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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ANNE N. DE ROVERE, GARY F. HOWORTH, MICHAEL PATRICK M. MANDANAS, and CLAUS MIDDENDORF

Appeal 2018-008526
Application 13/399,542
Technology Center 1700

BEFORE CATHERINE Q. TIMM, JEFFREY R. SNAY, and MICHAEL G. McMANUS, *Administrative Patent Judges*.

McMANUS, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant[1] seeks review of the Examiner's decision to reject claims 1–12, 15–17, and 53–59. We have jurisdiction under 35 U.S.C. § 6(b).

Oral argument was held January 9, 2020.

We affirm.

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[1] We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42. Appellant identifies the real parties in interest as 3M Company and its affiliate 3M Innovative Properties Company. Appeal Br. 2.

CLAIMED SUBJECT MATTER

The present application generally relates to a method of manufacturing a flexible fibrous material for use in pollution control devices such as catalytic converters and diesel particulate filters. Specification filed Feb. 17, 2012 ("Spec.") 1–2. Both catalytic converters and diesel particulate filters typically include ceramic structures. *Id.* at 1. The Specification teaches that "[t]o avoid damage to the ceramic monolith from road shock and vibration, to compensate for the thermal expansion difference, and to prevent exhaust gases from passing between the monolith and the metal housing, ceramic mat or intumescent sheet materials are often disposed between the ceramic monolith and the metal housing." *Id.* at 1–2. The Specification teaches a flexible fibrous material having mechanical properties suitable for use as such a mat in pollution control devices. *Id.* at 5.

The Specification teaches that one may make the subject flexible fibrous material by forming a slurry that includes inorganic fibers, a first emulsified organic polymer, and a flocculent. *Id.* at 3. The flocculent is taught to comprise a second organic polymer. *Id.* The Specification further teaches that one flocculates the emulsified first organic polymer onto the inorganic fibers to yield a flocculated slurry. *Id.*

Claims 1 and 2 are illustrative of the subject matter on appeal and are reproduced below with certain limitations bolded for emphasis:

> 1. A method of forming a flexible mounting mat or insulation material suitable for use in a pollution control device comprising the steps:
>
> (a) forming a slurry by mixing, in aqueous solution, components comprising:
>
> at least 40% by weight inorganic fibers based on the total weight of the flexible mounting mat or insulation material; and
>
> organic components, wherein the organic components comprise **an emulsified first organic polymer and a flocculent, the flocculent comprising a second organic polymer having cationic groups, and wherein the flocculent further comprises metal cation**;
>
> (b) flocculating at least a portion of the emulsified first organic polymer onto at least a portion of the inorganic fibers to provide a flocculated slurry;
>
> (c) dewatering the flocculated slurry to provide a dewatered slurry;
>
> (d) further drying the dewatered slurry to form the flexible mounting mat or insulation material suitable for use in a pollution control device,
>
> wherein the flexible mounting mat or insulation material suitable for use in a pollution control device has a total organic component weight of less than or equal to 9 percent of the total weight of the inorganic fibers.
>
> 2. A method of forming a flexible mounting mat or insulation material suitable for use in a pollution control device according to claim 1, wherein the first organic polymer comprises anionic groups.

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

REFERENCES

The Examiner relies upon the following prior art:

Name	Reference	Date
McReynolds	US 4,225,383	Sept. 30, 1980
Howorth	US 2004/0234436 Al	Nov. 25, 2004

REJECTION

The Examiner maintains the following rejection: Claims 1–12, 15–17 and 53–59 are rejected under pre-AIA 35 U.S.C. § 103(a) as unpatentable over Howorth in view of McReynolds. Final Action, dated April 4, 2017, ("Final Act.") 2–10.

DISCUSSION

The Examiner rejects claims 1–12, 15–17, and 53–59 as obvious over Howorth in view of McReynolds. *Id.* The Examiner finds that Howorth teaches an insulation mat for use with a pollution control device. *Id.* at 3. The Examiner further finds that Howorth teaches to form a slurry comprising "up to 90 weight percent of inorganic fibers on a dry weight of the mat (para. 57) and 0.1–15 weight percent on a dry basis of a polymeric binder such as latex." *Id.* The Examiner additionally finds that "[t]he slurry may also comprise 'latex coagulants' when latex is used as the polymeric binder." *Id.* The Examiner also finds that the coagulants[2] are "added to the slurry to flocculate the binder, causing it to form larger particles which get trapped in the inorganic fiber matrix." *Id.*

[2] The Examiner finds that the term "coagulant" is synonymous with the term "flocculent. Final Act. 3. This determination is not disputed.

