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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte THOMAS W. BEIHOFFER, NATALIYA V. LARIONOVA, and MAREK R. MOSIEWICZ

Appeal 2015-001052
Application 11/942,638
Technology Center 1700

Before PETER F. KRATZ, ROMULO H. DELMENDO, and JEFFREY R. SNAY, *Administrative Patent Judges*.

DELMENDO, *Administrative Patent Judge*.

DECISION ON APPEAL

The Applicants (hereinafter the "Appellants")[1] appeal under 35 U.S.C. § 134(a) from a final decision of the Primary Examiner to reject claims 1, 4–6, 8–11, 13–17, 19–24, and 27–45.[2, 3] We have jurisdiction under 35 U.S.C.

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[1] The Appellants state that the real party in interest is "AMCOL International Corporation" (Appeal Brief filed July 21, 2014, hereinafter "Appeal Br.," 2).
[2] Appeal Br. 5; Final Office Action delivered electronically on March 12, 2014, hereinafter "Final Act.," 6–29.
[3] The Appellants identify a related appeal in Application 13/077,871, which is a continuation-in-part of the current application (Appeal Br. 2). That appeal (2015-001038) is also assigned to us and is being decided concurrently.

§ 6(b).

We affirm-in-part.

BACKGROUND

The subject matter on appeal relates to: (i) a geocomposite article for waterproofing a surface against the penetration of high conductivity salt-containing water; (ii) a method of manufacturing such an article; and (iii) a method of waterproofing a surface (Specification, hereinafter "Spec.," ¶ 1, Abst.). The Appellants explain the basis for their invention as follows (*id.* ¶ 7):

> Surprisingly it has been found that a partially cross-linked copolymer of acrylamide/partially neutralized polyacrylic acid, preferably acrylamide/potassium acrylate or sodium acrylate/acrylic acid copolymer (CAS# 312-12-13-2), e.g., STOCKOSORB, or STOCKOSORB S, from Stockhausen, Inc. of Greensboro, NC, will waterproof surfaces against the penetration of high conductivity water.

According to the Appellants (*id.* ¶ 16), articles including the specified copolymer "have exceptional and unexpected free swell when in contact with high conductivity water or multivalent ion-containing-contaminated water."

Representative claims 1 and 41 are reproduced from pages 20 and 22–23 of the Appeal Brief (Claims Appendix), with key limitations highlighted in italics, as follows:

> 1. A self-healing geocomposite article comprising:
> a) at least one water-impermeable membrane layer;
> b) at least one active self-healing layer comprising *a water-insoluble powdered or granular high conductivity water-absorbent copolymer capable of absorbing water having a conductivity of at least 1mS/cm wherein the copolymer contains about 5-90 mole % acrylamide; about 2-50 mole % sodium or*

> *potassium or lithium or ammonium acrylate; and about 2-50 mole % acrylic acid, said copolymer having 50-90 wt.% of the particles in the 200μm to 800μm size range and about 10 wt.% to about 50 wt.% of the particles in the 50μm to 200μm size range*; and
>
> c) a woven or non-woven geotextile fabric containing at least a portion of the self-healing layer adhered to the membrane layer to sandwich the active self-healing layer between the membrane and the fabric;
>
> *wherein the geocomposite article exhibits a self-healing performance index less than 0.015 when tested by placing a 1 inch slit through all layers of the geocomposite article sealed at its edges under 4 meters of water with a conductivity of 1 mS/cm or greater*.
>
> 41. A method of water proofing a surface from contact with a water source having a conductivity of at least 1 mS/cm comprising disposing a geocomposite article in contact with the surface, such that the geotextile fabric is in contact with said surface, said geocomposite article comprising:
>
> a) at least one water-impermeable membrane layer;
>
> b) at least one active self-healing layer comprising a water-insoluble high conductivity water-absorbent copolymer capable of absorbing water having a conductivity of at least 1 mS/cm wherein the copolymer contains about 5-95 mole % acrylamide; about 5-95 mole % acrylate; and about 5-95 mole % acrylic acid.

Claims 21 and 31, the only other independent claims on appeal, recite the same or similar key limitations highlighted above in reproduced claim 1 (*id.* at 19–21).

