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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ALAN EKIN, RAMESH SUBRAMANIAN, STEFAN SOMMER,
ARNO NENNEMANN, and CHRISTINE MEBANE

Appeal 2019-006390
Application 14/130,978
Technology Center 1700

Before ADRIENE LEPIANE HANLON, CHRISTOPHER C. KENNEDY,
JANE E. INGLESE, *Administrative Patent Judges*.

INGLESE, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant¹ requests review under 35 U.S.C. § 134(a) of the
Examiner’s rejection of claims 1–15.² We have jurisdiction under 35 U.S.C.
§ 6(b).

We AFFIRM.

¹ We use the word “Appellant” to refer to the “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies Covestro LLC and Covestro Deutschland AG as the real parties in interest. Appeal Brief filed January 29, 2019 (“Appeal Br.”) at 1.

² Non-Final Office Action entered June 1, 2018 (“Non-Final Act.”) at 1.

CLAIMED SUBJECT MATTER

Appellant claims an aqueous polyurethane coating composition.

Appeal Br. 1–2. Claim 1, the sole pending independent claim, illustrates the subject matter on appeal, and reads as follows:

1. An aqueous polyurethane coating composition comprising:
 - (a) a water-dilutable free radically curable polyurethane resin comprising a reaction product of:
 - (A1) 40–90 wt.% of one or more acrylate prepolymers containing hydroxyl groups and having an OH content of 40-120 mg of KOH/g and
 - (B1) 0.1–20 wt.% of one or more mono- and/or difunctional compounds reactive towards isocyanate groups, which compounds contain groups which are cationic, anionic and/or have a dispersant action due to ether groups with
 - (C1) 10–50 wt.% of one or more polyisocyanates
 - (D1) 0.0–30.0 wt.% of one or more polyols together with a subsequent reaction with
 - (E1) 0.1–10 wt.% of one or more di- and/or polyamines, and
 - (b) *a water-dilutable polycarbonate-polyurethane resin, wherein the polycarbonate-polyurethane resin is non-functional and wherein the ratio of component (a) to component (b) in the aqueous polyurethane coating composition is from 90:10 to 50:50.*

Appeal Br. 8 (Claims Appendix) (emphasis added).

REJECTION

The Examiner maintains the rejection of claims 1–15 under 35 U.S.C. § 103(a) as unpatentable over Dannhorn³ in view of Stewart⁴ in the

³ US 5,684,081, issued November 4, 1997.

⁴ US 2011/0045219 A1, published February 24, 2011.

Examiner's Answer entered May 16, 2019 ("Ans.").

FACTUAL FINDINGS AND ANALYSIS

Upon consideration of the evidence relied upon in this appeal and each of Appellant's contentions, we affirm the Examiner's rejection of claims 1–15 under 35 U.S.C. § 103(a), for the reasons set forth in the Office Action, the Answer, and below.

We review appealed rejections for reversible error based on the arguments and evidence the Appellant provides for each issue the Appellant identifies. 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"))).

Appellant argues all of the claims together. Appeal Br. 2–7. We, therefore, select claim 1 as representative, and decide the appeal as to claims 1–15 based on claim 1 alone. 37 C.F.R. § 41.37(c)(1)(iv).

Appellant does not dispute the Examiner's finding that Dannhorn discloses an aqueous polyurethane coating composition comprising a water-dilutable, free radically-curable polyurethane resin having the features recited in claim 1. *Compare* Non-Final Act. 8 (citing Dannhorn col. 2, ll. 14–35), *with* Appeal Br. 2–7. The Examiner finds, however, that Dannhorn does not disclose that the aqueous polyurethane coating composition includes a non-functional, water-dilutable polycarbonate-polyurethane resin, and the Examiner relies on Stewart for suggesting inclusion of such a resin in Dannhorn's aqueous polyurethane coating composition. Non-Final Act.

