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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ANDREAS CHRISTEL

Appeal 2019-000998
Application 14/367,390
Technology Center 1700

Before BEVERLY A. FRANKLIN, JEFFREY B. ROBERTSON, and
MONTÉ T. SQUIRE, *Administrative Patent Judges*.

SQUIRE, *Administrative Patent Judge*.

DECISION ON APPEAL¹

¹ In this Decision, we refer to the Specification filed June 20, 2014 (“Spec.”); Final Office Action dated Feb. 20, 2018 (“Final Act.”); Advisory Action dated May 31, 2018 (“Adv. Act.”); Appeal Brief filed July 17, 2018 (“Appeal Br.”); Examiner’s Answer dated Sept. 20, 2018 (“Ans.”); and Reply Brief filed Nov. 14, 2018 (“Reply Brief”).

Appellant² appeals under 35 U.S.C. § 134(a) from the Examiner's decision finally rejecting claims 19, 20, 23–25, 27, 37, and 38.³ We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

The Claimed Subject Matter

Appellant's disclosure relates to a process for the solid-state polycondensation (SSP) of polyesters, in particular, of polyethylene terephthalate or copolymers thereof. Spec. ¶¶ 1, 9. Claim 19 is illustrative of the claimed subject matter on appeal and is reproduced below from the Claims Appendix to the Appeal Brief:

19. A process for a solid-state polycondensation of polyesters, the process comprising:

carrying out the solid-state polycondensation using polyester prepolymer particles having an intrinsic viscosity of from 0.35 to 0.80 dl/g and having an average pellet size in the range from 0.1 mm to 10 mm, in a reaction space in which ***an absolute pressure in the range from 10 mbar to 200 mbar*** and a process gas flow in the R value range from 0.005 to 0.05 is set,

where the R value is defined as a ratio of hourly amount of process gas (in Kg) flowing through the reaction space to hourly amount of polymer (in kg) flowing through the reaction space:

² We use the word "Appellant" to refer to "Applicant" as defined in 37 C.F.R. § 1.42(a). Appellant identifies Polymetrix AG as the real party in interest. Appeal Br. 1.

³ Claims 1–18, 21, 22, 26 and 28–36 are canceled. Appeal Br. 20–21.

$$R = \frac{m(\textit{gas})/h}{m(\textit{polymer})/h}; \text{ and}$$

carrying out the solid-state polycondensation over a period of time from 2 to 30 hours at a temperature of from 180°C to 5° below a crystalline melting point of the polyester prepolymer particles so that a resulting polyester has an intrinsic viscosity from 0.70 to 0.95 dl/g, and an increase in the intrinsic viscosity, during solid-state polycondensation, is at least 0.05 dl/g.

Appeal Br. 20 (key disputed claim language italicized and bolded).

The References

The Examiner relies on the following prior art references as evidence in rejecting the claims on appeal:

Al Ghatta et al. (“Al Ghatta”) US 5,708,124 Jan. 13, 1998

S. M. Aharoni, *Handbook of Thermoplastic Polymers: Homopolymers, Copolymers, Blends, and Composites* Ch. 2 59–66 (2002) (“Aharoni”).

B. Culbert et al., *Modern Polyesters: Chemistry and Technology of Polyesters and Copolyesters* Ch. 4 143–194 (2003) (“Culbert”).

Y. Ma et al., *Solid-State Polymerization of PET: Influence of Nitrogen Sweep and High Vacuum*, *Polymer* 44, 4085–4096 (2003) (“Ma”).

The Rejections

On appeal, the Examiner maintains (Ans. 3) the following rejections:

1. Claims 19, 20, 23, 25, 27, 37, and 38 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Aharoni in view of Culbert and Al Ghatta (“Rejection 1”). Ans. 3; Final Act. 3.
2. Claim 24 is rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Aharoni in view of Culbert and Al Ghatta as applied to

claim 19 above, and further in view of Ma (“Rejection 2”). Ans. 6; Final Act. 5–6.

OPINION

Rejection 1

The Examiner determines that the combination of Aharoni, Culbert, and Ghatta suggests a process for production of polyesters satisfying all of the steps of claim 19 and concludes the combination would have rendered the claim obvious. Ans. 3–6. Regarding the recitation “an absolute pressure in the range from 10 mbar to 200 mbar,” the Examiner relies on Aharoni for suggesting this element of the claim. *Id.* at 3–4, 10–12. In particular, the Examiner finds Aharoni discloses an SSP reaction of polyester conducted at a pressure of “2–3 psig” (Aharoni 81 (Fig. 5)), which, according to the Examiner’s calculation,⁴ corresponds to a range of approximately 138 mbar to 207 mbar, and overlaps the claimed range of “from 10 mbar to 200 mbar.” *Id.* at 11.

