct any previously detected and identified misalignments of the stored first and second portions of data.

The bilinear interpolation technique discussed initially at page 33 of Rosenfeld does indicate that such an approach may comprise "integer parts" and "fractional parts". It is somewhat speculative to us that the examiner may properly assert within 35 U.S.C. § 103 that such integer parts may be analogized to pixels and such fractional parts may be analogized to subpixels as set forth at page 6 of the principal answer. These "parts" are discussed at the top of page 34 of Rosenfeld. It appears to us that in context, these terms relate to integer and fractional coordinate points and do not necessarily correspond to pixel and subpixel

information. The application of integer parts and fractional parts to pixel and subpixel processing is not a reasonable correspondence to us based upon the collective teachings and suggestions of the references relied upon. Based upon our consideration of Levy and Rosenfeld, we can conclude only that independent claims 1 and 29 may have been or could have been obvious but not would have been obvious to the artisan within 35 U.S.C. § 103. Since we reverse the rejection of these independent claims, the rejection of their respective dependent claims is also reversed.

Turning lastly to the subject matter of independent claims 51 and 52 on appeal, these claims relate to detecting to an integer pixel level any misalignment and aligning to the closest integer pixel to correct any misalignments in contrast to the above noted features with respect to independent claims 1 and 29 on appeal. We do, however, note that independent claims 51 and 52 relate in the last clause of these respective claims the concept of comparing particular subportions of arrays where each shifted array is shifted to a different subpixel increment relative to the corresponding other array that it is being compared with.

The statements of the examiner's position in the Office action of February 2, 1993, as well as in the final rejection of August 24, 1993 and in the examiner's answer do not discuss the features of independent claims 51 and 52 at all. As such, we conclude that the examiner has failed to set forth a prima facie case of obviousness of these two independent claims. Additionally, we can surmise no line of reasoning from the examiner's more detailed position as to independent claims 1 and 29 as to how the features recited in independent claims 51 and 52 would have been obvious to the artisan in light of the collective teachings of Levy and Rosenfeld.

In view of the foregoing, the decision of the examiner rejecting claims 1 to 6, 12 to 15, 17, 23, 28 to 34, 36, 38, 40, 41, 43, 51 and 52 under 35 U.S.C. § 103 is reversed.

REVERSED

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JAMES D. THOMAS)
Administrative Patent Judge)
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) BOARD OF PATENT
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