



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/828,368	07/01/2010	Michael LEV	3017/106-US	6716

69054 7590 09/23/2016
RECHES PATENTS
211 North Union St.
Suite 100
Alexandria, VA 22314

EXAMINER

ITSKOVICH, MIKHAIL

ART UNIT	PAPER NUMBER
----------	--------------

2483

NOTIFICATION DATE	DELIVERY MODE
-------------------	---------------

09/23/2016

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

OREN@I-P.CO.IL
RECHESO@012.NET.IL
MAIL@I-P.CO.IL

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MICHAEL LEV and AMIR GILEAD

Appeal 2015-005715
Application 12/828,368
Technology Center 2400

Before MAHSHID D. SAADAT, JOHNNY A. KUMAR, and
JON M. JURGOVAN, *Administrative Patent Judges*.

JURGOVAN, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants¹ seek review under 35 U.S.C. § 134(a) from the Final Rejection of claims 1–26. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.²

¹ Appellants identify Camtek Ltd. as the real party in interest. (App. Br. 3.)

² Our Decision refers to the Specification filed July 1, 2010 (“Spec.”), the Final Office Action mailed Apr. 10, 2014 (“Final Act.”), the Appeal Brief filed July 6, 2014 (“App. Br.”), the corrected Claims Appendix filed Aug. 14, 2014 (“Claims App’x”), the Examiner’s Answer mailed Mar. 11, 2015 (“Ans.”), and the Reply Brief filed May 11, 2015 (“Reply Br.”).

CLAIMED SUBJECT MATTER

The claims are directed to an optical inspection system having an optical element that directs light from different areas of the edge of an inspected object toward an image sensor, so that the image sensor concurrently obtains images of the different areas. (Spec. Abstract.)

Claim 1, reproduced below, is illustrative of the claimed subject matter:

1. An optical inspection system, comprising:
 - a first image sensor;
 - a second image sensor;
 - a support module for supporting and rotating an inspected object that has an edge that comprises a top area, top bevel area, an apex area, a bottom bevel area and a bottom area;
 - a first optical element, for directing light from the top area, from the top bevel area and from the apex area towards the first image sensor; and
 - a second optical element, for directing light from the bottom area, from the bottom bevel area and from the apex area towards the second image sensor;
 - wherein the first image sensor is arranged to sense the light from the top area, from the top bevel area and from the apex area; and
 - wherein the second image sensor is arranged to sense the light from the bottom area, from the bottom bevel area and from the apex area.

(Claims App'x 2.)

REJECTIONS

Claims 1–14 and 26 stand rejected under 35 U.S.C. § 102(b) based on Wagner (US 2006/0072105 A1, published Apr. 6, 2006). (Final Act. 4–11.)

Claims 15–23 stand rejected under 35 U.S.C. § 103(a) based on Jung et al. (US 2006/0083437 A1, published Apr. 20, 2006) and Wagner. (Final Act. 12–16.)

Claims 24 and 25 stand rejected under 35 U.S.C. § 103(a) based on Wagner and Sandland et al. (US 4,556,317, issued Dec. 3, 1985). (Final Act. 17.)

ANALYSIS

35 U.S.C. § 102(b) Rejections over Wagner

Independent Claims 1 and 9

Appellants contend Wagner does not disclose a “first image sensor is arranged to sense the light from the top area, from the top bevel area and from the apex area” and a “second image sensor is arranged to sense the light from the bottom area, from the bottom bevel area and from the apex area.” (App. Br. 15–18; Reply Br. 4–5.) Appellants argue Wagner’s pairs of cameras are limited to separately imaging the upper edge zone of the wafer (cameras 10 and 11), the lower edge zone of the wafer (cameras 12 and 13), and the lateral edge of the wafer (cameras 14 and 15), with no overlap of zones as suggested by the Examiner. (App. Br. 16–17.)

Appellants contend the Examiner’s interpretation that the claimed image sensor can be any number of combinations of cameras, including a set of cameras, is contrary to the explicit language of the claims, which require an optical element to direct light from each area (e.g., top, top bevel, and apex area) to the sensor. (App. Br. 18.)