THE REJECTIONS

The Examiner rejected the claims as follows:

I. Claim 6 under 35 U.S.C. § 112, fourth paragraph, as failing to further limit the subject matter of claim 4 from which it depends;

II. Claims 1, 4–6, 8, 10, 11, 13, 20–23, 28, 30, 31, 33, and 41–45 under 35 U.S.C. § 103(a) as unpatentable over Alexander,[4] as evidenced by *U.S. Fish & Wildlife Service: Don Edwards San Francisco Bay*,[5] in view of White,[6] Ishizaki et al. (hereinafter "Ishizaki"),[7] and Kimura et al.,[8] as evidenced by *Components and Salinity of Seawater*;[9]

III. Claims 9, 19, and 29 under 35 U.S.C. § 103(a) as unpatentable over the same references applied in Rejection II and further in view of Levy;[10]

IV. Claims 14–16, 32, 36, and 37 under 35 U.S.C. § 103(a) as unpatentable over the same references applied in

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[4] US 5,132,021, issued July 21, 1992.
[5] *U.S. Fish & Wildlife Service: Don Edwards San Francisco Bay*, http://www.fws.gov/refuge/Don_Edwards_San_Francisco_Bay/habitat.html (first publication date unknown).
[6] US 5,237,945, issued August 24, 1993.
[7] EP 1 426 402 A2, published June 9, 2004.
[8] EP 0 450 924 A2, published October 9, 1991.
[9] *Components and Salinity of Seawater*, http://drake.marin.k12.ca.us/stuwork/rockwater/the%20salt%20in%20seawater/saltinseawaterpg3.html (last visited Nov. 9, 2010).
[10] US 5,679,364, issued October 21, 1997.

Rejection II and further in view of Zhou et al.[11];

V. Claims 17, 24, and 27 under 35 U.S.C. § 103(a) as unpatentable over the same references applied in Rejection II and further in view of Levy and Hardin et al.[12];

VI. Claims 34 and 35 under 35 U.S.C. § 103(a) as unpatentable over the same references applied in Rejection II and further in view of Stark;[13]

VII. Claims 38–40 under 35 U.S.C. § 103(a) as unpatentable over the same references applied in Rejection II and further in view of Stark and Olsta et al.[14]; and

VIII. Claims 1, 4–6, 8–11, 13–17, 19–24, and 27–43 provisionally under the judicially-created doctrine of obviousness-type double patenting as unpatentable over claims 1–40[15] of copending Application 13/077,871.

(Final Act. 7–29; Examiner's Answer delivered electronically on September 18, 2014, hereinafter "Ans.," 2–18.)

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[11] US 6,737,472 B2, issued May 18, 2004.
[12] US 6,802,672 B2, issued October 12, 2004.
[13] US 5,501,753, issued March 26, 1996.
[14] US 2005/0103707 A1, published May 19, 2005.
[15] Although the Examiner identified claims 1–40 of the conflicting application as the basis for the rejection, claims 2, 6, 9, 11, 16, 23, 25, and 29 were canceled in that application (Application 13/077,871, Appeal Brief filed June 16, 2014, 20–26).

DISCUSSION

Rejections I & VIII

The Appellants do not contest these rejections on the substantive merits (Appeal Br. 6, 12). Rather, with respect to Rejection I, the Appellants state that claim 6 will either be canceled or amended to overcome the rejection (*id.* at 6). With respect to Rejection VIII, the Appellants state that a terminal disclaimer will be filed upon an indication of allowability over the prior art (*id.* at 12). Because no amendment and/or terminal disclaimer has been filed, we summarily affirm Rejections I and VIII.

Rejections II–VII

A. Claims 1, 4–6, 8–11, 13–17, 19–24, 27–40, & 42–45

The Examiner interprets the recitation "said copolymer having 50-90 wt.% of the particles in the 200μm to 800μm size range and about 10 wt.% to about 50 wt.% of the particles in the 50μm to 200μm size range" in claim 1 to read on a copolymer in which 100% of the particles are 200 μm in size (Final Act. 8, 12). The Examiner then determines that the combined teachings of Alexander and White would have disclosed or suggested an article as recited in the Appellants' claim 1, except that it would contain bentonite clay and White's superabsorbent polyacrylate polymer, rather than the Appellants' specified water-absorbent copolymer containing specified molar amounts of acrylamide, sodium or potassium or lithium or ammonium acrylate, and acrylic acid (*id.* at 9–12). The Examiner further finds that Ishizaki teaches a water-absorbent copolymer with the same monomeric constituents in molar percentages within the ranges recited in claim 1 and that the copolymer particles have a particle size within the range of 200–700 μm (*id.* at 12). Based on these findings, the Examiner concludes (*id.* at 13):

> [I]t would have been obvious to one of ordinary skill in the art . . . to use the particulate water-absorbent resin as taught by Ishizaki . . . as the polyacrylate superabsorbent polymer as disclosed by modified Alexander motivated by expected success of providing a water-absorbent layer.

Regarding the "self-healing performance index less than 0.015" limitation recited in claim 1, the Examiner finds that "the geocomposite article as taught by *modified* Alexander would also exhibit a self-healing performance index less than 0.015" (emphasis added) and that the burden was shifted to the Appellants to provide evidence to the contrary (*id.*).

