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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MARCEL BROUNNE, CORNELIS JOHANNES,
and PRZEMYSŁAW OLSZYNSKI

Appeal 2018-003023
Application 13/542,878
Technology Center 1700

Before JAMES C. HOUSEL, MICHAEL G. McMANUS, and
JANE E. INGLESE, *Administrative Patent Judges*.

INGLESE, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants¹ request our review under 35 U.S.C. § 134(a) of the Examiner's decision to finally reject claims 1–8 and 31–35. We have jurisdiction over this appeal under 35 U.S.C. § 6(b).

We AFFIRM.

STATEMENT OF THE CASE

Independent claims 1 and 3 illustrate the subject matter on appeal and are reproduced below with emphasis added to highlight contested language:

1. A photovoltaic module assembly, comprising:
a photovoltaic cell;

¹ Appellants identify SABIC Global Technologies B.V. as the real party in interest. Appeal Brief filed October 16, 2017 (“App. Br.”), 2.

a transparent first layer comprising a plastic material, wherein the first layer has a first layer first surface and a first layer second surface;

a plastic structural second layer, wherein the plastic structural second layer has a second layer first surface and a second layer second surface, wherein the photovoltaic cell is between the first layer second surface and the second layer first surface, wherein the plastic structural second layer comprises a plastic multi wall sheet comprising ribs and/or hollow sections to increase the stiffness of the plastic structural second layer;
and

a cured layer between the first layer second surface and the second layer first surface, wherein the cured layer is made from a fluid having a viscosity of less than or equal to 1,500 centipoise before curing.

3. A photovoltaic module assembly, comprising:

a photovoltaic cell;

a transparent first layer comprising a plastic material, wherein the first layer has a first layer first surface and a first layer second surface;

a plastic structural second layer comprising a plastic material, wherein the plastic structural second layer has a second layer first surface and a second layer second surface, wherein the photovoltaic cell is between the first layer second surface and the second layer first surface, wherein the plastic structural second layer comprises a plastic multiwall sheet comprising ribs and/or hollow sections to increase the stiffness of the plastic structural second layer;

a connecting layer disposed between the first layer second surface and the second layer first surface, wherein the connecting layer forms a gap between the first layer first surface and the second layer second surface, wherein the photovoltaic cell is in the connecting layer; and

a cured layer in the gap, between the first layer and the photovoltaic cell.

The Examiner sets forth the following rejections in the Final Office Action entered April 28, 2017 (“Final Act.”), and maintains the rejections in the Examiner’s Answer entered November 27, 2017 (“Ans.”):

I. Claims 1, 33, and 35 under 35 U.S.C. § 103(a) as unpatentable over Xia in view of Roscheisen and Daily;

II. Claims 2, 3, 6, and 8 under 35 U.S.C. § 103(a) as unpatentable over Xia in view of Roscheisen and Daily, or, alternatively over Xia in view of Roscheisen, Daily, and Gittings;

III. Claims 4, 5, 31, and 32 under 35 U.S.C. § 103(a) as unpatentable over Xia in view of Roscheisen and Daily, or, alternatively over Xia in view of Roscheisen, Daily, Gittings, and Sam;

IV. Claim 7 under 35 U.S.C. § 103(a) as unpatentable over Xia in view of Roscheisen and Daily, or, alternatively over Xia in view of Roscheisen, Daily, Gittings, Sheats, and Bienick; and

V. Claim 34 under 35 U.S.C. § 103(a) as unpatentable over Xia in view of Roscheisen, Daily, Sheats, and Bienick.

DISCUSSION

Upon consideration of the evidence relied upon in this appeal and each of Appellants’ timely contentions², we affirm the Examiner’s rejections of claims 1–8 and 31–35 under 35 U.S.C. § 103(a) for the reasons set forth in the Final Office Action, the Answer, and below.

