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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* SEUNG-YEON JEONG, TAEK-JOON LEE,  
TAE-JIN KONG, MIN-SU KIM, SEUNG-WOOK NAM, and  
KYUNG-HO PARK

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Appeal 2015-005889  
Application 13/683,436  
Technology Center 1700

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Before ADRIENE LEPIANE HANLON, ELIZABETH M. ROESEL, and  
BRIAN D. RANGE, *Administrative Patent Judges*.

RANGE, *Administrative Patent Judge*.

DECISION ON APPEAL

SUMMARY

Appellants<sup>1</sup> appeal under 35 U.S.C. § 134(a) from the Examiner's decision rejecting claims 1, 4, 5, 10, 11, 16, 19, 20, 22, 25, and 26, which constitute all the claims pending in this application. Claims 2, 3, 6–9, 12–

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<sup>1</sup> According to the Appellants, the real party in interest is SAMSUNG DISPLAY CO., LTD. Appeal Br. 3.

15, 17, 18, 21, and 23–24 have been cancelled. We have jurisdiction. 35 U.S.C. § 6(b).

We AFFIRM.

#### STATEMENT OF THE CASE

Appellants describe the invention as relating to an alignment layer which aligns liquid crystal molecules of a liquid crystal display. Spec. ¶¶ 3, 7. The alignment layer may improve display quality. *Id.* at ¶ 5. Claim 1, reproduced below with emphasis added to certain key recitations, is illustrative of the claimed subject matter:

1. An alignment layer disposed on a substrate and comprising:

a first main chain comprising polyethylene and photocuring agents bonded to the polyethylene; and

a second main chain comprising polyimide and vertical alignment groups bonded to the polyimide,

wherein,

the photocuring agents are crosslinked to each other and aligned at a pretilt angle with respect to the substrate,

the vertical alignment groups are aligned in a direction normal with respect to a plane of the substrate,

**the photocuring agents are aligned so as to pretilt liquid crystal molecules at an angle of from 0.5 degrees to 3 degrees with respect to the direction normal to the plane of the substrate,** when no electric field is applied to the liquid crystal molecules, and

the polyimide main chain is not bonded to photocuring agents.

Appeal Br.<sup>2</sup> 9 (Claims Appendix).

#### REFERENCES

The Examiner relies upon the prior art below in rejecting the claims on appeal:

Park et al. (hereinafter “Park”)	US 2002/0188075 A1	Dec. 12, 2002
Lee et al. (hereinafter “Lee”)	US 2009/0325453 A1	Dec. 31, 2009
Terashita et al. (hereinafter “Terashita”)	US 2010/0085523 A1	Apr. 8, 2010
Sunaga et al. (hereinafter “Sunaga”)	US 2010/0187001 A1	July 29, 2010
Tsai et al. (hereinafter “Tsai”)	US 2010/0243955 A1	Sept. 30, 2010
Kim et al. (hereinafter “Kim”)	US 2011/0051026 A1	Mar. 3, 2011
Hatanaka et al. (hereinafter “Hatanaka”)	US 2012/0114879 A1 <sup>3</sup>	May 10, 2012

#### REJECTIONS

The Examiner maintains the following rejections on appeal:

Rejection 1. Claims 1, 10, 11, and 16 under 35 U.S.C. § 103 as unpatentable over Lee in view of Park as evidenced by Terashita. Ans. 3.

Rejection 2. Claims 4 and 20 under 35 U.S.C. § 103 as unpatentable over Lee in view of Park as evidenced by Terashita and in further view of Hatanaka. *Id.* at 5.

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<sup>2</sup> In this decision, we refer to the Final Office Action mailed August 6, 2014 (“Final Act.”), the Appeal Brief filed January 6, 2015 (“Appeal Br.”), the Examiner’s Answer mailed March 27, 2015 (“Ans.”), and the Reply Brief filed May 21, 2015 (“Reply Br.”).

<sup>3</sup> The Examiner relies upon WO 2011/010635 A1, but references US 2012/0114879 A1 as the English language equivalent. Ans. 5.

Rejection 3. Claims 5, 22, 25, and 26 under 35 U.S.C. § 103 as unpatentable over Lee in view of Park as evidenced by Terashita and in further view of Kim. *Id.* at 7.

Rejection 4. Claim 19 under 35 U.S.C. § 103 as unpatentable over Lee in view of Park in view of Hatanaka and as evidenced by Terashita in further view of Sunaga and Tsai. *Id.* at 9.

#### ANALYSIS

We review the appealed rejections for error based upon the issues identified by Appellants and in light of the arguments and evidence produced thereon. *Cf. Ex parte Frye*, 94 USPQ2d 1072, 1075 (BPAI 2010) (precedential) (cited with approval in *In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011) (“it has long been the Board’s practice to require an applicant to identify the alleged error in the examiner’s rejections”)). Appellants argue all rejections and all claims together as one group. *See* Appeal Br. 6–8. Therefore, consistent with the provisions of 37 C.F.R. § 41.37(c)(1)(iv) (2013), we limit our discussion to claim 1, and all other claims stand or fall together with claim 1.

After having considered the evidence presented in this Appeal and each of Appellants’ contentions, we are not persuaded that Appellants identify reversible error, and we affirm the Examiner’s § 103 rejections for the reasons expressed in the Final Office Action and the Answer. We add the following primarily for emphasis.

The Examiner rejects claim 1 as obvious over Lee in view of Park as evidenced by Terashita. Ans. 3. The Examiner finds that Lee teaches most recitations of claim 1. *Id.* (providing numerous citations to Lee). The Examiner states that Lee remains silent regarding specific polymers and is

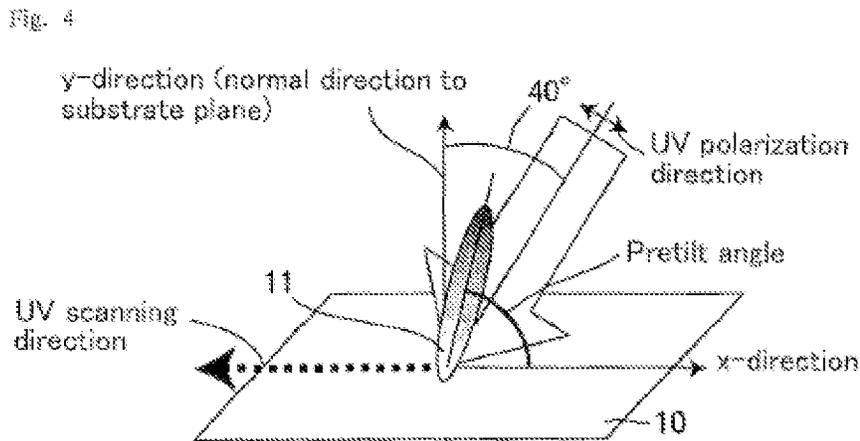
silent with respect to tilting at an angle from  $0.5^\circ$  to  $3^\circ$  with respect to the direction normal to the substrate. *Id.* at 4. The Examiner finds that Park teaches the use of the recited polymers (*Id.* at 4) and determines that it would have been obvious to one of ordinary skill in the art to utilize the polymers of Park in conjunction with Lee in order to “yield an alignment layer that has [a] high pretilt angle in the range of  $0.8^\circ$  to  $3^\circ$ , excellent thermal stability, and excellent alignment property as taught by Park.” *Id.* at 4 (citing Park ¶¶ 8, 19–28).

The Examiner also finds that Terashita teaches a pretilt angle of 0.5 to 3 degrees with respect to the direction normal to the plane of the substrate. Ans. 14. The Examiner reaches this finding (Ans. 14) by first relying on Terashita explaining that a pretilt angle of 87 to 89.5 degrees offers many advantages including, for example, excellent viewing angle characteristics, responsiveness, and light transmittance. Terashita states:

More specifically, in order to effectively drive the first liquid crystal display device in VA mode such as VATN mode, it is preferable that the alignment film aligns the liquid crystal molecules in such a way that an average pretilt angle of the liquid crystal layer is  $87^\circ$  to  $89.5^\circ$ , more preferably  $87.5^\circ$  to  $88.5^\circ$ . As a result, the liquid crystal display device in VATN mode excellent in viewing angle characteristics, responsiveness, and light transmittance, can be provided. More specifically, in order to suppress adverse effects on contrast in VATN mode (suppress increase in luminance under black display state), it is preferable that the alignment film aligns the liquid crystal molecules in such a way that an average pretilt angle of the liquid crystal layer is  $87^\circ$  or more, and more preferably  $87.5^\circ$  or more.

Terashita ¶ 60. The Examiner then notes that Terashita defines pretilt relative to the substrate whereas claim 1 defines pretilt relative to a line normal to the substrate such that there is a  $90^\circ$  difference. Ans. 14.

Terashita's measurement relative to the substrate is apparent in Figure 4, reproduced below:



Terashita's Figure 4 is a perspective view schematically showing a relationship between a photo-alignment treatment direction and a pretilt direction of a liquid crystal molecule in accordance with Terashita's embodiment 1. Terashita ¶ 142. Thus, as the Examiner explains, Terashita teaching of a pretilt angle of 87 to 89.5 degrees relative to the substrate is equivalent to a pretilt angle of 0.5 to 3 degrees with respect to the direction normal to the plane of the substrate. Ans. 14. The Examiner uses the teachings of Terashita to support the conclusion that it would have been obvious to modify Lee to have pretilt angles of 0.5 to 3 degrees with respect to the direction normal to the plane of the substrate. Ans. 13–14. A preponderance of the evidence supports the Examiner's findings and obviousness conclusion.

In the Appeal Brief, Appellants argue that Park fails to disclose a pretilt angle of 0.5 degrees to 3 degrees. Appeal Br. 6–8. Appellants argue against Park rather than Terashita because the Examiner originally relied on Park as teaching the recited pretilt angle. Final Act. 5. In the Answer,

however, the Examiner relies on Terashita as teaching the recited pretilt angle as explained above and relies on Park “for its alignment layer composition and its alignment layer formation (i.e.,] pretilting and curing) teachings” and does not rely on Park “to impart display device features such as . . . specific liquid crystal layer morphology (i.e.,] natural orientation).” Ans. 15. Thus, Appellants’ Appeal Brief arguments do not fairly meet the Examiner’s rejection as set forth in the Answer.

In the Reply Brief, Appellants continue to focus primarily on Park. Reply Br. 2–7. For example, Appellants critique the Examiner’s finding that “irradiating at a specific angle yields the same specific angle of pretilt” (Reply Br. 4), but the Examiner relied on that finding only when asserting that Park teaches the recited pretilt (Final Act 6–7). Appellants’ argument on this point is inapposite to the Examiner’s application of Terashita as teaching the recited pretilt because Terashita’s teaching of pretilt angle is explicit; the Examiner’s findings regarding the pretilt teachings of Terashita do not require inferring pretilt based on irradiation angle.

Appellants also argue that the Examiner does not provide a persuasive reason to combine the teachings of Lee, Park, and Terashita. Reply Br. 5–7. In particular, Appellants emphasize that a person of skill would not combine the references because Park’s alignment layer is for use with liquid crystals that are horizontally oriented when no electric field is applied, whereas Lee and Terashita are directed to liquid crystals having a vertical natural alignment. Reply Br. 6–7. Appellants, however, fail to persuasively dispute the Examiner’s reasoning for combining the polymer of Park with Lee, and Appellants fail to persuasively dispute the Examiner’s reasoning for combining Terashita’s teachings regarding pretilt angle with Lee. We thus

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sustain the Examiner's rejection because Appellants fail to identify reversible error.

**DECISION**

For the above reasons, we affirm the Examiner's rejection of claims 1, 4, 5, 10, 11, 16, 19, 20, 22, 25, and 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**