The Examiner concedes that Howorth does not teach a "flocculent comprising a second organic polymer having cationic groups, and wherein the flocculent further comprises a metal cation," as required by claim 1. *Id.* (emphasis omitted). The Examiner relies on McReynolds as teaching this limitation. More specifically, the Examiner finds that McReynolds teaches "a mixture of flocculents that is beneficial to coagulate a latex binder because it [is] more efficient and produces less water sensitive products compared to conventional flocculents." *Id.* The Examiner finds that the flocculent comprises "a second organic polymer having cationic groups (the cationic latex disclosed in McReynolds, col. 5, lns. 59–68), and where the flocculent further comprises a metal cation (the aluminum cation from the aluminum sulfate used in the McReynolds flocculent, col. 5, lns. 59–68)." *Id.* at 4–5 (emphasis omitted).

The Examiner determines that a person of ordinary skill in the art would have combined the teachings of Howorth and McReynolds "in order to improve efficiency and reduce production [of] water sensitive materials." *Id.* at 4. The Examiner further determines that use of the flocculents taught by McReynolds is the mere substitution of one known element for another and is therefore within the ambit of a skilled artisan. *Id.*

Appellant argues that the rejection is in error because a person of ordinary skill in the art would not have had reason to combine the teachings of Howorth and McReynolds. Appeal Brief mailed April 27, 2018 ("Appeal Br.") 5–7. Appellant advances several points in support of its argument.

First, Appellant argues that "the Examiner has provided no credible reason why a person of ordinary skill in the art of Howorth . . . would even look at the teachings of McReynolds." *Id.* at 5; Reply Br. 2. Appellant

asserts that the sheets of McReynolds have different uses and different temperature tolerances than the materials of Howorth. Appeal Br. 5; Reply Br. 2. This is not persuasive of error.

In the Final Action, the Examiner found that one of skill in the art would have used a mixture of the flocculants taught by McReynolds with the composition of Howorth "in order to improve efficiency and reduce production [of] water sensitive materials." Final Act. 4. Thus, the Examiner has set forth a reasoned basis why one of skill in the art would have combined the teachings of Howorth and McReynolds. Appellant has made broad assertions regarding the uses and heat tolerances of the products of Howorth and McReynolds. This is inadequate to show that one of skill in the art of Howorth would not have looked to the specific teaching of McReynolds regarding flocculants. Asserting that the sheets of McReynolds have different uses than the materials of Howorth does not squarely address the Examiner's proposed basis for combination.

Appellant's argument that the Examiner has provided no credible reason why the ordinary artisan in Howorth's field of making flexible mounting mats or insulation material for pollution control devices would look to the teachings of McReynolds is not persuasive. First, as we discuss above, the Examiner has established that Howorth requires a coagulant and McReynolds teaches coagulants for coagulating the same or similar latexes. Second, Appellant's questioning of McReynolds's suggestion of use as muffler paper is not supported. According to Appellant, "the highest temperature McReynolds teaches his sheet material is subjected to is 350 °F or 177 °C (see col. 23, line 65 to col. 24, line 1)." Appeal Br. 5. But the portion of columns 23 and 24 Appellant cites is directed to test parameters

for a hot tensile test, not to the maximum duty temperature of the end product muffler paper. McReynold intends the highly filled paper to substitute for asbestos-based fibrous sheets that had previously been used in muffler paper. McReynolds col. 2, ll. 10–23. Thus, the evidence does not support Appellant's argument.

Second, Appellant argues that Howorth teaches to use alum as its latex coagulant. Appeal Br. 5–6. Appellant asserts that "alum has been the staple coagulant used in the art." *Id.* at 6. Appellant, however, does not provide evidentiary support for this assertion. *Id.* Appellant further observes that McReynolds teaches to use alum, among other materials, as a coagulant. *Id.* Appellant appears to argue that, as both cited references teach the use of alum, one would not have reason to use other coagulants. As above, this does not squarely address the Examiner's stated reason to combine and does not show error therein. Further, Howorth's teachings to use aluminum sulfate (¶¶111, 115) or alum (¶124) do not negate McReynolds' teachings regarding other coagulants (col. 5, l. 59 – col. 6, l. 9). *See, e.g., In re Applied Materials, Inc.*, 692 F.3d 1289, 1298 (Fed. Cir. 2012) ("A reference must be considered for everything that it teaches, not simply the described invention or a preferred embodiment.").

