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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte RICHARD ORR MASCHMEYER,
JOHN CHRISTOPHER THOMAS, and KEVIN LEE WASSON[1]

Appeal 2017-000536
Application 14/814,181
Technology Center 1700

Before BRADLEY R. GARRIS, CHRISTOPHER C. KENNEDY, and JENNIFER R. GUPTA, *Administrative Patent Judges*.

KENNEDY, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134(a) from the Examiner's decision to reject claims 1–9, 22, and 25–32.[2] We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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[1] According to the Appellants, the real party in interest is Corning Incorporated. App. Br. 1.

[2] Claims 10–21 were canceled in an amendment following the Final Action. *See* Claims dated May 3, 2016. The Examiner entered the amendment. *See* Amendment initialed by Examiner dated May 18, 2016.

BACKGROUND

The subject matter on appeal relates to "glass or glass-ceramic that has a stress profile for strengthening exterior portions thereof." *E.g.*, Spec. ¶ 2; Claim 1. Claim 1 is reproduced below from pages 12–13 (Claims Appendix) of the Appeal Brief (emphasis added to identify the limitation focused on by the Appellants in this appeal):

1. A strengthened glass or glass-ceramic article, comprising:

   a first surface, a second surface, and a body extending therebetween, wherein the second surface is on an opposite side of the body from the first surface such that a thickness of the strengthened glass or glass-ceramic article is defined as a distance between the first and second surfaces, a width of the strengthened glass or glass-ceramic article is defined as a first dimension of one of the first or second surfaces orthogonal to the thickness, and a length of the strengthened glass or glass-ceramic article is defined as a second dimension of one of the first or second surfaces orthogonal to both the thickness and the width;

   wherein the length of the strengthened glass or glass-ceramic article is greater than or equal to the width;

   wherein at least one of the first or second surfaces has a relatively large surface area, that being at least 5000 mm^2;

   wherein the strengthened glass or glass-ceramic article is thin such that the width is greater than five times the thickness;

   wherein at least one of the first and second surfaces is flat such that a 1 cm lengthwise profile therealong, measured in the thickness direction, stays within 2 μm of a straight line and a 1 cm widthwise profile therealong stays within 2 μm of a straight line; and

   a stress profile of the strengthened glass or glass-ceramic article, wherein, at room temperature of 25° C and standard atmospheric pressure, an interior portion of the strengthened glass or glass-ceramic article is under positive tensile stress and portions of the strengthened glass or glass-ceramic article exterior to and adjoining the interior portion are under negative tensile stress, whereby the negative tensile stress at least in part fortifies the strengthened glass or glass-ceramic article by limiting initiation and/or propagation of cracks therethrough;

wherein a difference in peak values of the positive and negative tensile stresses is at least 200 MPa; and

wherein, despite the relatively large surface area and thin thickness of the strengthened glass or glass-ceramic article, tensile stress in the stress profile sharply transitions between the positive tensile stress of the interior portion and the negative tensile stress of the portions exterior to and adjoining the interior portion such that a rate of change of the tensile stress is at least 200 MPa divided by a distance of 500 μm; and

composition of the strengthened glass or glass-ceramic article, wherein the composition comprises (a) an amorphous, non-crystalline solid or (b) a polycrystalline solid comprising an amorphous phase and one or more crystalline phases; and

wherein the composition comprises silicon dioxide;

wherein the composition of the strengthened glass or glass-ceramic article located in at least a part of the portions of the strengthened glass or glass-ceramic article exterior to and adjoining the interior portion, under the negative tensile stress, is the same in terms of ion content and chemical constituency as the composition located in at least a part of the interior portion, under the positive tensile stress, such that at least some of the negative tensile stress of the stress profile is independent of a change in the composition of the strengthened glass or glass-ceramic article.

