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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte TIMOTHY A. DENNIS

Appeal 2019-007027
Application 14/269,582
Technology Center 1700

Before MICHAEL P. COLAIANNI, GEORGE C. BEST, and
DEBRA L. DENNETT, *Administrative Patent Judges*.

BEST, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the Examiner’s decision to reject claims 25–27 and 31 of Application 14/269,582. Final Act. (June 26, 2018). We have jurisdiction under 35 U.S.C. § 6.

For the reasons set forth below, we *affirm*. We, however, reject claims 25–27 of the ’582 Application by relying upon findings of fact and conclusions of law that differ from those that the Examiner relied upon.

¹ We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies Guardian Glass, LLC as the real party in interest. Appeal Br. 3.

Accordingly, we designate this opinion as containing a *new ground of rejection*.

I. BACKGROUND

The '582 Application describes frit materials and methods for making vacuum insulated glass (VIG) units. *See* Spec. ¶ 1. In particular, the '582 Application describes frit materials with increased infrared (IR) absorption properties and methods of incorporating the frit materials into VIG units. *Id.* The '582 Application describes subjecting the frit material to IR energy, which may facilitate the melting and/or sealing of the frit material to a glass substrate. *Id.* ¶ 19.

Claim 25 is representative of the '582 Application's claims and is reproduced below from the Appeal Brief's Claims Appendix.

25. A method of making an edge seal for a VIG window unit, the method comprising:

applying a first IR energy to a frit material for a first predetermined period of time, wherein the frit material along with a plurality of spacers are located between first and second substrates, *wherein the frit material comprises metal oxides in amounts sufficient to absorb at least 80% of infrared (IR) energy having a wavelength of 1100–2100 nm;*

after applying the first IR energy, applying a second IR energy from at least one IR emitter to the frit material for a second predetermined period of time;

after applying the second IR energy, applying another IR energy to the frit material for a third predetermined period of time so as increase the temperature of the frit material compared to the temperature of the frit material resulting from the second IR energy; and

after applying the another IR energy, cooling and/or allowing the frit material to cool over a fourth period of time in making the VIG window unit.

Appeal Br. 14 (Claims App.) (emphasis added).

II. REJECTIONS

On appeal, the Examiner maintains the following rejections:

1. Claims 25–27 are rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Wang² and Aitken.³ Final Act. 2–3.
2. Claims 25–27 and 31 are rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Wang and Lee.⁴ Final Act. 3–5.

Appellant argues for reversal of all of the rejections at issue based upon the limitations common to independent claims 25 and 26. Appeal Br. 7–13; Reply Br. 2–7. We select claim 25 as representative of the claims subject to this ground of rejection and limit our discussion to this claim. 37 C.F.R. § 41.37(c)(1)(iv).

III. DISCUSSION

A. Rejection of Claims 25–27 under 35 U.S.C. § 103(a) as unpatentable over the combination of Wang and Aitken

The Examiner rejected claims 25–27 as unpatentable over the combination of Wang and Aitken. Final Act. 2–3.

² US 2009/0151855 A1, published June 18, 2009.

³ US 2005/0001545 A1, published Jan. 6, 2005.

⁴ US 2007/0170605 A1, published July 26, 2007.

In rejecting claim 25, the Examiner found that Wang's method of making VIG window units describes each step and limitation of the claimed method, except that Wang does not disclose the frit material. *Id.*

The Examiner, however, found that Aitken teaches a frit material having IR absorption properties that overlap the claimed range. *Id.* at 3 (citing Aitken, Abstr.; Fig. 7A). The Examiner found that although Aitken's Figure 7A "shows that the transmittance remains constant through 1500 nm, . . . it would have been obvious to one of ordinary skill in the art that the transmittance would have stayed constant from 1500–2100 nm." Final Act. 3. With respect to the claimed metal oxides in the frit material, the Examiner found that Aitken discloses that "vanadium is a particularly strong [IR] absorber in oxide glasses." *Id.* (citing Aitken ¶ 51).

The Examiner determined that it would have been obvious to a person having ordinary skill in the art at the time of invention to have modified Wang's VIG assemblies with Aitken's suggested vanadium oxide frit material "because both Wang and Aitken teach that the frit is melted by [IR] radiation." Final Act. 3 (citing Aitken ¶ 51).

Appellant argues that the Examiner reversibly erred in relying upon Aitken's: (i) Figure 7A for the claimed IR absorption properties and (ii) paragraph 51 for a metal oxide teaching. To resolve the present appeal, we need only discuss Appellant's arguments with respect to Aitken's suggested vanadium oxide frit material.