Appellant argues the Examiner’s rejection should be reversed because Aharoni does not teach or suggest “an absolute pressure in the range from 10 mbar to 200 mbar,” as recited in the claim. Appeal Br. 7–8; Reply Br. 3–4. Appellant essentially argues the Examiner did not correctly convert Aharoni’s psig units to mbar units, and had the Examiner correctly performed the calculation, Aharoni “would indicate even a higher pressure

⁴ According to the Examiner (Ans. 11), the calculation is based on a conversion table from a Wikipedia article cited by Appellant at page 8 of the Appeal Brief.

than normal pressure.” Appeal Br. 8. *See also* Reply Br. 3 (arguing the Examiner “confuses ‘psi’ units with ‘psig’ units”).

We agree with Appellant’s argument. On the record before us, we are not persuaded the Examiner has established by a preponderance of the evidence that Aharoni teaches or suggests “an absolute pressure in the range from 10 mbar to 200 mbar,” as recited in the claim. *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992) (holding the examiner bears the initial burden of establishing a prima facie case of obviousness).

As Appellant explains (Appeal Br. 7–8; Reply Br. 3–4), the Examiner’s findings regarding Aharoni’s teachings are erroneous because, in converting from psig units to mbar units, the Examiner’s does not correctly calculate the pressure range Aharoni actually discloses. As Appellant points out (Appeal Br. 8; Reply Br. 3–4), Figure 5 of Aharoni discloses a pressure range of 2–3 in psig (pounds per square in gauge) units, which indicates the pressure is relative to atmospheric pressure. Claim 19, however, recites “an ***absolute pressure*** in the range from 10 mbar to 200 mbar” (emphasis added). Thus, in converting Aharoni’s pressure from psig to mbar, the Examiner erred because the Examiner should have, first, converted the pressure range from psig units to psia (pounds per square inch absolute) units, which indicates the pressure is absolute and relative to a vacuum rather than the ambient, atmospheric pressure.

The Examiner should have, then, converted the pressure range, now in psia units, to mbar units, which as Appellant argues (Appeal Br. 8), would have resulted in much higher absolute pressure values. The preponderance of the evidence supports Appellant’s argument in this regard. For example, based on the unit conversion information provided in the Wikipedia page

cited by Appellant and relied upon by the Examiner, it appears that when the calculation is performed correctly, 2–3 psig actually converts to an absolute pressure in the range from about 1150 mbar to 1215 mbar, which is substantially higher than and falls outside the claimed range.

The Examiner also does not identify evidence or provide reasoning sufficient to support a finding that one of ordinary skill would have had reason to modify Aharoni’s process to operate at such a substantially reduced pressure, as would be required to arrive at the claimed invention. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (requiring “reasoning with some rational underpinning to support the legal conclusion of obviousness”) (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

In particular, at pages 10–12 of the Answer, the Examiner does not adequately explain why Aharoni’s disclosure at pages 81 and 82 would have led one of ordinary skill to modify Aharoni’s process to operate at “an absolute pressure in the range from 10 mbar to 200 mbar,” as recited in the claim. *See Belden Inc. v. Berk–Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015) (“[O]bviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the combinations or modifications of prior art to arrive at the claimed invention.”).

The Examiner’s assertions that “the combination of reduced pressure and Nitrogen sweep is well known in the art” (Ans. 10) and “Aharoni . . . provide[s] clear motivation to use reduce pressure in combination with Nitrogen sweep” (*id.* at 12) are conclusory and, without more, insufficient to sustain the Examiner’s rejection. *Kahn*, 441 F.3d at 988 (holding “rejections on obviousness grounds cannot be sustained by mere conclusory statements”).

The Examiner's assertion that "one of ordinary skill will be motivated to optimize this combination in order to reach mostly suitable pressure, temperature and R value for [a] specific SSP process by routine experimentation" (Ans. 10) is equally unpersuasive because it, too, is conclusory and the Examiner does not identify persuasive evidence in the record to support it.

We, therefore, cannot sustain the Examiner's rejection of claim 19 and determination that it would have been obvious to combine the teachings of Aharoni, Culbert, and Ghatta to arrive at the claimed subject matter.

Because claims 23, 25, and 27 depend from claim 19, we also cannot sustain the Examiner's rejection of these claims. Similarly, because claims 37 and 38 recite the same "absolute pressure in the range from 10 mbar to 200 mbar" limitation as claim 19, we also cannot sustain the Examiner's rejection of those claims.

Accordingly, we reverse the Examiner's rejection of claims 19, 20, 23, 25, 27, 37, and 38 under 35 U.S.C. § 103(a) as obvious over the combination of Aharoni, Culbert, and Ghatta.

Rejection 2

The foregoing deficiencies in the Examiner's analysis and conclusion regarding Rejection 1 and the Aharoni reference are not remedied by the Examiner's findings regarding the additional reference and combination of references cited in support of the second ground of rejection (Rejection 2). Accordingly, for principally the same reasons discussed above in reversing Rejection 1, we reverse Rejection 2.

CONCLUSION

In summary:

Claim(s) Rejected	Basis	Affirmed	Reversed
19, 20, 23, 25, 27, 37, 38	§ 103(a) Aharoni, Culbert, Ghatta		19, 20, 23, 25, 27, 37, 38
24	§ 103(a) Aharoni, Culbert, Ghatta, Ma		24
Overall Outcome			19, 20, 23–25, 27, 37, 38

REVERSED