ANALYSIS

Claims 1–9, 22, and 25–32 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Isono et al. (US 2014/0050912 A1, published Feb. 20, 2014, claiming priority to an application filed June 30, 2011) in view of Rieser et al. (US 3,558,415, issued Jan. 26, 1971), with evidence from Beall et al. (US 3,931,438, issued Jan. 6, 1976), further in view of Kitayama et al. (US 5,654,057, issued Aug. 5, 1997). Final Act. 6. The Appellants present arguments concerning a limitation appearing in claim 1. We select claim 1 as representative of the rejected claims, and we limit our discussion to claim 1. The remaining claims on appeal will stand or fall with claim 1.

After review of the cited evidence in the appeal record and the opposing positions of the Appellants and the Examiner, we determine that the Appellants have not identified reversible error in the Examiner's rejection. Accordingly, we affirm the rejection for reasons set forth below, in the Final Action, in the Advisory Action, and in the Examiner's Answer. *See generally* Final Act. 6–11; Advisory Act. 2; Ans. 2–3.

The Examiner finds, and the Appellants do not dispute, that the combination of Isono, Rieser, and Beall teaches or suggests a strengthened glass or glass-ceramic article comprising each element of claim 1, except that those references do not expressly disclose the claimed surface flatness of 2 μm over 1 cm. Final Act. 6–8. The Examiner finds that Kitayama teaches a method of manufacturing a disk-shaped glass substrate possessing the claimed flatness. *Id.* at 8. The Examiner concludes that it would have been obvious to modify Isono's disk-shaped substrate "to include the high flatness of Kitayama . . . because non-flat surfaces used in magnetic disk applications interfere[] with the function of the disk in read/write applications." *Id.*

The Appellants argue that use of Kitayama's flattening method in combination with Isono would render the glass of Isono unsuitable for its intended purpose because it would "remove the thermal temper formed by the 'press forming' process of Isono et al." App. Br. 8. The Appellants' argument appears to presume that, if Kitayama's flattening method were combined with Isono's tempering method, tempering must occur first, followed by Kitayama's flattening process. *See id.* at 8–10.

We are not persuaded by the Appellants' arguments for reasons consistent with those stated by the Examiner. *See* Ans. 2–3. As the Examiner explains, *see id.*, the Appellants provide no persuasive evidence to establish that Kitayama's flattening method would render Isono's glass unsuitable for its intended purpose. They do not, for example, persuasively explain why glass with no or reduced thermal tempering could not be used in magnetic disk applications such as those of Isono. Kitayama's disks are also used in magnetic disk applications, indicating that disks subject to Kitayama's process are suitable for use in magnetic disk applications. *See, e.g.*, Kitayama at Abstract.

Nor do the Appellants identify a temperature range at which the thermal tempering of Isono's glass would be removed or explain whether that temperature range would be achieved by Kitayama's flattening method. The Appellants identify temperatures at which Kitayama's process operates (i.e., "higher than the transition temperature of glass") and assert, without persuasive explanation, that such temperatures would remove Isono's thermal tempering. *See* App. Br. 8. However, the Appellants subsequently concede that the use of Kitayama's process with Isono's glass may *not* remove Isono's thermal tempering. *See id.* at 9 ("[T]he flattening process of Kitayama et al. would *reduce or eliminate* the thermal tempering of Isono et al. . . ." (emphasis added)).

On this record, the actual effect of Kitayama's flattening process on Isono's glass appears to be speculative, and the Appellants' position is based principally on attorney argument. "Attorney's argument in a brief," however, "cannot take the place of evidence." *See In re Pearson*, 494 F.2d 1399, 1405 (CCPA 1974). Similarly, the Appellants provide no persuasive technical reasoning or evidence to support their assertion that Kitayama's disclosure of chemical tempering somehow suggests that its flattening process is incompatible with thermal tempering. *See* App. Br. 8; *see also* Ans. 2 ("The fact that Kitayama uses chemical strengthening is not sufficient evidence to show that the stresses imparted by thermal tempering would necessarily be removed by the flattening step of Kitayama."); *cf. In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004) ("The prior art's mere disclosure of more than one alternative does not constitute a teaching away from any of the[] [disclosed] alternatives . . . ."). Accordingly, we are not persuaded of reversible error in the Examiner's rejection.