Appellant argues that, *inter alia*, selection of vanadium or vanadium oxide as a metal oxide frit material would not have necessarily resulted in the claimed absorption properties. Appeal Br. 10–11. To support this argument, Appellant's Brief includes a graph from Heinilehto, S. et al., *Pulsed laser deposition and e-beam evaporation of vanadium dioxide thin*

films for IR-photonics applications, Proc. SPIE 7022, Advanced Laser Technologies 2007 (2008) Fig. 9 (“Heinilehto’s graph”). *See* Appeal Br. 10. According to Appellant, Heinilehto’s graph provides optical transmission spectra of 247 nm thick pulsed-laser deposited polycrystalline VO₂ thin films measured at room temperature (black) and at 80°C (grey). *Id.* Appellant notes that Heinilehto’s graph shows transmission differences in the 500–800 nm wavelength range as compared to the 1500–2100 nm range. *Id.* Appellant concludes that “[o]ne skilled in the art would [have] know[n] that the presence of vanadium, even though it is a strong absorber in certain circumstances, would not necessarily (i.e., inherently) result in the specifically claimed subject matter.” *Id.*

We note that the purported transmission differences shown in Heinilehto’s graph result from measuring transmission spectra at the specific temperature of 80°C. *Id.* Claim 25, however, does not limit the temperature at which the metal oxides’ absorption properties are measured. *See* Appeal Br. 14 (Claims App.); *see also* Spec. ¶¶ 41, 42; Fig. 6. We are unable to address Appellant’s arguments in the absence of a temperature measurement limitation in the claim. In other words, claim 25 lacks sufficient clarity to permit an analysis as to whether it is nonobvious based on the evidence relied upon by Appellant. *See In re Wilson*, 424 F.2d 1382, 1385 (CCPA 1970) (“If no reasonably definite meaning can be ascribed to certain terms in the claim, the subject matter does not become obvious—the claim becomes indefinite.”). We, therefore, reject claim 25 under 35 U.S.C. § 112, ¶ 2, as indefinite.

Discerning the claims’ proper scope with respect to the prior art would require undue and improper speculation. *See In re Steele*, 305 F.2d

859, 862 (CCPA 1962) (“[W]e do not think a rejection under 35 U.S.C. § 103 should be based on such speculations and assumptions.”).

Thus, *for procedural reasons only*, we reverse the Examiner’s obviousness rejection of claims 25–27 as unpatentable over the combination of Wang and Aitken. We emphasize that our reversal should not be interpreted as an expression of any opinion regarding the merits of the Examiner’s rejection pursuant to § 103(a) as set forth in the Final Office Action and the Examiner’s Answer. If prosecution of the ’582 Application continues and the § 112, ¶ 2 rejection is overcome, the Examiner remains free to reject claims 25–27 under § 103(a) as unpatentable over the combination of Wang and Aitken, if such a rejection is appropriate.

B. Rejection of Claims 25–27 and 31 under 35 U.S.C. § 103(a) as unpatentable over the combination of Wang and Lee

The Examiner rejected claims 25–27 and 31 as unpatentable over the combination of Wang and Lee. Final Act. 3–5.

According to Appellant, the combination of Wang and Lee does not describe or suggest varying the amount of metal oxides to provide the claimed absorption properties. *See generally* Appeal Br. 12–13; Reply Br. 5–7.

As set forth *supra*, the Examiner found that Wang’s method of making VIG window units describes the claimed method, with the exception that Wang does not disclose the frit material. Final Act. 4.

The Examiner found Lee teaches that a frit material may comprise bismuth oxide, zinc oxide, boric oxide, aluminum oxide, and magnesium oxide. *Id.* at 4 (citing Lee ¶ 53). According to the Examiner, Lee’s frit materials comprising these compounds would have possessed the claimed

absorption properties because the Specification describes that a frit comprising these metal oxides exhibits “an IR absorption percentage over 80% in a wavelength range of 1100–2100 [nm].” Final Act. 4–5 (citing Spec. ¶ 20). The Examiner found Lee teaches that the frit provides: (i) a substantially non-permeable seal to oxygen and water vapor and (ii) a substantially hermetically enclosed space. Final Act. 5 (citing Aitken ¶ 48).

The Examiner determined that it would have been obvious to a person having ordinary skill in the art at the time of invention to have modified Wang’s VIG assemblies with Lee’s frit materials as both references teach that application of IR energy melts a frit. Final Act. 5.

Appellant argues that the Examiner reversibly erred in relying upon Lee because the ordinarily skilled artisan would have “recognize[d] that the relative amounts of materials would have an impact on absorption in the various wavelength ranges.” Appeal Br. 12. Appellant points to the Specification for evidence that the absorption properties of metal oxides may vary widely over the claimed range, depending on the amounts of each metal oxide. *Id.* (citing Spec. ¶ 40; Fig. 6).

