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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte HEATHER BOSSARD DECKER, SHANDON DEE HART, GUANGLI HU, JAMES JOSEPH PRICE, and PAUL ARTHUR SACHENIK

Appeal 2019-003682
Application 14/053,093
Technology Center 1700

Before JEFFREY B. ROBERTSON, JAMES C. HOUSEL, and JANE E. INGLESE, *Administrative Patent Judges.*

ROBERTSON, *Administrative Patent Judge.*

DECISION ON APPEAL[1]

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant[2] appeals from the Examiner's decision to reject claims 1–10, 28, and 30–32. Appeal Br. 7. We have jurisdiction under 35 U.S.C. § 6(b).

We reverse.

CLAIMED SUBJECT MATTER

Appellant states the invention relates to articles including a glass substrate that has a film disposed on its surface, and a modified interface between the film and glass substrate. Spec. ¶ 2. Claim 1, the only independent claim on appeal, is illustrative of the claimed subject matter and reproduced below with emphasis in order to highlight key disputed claim terms (Appeal Br., Claims Appendix 19):

> 1. An article comprising:
> *a glass substrate* having opposing major surfaces and *having a first average strain-to-failure*;
> a crack mitigating layer disposed on a first major surface of the glass substrate, the crack mitigating layer comprising a first elastic modulus, wherein the crack mitigating layer comprises an inorganic material; and

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[1] This Decision includes citations to the following documents: Specification filed October 14, 2013 ("Spec."); Final Office Action mailed May 3, 2018 ("Final Act."); Appeal Brief filed October 1, 2018 ("Appeal Br."); Examiner's Answer mailed February 7, 2018 ("Ans."); and Reply Brief filed April 8, 2019 ("Reply Br.").

[2] We use the word Appellant to refer to "applicant" as defined in 37 C.F.R. § 1.42(a). Appellant identifies the real party in interest as Corning Incorporated. Appeal Br. 3.

a film disposed on the crack mitigating layer *having a second average strain-to-failure that is less than the first average strain-to-failure* and a second elastic modulus that is greater than the first elastic modulus,

wherein the crack mitigating layer reduces the stress intensity factor of a crack having a stress intensity factor and originating in the film, as the crack bridges into one or more of the crack mitigating layer and the glass substrate.

REFERENCES

The prior art relied upon by the Examiner is:

Name	Reference	Date
Amin et al. hereinafter "Amin"	US 8,187,987 B2	May 29, 2012
Fang et al. hereinafter "Fang"	US 2009/0142790 A1	June 4, 2009
Lemmer et al. hereinafter "Lemmer"	US 2011/0212311 A1	September 1, 2011
Rimsza et al. hereinafter "Rimsza"	"Structural and Mechanical Properties of Nanoporous Silica" Journal of the American Ceramic Society, Abstract	November 2013
MEMSnet	Material: Niobium Oxide (Nb2O9) film	Accessed March 2016

REJECTIONS

1. The Examiner rejected claims 1–10, 28, and 30 under pre-AIA 35 U.S.C. § 103(a) as unpatentable over Fang, Rimsza, Amin, and as evidenced by MEMSnet. Ans. 3–6.

2. The Examiner rejected claims 1, 7–10, 28, and 30–32 under pre-AIA 35 U.S.C. § 103(a) as unpatentable over Lemmer in view of Amin. Ans. 6–7.

OPINION

Rejection 1

We limit our discussion to claim 1, which is sufficient to dispose of the issues related to this rejection.

The Examiner's Rejection

The Examiner found Fang discloses a glass bottom support (glass substrate), a nanoporous silica layer (crack mitigating layer), and a film of niobium pentoxide (film). Ans. 3, citing Fang, ¶ 9; Fig. 5. The Examiner relied on MEMSnet to show the Young's Modulus (modulus of elasticity) of the niobium pentoxide layer ranges from 68–102 GPa. *Id.* The Examiner found Fang is silent as to the strain-to-failure values, the porosity and elastic modulus of nanoporous silica, and certain properties of the crack mitigating layer recited in the claims. *Id.* at 4.

The Examiner relied on Rimsza's disclosure that the porosity of silica is directly related to elastic modulus and determined that it would have been obvious to select the porosity of nanoporous silica so as to obtain the desired elastic modulus including the relationship between the elastic modulus of the crack mitigating layer and film layer recited in claim 1. *Id*. The Examiner relied on Amin's disclosure of chemically strengthened glass substrates to determine that the compressive stress and stress depth values recited in the claims (*see* claim 10) would have been obvious. *Id.* at 4–5.

The Examiner determined that because Fang as evidenced by MEMSnet, Rimsza, and Amin teaches the same structure as claimed, it would have been expected to have the same properties recited in the claims including the differences between the first and second strain-to-failures recited therein. *Id.* at 5–6.

Appellant's Contentions

Appellant argues, *inter alia*, the Examiner's position that the relationship of strain-to-failure of the glass substrate and film would be inherent based on the composition of the materials disclosed in the prior art is not sufficiently supported. Appeal Br. 10. In particular, Appellant contends the Specification describes strain-to-failure as a controllable mechanical property that not only depends on the materials, but also other factors such as deposition techniques. *Id.* at 11–12, citing Spec. ¶¶ 56, 85, 86, 100, 115. Appellant argues none of the references discloses a glass substrate having a first average strain-to-failure that is greater than the second average strain-to-failure of a film. *Id.* at 13.