We are unpersuaded of Examiner error in the rejection, and agree with the Examiner’s finding that the first image sensor and second image sensor

are claimed in terms of functional language (i.e., “arranged to sense the light”) and do not require any specific structure. (Final Act. 5–7; Ans. 8–10.) Thus, under the broadest reasonable interpretation consistent with Appellants’ disclosure, we agree with the Examiner’s finding that an “image sensor” as claimed does not preclude using a combination of cameras to sense the light of the various areas. As the Examiner finds, Wagner’s top (10) and side (14) cameras disclose a first image arranged to sense the light from the top area, from the top bevel area and from the apex area, and Wagner’s bottom (12) and side (15) cameras disclose a second image sensor arranged to sense the light from the bottom area, from the bottom bevel area and from the apex area. (*Id.* (citing Wagner ¶¶ 45, 47–49); *see In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1369 (Fed. Cir. 2004): “[T]he PTO is obligated to give claims their broadest reasonable interpretation during examination.”) We further agree with the Examiner’s finding that Wagner’s light guides (5) disclose first and second optical elements that direct light into each of the image sensor cameras. (*Id.* (citing Wagner ¶ 49).)

Dependent Claims 2 and 10

Appellants contend Wagner does not disclose the first optical element comprises “a first segment that faces the top area, a second segment that faces the top bevel area and a third segment that faces the apex area,” because a “segment” is one of the parts into which something can be divided, and Wagner’s separate cameras cannot be regarded as segments of an optical element. (App. Br. 19; Reply Br. 6.) Appellants’ contention does not persuade us of error in the rejection, as we find Appellants’ definition of “segment,” dividing the optical element into separate parts, supports the use

of a combination of light guides and cameras to image the top, top bevel, and apex areas. Thus, we agree with the Examiner's finding that Wagner's light guides disclose a first optical element with segments that face the top and top bevel areas (Final Act. 7; Ans. 10–11 (citing Wagner ¶¶ 48–49: segments of light guide 5 for camera 10 face both the top and upper edge zone of the wafer)) and a segment that faces the apex area (*id.* (light guide 5 for camera 14 faces the lateral edge, or apex, of the wafer)).

Dependent Claims 7 and 13

Appellants contend Wagner does not disclose “a processor that is arranged to analyze images . . . for suspected inspected object defects” and “a review unit comprises a review camera for obtaining images of the suspected defects . . . wherein the first scan unit, the second scan unit and the review unit are spaced apart from each other.” (App. Br. 20–21; Reply Br. 6.) Appellants argue Wagner discusses an inspection station with pairs of cameras and a PC for image processing, but does not disclose the claimed processor that is arranged to analyze images and review unit for obtaining images of suspected defects. (*Id.*)

We do not find Appellants' contention persuasive of Examiner error. Under the broadest reasonable interpretation consistent with Appellants' disclosure, the review camera need not be separate from the cameras of the first and second image sensor, rather, only a portion of the review unit must be “spaced apart” from the first and second sensors, or scan units. (*See In re Am. Acad. of Sci. Tech. Ctr., supra.*) Therefore, we agree with the Examiner's finding that Wagner's inspection system comprises a review unit camera (i.e., any one of cameras 10–15) that obtains images of suspected

defects (Ans. 11–12 (citing Wagner ¶ 21)), wherein the review unit is spaced apart from the first and second image sensors and comprises a processor to analyze images of suspected defects (*id.* (citing Wagner ¶ 45: evaluation unit 8 comprises PC 9, which contains a processor that analyzes image data)).

Dependent Claims 8 and 14

Appellants contend Wagner does not disclose “the review unit comprises a rotating module that rotates the review camera about an axis such as to change an angle between the review camera and the edge of the inspected object,” rather, Wagner merely discloses a wafer that can be translated vertically or horizontally. (App. Br. 22; Reply Br. 7.) We are unpersuaded of Examiner error by Appellants’ contention, and agree with the Examiner’s finding that Wagner discloses the cameras, which include a review camera as discussed *supra*, can be pivotally arranged to change the angle between the cameras and the wafer. (Ans. 13 (citing Wagner ¶ 29)).

Dependent Claim 26

Appellants contend Wagner does not disclose “the first and second optical elements form a multi facet deflector that is made of transparent material and comprises two facets, one positioned above the inspected object and the other positioned below the inspected object . . . wherein the two facets are coated with reflective material or are connected to a mirror.” (App. Br. 30; Reply Br. 9.) Appellants argue Wagner fails to indicate how the cited optical imaging system is formed, thus the imaging system cannot be regarded as the claimed multi facet deflector.

As discussed *supra* regarding claim 1, we agree with the Examiner's finding that the Wagner discloses a first optical element (transparent light guides 5 with cameras 10 and 14) and second optical element (transparent light guides 5 with cameras 12 and 15), which are positioned above and below the wafer, respectively. (Final Act. 5–7; Ans. 8–10.) Further, we agree with the Examiner's finding that at least a portion of the light guides are coated with reflective material. (Ans. 17–19 (citing Wagner ¶ 48)). Accordingly, we are not persuaded of Examiner error in the rejection.