In response, the Examiner found that Lee teaches or suggests “that the frit material can be adjusted to achieve specific absorption characteristics.” Ans. 4 (citing Lee ¶ 54).

Appellant disputes that Lee teaches or suggest adjusting metal oxides to achieve the claimed absorption properties. Reply Br. 6. According to Appellant, Lee merely teaches adjusting filler or additive materials. *Id.* Appellant contends that Lee’s passage does not suggest “modifying absorption characteristics in the specifically claimed range.” *Id.*

We are not persuaded by these arguments because Lee explicitly discloses that

[t]he frit material used to form the seal **1071** can also include one or more filler or additive materials. The filler or additive materials can be provided to adjust an overall thermal expansion characteristic of the seal **1071** and/or *to adjust the absorption characteristics of the seal 1071 for selected frequencies of incident radiant energy.*

Lee ¶ 54 (emphasis added). We note that Lee also discloses that

[t]he selective heating of the frit seal is carried out by irradiation of light, such as a laser or directed infrared lamp. As previously noted, *the frit material forming the seal 1071 can be combined with one or more additives or filler such as species selected for improved absorption of the irradiated light to facilitate heating and melting of the frit material to form the seal 1071.*

Id. ¶ 58 (emphasis added).

Our reviewing court's predecessor has held that a variable must be art-recognized as result-effective before it can be deemed to be subject to routine optimization. *In re Antonie*, 559 F.2d 618, 620 (CCPA 1977).

In this instance, Lee suggests adjusting the relative amounts of frit materials to optimize absorption characteristics of the frit, which promotes subsequent heating and melting of these materials to form seal **1071**. *See* Lee ¶¶ 53, 54, 58. On the record before us, the prior art establishes that modifying the relative amounts of frit materials, including suitable metal oxides, provides an improved absorption property,⁵ which one skilled in the

⁵ Appellant admits that Lee teaches adjusting the filler or additive material vanadium to a frit material, which includes the suitable metal oxides described in paragraph [0020] of the Specification (Reply Br. 6 (citing Lee ¶ 54)). Lee's filler or additive vanadium would have reacted with these frit

art would have recognized as a result-effective variable in the context of the claimed invention. We, therefore, agree with the Examiner that Lee sufficiently suggests that a composition of metal oxides could have optimized to meet the claimed property through routine experimentation.

Ans. 5.

In view of the foregoing, we determine that the Examiner did not reversibly err in rejecting claim 25 as unpatentable over the combination of Wang and Lee. Accordingly, we also affirm the rejection of claims 26, 27, and 31. 37 C.F.R. § 41.37(c)(1)(iv).

IV. CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed	New Ground
25–27	112, ¶ 2	Indefiniteness			25–27
25–27	103(a)	Wang, Aitken		25–27	
25–27, 31	103(a)	Wang, Lee	25–27, 31		
Overall Outcome			25–27, 31		25–27

As explained above, although we cannot sustain the rejection of claims 25–27 as unpatentable over the combination of Wang and Aitken as asserted by the Examiner, we reject claims 25–27 as indefinite. To protect Appellant’s procedural rights, we designate our opinion as setting forth a new ground of rejection pursuant to 37 C.F.R. § 41.50(b).

material oxides during heating and melting of the frit material. Moreover, Appellant admits that the ordinarily skilled artisan would have “recognize[d] that the relative amounts of materials would have an impact on absorption in the various wavelength ranges.” Appeal Br. 12.

This decision contains a new ground of rejection pursuant to 37 C.F.R. § 41.50(b), which provides that “[a] new ground of rejection pursuant to this paragraph shall not be considered final for judicial review.” Section 41.50(b) also provides that Appellant, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of the appeal as to the rejected claims:

(1) *Reopen prosecution.* Submit an appropriate amendment of the claims so rejected or new Evidence relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the prosecution will be remanded to the examiner. The new ground of rejection is binding upon the examiner unless an amendment or new Evidence not previously of Record is made which, in the opinion of the examiner, overcomes the new ground of rejection designated in the decision. Should the examiner reject the claims, [A]ppellant may again appeal to the Board pursuant to this subpart.

(2) *Request rehearing.* Request that the proceeding be reheard under § 41.52 by the Board upon the same Record. The request for rehearing must address any new ground of rejection and state with particularity the points believed to have been misapprehended or overlooked in entering the new ground of rejection and also state all other grounds upon which rehearing is sought.

AFFIRMED; 37 C.F.R. § 41.50(b)