² We do not consider the arguments that Appellants present at pages 2 to 3 of the Reply Brief because Appellants do not show good cause for raising these arguments for the first time in their Reply Brief. 37 C.F.R. § 41.37(c)(1)(iv); 37 C.F.R. § 41.41(b)(2) (arguments raised for the first time in the Reply Brief that could have been raised in the Appeal Brief will not be considered by the Board unless good cause is shown).

We review appealed rejections for reversible error based on the arguments and evidence Appellants provide for each ground of rejection Appellants contest. 37 C.F.R. § 41.37(c)(1)(iv); *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) (explaining that even if the examiner had failed to make a prima facie case, “it has long been the Board’s practice to require an applicant to identify the alleged error in the examiner’s rejections”)).

Rejection I

Appellants argue claims 1, 33, and 35 together on the basis of claim 1, to which we accordingly limit our discussion. App. Br. 5–9; 37 C.F.R. § 41.37(c)(1)(iv).

Appellants do not dispute the Examiner’s finding that Xia discloses photovoltaic device 10 comprising photovoltaic cells 14, transparent layer 12 that includes polycarbonate and corresponds to the transparent first layer recited in claim 1, backsheet 18 that can be flexible and/or rigid, and encapsulant 20 that corresponds to the cured layer recited in claim 1. *Compare* Final Act. 3, *with* App. Br. 5–9. Nor do Appellants dispute the Examiner’s finding that because backsheet 18 “has a definite shape, structural properties, and a structure [that] performs a function, it is a structural [second] layer” as recited in claim 1. *Compare* Final Act. 3, *with* App. Br. 5–9.

The Examiner finds that Xia does not disclose that plastic backsheet 18 includes a plastic multiwall sheet comprising ribs and/or hollow sections, and the Examiner relies on Roscheisen and Daily for suggesting this feature. Final Act. 4–5.

Roscheisen discloses a photovoltaic device comprising a photovoltaic cell deposited onto thermally conductive backsheet 120, which is connected to heat sink 122. Col. 2, ll. 1–5, 40–42; col. 11, l. 67–col. 12, l. 3; Fig. 4. Roscheisen discloses that heat sink 122 has a plurality of metal fins 124 that create greater surface area for heat to be carried away from the heat sink by way of air convection. Col.12, ll. 5–9; Fig. 4. Roscheisen discloses that the heat sink allows sufficient heat transfer to lower a normal operating cell temperature of the photovoltaic cell, thereby increasing the efficiency of the cell. Col. 2, ll. 4–8. The Examiner finds that the fins of Roscheisen’s heat sink are walls and “are the claimed ribs with the claimed hollows between them.” Final Act. 4–5; Ans. 12.

The Examiner concludes that it would have been obvious to one of ordinary skill in the art at the time of Appellants’ invention to add a multiwall heatsink as disclosed in Roscheisen to Xia’s photovoltaic device to cool Xia’s device and “increase its conversion efficiency.” Final Act. 5. The Examiner finds that because the fins of Roscheisen’s heat sink are made of metal—a solid material—they would necessarily increase the stiffness of Xia’s backsheet 18. Ans. 12.

The Examiner relies on Daily for suggesting a heat sink having plastic (rather than metal) fins. Final Act. 5. Daily discloses light-emitting diode (LED) heat sink assembly 150 comprising LED 154 positioned in heat sink body 156. ¶ 37; Fig. 15A. Daily discloses that LED 154 transfers heat to heat sink body 156, which has an axially extending fin pattern that facilitates removal of heat to air passing over the outer surfaces of heat sink body 156. ¶ 40; Fig. 15A. Daily discloses that heat sink body 156 may be comprised

of any thermally conductive material, such as a conductive metal or a thermally conductive resin. ¶ 40.

The Examiner finds that light emitting diodes (LEDs) as disclosed in Daily, like the photovoltaic cells disclosed in Roscheisen, are optoelectronic semiconductor devices, and the Examiner finds that Daily's heat sink 156 and Roscheisen's heat sink 122 both work the same way—they both take heat from the semiconductor device and dissipate it outward via the fins. Final Act. 5. The Examiner finds that “Daily's teachings show that, at the time of the invention, it was known in the art that either a metal or a thermally conductive resin would make an effective heat sink for an optoelectronic semiconductor device.” *Id.* The Examiner concludes that it would have been obvious to one of ordinary skill in the art at the time of Appellants' invention to use a thermally conductive resin—or plastic—as disclosed in Daily to form Roscheisen's heat-dissipating fins, which “would have provided a plastic multiwalled sheet as claimed.” *Id.*

Appellants argue that one skilled in the art of plastic sheets would understand that a heat sink as disclosed in Roscheisen or Daily used for heat transfer is not a multiwall sheet comprising ribs and/or hollow sections that increase the stiffness of the sheet. App. Br. 6–7, 9. Appellants argue that the Examiner incorrectly “tak[es] a literal meaning of a multiwall sheet, alleging the fins of the heat sink are walls.” App. Br. 7.

As the Examiner correctly finds, however, Appellants' Specification as originally filed does not provide a definition of “multiwall sheet.” Ans. 13. Nor does the Specification provide any description of a “multiwall sheet.” Rather, the Specification as originally filed includes only three references to a “multiwall sheet,” none of which does anything more than

state that the second layer comprises a multiwall sheet comprising ribs and/or hollow sections to increase the stiffness of the second layer, as recited in claim 1. Spec. ¶¶ 53, 72, 88. Due to the absence of any definition or limiting description of a “multiwall sheet” in Appellants’ Specification, the Examiner correctly interprets this phrase according to its plain and ordinary meaning as a sheet having multiple walls. Ans. 13 (citing dictionary definitions of “multiwall” previously cited in the Advisory Action entered July 21, 2017); *In re Zletz*, 893 F.2d 319, 321 (Fed. Cir. 1989) (the words of a claim must be given their plain meaning unless the plain meaning is inconsistent with the specification.). The Examiner further correctly finds that a wall is a structure that divides an area,³ and determines that because the fins disclosed in Roscheisen divide the space between the fins, the fins are walls. Ans. 13.

Although Appellants argue that one skilled in the art of plastic sheets would understand that a heat sink as disclosed in Roscheisen used for heat transfer is not a multiwall sheet comprising ribs and/or hollow sections to increase the stiffness of the sheet, Appellants do not provide any evidence to support this assertion, which is a question of fact. App. Br. 6–7. Because it is well-established that unsupported attorney arguments cannot take the place of evidence necessary to resolve a disputed question of fact, Appellants’ arguments lack persuasive merit. *In re Geisler*, 116 F.3d 1465, 1470 (Fed. Cir. 1997) (“An assertion of what seems to follow from common experience is just attorney argument and not the kind of factual evidence that is required to rebut a prima facie case of obviousness.”); *Icon Health & Fitness, Inc. v. Strava, Inc.*, 849 F.3d 1034, 1043 (Fed. Cir. 2017)

³ See, e.g., <https://dictionary.cambridge.org/us/dictionary/english/wall>.

(“[a]ttorney argument is not evidence” and cannot rebut other admitted evidence).

Appellants argue that “no motivation, prompting, or suggestion exists for one skilled in the art to combine Roscheisen and Daily.” App. Br. 7. Appellants argue that “[s]imply because Daily and Roscheisen disclose heat sinks does not provide the requisite motivation for one skilled in the art to combine the references in the manner done” by the Examiner. App. Br. 8.

