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EXAMINER	
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte RUOSHUANG HUANG and MARY TERESA LOMBARDO

Appeal 2019-001364
Application 14/394,060
Technology Center 3700

Before NINA L. MEDLOCK, BRUCE T. WIEDER, and KENNETH G. SCHOPFER, *Administrative Patent Judges*.

SCHOPFER, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals from the Examiner's decision to reject claims 1–20. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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[1] We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as Carrier Corporation. Appeal Br. 4.

BACKGROUND

The Specification discloses that "[t]he subject matter disclosed herein generally relates to heat exchangers and, more particularly, to heat exchangers having alloy tubes and aluminum collar-style fins tubes." Spec. ¶ 1.

ILLUSTRATIVE CLAIM

Claim 1 is the only independent claim on appeal and recites:

> 1. A heat exchanger, comprising:
>
> a tube comprising a first aluminum alloy;
>
> a plurality of fins in thermally conductive contact with the exterior of said tube, said fins formed from a second aluminum alloy comprising a base alloy selected from the group consisting of AA1100, AA8006, and AA8011 and zinc or magnesium, said second aluminum alloy having an electrochemical solution potential at least 10 mV more negative than the electrochemical solution potential of said first aluminum alloy.

Appeal Br. 18.

REJECTIONS[2]

1. The Examiner rejects claims 1, 4–10, 12, 13, 15, 19, and 20 under 35 U.S.C. § 103(a) as unpatentable over Minami[3] in view of Grunenwald[4] and ASM.[5]

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[2] The Examiner has withdrawn the rejections under 35 U.S.C. § 112. *See* Ans. 6.
[3] Minami et al., US 2008/0041571 A1, pub. Feb. 21, 2008.
[4] Grunenwald et al., US 2008/0190403 A1, pub. Aug. 14, 2008.
[5] ASM International, (8xxx series) aluminum plus other elements and clad aluminum 8006, 8011, Registration Record Series (7/31/2017)

2. The Examiner rejects claims 2, 3, 14, 16, and 17 under 35 U.S.C. § 103(a) as unpatentable over Minami in view of Grunenwald, ASM, and Kanada.[6]
3. The Examiner rejects claims 11 and 18 under 35 U.S.C. § 103(a) as unpatentable over Minami in view of Grunenwald, ASM, and Mitchell.[7]

DISCUSSION

Claim 1, 4–10, 12, and 13

With respect to claim 1, the Examiner finds that Minami discloses a heat exchanger including a tube made of a first aluminum alloy; a plurality of fins made of a second aluminum alloy comprising a base allow and zinc; and wherein the second alloy has a potential at least 10 mV more negative than the first alloy, as required by the claim. Final Act. 4 (citing Minami ¶¶ 17, 62, 81, 82). The Examiner acknowledges that Minami does not disclose that the second aluminum alloy includes a base alloy that is selected from the group consisting of AA1100, AA8006, and AA8011. *Id.* The Examiner relies on Grunenwald as teaching that AA8006 or AA80111 may be used for fins in a heat exchanger. *Id.* (citing Grunenwald ¶ 20). The Examiner also finds that the composition data sheets for both AA8006 and AA8011 indicate that these alloys may contain zinc or magnesium. *Id.* (citing ASM). The Examiner concludes:

> It would have been obvious to one of ordinary skill in the art at the time of invention to have modified the heat exchanger of Minami to have included fin material of AA8006 or AA8011

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mio.asminternational.org/ac/datasheet.aspx?record=156380&print=true&dbKey=grantami_ac_alloylinder

[6] Kanada et al., US 4,410,036, iss. Oct. 18, 1983.

[7] Mitchell et al., US 2005/0155750 A1, pub. July 21, 2005.

> which may contain zinc or magnesium, doing so would provide a known construction material for fins where the fins are meant to corrode before a core tube or core material as taught by Grunenwald (per Paragraphs 0015 and 0020).

Id. at 5.

Appellant first argues that "Minami fails to disclose heat exchanger fins formed from zinc-containing alloys." Appeal Br. 10 (emphasis omitted). In support, Appellant asserts that Minami discloses only adding zinc after the fins are formed, either before or during brazing. *Id.* We disagree. As the Examiner notes, Minami explicitly discloses the use of a zinc containing alloy: "in order to attain a prescribed Zn concentration difference and therefore to create a predetermined pitting potential difference, it is preferable that a fin is manufactured using Zn contained aluminum alloy and then Zn concentration of the fin is adjusted by the aforementioned method at the time of brazing." Minami ¶ 81; *see also* Answer 6.

Next, Appellant argues that the references do not teach or suggest the use of AA1100, AA8006, or AA8011 plus zinc or magnesium to form the fins. Appeal Br. 10. Appellant asserts that Grunenwald does not disclose adding zinc to any non-zinc containing alloys and Grunenwald merely discloses "that known zinc-containing or non-zinc-containing aluminum alloys can be selected." *Id.* at 11. Appellant further asserts that Grunenwald acknowledges that the aluminum alloys used can be zinc-free, "there would be no motivation for the skilled person to add zinc to an alloy that [Grunenwald] has disclosed for use as a zinc-free alloy because [Grunenwald] already discloses other alloys that include zinc." *Id.* Also, Appellant asserts that the ASM composition sheets teach away from adding

zinc to an aluminum alloy because they specify that only trace amounts of zinc are tolerated. *Id.* Appellant asserts that "[t]he skilled person would be motivated away from *adding* zinc to either AA8006 or AA8011 in order to avoid brining the alloy out of specification." *Id.*

We are not persuaded. The claim requires "a second aluminum alloy comprising a base alloy selected from the group consisting of AA1100, AA8006, and AA8011 and zinc or magnesium." Appeal Br. 18. Because this is an apparatus claim, the process by which the second aluminum alloy is made is not relevant to the patentability determination unless Appellant can show a relevant process limitation. Here, Appellant must show some non-obvious difference between the claimed product and the prior art relied upon. *See* MPEP § 2113. Further, we note that the claim does not require a specific amount of zinc or magnesium in the second aluminum alloy. Thus, without any showing of a non-obvious difference between the claimed product and the prior art, the claim requires only a second aluminum alloy that includes AA1100, AA8006, or AA8011 and any amount of zinc or magnesium. Here, the Examiner has shown that Minami discloses fins made of a second aluminum alloy including zinc; that Grunenwald discloses the use of either AA8006 or AA8011 for fins in a heat exchanger; and that the composition sheets for these alloys indicate that they may include zinc. Thus, we determine that the art of record suggests the use of either AA8006 or AA8011 as suitable aluminum alloys containing zinc for use in Minami's fins.

Regarding whether there is a non-obvious difference between the claimed product and the prior art, Appellant argues that "[f]rom a purely compositional standpoint, AA1100 plus zinc does not appear to be

substantially different than AA7072, but Applicant has discovered that it makes a surprising difference in performance for manufacturability of the heat exchanger fins." Appeal Br. 12. Thus, Appellant is arguing that unexpected results are obtained from the formation of a second aluminum alloy produced by combining a base zinc-free aluminum alloy and zinc or magneisum. The problem with this argument is that it is not commensurate with the full scope of the claim. Appellant only addresses unexpected results that occur when a base alloy of AA1100 and zinc are used as the second aluminum alloy claimed. However, the claim allows for a base alloy selected from the group consisting of AA1100, AA8006, and AA8011, and Appellant provides no evidence of unexpected results with respect to base alloys AA8006 and AA8011. We also find that the evidence of alleged unexpected results is not commensurate with the scope of the claim because the evidence discloses only a base aluminum alloy plus 1% zinc, whereas the claim requires any amount of zinc, even a trace amount. Appellant does not point to any evidence of unexpected results for second aluminum alloys including other amounts of zinc. Thus, Appellant has not brought forth sufficient evidence of a non-obvious difference between the product claimed and the prior art relied upon by the Examiner, which, as discussed, at least suggests the use of a base alloy AA8006 or AA8011 with zinc.