Even if the Appellants had established that Kitayama's method could reduce or remove the thermal tempering of Isono's glass, we would not be persuaded of reversible error. The Appellants explain that Isono teaches that rapid cooling of outer glass layers results in thermal tempering. *See* App. Br. 8. There is no persuasive basis in the record to conclude that it would have been beyond the ordinary level of skill in the art to combine Kitayama's flattening process with the teachings of Isono in a way that would have been expected to maintain thermal tempering, if desired. For example, it appears that Kitayama's flattening method could precede Isono's cooling/tempering process, or that Kitayama's cooling step could itself be operated to produce glass that is thermally tempered. *See, e.g.*, Kitayama at 8:24–25.

Moreover, even assuming that the combination of Isono and Kitayama necessarily and inevitably would reduce the thermal tempering of Isono's glass, the Appellants do not explain why that would have discouraged a person of ordinary skill, motivated to achieve glass with a high level of flatness, from combining the references. "The fact that the motivating benefit [i.e., flatness] comes at the expense of another benefit [i.e., thermal tempering] . . . should not nullify its use as a basis to modify the disclosure of one reference with the teachings of another. Instead, the benefits, both lost and gained, should be weighed against one another." *Winner Int'l Royalty Corp. v. Wang*, 202 F.3d 1340, 1349 n.8 (Fed. Cir. 2000). Isono and Kitayama both concern disk-shaped glass substrates for use, for example, in computer hard drives. *See* Isono ¶¶ 1–2; Kitayama at 1:20–30. Both references teach that substrates having a flat surface are desirable. *E.g.*, Isono ¶ 3 (discussing read errors and flatness); Kitayama at 4:45–55, 13:1–5. Isono teaches that "the flatness required for a substrate for magnetic disk as a final product is, for example 4 μm or less." Isono ¶ 33. Isono discloses methods for achieving disks "excellent in flatness." *Id.* ¶ 34; *see also id.* ¶¶ 33, 79, 81, 83, 86. Kitayama teaches an embodiment having a flatness of "2 μm or less [o]n average." Kitayama at 11:39. A preponderance of the evidence of record supports the Examiner's determination that a person of ordinary skill in the art would have been motivated to combine Isono and Kitayama to achieve a magnetic disk having a flatness falling within the scope of claim 1 to achieve improved properties, such as reduced read errors, even if a person of ordinary skill in the art may have expected the combination to result in reduced thermal tempering of the glass.

In that regard, we additionally note that the Appellants' Specification appears to disclose a variety of methods for forming glass articles having "smooth surfaces and consistent thickness," and does not appear to attribute particular significance to how the glass is flattened. *E.g.*, Spec. ¶¶ 88–95. While the Specification does express a preference for cooling glass "by conduction more than by convection," *e.g.*, *id.* ¶ 10, it does not suggest that high dimensional consistency cannot be achieved by convection-based methods, by solid/liquid quenching, *id.* ¶¶ 73–74, or by methods disclosed by Isono, *see, e.g.*, Isono ¶¶ 67–68. Rather, it suggests that such methods involve certain additional considerations (e.g., "cooling plate alignment and/or surface irregularities," Spec. ¶ 73) for which a person of ordinary skill in the art would account to achieve high dimensional consistency. *See id.* ¶¶ 73–74.

In view of the arguments presented, we are not persuaded of reversible error in the Examiner's findings and conclusions. A person of ordinary skill in the art would have been motivated to achieve a high level of flatness, including the claimed flatness, by Isono and Kitayama.[3] The Appellants provide no persuasive argument or evidence that combining Isono and Kitayama would remove thermal tempering, or that achieving such a flatness while maintaining thermal tempering, if desired, would have been beyond the ordinary level of skill in the art.

[3] The Appellants do not attribute unexpected results to the claimed flatness.

CONCLUSION

We AFFIRM the Examiner's rejections of claims 1–9, 22, and 25–32.

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