8–9. Appellant does not dispute the Examiner’s finding that Stewart discloses an aqueous polyurethane coating composition comprising a non-functional, water-dilutable polycarbonate-polyurethane resin. *Compare* Non-Final Act. 8–9 (citing Stewart ¶¶ 14, 36, 36, 91), *with* Appeal Br. 2–7. Nor does Appellant dispute the Examiner’s finding that Stewart discloses that the aqueous polyurethane coating composition is especially suitable for glass substrates, and provides improved mechanical properties, including improved caustic resistance, scuff resistance, and durability. *Compare* Non-Final Act. 8–9 (citing Stewart ¶ 118), *with* Appeal Br. 2–7.

In view of these disclosures in Stewart, the Examiner concludes that it would have been obvious to one of ordinary skill in the art to modify Dannhorn’s aqueous polyurethane coating composition to include a non-functional, water-dilutable polycarbonate-polyurethane resin as disclosed in Stewart to “provide an improved aqueous polyurethane coating composition that is suitable for glass substrates and provides improved mechanical properties including improved caustic resistance, scuff resistance and durability as taught by Stewart.” Non-Final Act. 9.

The Examiner further concludes that it would have been obvious to one of ordinary skill in the art to adjust the amounts of polyurethane resin and polycarbonate-polyurethane resin included in Dannhorn’s modified aqueous polyurethane coating composition to achieve desired mechanical properties, such as caustic resistance, scuff resistance, and durability. Non-Final Act. 9. The Examiner determines that in so doing, the ordinarily skilled artisan would have arrived at suitable relative amounts of each component, such as relative amounts resulting in a ratio of polyurethane resin to polycarbonate-polyurethane resin as recited in claim 1, through

nothing more than routine experimentation. Non-Final Act. 9–10 (citing *In re Boesch*, 617 F.2d 272 (CCPA 1980); MPEP § 2144.05).

Appellant argues that “obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art.” Appeal Br. 6 (citing MPEP § 2143.01; *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347 (Fed. Cir. 1992)). Appellant argues that “[c]learly, there is no such teaching, suggestion or motivation shown in the references in this case.” Appeal Br. 6.

As discussed above, however, the Examiner articulates a thorough, reasoned explanation, based on sound factual findings, for why one of ordinary skill in the art reasonably would have been led to combine the relied-upon disclosures of Dannhorn and Stewart to arrive at an aqueous polyurethane coating composition as recited in claim 1. Appellant’s conclusory arguments fail to identify any specific error in the Examiner’s factual findings, reasoning, or rationale for the proposed combination. Appellant’s arguments, therefore, do not identify reversible error in the Examiner’s rejection. *Jung*, 637 F.3d at 1365.

Appellant argues that because Dannhorn does not disclose inclusion of a non-functional, water-dilutable polycarbonate-polyurethane resin in Dannhorn’s aqueous polyurethane coating composition, Dannhorn “also fail[s] to teach or fairly suggest a ratio of polyester urethane acrylate resin to polycarbonate polyurethane resin” as recited in claim 1. Appeal Br. 7. Appellant argues that Stewart fails to remedy this deficiency so as “to lead

one of ordinary skill in the art to the instantly claimed invention.” *Id.*

Appellant’s arguments, however, are improperly based on Dannhorn and Stewart individually, and do not address what a combination of the relied-upon disclosures of these references reasonably would have suggested to one of ordinary skill in the art. *In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986) (“Non-obviousness cannot be established by attacking references individually where the rejection is based upon the teachings of a combination of references.”); *In re Keller*, 642 F.2d 413, 425 (CCPA 1981) (The test for obviousness “is what the combined teachings of the references would have suggested to those of ordinary skill in the art.”).

