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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte BYOUNG-TAK YIM, DU-YOUN KA, and
BYOUNG-CHEON JO

Appeal 2020-002709
Application 15/011,701
Technology Center 1700

Before CATHERINE Q. TIMM, JEFFREY T. SMITH, and
BRIAN D. RANGE, *Administrative Patent Judges*.

TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the Examiner's decision to reject claims 16–20. *See* Final Act. 1. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

¹ “Appellant” refers to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as SK Innovation Co., LTD and SK Global Chemical Co., LTD. Appeal Br. 3.

CLAIMED SUBJECT MATTER

The claims are directed to a water-absorbing resin that is defined in terms of (a) its content of water-soluble fraction, (b) an absorbency against pressure property, and (c) a water-soluble fraction shear index property. *See, e.g.,* claim 16. Claim 16, reproduced below, is illustrative of the claimed subject matter:

16. A water-absorbing resin, in which

- [a] a content of a water-soluble fraction is 15 wt% or less based on the total weight of the resin,
- [b] an absorbency against pressure at 0.3 psi with respect to a saline solution including sodium chloride at 0.9 wt% is 25 g/g or more, and
- [c] a water-soluble fraction shear index A/B represented by the following Expression 1 is in a range of 0.1×10^{-5} (s) to 10×10^{-5} (s):

$$A/B \qquad \qquad \qquad \text{[Expression 1]}$$

where A is an absolute gradient of viscosity with respect to a shear rate of an ultrapure water solution with a content of a water-soluble fraction of 0.2 wt% of the water-absorbing resin, and is represented by the following Expression 2, and B is a viscosity at a shear rate of 10/s of an ultrapure water solution including a water-soluble fraction of a water-absorbing resin after immersing a water-absorbing resin in ultrapure water of which the weight is 400 times the weight of the water-absorbing resin and stirring a mixed solution at 300 rpm for 60 minutes;

$$(\text{Vis}(100)-\text{Vis}(10))/(100-10) \qquad \text{[Expression 2]}$$

where Vis (100) is a viscosity of an aqueous solution at a shear rate of 100/s, and Vis (10) is a viscosity of an aqueous solution at a shear rate of 10/s.

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Appeal Br. 17 (Claims Appendix) (formatting added).

REFERENCE

The prior art relied upon by the Examiner is:

Name	Reference	Date
Naumann	WO 2013/101197 A1 ²	July 4, 2013

REJECTION

Claims 16–20 are rejected under 35 U.S.C. § 102(a)(1) as anticipated by or, in the alternative, under 35 U.S.C. § 103 as obvious over Naumann. Final Act. 2.

OPINION

Like Appellant, Naumann describes forming a water-absorbing polymer by crosslinking and polymerizing an acrylic acid monomer. *Compare* Naumann ¶¶ 1–2, 9–12, 87, 89, *with* Spec. 2:17–21. There is no dispute that Naumann does not report the specific properties that claim 16 recites. The Examiner’s rejection is based on a finding that Naumann describes example absorbents inherently having the claimed properties given the similarities in starting materials and processing to Appellant’s starting materials and processing. Final Act. 2–3. Appellant contends that the Examiner has not established a sound basis for that finding. Appeal Br. 5–16. In making this argument, Appellant does not argue any claim separately from independent claim 16. Appeal Br. 5–16. We select claim 16 as representative for resolving the issues on appeal.

² The Examiner cites to the U.S. equivalent, US 2015/0093575 A1, published April 2, 2015. We will also cite to this document.

The Examiner and Appellant both recognize the well-settled law involved. *Compare* Final Act. 2–3, with Appeal Br. 5. “Where . . . the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the [USPTO] can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product.” *In re Best*, 562 F.2d 1252, 1255 (CCPA 1977). Similarities in the products and of the process of making provide a reasonable basis to believe that the products are the same. *Id.*; see also *In re Spada*, 911 F.2d 705, 708 (Fed. Cir. 1990) (“[W]hen the [USPTO] shows sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not.”).

The Examiner’s inherency finding is based on the fact that Naumann uses two internal crosslinkers to crosslink an acrylic acid and this method is the same or similar to Appellant’s two-crosslinker method. Final Act. 2; Ans. 3. Appellant contends that the Examiner is mistaken. According to Appellant, Naumann uses only one crosslinker. Appeal Br. 10–12; Reply Br. 3–9.

A preponderance of the evidence supports the Examiner’s finding. Specifically, Naumann teaches using the reaction product of diallylamine-allylglycidyl ether (diallylamine-AGE) as one internal crosslinking agent together with ethoxylated (3) trimethylolpropane triacrylate (Sartomer Co.’s SR454) as a second crosslinking agent. See, e.g., Naumann ¶ 179 (describing a procedure of adding crosslinkers labeled “crosslinker 6”). That these two crosslinking agents are separate is evidenced by the procedure of adding the first crosslinking agent to the monomer mixture and only adding SR454 to that mixture “right before polymerization.” See, e.g., Naumann ¶

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175 (crosslinker 2), ¶ 177 (crosslinker 4), ¶ 181 (crosslinker 8), ¶ 183 (crosslinker 10). Although the description of the crosslinker 6 procedure omits the words “added to the monomer,” there is no convincing evidence that the procedure is different from the other examples using SR454. *See* Naumann *generally*. Indeed, other portions of Naumann indicate that ethoxylated (3) trimethylolpropane triacrylate (Sartomer Co.’s SR454) is a separate crosslinker. For instance, paragraph 89 describes alkoxyated derivatives of trimethylolpropane triacrylate as a “second, different internal crosslinker” from those listed in paragraph 87, which lists diallylamine-based internal crosslinkers.

Appellant’s reliance on claim 1 of Naumann does not convince us otherwise. Naumann’s claim 1 encompasses embodiments using amine-based crosslinkers such as those listed in paragraph 87 as the first internal crosslinker. Claim 6, which depends from claim 1, further requires “a second internal crosslinker composition.” Thus, claims 1 and 6 support, rather than detract from the Examiner’s finding.

As the Examiner has cogently explained, Naumann describes using two internal crosslinkers, not just one, to form the example absorbents with the “crosslinker 6” procedure. Ans. 6–10. Naumann teaches specific examples in Table 6. Naumann describes crosslinker 6 as “Diallylamine-AGE+0.035% SR454.” Naumann ¶¶ 178–179. As pointed out by the Examiner, the two crosslinkers have different chemical structures and would, thus, have different reactivities. Ans. 8. Appellant has not directed us to convincing evidence on this record indicating that Naumann’s two crosslinkers have the same reactivity. Appellant’s Specification indicates that using two internal crosslinkers of different reactivity results in a base resin of more uniform crosslinking density. Spec. 13:8–15. It is reasonable

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to conclude that Naumann's two internal crosslinkers would likewise result in more uniform crosslinking density as compared to absorbents made with one crosslinker. At least, in the absence of evidence showing otherwise.

Appellant contends that Naumann's additional crosslinker does not necessarily improve the absorbency under load (AUL) and absorbency against pressure (AAP) properties reported by Naumann and relies on Naumann's data reported in Tables 5 and 6. Appeal Br. 12; Reply Br. 10–13. The problem is that Naumann does not report the properties that Appellant is claiming. The burden is on Appellant to show that, in fact, the specific properties they claim are not present in Naumann's absorbents. Appellant has not met that burden.

Appellant contends that there is a second condition (condition (ii) using a polyvalent metal salt solution) that results in the properties they claim. Appeal Br. 13–16. Because the Examiner relies on similarities between Appellant's two crosslinker embodiment and Naumann's two crosslinker embodiment, Appellant's alternative embodiment using a polyvalent metal salt is of little relevance to the question at hand, i.e., whether the Examiner reversibly erred in finding that the similarities between Appellant's and Naumann's two crosslinker embodiments provide a reasonable basis to believe Naumann describes absorbents having the properties required by claim 16 and that Appellant has not shown, in fact, that the Naumann's absorbents fail to have the specific properties Appellant claims. Appellant has not identified such an error.

Even if the Examiner had reversibly erred in finding anticipation by inherency, there is still the alternative rejection based on obviousness. Final Act. 3. The Examiner finds that even if the properties of Naumann's examples are not within the ranges of claim 16, obtaining those properties

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would have been obtainable through minor modifications to the quantity of internal and surface crosslinking agents as recommended in Naumann and within the ordinary skill in the art based on the known effects of internal and external crosslinking on solubility and absorbance properties. *Id.*, citing Naumann ¶¶ 9–12, 102. Appellant does not dispute this. Appeal Br. 5–16; Reply Br. 3–11. Like Appellant, Naumann seeks to form a superabsorbent polymer useful in diapers by crosslinking an acrylic acid. *Compare* Naumann ¶ 1, *with* Spec. 34:14–17. Optimizing the properties of Naumann’s absorbent for such uses would have been a mere matter of routine experimentation within the ordinary skill in the art. The legal principle at issue in this case is old. *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.”). Appellant has not identified a reversible error in the Examiner’s obviousness analysis.

CONCLUSION

The Examiner’s decision to reject claims 16–20 is **AFFIRMED**.

DECISION SUMMARY

Claim(s) Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
16–20	102/103	Naumann	16–20	

RESPONSE

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)(1)(iv).

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AFFIRMED