The Appellants contend, *inter alia*, that Ishizaki "neither discloses nor suggests 10-50% of the particles in the 50-200μm size" because Ishizaki's "Table 1 at page 24 shows 1.6 to 3% of the particles have a size smaller than 150μm" (Appeal Br. 10). In addition, the Appellants argue that the Examiner's inherency position with respect to the self-healing performance index relative to high conductivity water is flawed because the "DECLARATION OF MICHAEL DONOVAN, PH.D" filed January 6, 2012 (hereinafter "First Donovan Declaration") (Evidence Appendix) provides evidence that "bentonite, when in contact with sea water, had a Self-Healing Performance (SHPI) Index of 1.15 vs. Applicants' claimed SHPI of less than 0.015" (*id.* at 8). Specifically, the Appellants rely on the comparative test results summarized in the table found in the First Donovan Declaration (*id.* at 8, 10) (citing First Donovan Decl. ¶ 6).

The Examiner responds that the First Donovan Declaration is unpersuasive because it refers to partially crosslinked copolymers described in prior art references (US 6,783,802 B2, iss. Aug. 31, 2004, and US 6,777,480, iss. Aug. 17, 2004) that are not relied upon in the rejection and that the mole percentages recited for the partially crosslinked copolymers

based on these references are outside of those suggested by Ishizaki (Ans. 7). In addition, the Examiner points out that the Declaration provided tests conducted with 3.5% salt water, whereas the claims (e.g., claim 5) recite 4.5% sea water (*id.*). Furthermore, the Examiner finds that the showing is not commensurate in scope with the claims in terms of the amount of the water-absorbent copolymer in the self-healing layer (*id.*).

We agree with the Appellants. Alexander discloses an article for holding and treating water contaminated with one or more water-soluble contaminants so as to substantially prevent the contaminants from seeping into ground water supplies disposed below a water hold area (Abst.). According to Alexander, the article includes a water-holding material such as a water-swellable clay (e.g., bentonite) for reducing the permeation of the contaminated water into the soil and a water-holding material containing a material for adsorbing, absorbing, ion-exchanging, neutralizing, or reaction with the one or more water-soluble contaminants (*id.*). Although Alexander teaches "cross-linked acrylic . . . copolymers" as ion-exchange materials, the ion-exchange materials are included for removing the water-soluble contaminants (col. 6, ll. 62–66; col. 8, ll. 24–34). Thus, in Alexander, a water-swellable clay such as bentonite is disclosed as the material that holds water or swells in the presence of water (col. 4, ll. 28–56; col. 5, ll. 39–53).

White discloses a water barrier fabric filled with a water-absorbent powdered or granular material (e.g., bentonite) (col. 3, ll. 9–30). White further teaches that the water-absorbent material may include "bentonite clay and/or a polyacrylate superabsorbent polymer" (col. 17, ll. 19–25).

Ishizaki discloses water-absorbent resins for use in sanitary materials such as diapers (¶¶ 10–11). Ishizaki teaches that the resins may be made by

crosslink-polymerizing acrylic acid and/or its salt and then surface-crosslinking the resultant polymer with a dehydration-reactable crosslinking agent (¶ 16). According to Ishizaki, the water-absorbent resin may contain 0–50 mol% of acrylic acid, 50–100 mol% of acrylic acid salt, and 0–30 mol% of another monomer such as acrylamide (¶¶ 15, 28–29). Ishizaki further teaches that the mass-average particle diameter is in the range of 300 to 600 μm and "an average value of less than 5.0 mass % and a standard deviation of 0 to 0.50 as to a fine powder (smaller than 150 μm) content which is measured in a number 'n' of analyzed samples = 3" (*id.* ¶ 16).

These teachings in Alexander, White, and Ishizaki are insufficient to support the Examiner's flawed inherency position. The closest prior art references—Alexander and White—both disclose water-swellable clay (e.g., bentonite) as the primary water-absorbent material. Although these references suggest the inclusion of other materials including acrylic resins, they do not disclose the specific water-absorbent copolymer recited in claim 1 and no specific findings are offered to establish that all acrylic resins as disclosed in these references would necessarily yield the characteristic recited in the claim. Contrary to the Examiner's stated position (Final Act. 13), the burden did not properly shift to the Appellants to show that Alexander, *when modified in view of the other references*, would inherently possess the self-healing performance index of 0.015 as specified in claim 1. That would impermissibly require the Appellants to compare the claimed invention against the claimed invention. *In re Tiffin*, 443 F.2d 394, 399 (CCPA 1971) ("The examiner's composite process is appellants' process, and thus cannot be compared with it.").