More specifically, as discussed above, the Examiner determines that it would have been obvious to one of ordinary skill in the art to modify Dannhorn’s aqueous polyurethane coating composition to include a non-functional, water-dilutable polycarbonate-polyurethane resin, in view of Stewart’s disclosure that such a resin is suitable for use in polyurethane coating compositions, and teaching that polyurethane coating compositions that include a non-functional, water-dilutable polycarbonate-polyurethane resin exhibit improved mechanical properties, including improved caustic resistance, scuff resistance, and durability. Non-Final Act. 9. Supporting the Examiner’s rationale for the proposed modification of Dannhorn’s coating composition, Stewart further discloses that polyurethane coating compositions that include a non-functional, water-dilutable polycarbonate-polyurethane resin have “outstanding optical properties, good adhesion, increased abrasion resistance, elasticity, toughness, water resistance and alkali resistance, in particular to hot, alkaline washing media.” Stewart ¶ 9.

The Examiner concludes that it would have been obvious to one of ordinary skill in the art to adjust the amounts of polyurethane resin and polycarbonate-polyurethane resin included in Dannhorn's modified aqueous polyurethane coating composition to achieve desired mechanical properties. Non-Final Act. 9. In so doing, the ordinarily skilled artisan would have arrived at suitable relative amounts of each component to include in the coating composition, such as amounts resulting in a ratio of polyurethane resin to polycarbonate-polyurethane resin as recited in claim 1, through nothing more than routine experimentation. *In re Boesch*, 617 F.2d 272, 276 (CCPA 1980) (“[D]iscovery of an optimum value of a result effective variable . . . is ordinarily within the skill of the art.”); *In re Aller*, 220 F.2d 454, 456 (CCPA 1955) (“[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.”).

For reasons discussed below, Appellant does not meet Appellant's burden of demonstrating the criticality of the ratio of polyurethane resin to polycarbonate-polyurethane resin recited in claim 1. *In re Woodruff*, 919 F.2d 1575, 1578 (Fed. Cir. 1990) (indicating that in cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range.). Appellant's argument that neither Dannhorn nor Stewart discloses the recited ratio, therefore, does not identify reversible error in the Examiner's rejection.

Appellant argues that data presented in Table 1 of Appellant's Specification show that the range of ratios of polyurethane resin to

polycarbonate-polyurethane resin recited in claim 1 “results in a coating having desired impact resistance for bottles,” and “[c]oatings having a ratio above this range are too hard and those below are too soft.” Appeal Br. 7. Appellant argues that “such is neither taught nor fairly suggested by Dannhorn [] alone or in combination with Stewart.” *Id.*

For reasons well-expressed by the Examiner in the Answer and discussed below, however, the data presented in Table 1 of Appellant’s Specification do not demonstrate the criticality of the polyurethane resin to polycarbonate-polyurethane resin ratio range recited in claim 1. Ans. 11–13.

An appellant may show that a claimed range is non-obvious by demonstrating that the range “produce[s] a new and unexpected result which is different in kind and not merely in degree from the results of the [closest] prior art.” *In re Aller*, 220 F.2d 454, 456 (CCPA 1955); *In re Klosak*, 455 F.2d 1077, 1080 (CCPA 1972) (“[I]t is not enough to show that results are obtained which differ from those obtained in the prior art: that difference must be shown to be an unexpected difference.”); *In re Baxter Travenol Labs.*, 952 F.2d 388, 392 (Fed. Cir. 1991) (“[W]hen unexpected results are used as evidence of nonobviousness, the results must be shown to be unexpected compared with the closest prior art.”).

Such a range is referred to as a “critical” range, and must be demonstrated through objective evidence that is commensurate in scope with the claimed range. *Woodruff*, 919 F.2d at 1578; *In re Harris*, 409 F.3d 1339, 1344 (Fed. Cir. 2005) (“Even assuming that the results were unexpected, Harris needed to show results covering the scope of the claimed range. Alternatively Harris needed to narrow the claims”); *In re Greenfield*, 571 F.2d 1185, 1189 (CCPA 1978) (“Establishing that one (or a small number

of) species gives unexpected results is inadequate proof, for ‘it is the view of this court that objective evidence of non-obviousness must be commensurate in scope with the claims which the evidence is offered to support.’” (Quoting *In re Tiffin*, 448 F.2d 791, 792 (CCPA 1971))).