*35 U.S.C. § 103(a) Rejections over Jung and Wagner
Independent Claims 15 and 18*

Appellants contend the combination of Jung and Wagner does not teach “a multi facet deflector that surrounds an edge of an inspected object and is arranged to allow light to pass through a transparent material of the multi facet deflector and to impinge on the edge of the inspected object.” (App. Br. 24–26; Reply Br. 7–8.) Appellants argue Jung's multi-facet mirror array only reflects light, and does not include a transparent material that allows light to pass through it. (*Id.*) Appellants contend Wagner does not cure the deficiencies of Jung, and Wagner teaches away from using a multi facet deflector as claimed.

Appellants' contentions do not persuade us of Examiner error. The Examiner properly relies on *In re Keller*, 642 F.2d 413, 425 (CCPA 1981) and *In re Merck & Co. Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986) (Ans. 14), and states that nonobviousness cannot be established by attacking the references individually when the rejection is predicated upon a combination of Jung and Wagner (*id.*). We agree with the Examiner's finding that a

skilled artisan would recognize using Jung's curved, multi facet mirror (60) as the reflective mirror in Wagner's transparent light guide optics would result in the claimed multi facet deflector, which surrounds the edge of a wafer and allows light to pass through the light guide and impinge on the wafer. (Final Act. 13–14; Ans. 14–15 (citing Jung ¶ 37 and Wagner ¶ 48).)

Further, we agree with the Examiner's finding that Wagner does not teach away from the combination with Jung. (Ans. 15). "A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant." (*In re Kahn*, 441 F.3d 977, 990 (Fed. Cir. 2006) (citations and internal quotation marks omitted).) Here, Wagner teaches the use of mirrors in the imaging optics, rather than discouraging the use of such mirrors. (Final Act. 13–14; Ans. 15 (citing Wagner ¶ 48).)

Dependent Claims 22 and 23

Appellants contend the combination of Jung and Wagner does not teach "the multi facet deflector comprises a facet that is located above the inspected object and is parallel to the inspected object and comprises a facet that is located below the inspected object and is parallel to the inspected object." (App. Br. 27; Reply Br. 8.) As discussed *supra* with respect to claims 1 and 15, we agree with the Examiner's finding that Wagner's camera system teaches an image sensor above and parallel to the wafer (i.e., cameras 10 and 14) and an image sensor below and parallel to the wafer (i.e., cameras 12 and 15), and the combination of Jung and Wagner teaches a multi facet deflector that surrounds an edge of the wafer. (Final Act. 5–7,

13–14; Ans. 8–10, 14–15.) Thus, we agree with the Examiner’s finding that the combination of Jung and Wagner results in a multi facet deflector that has a facet located above and parallel to the wafer (i.e., facets of the combined optics of Wagner’s light guide 5 for cameras 10 and 14 with Jung’s mirror 60) and a facet located below and parallel to the wafer (i.e., facets of the combined optics of Wagner’s light guide 5 for cameras 12 and 15 with Jung’s mirror 60). (Ans. 16.)

35 U.S.C. § 103(a) Rejections over Wagner and Sandland

Dependent Claims 24 and 25

Appellants contend the combination of Wagner and Sandland does not teach “each one of the first and second optical elements is a penta-prism,” because Sandland teaches a single penta-prism that directs light only from the top of the wafer to a single a camera, and Wagner teaches away from using a penta-prism as a first and second optical element to direct light as claimed. (App. Br. 28–29; Reply Br. 8.) Appellants’ contentions are unpersuasive of Examiner error, as Appellants are arguing the Wagner and Sandland references individually. (Ans. 16–17; *see Keller and Merck, supra.*) We agree with the Examiner’s finding that a skilled artisan would recognize the ability to use the penta-prism of Sandland as part of the refractive light guides of Wagner. (Final Act. 17; Ans. 16–17 (citing Wagner ¶ 48 and Sandland col. 17:14–17); *see KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007): “The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.”)

Remaining Claims

No separate arguments are presented for the remaining dependent claims. Thus, for reasons stated with respect to independent claims 1, 9, 15, and 18, we sustain the Examiner's rejections of the remaining dependent claims. 37 C.F.R. § 41.37(c)(1)(iv); *In re King*, 801 F.2d 1324, 1325 (Fed. Cir. 1986); *In re Sernaker*, 702 F.2d 989, 991 (Fed. Cir. 1983).

DECISION

We affirm the Examiner's decision to reject claims 1–26.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED