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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/491,261	04/19/2017	Uwe KELLER	KURA0149PUS	4942
22045	7590	08/28/2020	EXAMINER	
Brooks Kushman 1000 Town Center 22nd Floor Southfield, MI 48075			UTT, ETHAN A	
			ART UNIT	PAPER NUMBER
			1783	
			NOTIFICATION DATE	DELIVERY MODE
			08/28/2020	ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte UWE KELLER

Appeal 2019-004833
Application 15/491,261
Technology Center 1700

Before LINDA M. GAUDETTE, GEORGE C. BEST, and
MICHAEL G. McMANUS, *Administrative Patent Judges*.

GAUDETTE, *Administrative Patent Judge*.

DECISION ON APPEAL¹

The Appellant² appeals under 35 U.S.C. § 134(a) from the Examiner’s decision finally rejecting claims 1–13 and 15–20.³

We AFFIRM IN PART.

¹ This Decision includes citations to the following documents: Specification filed April 19, 2017 (“Spec.”); Final Office Action dated August 28, 2018 (“Final”); Appeal Brief filed February 22, 2019 (“Appeal Br.”); Examiner’s Answer dated April 4, 2019 (“Ans.”); and Reply Brief filed June 3, 2019 (“Reply Br.”).

² We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. The Appellant identifies the real party in interest as Kuraray Europe GmbH. Appeal Br. 1.

³ We have jurisdiction under 35 U.S.C. § 6(b).

CLAIMED SUBJECT MATTER

The “invention relates to laminated glass comprising a functionalised polymer film sandwiched between two films based on polyvinyl acetal, having high and low plasticiser content.” Spec. ¶ 1. According to the Appellant, the invention addresses the problem of “incorporation of polymer films into a glass laminate while avoiding optical distortion.” Appeal Br. 4. Claims 1 and 15, reproduced below, are illustrative of the claimed subject matter:

1. A laminated glass, consisting of two glass sheets interlayered with an interlayer film assembly comprising
 - at least one film A containing a polyvinyl acetal PA and optionally at least one plasticiser WA,
 - at least one film B containing a polyvinyl acetal PB and at least one plasticiser WB and
 - at least one polymer film C, wherein
 - film A comprises less than 16 % by weight of plasticiser WA,
 - film B comprises at least 16 % by weight of plasticiser WB,
 - film C comprises a polyamide, polyethylene terephthalate (PET), polybutylene terephthalate (PBT), polyvinyl alcohol (PVA), polylactic acid (PLA), cellulose acetate, or ionomer polymer, and
- wherein film C is located between film A and film B.

Claims Appendix 1 (paragraphing added).

15. The laminated glass of Claim 1, wherein the laminated glass is prepared by first forming a duplet film of film A and film C, melt adhering the duplet film to a first glass sheet with film A directly abutting the first glass sheet, and then applying the film B onto the film C layer of the duplet film, applying a second glass sheet onto film B, and laminating under heat and pressure.

Id. at 2.

REJECTIONS^{4, 5}

1. Claims 1–3, 6, 7, 11–13, and 15–17 are rejected under 35 U.S.C. § 103 as unpatentable over Lu (US 2006/0210776 A1, pub. Sept. 21, 2006). Final Act. 6.

2. Claims 4 and 5 are rejected under 35 U.S.C. § 103 as unpatentable over Lu in view of Lee (US 2007/0009714 A1, pub. Jan. 11, 2007). Final Act. 10.

3. Claim 8 is rejected under 35 U.S.C. § 103 as unpatentable over Lu in view of Beekhuizen (EP 2,269,816 A1, pub. Jan. 5, 2011). Final Act. 11.

⁴ The Examiner has withdrawn the rejection of claim 19 under 35 U.S.C. § 112(d) or pre-AIA 35 U.S.C. § 112, 4th paragraph. Ans. 15.

⁵ In the Final Office Action, the Examiner includes claim 18 (but not claim 16) in the first ground of rejection, and identifies claim 19 (but not claim 18) and claim 21 (but not claim 19) as subject to the fifth and sixth grounds of rejection, respectively. In an Amendment filed November 27, 2018, the Appellant renumbered claims 17–21 as 16–20. In the Advisory Action dated December 27, 2018, the Examiner stated that the claim numbering that appears in the November 27, 2018 Amendment is the correct numbering and, therefore, references to claims 17–21 should be treated as references to claims 16–20 as they appear in the November 27, 2018 Amendment. In our discussion, we use the November 27, 2018 claim numbering.

4. Claims 9 and 10 are rejected under 35 U.S.C. § 103 as unpatentable over Lu in view of Keller (US 2014/0224423 A1, pub. Aug. 14, 2014). Final Act. 12.

5. Claim 18 is rejected under 35 U.S.C. § 103 as unpatentable over Lu in view of Nakamachi (US 5,066,525, iss. Nov. 19, 1991) as evidenced by OXFORD DICTIONARY OF SCIENCE, 6th ed., p.178 (“Oxford”). Final Act. 14.

6. Claims 19 and 20 are rejected under 35 U.S.C. § 103 as unpatentable over Lu in view of Moynihan (US 3,458,388, iss. July 29, 1969). Final Act. 15.

OPINION

The Examiner rejected claims 1–3, 6, 7, 11–13, and 15–17 under 35 U.S.C. § 103 as unpatentable over Lu. *See* Rejection 1 *supra* p. 3. The Appellant argues in support of patentability of claims 1, 2, 7, and 15.

Claim 1 recites “[a] laminated glass, consisting of two glass sheets interlayered with an interlayer film assembly comprising” films A, B, and C. Claim 1 requires that “film C is located between film A and film B.” In rejecting claim 1, the Examiner relies on the following disclosure in Lu (*see* Final Act. 6–8): Lu discloses an interlayer “laminated between two sheets of glass panes.” Lu ¶ 22. In one embodiment, the interlayer comprises three layers: a wedge-shaped acoustic polymer sheet, a flat non-acoustic polymer sheet, and a poly(ethylene terephthalate) layer positioned between the wedge-shaped and flat sheets. *Id.* ¶¶ 19, 21. Lu defines an “acoustic polymer sheet” as a polymer sheet having “a glass transition temperature of less than 25° C,” and defines a “non acoustic polymer sheet[.]” as having a glass transition temperature of 25° C or greater. *Id.* ¶ 34. Lu discloses that

“[p]lasticized poly(vinyl butyral) is most commonly used to form [the] polymer sheets.” *Id.* ¶ 33. A “[c]onventional, non acoustic poly(vinyl butyral) interlayer typically has a glass transition temperature in the range of 30–33° C.” *Id.* ¶ 46. Lu discloses that “[i]n various embodiments . . . non acoustic polymer sheets can comprise 10 to 90 . . . parts plasticizer per hundred resin . . . parts” (*id.* ¶ 45), which the Examiner determines is equal to 9.1 to 47.4 % by weight plasticizer in the non-acoustic polymer sheet (Final Act. 6). According to Lu, an “acoustic interlayer can be obtained by increasing the concentration of plasticizer . . . to decrease the glass transition temperature.” Lu ¶ 46. Lu discloses that “[i]n various embodiments of the . . . invention, an acoustic polymer sheet comprises, for example, 30–100 phr of plasticizer” (*id.*), which the Examiner determines is equal to 23.1 to 50 % by weight plasticizer in the acoustic polymer sheet (Final Act. 7).

The Examiner found that Lu discloses a laminated glass consisting of two glass sheets interlayered with three films corresponding to the claim 1 films A, B, and C, and arranged so that film C is between films A and B. Final Act. 6. The Examiner found that Lu’s film B includes plasticizer in an amount that falls within the claimed range of “at least 16 % by weight” (claim 1). *Id.* at 7. The Examiner found that Lu’s film A includes plasticizer in an amount that overlaps the claimed range of “less than 16 % by weight” (claim 1). *Id.* The Examiner further found that Lu teaches that the amount of plasticizer in film A can be adjusted depending on the particular application and, therefore, including plasticizer in the claimed amount of “less than 16 % by weight” would have been a matter of routine optimization. *Id.* (citing *In re Aller*, 220 F.2d 454, 456 (CCPA 1955)).