As the Examiner explains (Ans. 11–12), coatings prepared from formulations C, D, and E set forth in table 1 include ratios of polyurethane resin to polycarbonate-polyurethane resin falling within the range recited in claim 1 (referred to as “inventive formulations”), while formulations A, B, F, and G include ratios outside the recited range (referred to as “comparative formulations”). Table 1 does not set forth a formulation as disclosed in Dannhorn that includes only a polyurethane resin and does not include a polycarbonate-polyurethane resin. The results presented in Table 1, therefore, do not provide a comparison between results exhibited by aqueous polyurethane coating compositions within the scope of claim 1 and coating compositions disclosed in Dannhorn, the closest prior art.

As the Examiner also explains (Ans. 12), coatings prepared from comparative formulations F and G exhibit the same direct and reverse impact strength as coatings prepared from formulations inventive formulations C, D, and E. Contrary to Appellant’s arguments, the results presented in Table 1, therefore, show that a ratio of polyurethane resin to polycarbonate-polyurethane resin as recited in claim 1 is not necessary for “desired impact resistance for bottles.”

Furthermore, the microhardness results set forth in Table 1 for the inventive formulations differ only slightly from the microhardness results exhibited by the comparative formulations, and the results thus appear to show a difference in degree, rather than a difference in kind, between the

inventive and comparative formulations. Appellant does not direct us to any persuasive evidence demonstrating that the microhardness results for inventive formulations C, D, and E presented in Table 1 actually would have been unexpected by one of ordinary skill in the art at the time of the invention. *In re Geisler*, 116 F.3d 1465, 1471 (Fed. Cir. 1997) (“Geisler made no such assertion [that results were unexpected] in his application. Nor did Geisler submit any such statement through other evidentiary submissions, such as an affidavit or declaration under Rule 132 Instead, the only reference to unexpected results was a statement by Geisler’s counsel . . . that Geisler’s results were ‘surprising.’”). Nor does Appellant explain why, or provide objective evidence to show, that coatings produced from formulations having a ratio of polyurethane resin to polycarbonate-polyurethane resin above the range recited in claim 1 are “too hard,” while coatings produced from formulations below the recited range are “too soft.” As expressed by the Examiner, “there is no evidence what level of hardness is considered as being too hard and what level of hardness is considered as being too soft.” Ans. 12–13.

Finally, as discussed above, Table 1 includes results obtained from only three inventive coating composition formulations. Even if the results presented in Table 1 would have been unexpected, Appellant does not explain why, or provide objective evidence to show, that this limited data are sufficient to demonstrate that the full scope of the coating compositions encompassed by claim 1 impart results that would have been unexpected relative to the coating compositions of the closest prior art.⁵

⁵ Appellant does not explain why comparative formulations A, B, F, and G in Table 1, rather than Dannhorn, are the closest prior art. To that end, we

Consequently, on the record before us, Appellant does not meet its burden of demonstrating the criticality of the polyurethane resin to polycarbonate-polyurethane resin ratio range recited in claim 1.

As discussed above, one of ordinary skill in the art would have adjusted the amounts of polyurethane resin and polycarbonate-polyurethane resin included in Dannhorn's modified aqueous polyurethane coating composition to achieve desired mechanical properties, such as desired impact resistance and hardness, and in so doing, the ordinarily skilled artisan would have arrived at suitable relative amounts of each component, such as amounts resulting in a ratio of polyurethane resin to polycarbonate-polyurethane resin as recited in claim 1, through nothing more than routine experimentation.

We, accordingly, sustain the Examiner's rejection of claims 1–15 under 35 U.S.C. § 103(a).

CONCLUSION

Claims	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1–15	103(a)	Dannhorn, Stewart	1–15	

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

note that Table 1 does not set forth a formulation as disclosed in Dannhorn that includes only a polyurethane resin and does not include a polycarbonate-polyurethane resin.