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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ERIK MARIE JOSE SMEETS

Appeal 2015-005143
Application 13/370,102
Technology Center 2800

Before ADRIENE LEPIANE HANLON, CATHERINE Q. TIMM, and
JAMES C. HOUSEL, *Administrative Patent Judges*.

PER CURIAM.

DECISION ON APPEAL¹

Appellant² filed an appeal under 35 U.S.C. § 134 from the Examiner's decision rejecting, under 35 U.S.C. § 103(a), claims 14–17, 20–22, and 38–40 as unpatentable over Takakuwa³ in view of Akiyama,⁴ and claims 31, 34–36, and 41 as unpatentable over Takakuwa alone. We have jurisdiction under 35 U.S.C. § 6(b).

¹ Our decision refers to Appellant's Specification filed February 9, 2012 (Spec.), Appellant's Appeal Brief filed November 11, 2014 (Appeal Br.), the Examiner's Answer delivered February 25, 2015 (Ans.), and Appellant's Reply Brief filed April 7, 2015 (Reply Br.).

² Appellant identifies the real party in interest as ASML Netherlands B.V. Appeal Br. 2.

³ Takakuwa et al., US 6,597,509 B2, issued July 22, 2003 ("Takakuwa").

⁴ Akiyama, US 2004/0201789 A1, published Oct. 14, 2004 ("Akiyama").

We REVERSE.

STATEMENT OF THE CASE

The subject matter on appeal relates to substrates (*see, e.g.*, claims 14 and 31). Lithography is used to apply a desired pattern onto a substrate, such as in the manufacture of integrated circuits or flat panel displays. Spec. ¶ 3. Appellant discloses that some substrates, such as glass or plastic substrates, may be more likely to suffer from distortion during a manufacturing process. *Id.* at ¶ 5. Figure 5 of Appellant's disclosure is reproduced below.

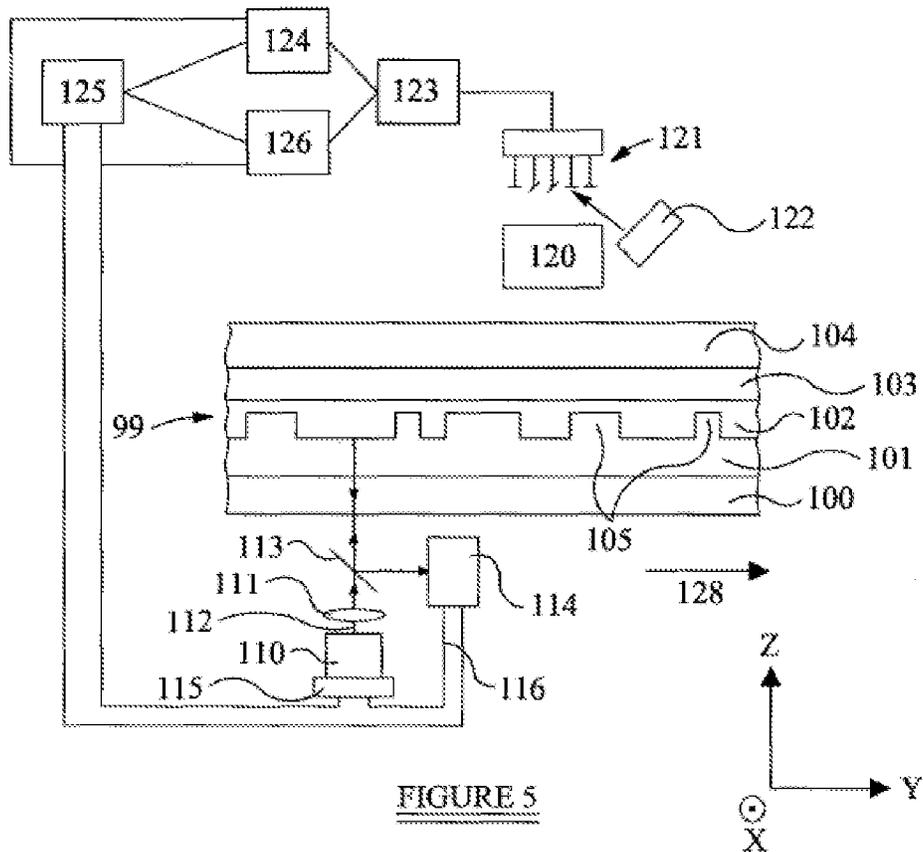


Figure 5 depicts a lithographic apparatus

Appellant discloses a process in which a substrate **99**⁵ is provided on a substrate table **100**. *Id.* at ¶ 58. The substrate **99** includes a base layer **101**, a reflective layer **102**, and a protective layer **103**. *Id.* A resist layer **104** is provided on top of the protective layer **102**. *Id.* In addition, the base layer **101** includes an array of pits **105**. *Id.* at ¶ 59.