Based on the foregoing, we are not persuaded of error in the rejection of claim 1. Accordingly, we sustain the rejection of claim 1. Appellant does not provide separate arguments with respect to the rejection of dependent claims 4–10, 12, and 13. Thus, we also sustain the rejection of claims 4–10, 12, and 13.

Claims 2, 3, 14, 16, and 17

With respect to claims 2, 3, 14, 16, and 17, the Examiner further finds

> Kanada teaches the use of AA 3003 as a conventional tube construction material for a heat exchanger (per col. 1 line 15–31) and that AA 3003 has a potential of -710 mV (per the table at the bottom of column 6).
>
> It would have been obvious to one of ordinary skill in the art at the time of invention to have used AA 3003 as the alloy for the tubes as taught by Kanada doing so would provide a known conventional tube construction material which can help prevent corrosion of the tubes as taught by Kanada (Col. 1 line 15–31).

Final Act. 6.

Appellant first argues that Kanada does not overcome the deficiency in the rejection of claim 1. Appeal Br. 12. Having found no deficiency, we are not persuaded by this argument.

Appellant also argues that "Kanada discloses a new alloy as a replacement for AA3003," and thus, any combination with Kanada "would be made with Kanada's new alloys, not the comparison alloys that Kanada teaches to be inferior to its new alloys." *Id.* at 13. We disagree for the reasons provided by the Examiner. Specifically, "[w]hile Kanada may acknowledge in the invention that other materials may have improved manufacturability[,] that does not teach away from the use of AA3003 as a heat exchanger tube material, as Kanada recognizes that AA3003 is a material used in the prior art for construction of heat exchanger tubes where corrosion resistance is required (per Col. 1 line 15–31)." Ans. 9.

Thus, we are not persuaded of error and we sustain the rejection of claims 2, 3, 14, 16, and 17.

Claims 11 and 18

Claim 11 depends from claim 1 and specifically requires that the second aluminum alloy includes a base alloy that is AA1100. Appeal Br. 18. Claim 18 depends from claim 11.

The Examiner further relies on Mitchell as teaching the use of AA1100 in fin construction and determines that it would have been obvious to use this material as a known suitable material for such construction. Final Act. 7.

Appellant first argues that Mitchell does not cure the deficiency in the rejection of claim 1. Appeal Br. 13–14. Having found no deficiency, we are not persuaded by this argument. Appellant also reiterates arguments regarding unexpected results:

> As discussed above with respect to the rejection of claims 1, 4–10, 12, 13, 15, 19, and 20, what is so surprising about the results reported in the Examples of the application is that from a purely compositional standpoint, AA1100 plus zinc does not appear to be substantially different than AA7072. However, Applicant has discovered that it makes a surprising difference in performance for manufacturability of the heat exchanger fins. The data shown in the Table between paragraphs [0017] and [0018] at page 6 of the application as filed clearly demonstrate this advantage, and this data is highly commensurate in scope with claims 11 and 18 directed to fin alloys with AA1100 plus zinc.

Id. at 14. We are not persuaded for reasons previously discussed. Specifically, although the table provided in Appellant's written disclosure compares the use of AA1100 with AA7072, it is not commensurate with the scope of the claim. As discussed above, the claim scope allows for any concentration of zinc in the base alloy, whereas the data provided in the written disclosure only relates to results that are obtained when 1% zinc is added to AA1100. Thus, we are not persuaded that Appellant has provided

sufficient evidence of unexpected results commensurate with the scope of the claim at issue.

Accordingly, we also sustain the rejection of claims 11 and 18.

CONCLUSION

We AFFIRM the rejections of claims 1–20.

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

In summary:

Claims Rejected	35 U.S.C. §	Basis	Affirmed	Reversed
1, 4–10, 12, 13, 15, 19, 20	103(a)	Minami, Grunenwald, ASM	1, 4–10, 12, 13, 15, 19, 20	
2, 3, 14, 16, 17	103(a)	Minami, Grunenwald, ASM, Kanada	2, 3, 14, 16, 17	
11, 18	103(a)	Minami, Grunenwald, ASM, Mitchell	11, 18	
Overall Outcome			1–20	

AFFIRMED