As discussed above, however, Roscheisen and Daily both disclose a heat-conducting finned heat sink. Roscheisen discloses that the heat sink conducts heat away from a photovoltaic cell, while Daily discloses that the heat sink conducts heat away from a light emitting diode. *Compare* Roscheisen col. 2, ll. 4–8; col. 12, ll. 5–9, *with* Daily ¶ 40. As the Examiner correctly finds, photovoltaic cells and light emitting diodes are both optoelectronic semiconductor devices, which Appellants do not dispute. *Compare* Final Act. 5, *with* App. Br. 5–9. Thus, Roscheisen and Daily disclose structurally similar heat sinks that perform the same function in similar devices. As also discussed above, Daily discloses that the finned heat sink may be comprised of any thermally conductive material, such as a conductive metal or a thermally conductive resin. Implicit in this disclosure is a teaching that conductive metals and thermally conductive resins are reasonably interchangeable materials for forming finned heat sinks. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) ([A]n obviousness analysis “need not seek out precise teachings directed to the specific subject matter of the challenged claim, for [an examiner] can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.”; *see also In re Preda*, 401 F. 2d 825, 826 (CCPA 1968) (“[I]t is

proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom.”).

Consequently, contrary to Appellants’ arguments, the combined disclosures of Roscheisen and Daily reasonably would have led one skilled in the art, through no more than ordinary skill and creativity, to utilize a thermally conductive resin (plastic) as disclosed in Daily to form a finned heat sink, with a reasonable expectation that the heat sink could be successfully used in a photovoltaic device as disclosed in Roscheisen. *In re Fout*, 675 F.2d 297, 301 (CCPA 1982)(“Express suggestion to substitute one equivalent for another need not be present to render such substitution obvious.”).

Although Appellants also argue that the Examiner does not provide reasoning that one skilled in the art of photovoltaic modules would also be skilled in the art of LEDs (App. Br. 8), Appellants do not dispute the Examiner’s finding in the Answer that “a person working in the solar cell field would have been sufficiently familiar with optoelectronic devices in general to know which materials could be used to make heat sinks.” *Compare* Ans. 14, *with* Reply Br. 2–4. Nor do Appellants dispute the Examiner’s finding that “finned heat sinks are broadly used across so many semiconductor technologies that a person of ordinary skill in any semiconductor subfield would have been familiar with finned heat sinks and their materials.” *Compare* Ans. 14, *with* Reply Br. 2–4.

Appellants also argue that the requirements and operating conditions for photovoltaic modules and light emitting diodes vary greatly, and the devices “are not similar enough such that materials for each can be

interchanged between the two devices.” App. Br. 8. Appellants argue that “[m]erely alleging that replacing metal with plastic in Roscheisen would be possible, when Roscheisen clearly prefers metal is not sufficient to establish a *prima facie* case of obviousness.” *Id.*

Although the general requirements and operating conditions for photovoltaic modules and light emitting diodes may vary greatly, what is at issue is whether the requirements for heat sinks used in photovoltaic modules and light emitting diodes as disclosed in Roscheisen and Daily, respectively, vary to the extent that materials used to form the heat sink of one device would not be suitable for use to form the heat sink of the other device. As discussed above, the heat sinks disclosed in Roscheisen and Daily have similar finned structures and both function to conduct heat away from an optoelectronic semiconductor device. Although Roscheisen may prefer use of metal to form the fins, as discussed above, Daily nonetheless implicitly teaches that conductive metals and thermally conductive resins are reasonably interchangeable materials for forming finned heat sinks.

We accordingly sustain the Examiner’s rejection of claims 1, 33, and 35 under 35 U.S.C. § 103(a).

Rejection II

To address this rejection, Appellants repeat the arguments that Appellants provide for claim 1 (addressed above), and argue that Gittings fails to cure the deficiencies of Xia, Roscheisen, and Daily. App. Br. 9–12. Because we are unpersuaded of reversible error in the Examiner’s rejection of claim 1 for the reasons discussed above, Appellants’ position as to this rejection is also without merit.

Rejections III–V

To address these rejections, Appellants rely on the arguments made for claim 1 (discussed above), and argue in essence that the additional references applied in these rejections fail to cure the deficiencies of Xia, Roscheisen, and Daily. App. Br. 12–13. Because we are unpersuaded of reversible error in the Examiner’s rejection of claim 1 for the reasons discussed above, Appellants’ position as to these rejections is also without merit.

DECISION

We affirm the Examiner’s rejections of claims 1–8 and 31–35 under 35 U.S.C. § 103(a).

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