A laser **110**, lens **111**, and beam splitter **113** are located beneath the base layer **101** for directing a beam **112** of light at the substrate **99**. *Id.* at ¶ 64. The substrate table **100** is made of a material substantially transparent to the light used to illuminate the pits **105** and the reflective layer **102** may be opaque and reflective to the light. *Id.* at ¶ 63. Appellant discloses the intensity of reflected light is greater when the beam **112** is incident upon pits **105**, as compared to when the light is incident upon a region of the base layer **101** not including pits, because the focal plane of the beam corresponds with the pits **105** but not with areas between the pits **105**. Thus, light reflected from areas between pits **105** has a greater divergence and thus lower intensity. *Id.*

After passing through the base layer **101**, the light is reflected by the reflective layer **102** and then reflected by the beam splitter **113** to a detector **114**. *Id.* A feedback circuit **116** connects the detector **114** to a comparator **124** that compares the detected positions of the pits **105** to previously detected positions of the pits **105** stored in a memory **125**. *Id.* at ¶¶ 71, 79. Differences between the two patterns of pit positions indicate distortion of the substrate **99**. *Id.* at ¶ 79. These differences are sent to control

⁵ Throughout this Opinion, for clarity, we present labels to elements in figures in bold font, regardless of their presentation in the original document.

electronics **123**, which adjust the pattern provided by an array of moveable mirrors **121** used to project an adjusted pattern onto the substrate **99**. *Id.*

Independent claim 14 is illustrative and is reproduced below from the Claims Appendix of the Appeal Brief.⁶ The limitations at issue are italicized.

14. A substrate comprising:
 - a photosensitive layer;
 - a mark layer arranged below the photosensitive layer and having at least 1000 marks, and
 - a reflective layer arranged between the mark layer and the photosensitive layer so as to fill spaces between the marks, said reflective layer being reflective to a radiation beam of a first wavelength,*
 - wherein said mark layer is transmissive to the radiation beam at said first wavelength so that said radiation beam propagating through said mark layer is reflected by said reflective layer, and
 - wherein said substrate is a polygonal substrate and wherein at least one side of the polygonal substrate has a length of at least 50cm.

The remaining independent claim 31 similarly recites, “wherein the reflective layer is arranged on the mark layer so as to cover each of said marks and fill spaces between the marks.”

ANALYSIS

The dispositive issue on appeal is whether Appellant has shown a reversible error in the Examiner’s finding that Takakuwa discloses a reflective layer that fills spaces between the marks of a mark layer, as recited

⁶ Appeal Br. 23.

in claim 14. We answer this question in the affirmative and, therefore, will not sustain the Examiner’s rejections based on Takakuwa.

The Examiner finds Takakuwa discloses a substrate comprising a photosensitive layer, a mark layer including a plurality of marks (mark **34** and lenses **32**), and a reflective layer **36** arranged between the mark layer and the photosensitive layer. Ans. 3.

Appellant contends that Takakuwa’s reflecting layer **36** does not fill spaces between mark **34** and lenses **32**. Appeal Br. 6. Appellant asserts that the reflecting layer **36** is formed on an upper surface of the mark **34** to make it recognizable during an alignment procedure. *Id.* However, according to Appellants, Takakuwa’s reflecting layer **36** does not “fill spaces between the marks,” as recited in claim 14. *Id.*

Appellant’s arguments are persuasive of reversible error. Figure 4(B) of Takakuwa is reproduced below.



Takakuwa, Figure 4(B) depicts a manufacturing step for a microlens array

As shown in Figure 4(B), which shows a step in a manufacturing process for a microlens array, a light-transmitting layer **30** including lenses **32** is located on a substrate **40**. Takakuwa col. 8, ll. 44–46, 60–61.

Takakuwa discloses “a reflecting layer **36** is formed on the mark **34**” and “may be formed around the mark **34**.” Takakuwa col. 9, ll. 14–15, 17–18.

Appellant further asserts the microlens array of Takakuwa would not work if it were modified so the reflecting layer **36** filled the spaces between marks **34** and lenses **32**. Appeal Br. 7. Specifically, Appellant contends the microlens array of Takakuwa is designed so light passes through the light transmitting layer **30** but if the reflecting layer **36** were modified to fill spaces between marks **34** and lenses **32** the reflecting layer **36** would block light and prevent the microlens array from operating as intended. *Id.* at 7.

We agree. Though the Examiner states, in response, it is implicit or obvious that the reflecting layer **36** of Takakuwa is formed on marks **34** and fills spaces between marks (Ans. 12), these statements lack any supporting evidence or explanation. Such conclusory statements do not support the Examiner's finding that Takakuwa discloses a reflective layer that fills spaces between marks of a mark layer, as recited in claim 14, or explain why one of ordinary skill in the art would have modified the reflecting layer **36** so it fills spaces between such marks. The Examiner further cites passages in column 1 of Takakuwa⁷ but these passages do not disclose a reflective layer that fills spaces between marks of a mark layer, as recited in claim 14. As noted by Appellant,⁸ “rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR Intern. Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006).

In view of the above, Appellant has shown a reversible error in the Examiner's finding that Takakuwa discloses a reflective layer that fills

⁷ Ans. 16.

⁸ Reply Br. 6.

spaces between the marks of a mark layer, as recited in claims 14 and 31. The Examiner's reliance on Akiyama does not cure the deficiencies of Takakuwa discussed above. Each of the dependent claims include the limitation at issue from independent claims 14 or 31, respectively. Therefore, the Examiner's erroneous finding extends to these dependent claims as well.

For the reasons set forth above, the Examiner's § 103 rejections are not sustained.

DECISION

On the record before us and for the reasons given in Appellant's Appeal and Reply Briefs, we *reverse* the Examiner's decision rejecting claims 14–17, 20–22, 31, 34–36, and 38–41 under 35 U.S.C. § 103 as unpatentable over Takakuwa alone or in combination with Akiyama.

REVERSED