Rather, the Appellants can effectively rebut a prima facie case of obviousness by comparing the claimed invention against the closest prior art. *In re Merchant*, 575 F.2d 865, 869 (CCPA 1978).

In our view, they did so here for claim 1. As noted above, the Appellants attribute the surprising results in terms of waterproofing surfaces against the penetration of high conductivity water to the use of the particular copolymer recited in claim 1 (Spec. ¶ 7). The First Donovan Declaration reasonably supports that assertion. Specifically, the Declaration demonstrates that a copolymer within the scope of claim 1 (or a combination thereof with bentonite) exhibited significantly improved self-healing performance index characteristics (tested with 3.5% salt water) compared to bentonite alone, which is representative of either Alexander or White, or bentonite in combination with partially crosslinked acrylic acid/neutralized acrylic acid (First Donovan Decl. ¶ 6).

We discern no merit in the Examiner's objections to the Declaration evidence. Although the First Donovan Declaration refers to other prior art documents (First Donovan Decl. ¶ 5), the described experiments include a fair comparison between the claimed invention and the applied closest prior art references (Alexander and White), both of which disclose bentonite as in the comparative experiment described in the Declaration (*id.* ¶ 6). In addition, although the Declaration states that the testing was performed using 3.5% salt water, as opposed to 4.5% salt water as recited in claim 5, the Examiner fails to explain why that difference would negate the surprising or unexpected results shown in the Declaration. Finally, the Examiner's position that the showing is not commensurate in scope with the claims is not well-founded because, as the Appellants point out (Reply Brief

filed October 14, 2014 at 3), claim 1 limits the article to only those that exhibit the specified self-healing performance index of "less than 0.015" (Appeal Br. 17).

In addition to the Examiner's flawed inherency position, we cannot agree with the Examiner (Final Act. 8, 12) that Ishizaki discloses (or would have suggested) 100% of the copolymer particles to be 200 μm in size. Ishizaki describes particles having a distribution of particle sizes (¶¶ 16, 187). The Examiner does not articulate a sufficient reason why a person having ordinary skill in the art would have undertaken the additional steps (if possible) to ensure 100% of the particles are 200 μm in size or to use copolymer particles having the size distributions specified in the claims.

For these reasons, we cannot uphold the § 103 rejection of claims 1, 4–6, 8–11, 13–17, 19–24, 27–40, and 42–45.

B. Claim 41

Claim 41, however, stands on different footing. Claim 41, unlike claim 1, does not require any particular self-healing performance index or any particular size distribution for the copolymer particles. Therefore, we share the Examiner's view that the showing in the First Donovan Declaration is not commensurate in scope with the claim.

The Appellants argue that Ishizaki "provides a long, at least 26 member, list of third monomers capable of copolymerization to form water-insoluble (cross-linked) copolymers at paragraph [0028] – one of which is acrylamide – but provide no examples of a copolymer that includes acrylamide, or any other third monomer" (Appeal Br. 9). A prior art reference disclosure, however, is not limited to its working examples. *Merck & Co. Inc. v. Biocraft Labs. Inc.*, 874 F.2d 804, 807 (Fed. Cir. 1989)

("[I]n a section 103 inquiry, 'the fact that a specific [embodiment] is taught to be preferred is not controlling, since all disclosures of the prior art, including unpreferred embodiments, must be considered.'") (quoting *In re Lamberti*, 545 F.2d 747, 750 (CCPA 1976)). Furthermore, the mere fact "[t]hat the [reference] discloses a multitude of effective combinations does not render any particular formulation less obvious." *Id.* at 807.

The Appellants also argue that it would not have been obvious to replace the (meth)acrylic copolymers described in Alexander with Ishizaki's water-absorbent copolymers because Alexander's copolymers are described as ion-exchange resins designed to remove contaminants, not water-absorbent resins (Appeal Br. 10). We do not find this argument persuasive because Alexander discloses "water-holding materials" generally including water-absorbing materials (Abst.). In addition, White teaches that a superabsorbent polyacrylate copolymer may be included (col. 17, ll. 19–25).

For these reasons, we uphold the rejection of claim 41.

SUMMARY

Rejections I and VIII are affirmed. Rejection II is affirmed as to claim 41, but reversed as to claims 1, 4–6, 8, 10, 11, 13, 20–23, 28, 30, 31, 33, and 42–45. Rejections III–VII are reversed.

Therefore, the Examiner's final decision to reject the appealed claims is affirmed as to claims 1, 4–6, 8–11, 13–17, 19–24, and 27–43, but reversed as to claims 44 and 45.

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).

AFFIRMED-IN-PART