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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MARTIN WEBER, PETER ITTEMANN, AXEL GOTTSCHALK,
BERND NIEDERMAIER, BIRGIT REINHARD, and
DIRK MECKELNBURG

Appeal 2017-005727
Application 13/504,576
Technology Center 1700

Before ROMULO H. DELMENDO, AVELYN M. ROSS, and
JANE E. INGLESE, *Administrative Patent Judges*.

DELMENDO, *Administrative Patent Judge*.

DECISION ON APPEAL

The Applicants (hereinafter “Appellants”)¹ appeal under 35 U.S.C. § 134(a) from the Primary Examiner’s final decision to reject claims 10, 11, and 13–28.² We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

¹ The Appellants identify the real party in interest as “Styrolution Group GmbH” (Appeal Brief filed September 12, 2016, hereinafter “Br.,” 1).

² Br. 4–17; Final Office Action entered May 13, 2016, hereinafter “Final Act.,” 2–10; Examiner’s Answer entered October 20, 2016, hereinafter “Ans.,” 2–14.

I. BACKGROUND

The subject matter on appeal relates to a process for preparing anhydride-containing vinylaromatic-vinyl cyanide copolymers with “reduced soil particle content”³ (Specification filed April 27, 2012, hereinafter “Spec.,” 1, ll. 2–3). Representative claim 10 is reproduced from the Appeal Brief (Claims Appendix A), with key limitations emphasized, as follows:

10. A process for preparing copolymers A) with a reduced soil particle content, the copolymers A) comprising[:]
66.3 to 83.3% by weight of structural units which derive from one or more vinylaromatic monomers component A1),
15 to 32% by weight of structural units which derive from one or more vinyl cyanides component A2),
1.7 to 3.6% by weight of structural units which derive from one or more dicarboxylic anhydrides component A3), and
0 to 10% by weight of structural units which derive from further copolymerizable monomers component A4),
where the percentages by weight are each based on the total weight of the structural units which derive from components A1), A2), A3) and A4), and together do not exceed 100% by weight, wherein the process comprises
preparing the copolymers A) *by solution polymerization* of components A1), A2), A3), and A4) *in the presence of an organic solvent under continuous steady-state conditions for at least 24 hours calculated from the time of attainment of the steady-state condition,*
wherein *the mathematical product of the percentages by weight of the structural units which derive from component A2) and the percentages by weight of the structural units which derive from component A3) in the copolymer A) is in the range from 40%² by weight to 65%² by weight,* and
wherein *the copolymer A) has 2 mm² to 21 mm² of soil particles/m² after an operating time of 24 hours,* which is

³ It appears that the term “soil” refers to “inclusions other than the copolymer matrix” (Spec. 8, ll. 16–19).

calculated from the time of attainment of the steady-state condition, and measured by a PS 25C pellet scanner, wherein the size and number of the inclusions other than the copolymer matrix are detected in 2160 g of pellets.

II. REJECTION ON APPEAL

The Examiner maintains a rejection under pre-AIA 35 U.S.C. § 103(a) of claims 10, 11, and 13–28 as unpatentable over Weber et al. (WO 2008/101888 A1, published August 28, 2008),⁴ Weber et al. (US 2008/0300333 A1, published December 4, 2008; hereinafter “Weber”), NieSsner et al. (US 2001/0007890 A1, published July 12, 2001; hereinafter “NieSsner”), Liebig et al. (US 4,167,543, issued September 11, 1979; hereinafter “Liebig”), and Kolvoort et al. (US 2,496,222, issued January 31, 1950; hereinafter “Kolvoort”). *See, e.g.*, Ans. 2–14; Final Act. 2–10; Non-Final Action entered February 4, 2016, hereinafter “02-04-16 Non-Final Act.,” 2–3; 06-5-14 Non-Final Act. 3–4.

III. DISCUSSION

Unless separately argued pursuant to 37 C.F.R. § 41.37(c)(1)(iv), all claims stand or fall together with representative claim 10.

The Examiner finds that BASF describes a process for preparing a styrene-acrylonitrile-maleic anhydride polymer having monomeric contents for A1)–A3) and a “mathematical product” relationship for A2) and A3) that

⁴ The Examiner and the Appellants refer to this reference as “BASF” and rely on Weber et al. (US 8,119,723 B2, issued February 21, 2012) as an English language equivalent (Non-Final Action entered June 5, 2014, hereinafter “06-05-14 Non-Final Act.,” 3; Br. 4). To avoid confusion, we also refer to this reference as “BASF” but cite to the US document.

fall squarely within claim 10's scope (Ans. 3; Final Act. 4; 06-05-14 Non-Final Act. 3). The Examiner finds further that BASF discloses using solution polymerization to prepare the polymer (Ans. 3). The Examiner acknowledges that BASF's process differs from that recited in claim 10 in that the claimed process is conducted in a continuous, steady state mode, whereas BASF exemplifies a batch process (*id.*). Relying on Liebig and Weber, however, the Examiner concludes that a person of ordinary skill in the art would have been prompted to perform BASF's process in a continuous, steady state solution polymerization mode as is commonly practiced in the art (02-04-16 Non-Final Act. 2–3). With respect to the “soil particles” content limitation recited in claim 10, the Examiner finds that BASF's process is consistent with the processes described in the Appellants' Specification as suitable for achieving the reduced “soil particles” content, and, therefore, the prior art polymer would reasonably appear to have “soil particles” content within the range recited in the claim (Ans. 5–6; Final Act. 5–6).