The Appellant does not dispute that Lu discloses the individual films recited in claim 1, but argues that arriving at the claimed arrangement of films would have required too much picking and choosing. Appeal Br. 9. The Appellant argues that Lu fails to recognize the optical distortion problem that occurs when using a polymer film with a polymer sheet and, therefore, does not provide direction to select the claimed combination of films. *Id.* at 10–11. The Appellant argues that Lu’s statement that the plasticizer content can be varied over a wide range is insufficient to provide direction to select two films having the claimed plasticizer amounts. *Id.* at 14. The Appellant notes that Lu’s laminated glass examples do not include a polymer film, and in each example, the non-acoustic polymer sheet—corresponding to the claimed film A—contains 27.5 weight percent plasticizer, which exceeds the claim 1 requirement of “less than 16 % by weight of plasticiser.” *Id.* at 13–14. The Appellant also argues that the Examiner has not identified a particular application that would have led the ordinary artisan to optimize the plasticizer amount to “less than 16 % by weight” (claim 1). *Id.* at 14.

A reference’s teachings and its obvious variants are relevant prior art, even if the reference addresses a problem which differs from that addressed by a patent applicant. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1259 (Fed. Cir. 2007). Thus, the fact that Lu may not explicitly address optical distortion does not control the obviousness analysis.

The Appellant’s argument that Lu fails to provide direction to select three films that fall within the limitations recited in claim 1 is also unpersuasive. As found by the Examiner, “Lu expressly and positively discloses embodiments of an interlayer film assembly wherein two polymer

sheets and an intermediate polymer layer are used.” Ans. 18 (citing Lu ¶¶ 15, 21); Lu ¶ 21 (“[A] polymer film can be included between the wedge shaped polymer sheet 14 and the flat polymer sheet 12 . . . to produce a three layer embodiment.”). Lu lists only one exemplary material for the polymer film layer: poly(ethylene terephthalate). Lu ¶ 21. And, the Appellant acknowledges that “*Lu* appears to prefer polyvinyl acetals [for the acoustic and non-acoustic polymer sheets], since these are used in all his examples.” Appeal Br. 12. As to the Appellant’s contention that the non-acoustic films—corresponding to claim 1’s film A—in Lu’s examples include at least 27.5 % by weight plasticizer (Appeal Br. 12), we note that “[a] reference must be considered for everything that it teaches, not simply the described invention or a preferred embodiment.” *In re Applied Materials, Inc.*, 692 F.3d 1289, 1298 (Fed. Cir. 2012). Where, as here, the prior art and claimed ranges overlap, there is a presumption of obviousness. *See, e.g., In re Peterson*, 315 F.3d 1325, 1329 (Fed. Cir. 2003); *In re Geisler*, 116 F.3d 1465, 1469 (Fed. Cir. 1997). Thus, the Examiner’s fact finding and reasoning was sufficient to establish that claim 1 is prima facie obvious even absent the Examiner’s additional finding that adjusting the amount of plasticizer in Lu’s non-acoustic film to the claimed amount of “less than 16 % by weight” would have been a matter of routine optimization (*see* Final Act. 7).

Regardless, we are not persuaded of error in the Examiner’s finding that the plasticizer content is a result-effective variable. As found by the Examiner, Lu discloses that adding plasticizer affects acoustic properties, “wherein, all other things being the same, a lower plasticizer content is used for a non-acoustic polymer sheet as compared to the acoustic polymer

sheet.” Ans. 21 (citing Lu ¶¶ 45, 46). The Appellant’s argument that “such an optimization is irrelevant to the problems of eliminating distortion and increasing penetration resistance” (Reply Br. 5) is not persuasive because, as noted above, the prior art need not address the same problem addressed by the applicant. Moreover, “the prior art need not provide the exact method of optimization for the variable to be result-effective. A recognition in the prior art that a property is affected by the variable is sufficient to find the variable result-effective.” *Applied Materials*, 692 F.3d at 1297. The Appellant has not provided objective evidence establishing criticality in the claimed plasticizer ranges. *See In re Woodruff*, 919 F.2d 1575, 1578 (Fed. Cir. 1990); *Aller*, 220 F.2d at 456.