Issue

The dispositive issue with respect to this rejection is:

Has Appellant demonstrated reversible error in the Examiner's position that the cited prior art would necessarily produce "a glass substrate . . . having a first average strain-to-failure" and "a film . . . having a second average strain-to-failure that is less than the first average strain-to-failure" as recited in claim 1?

Discussion

We are persuaded by Appellant's arguments. Although we appreciate the Examiner's effort and explanation with respect to the properties recited in the claims, we agree with Appellant that the Specification provides evidence that the mere similarity between the materials disclosed in the prior art is insufficient to support the position that the claimed relationship between the strain-to-failure in the glass substrate and the film would necessarily be present.

The Specification discloses that average strain-to-failure of a glass substrate or any other material, which may be directly correlated to average flexural strength, "is dependent on the surface quality of such material" and with respect to glass substrates "is dependent on the conditions of ion exchange or strengthening process utilized in addition to or instead of the surface quality of the glass substrate." Spec. ¶ 56. The Specification discloses the film may have a strain-to-failure that is lower than the strain-to-failure of the glass substrate. *Id.* at ¶¶ 79, 80. Thus, although the Examiner relies on certain disclosures in the Specification relating to niobium pentoxide being a satisfactory film layer and nanoporous silica having a porosity between 10% and 90% (Ans. 9–10, citing Spec. ¶¶ 6, 9, 86, 109–112), such disclosures do not address obtaining the strain-to-failure properties recited in claim 1 as identified in the additional disclosures of the Specification.

In this regard, we do not subscribe to the Examiner's position that because the examples in the Specification do not appear to address strain-to-failure, Appellant has not provided any evidence that the strain-to-failure properties depend on multiple factors (Ans. 8–10). As discussed above, the

Specification expressly discloses that strain-to-failure is dependent on surface quality as well as other factors. Spec. ¶ 56. That the examples do not discuss the particular strain-to-failure property of the glass substrate or the film does not change this disclosure, which provides evidence that the mere similarity between materials is insufficient to establish the strain-to-failure relationship between the glass substrate and the film is necessarily present. As stated by our reviewing court "[w]hile '[w]e have recognized that inherency may supply a missing claim limitation in an obviousness analysis,' . . . we have emphasized that 'the limitation at issue *necessarily* must be present' in order to be inherently disclosed by the reference." *Southwire Co. v. Cerro Wire LLC*, 870 F.3d 1306, 1311 (Fed. Cir. 2017) quoting *PAR Pharm., Inc. v. TWI Pharm., Inc.*, 773 F.3d 1186, 1194–95 (Fed. Cir. 2014).

Although the Examiner relies on MEMSnet, Rimsza, and Amin to make up for certain deficiencies in Fang, such as the elastic modulus of niobium pentoxide, the porosity and modulus of nanoporous silica, and a chemically strengthened glass substrate (Ans. 10), the Examiner does not direct us to sufficient evidence or explanation that such disclosures would necessarily result in the strain-to-failure relationship between the glass substrate and the film recited in claim 1.

As a result, we reverse the Examiner's rejection of claim 1, and claims 2–10, 28, and 32 dependent therefrom.

Rejection 2

We limit our discussion to claim 1, which is sufficient to dispose of the issues related to this rejection.

The Examiner's Rejection

The Examiner found Lemmer discloses a first glass substrate coated with silicon oxynitride, which is then coated with indium tin oxide (ITO). Ans. 6, citing Lemmer ¶¶ 20, 38, Fig. 6. The Examiner found Lemmer does not disclose a strengthened glass substrate (*see* claim 10), and relied on Amin for such a disclosure to provide the advantages of compressive stress and compressive stress depth-of-layer disclosed therein. Ans. 6–7. The Examiner determined that because Lemmer in view of Amin disclose the structure recited in the claims, the same differences of strain-to-failure, difference of elastic moduli, and reduction of stress intensity as recited in the claims would have been expected. *Id.* at 7.

Appellant's contentions

Appellant contends the Examiner has not established a *prima facie* case of obviousness because Lemmer and Amin do not discuss the strain-to-failure limitations in the claims and the fact that the materials of Lemmer are disclosed to some degree in the Specification is not sufficient to support a position that the claimed relationships are inherent to Lemmer in view of Amin. Appeal Br. 16. In this regard, Appellant contends the disclosures of Lemmer and Amin at best provide the possibility of the strain-to-failure relationships in the claims, which is insufficient to support a position based on inherency. *Id.* at 16–17.

Discussion

We are persuaded by Appellant's arguments, largely for the same reasons as discussed above in Rejection 1. That is, the Examiner similarly relies on the identity of the materials used in Lemmer as being the same materials disclosed in the Specification as well as the lack of examples in the Specification in order to support the position that the strain-to-failure relationship between the glass substrate and the film is necessarily present. Ans. 11–12. The Examiner's position is insufficient to support the determination that strain-to-failure relationship between the glass substrate and the film is necessarily present for similar reasons as discussed above. Neither Lemmer nor Amin disclose strain-to-failure of the materials, and the Examiner does not direct us to sufficient disclosures in Lemmer and Amin that would provide a sufficient basis to support the position that the strain-to-failure relationship between the glass substrate and the film recited in claim 1 necessarily would have been present.

Accordingly, we reverse the Examiner's rejection of claim 1 and claims 7–10, 28, and 30–32 dependent therefrom.

DECISION SUMMARY

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1–10, 28, 30	103	Fang, Rimsza, Amin, MEMSnet		1–10, 28, 30
1, 7–10, 28, 30–32	103	Lemmer, Amin		1, 7–10, 28, 30–32
Overall Outcome				**1–10, 28, 30–32**

REVERSED