The Appellants disagree with the Examiner's obviousness conclusion based on a number of different arguments (Br. 5–17). These arguments, however, are ineffective to identify a reversible error for the reasons discussed below. *In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011).

The Appellants concede that “BASF does describe a species of styrene-acrylonitrile-maleic anhydride terpolymer (74/23.8/2.2 % by weight, respectively), which does comply with the recited mathematical product of the percentage of component A2) and component A3)” (Br. 8 (referring to BASF, col. 19, ll. 4–16)). The Appellants also admit, as they should, that BASF teaches “terpolymers are preferably prepared via solution

polymerization” (Br. 9 (quoting BASF, col. 13, ll. 42–44)). Although BASF does not explicitly state that the terpolymer was prepared by polymerizing the monomers in a continuous, steady-state mode, such a polymerization mode was well known as a preferred technique to ensure “that the concentration of all of the reactants and the constitution of the copolymers . . . formed remain practically constant over the reaction time” (Weber ¶¶ 1, 22); *see also* Liebig, col. 2, ll. 26–35), which discloses—in the context of bulk polymerization—that continuous, stationary (i.e., steady-state) conditions are achieved after about 0.5–24 hours. Given these teachings in the prior art references, we agree with the Examiner that a person of ordinary skill in the art would have conducted BASF’s solution polymerization in a continuous, steady-state mode in order to ensure that the monomer concentrations and terpolymer composition remain relatively constant during reaction, as suggested by Weber and Liebig. Additionally, a person of ordinary skill in the art would have determined—through nothing more than routine experimentation and using Liebig’s disclosure as a general guide—the times required to achieve steady-state in a solution polymerization process.

The Appellants argue that three claim elements are critical, but the Examiner improperly “dissect[ed] the process claim into its separate and distinct essential elements” (Br. 5–6). According to the Appellants, none of the secondary references “teach, suggest or show any interest in the recited properties of copolymer A) and the technical benefits that result from [the Appellants’] process” (*id.* at 7). The Appellants’ arguments are misplaced.

As the Examiner finds (Ans. 3), performing the polymerization in a continuous, steady-state solution polymerization mode does not appear to be

critical to achieving the specified “soil particles” content. Specifically, the current Specification discloses that although solution polymerization is preferred, bulk polymerization may also be used (Spec. 4, ll. 33–55). Similarly, the Specification states that although continuous, steady-state conditions are preferred, the polymerization can be performed in a batchwise or semi-batchwise fashion (*id.* at 5, ll. 6–15). Indeed, as the Examiner points out (Ans. 3), the original claims recite that “bulk or solution polymerization”—without regard to whether steady-state conditions are achieved—results in a product with “reduced soil particle content” (original claim 1). Therefore, contrary to the Appellants’ position (Br. 8–9), it would reasonably appear that BASF’s terpolymer would possess a “soil particles” content within the range recited in current claim 10. The Appellants do not direct us to persuasive evidence to the contrary. *See, e.g., In re Spada*, 911 F.2d 705, 708 (Fed. Cir. 1990) (“[W]e think that it was reasonable for the PTO to infer that the polymerization by both Smith and Spada of identical monomers, employing the same or similar polymerization techniques, would produce polymers having the identical composition.”); *In re Thorpe*, 777 F.2d 695, 697–98 (Fed. Cir. 1985) (“The examiner compared the product of the prior art, and the product of Thorpe’s process as described by Thorpe, in accord with standard examination practice . . .”).

The Appellants rely on the comparative experimental data reported in their Specification (Table 1) as demonstrating that solution polymerization “does make a difference” and is “essential” (Br. 9). We agree with the Examiner (Ans. 8; Final Act. 9–10) that the proffered evidence is insufficient. The Appellants do not direct us to any comparative examples comparing solution polymerization against bulk polymerization, much less

continuous, steady-state solution polymerization versus other types of polymerization modes. Table 1 appears to show that when the “[m]athematical product of percentages by weight of components A2) and A3)” is outside the range recited in claim 10, certain properties including “[s]oil particle content” are outside the range specified in the claim. But, as the Examiner finds (Final Act. 9–10) and the Appellants concede (Br. 8), BASF teaches a terpolymer that meets the “mathematical product” limitation recited in claim 10. *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.”).

For these reasons, we uphold the Examiner’s rejection of claim 10.

With respect to claims 20 and 21, the Appellants argue that these claims further define the “mathematical product” to narrower ranges (Br. 15). The Examiner calculates, however, the “mathematical product” for BASF’s disclosed terpolymer to be 52.36 wt.%² (06-05-14 Non-Final Act. 3), which falls squarely within the ranges recited in these claims.

With respect to claims 22 and 28, the Appellants contend that these claims recite further limitations on the “mathematical product” (43.9–57.6 wt.%²), steady-state operation time (144 hours), and soil particle content (5–12 mm² of soil particles/m²) (Br. 16). Again, however, the Appellants do not direct us to any evidence that BASF’s polymer does not possess the specified soil particles content.

Finally, with respect to claims 23 and 24, the Appellants argue that these claims further define a range of 72.5–81.2 wt.% for component A1).

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BASF, however, discloses 74 wt.%, which falls squarely within the range specified in these claims.

For these reasons and those well-stated by the Examiner, we sustain the rejection of all claims on appeal.

IV. SUMMARY

The Examiner's final decision to reject claims 10, 11, and 13–28 is affirmed.

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

AFFIRMED