Claim 2 depends from claim 1 and recites “wherein the tensile stress of film C at 10% elongation is at least 100% that of the tensile stress of film B at 10% elongation.” Claims App. 1. The Appellant asserts that a film having these properties provides the glass laminate with a high penetration resistance. Appeal Br. 16 (citing Spec. ¶ 14 (“This embodiment provides laminated glass with enhanced penetration resistance.”)). The Appellant argues that the Examiner failed to cite evidence to support a finding that Lu discloses a film that provides this feature. *Id.* at 17. Referencing the disclosure in Lu paragraph 28, the Appellant argues that Lu teaches that its polymer films cannot provide the necessary penetration resistance to a multiple layer glazing structure. *Id.* at 16; *see* Lu ¶ 28 (“Polymer films differ from polymer sheets, as used herein, in that *polymer films do not themselves provide the necessary penetration resistance* and glass retention properties to a multiple layer glazing structure, but rather provide performance

improvements, such as infrared absorption or reflection character.”
(emphasis added)).

The Appellant’s argument is not persuasive because claim 2 does not require that film C alone provide the necessary penetration resistance. *See* Claims App. 1. As explained by the Examiner, Lu paragraph 28 “only states that minimum requirements of penetration resistance are not met by a polymer film alone.” Ans. 22. Similarly, Specification paragraph 14 discloses that the claim 2 “*embodiment* provides laminated glass with *enhanced* penetration resistance.” Spec. ¶ 14 (emphasis added).

The Appellant further disputes the Examiner’s finding that Lu’s description of the polymer film as “usually ha[ving] a greater . . . tensile modulus regardless of composition than that of an adjacent polymer sheet” (Lu ¶ 29) “suggests that the tensile stress at any given strain for the film C is greater than the film B” (Ans. 23; *see also* Final Act. 8). Reply Br. 7; Appeal Br. 17. The Appellant argues that “[t]ensile modulus has no relationship to tensile stress at 10% elongation,” explaining that “tensile modulus is the slope of the tensile stress/strain curve exhibited by the film, and as is also well known in mathematics, a single point, i.e. a tensile stress at 10% elongation cannot define a slope.” Appeal Br. 17 (emphasis omitted).

The Appellant’s argument is not persuasive. As explained by the Examiner, Lu’s description of the polymer film as having a greater tensile modulus than that of an adjacent polymer sheet means that a higher tensile stress must be applied to the polymer film (corresponding to the claimed film C) than is applied to the polymer sheet (corresponding to the claimed film B) to achieve the same strain, and the Appellant agrees that “tensile modulus is the slope of the tensile stress/strain curve.” Ans. 23. “Thus, at

10% elongation, or tensile strain, Lu implies more tensile stress is applied to the film C than the film B.” *Id.*

Turning next to claim 15, drafted in product-by-process format, the Appellant argues that the recited process steps result in “a different product than when individual sheets A and B and film C are individually applied prior to laminating under heat and pressure.” Appeal Br. 18. The Appellant’s argument is not persuasive because the Appellant does not identify evidence to support the alleged differences in the claimed and prior art products. *See id.*; *Geisler*, 116 F.3d at 1471 (explaining that argument by counsel cannot take the place of evidence); Spec. ¶ 64 (describing the claim 15 process, but failing to describe the improvement in adherence alleged by the Appellant); *see also* Ans. 24.

The Appellant also argues in support of patentability of claim 7. *See* Appeal Br. 18. These arguments have been fully addressed by the Examiner and are unpersuasive for the reasons explained in the Answer. *See* Ans. 23–24.

Accordingly, we sustain the rejection of claims 1–3, 6, 7, 11–13, and 15–17 for the reasons stated above and in the Final Office, the Advisory Action, and the Answer. *See* 37 C.F.R. § 41.37(c)(iv)(2018).

The Examiner rejected claims 4 and 5, claim 8, and claims 9 and 10 under 35 U.S.C. § 103 as unpatentable over Lu in view of various secondary references. *See* Rejections 2–4 *supra* pp. 3–4. The Appellant’s arguments are limited to assertions that the secondary references’ teachings fail to cure the deficiencies in the Examiner’s rejection of claim 1 from which claims 4, 5, and 8–10 depend. *See* Appeal Br. 20–21. Because we are not persuaded of

error in the Examiner's rejection of claim 1, we sustain the rejections of claims 4, 5, and 8–10.

The Examiner rejected claim 18 under 35 U.S.C. § 103 as unpatentable over Lu in view of Nakamachi as evidenced by Oxford. *See* Rejection 5 *supra* p. 4. Claim 18 depends from claim 1 and recites “wherein film C is a PET film having a surface roughness parameter Ra of less than 3 μm and a surface roughness Rz of less than 5 μm .” Claims App. 3. The Appellant disputes the Examiner's finding that the ordinary artisan would have modified Lu's polymer film (corresponding to the claimed film C) to have surface roughness parameters of less than 0.740 μm (i.e., within the claimed ranges) based on “Nakamachi's disclosure [that] the roughness is suitably less than the wavelength of light used in the HUD [(head-up display)],” and Oxford's disclosure that visible light wavelengths range from 0.425–0.740 μm (Final Act. 15). *See* Appeal Br. 21–22. The Appellant argues that the references describe entirely different head-up displays. *Id.* More specifically, the Appellant argues that Nakamachi is concerned with limiting surface roughness because it uses a holographic film, which requires optical clarity. *Id.* at 22. The Appellant contends that Lu “contains a wedge-shaped interlayer for producing his non-halogramic head[]-up display,” “does not require any optical clarity whatsoever,” and “does not even discuss optical clarity.” *Id.*

The Examiner cites Lu paragraph 3 as evidence that head-up displays require clarity. Ans. 25. We agree with the Appellant, however, that neither Lu paragraph 3 nor the Examiner's relied-upon disclosure in Nakamachi supports the Examiner's finding that the ordinary artisan would have had a reason to use a PET film having a surface roughness within claim 18's

ranges. Lu paragraph 3 discloses that a wedge-shaped interlayer “provide[s] the correct light dynamics through the windshield required for a head up display,” thus suggesting that Lu’s wedge-shaped interlayer provides sufficient clarity. The Nakamachi disclosure cited by the Examiner addresses lack of clarity in laminated glass panels that incorporate a hologram sheet. The Examiner has not directed us to any evidence suggesting that the ordinary artisan would have expected the same clarity problems that occur in a laminated glass panel that incorporates a hologram sheet also to occur in a laminated glass panel that incorporates a wedge-shaped interlayer. Accordingly, we do not sustain the rejection of claim 18.

The Examiner rejected claims 19 and 20 under 35 U.S.C. § 103 as unpatentable over Lu in view of Moynihan. *See* Rejection 6 *supra* p. 4. Claims 19 and 20 depend from claim 1 and recite that film A contains, respectively, “less than 4 weight percent plasticizer” and “no plasticizer.” Claims App. 3. The Examiner determined that the ordinary artisan would have modified Lu’s polymer sheet (corresponding to the claimed film A) to reduce or eliminate the plasticizer based on Moynihan’s disclosure that a layer of unplasticized polyvinyl butyral (PVB) provides a laminated glass with structural rigidity even when a glass sheet is broken. Final Act. 16.

The Appellant persuasively argues that the Examiner’s evidence is insufficient to support a finding that the ordinary artisan reasonably would have expected that reducing the plasticizer content of Lu’s polymer sheet (corresponding to the claimed film A) would improve the laminate’s structural rigidity. *See* Appeal Br. 23–24. As argued by the Appellant, Moynihan discloses that its polyvinyl butyral sheets “are very strong by

virtue of having a high molecular weight in combination with a high residual polyvinyl alcohol content,” not the elimination or reduction in plasticizer content. *Id.* at 23; *see* Moynihan 1:64–71. Accordingly, we do not sustain the rejection of claims 19 and 20.

Any additional arguments made by the Appellant, but not discussed in this Decision, have been fully addressed by the Examiner and are unpersuasive for the reasons explained in the Answer.

DECISION SUMMARY

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1–3, 6, 7, 11–13, 15–17	103	Lu	1–3, 6, 7, 11–13, 15–17	
4, 5	103	Lu, Lee	4, 5	
8	103	Lu, Beekhuizen	8	
9, 10	103	Lu, Keller	9, 10	
18	103	Lu, Nakamachi, Oxford		18
19, 20	103	Lu, Moynihan		19, 20
Overall Outcome:			1–13, 15–17	18–20

TIME PERIOD FOR RESPONSE

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

AFFIRMED IN PART