Third, Appellant argues that McReynolds does not teach that there is any benefit to using a mixture of the flocculents taught therein. *Id.* at 6–7; Reply Br. 2. In the Final Action, the Examiner finds that, "in the papermaking arts, McReynolds discloses that a mixture of flocculents . . . is beneficial to coagulate a latex binder because it more efficient and produces less water sensitive products compared to conventional flocculents." Final Act. 3 (citing McReynolds col. 5, ll. 59–68, col. 6, ll. 6–9). Appellant argues

that McReynolds attributes the asserted benefit to the use of polymeric flocculents rather than to use of a mixture of flocculents. Appeal Br. 6. Given such understanding, Appellant argues that the Examiner "has failed to provide any reasoning why a person of ordinary skill in the art of Howorth would choose to replace his flocculent of choice, alum, with any mixture of the McReynolds' flocculents, let alone the particular mixture asserted by the Examiner." *Id.*

In the Answer, the Examiner determines that "McReynolds teaches that a mixture of two or more coagulants such as cationic latex and aluminum sulfate are useful for coagulating latex binder within an aqueous solution . . . . The reference also teaches that polymeric flocculents are especially beneficial because they improve efficiency." Answer 14. The portion of McReynolds relied upon by the Examiner provides as follows:

> ***Representative flocculants are*** cationic starch; water-soluble, inorganic salts such as alum, ***aluminum sulfate***, calcium chloride and magnesium chloride; an ionic latex having a charge opposite in sign (+ or -) to that of the binder latex, e.g., ***a cationic latex*** or an anionic latex; water-soluble, ionic, synthetic, organic polymers such as polyethylenimine and various ionic polyacrylamides such as carboxyl-containing polyacrylamides; copolymers of acrylamide with dimethylaminoethyl methacrylate or diallyldimethyl ammonium chloride; polyacrylamides modified other than by copolymerization to have ionic groups; ***and combinations of two or more of the above, added simultaneously or in sequence***. Quaternized polyacrylamide derivatives are especially advantageous when the latex which is used is anionic. ***Polymeric flocculants are preferred because they are more efficient, tend to produce less water-sensitive products and provide better shear stability of the furnish***.

McReynolds col. 5, l. 58 – col. 6, l. 9 (emphasis added). Review of the foregoing portion of McReynolds suggests that Appellant is correct that the reference does not teach any particular benefit flowing from the use of a mixture of flocculents (as opposed to a single flocculent). McReynolds does, however, teach that one may use "combinations of two or more" of the listed flocculents. *Id.* at col. 6, ll. 2–3.

Additionally, it is prima facie obvious to combine two compositions so as to form a third composition for the same purpose.

> It is prima facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition which is to be used for the very same purpose. . . . [T]he idea of combining them flows logically from their having been individually taught in the prior art.

In re Kerkhoven, 626 F.2d 846, 850 (CCPA 1980). Here, McReynolds explicitly teaches to combine two or more listed flocculents for use as a flocculent composition. The specifically listed flocculents include aluminum sulfate and cationic latex. *See Merck & Co. v. Biocraft Labs. Inc.*, 874 F.2d 804, 807 (Fed. Cir. 1989) ("That the [reference] discloses a multitude of effective combinations does not render any particular formulation less obvious."). Accordingly, the Examiner has set forth a prima facie case of obviousness. Appellant has not shown reversible error in the foregoing.

In its Reply Brief, Appellant additionally argues that a person of ordinary skill in the art "would need significant assurances that a change to the Howorth composition would not detrimentally affect the properties of the finished material or the process used to make those materials." Reply Br. 3–4. Appellant further argues that "the Examiner has failed to provide a

prima facie case that such a substitution would be expected to produce predictable results." *Id.* at 4. These arguments were not included in Appellant's opening brief, nor has Appellant shown good cause for such omission. Accordingly, such arguments will not be considered. *See* 37 CFR § 41.41(b)(2) (providing that new argument will not be considered by the Board absent a showing of good cause).

Claim 2

Appellant presents separate argument with respect to claim 2. Appeal Br. 7. Claim 2 depends from claim 1 and further requires that "the first organic polymer comprises anionic groups." *Id.* at 8 (Claims App.).

In the Final Action, with respect to claim 1, the Examiner finds that Howorth teaches forming a slurry by mixing certain components including "an emulsified first organic polymer (the latex used as the polymeric binder, para. 75)." Final Act. 4. The Examiner further finds, with respect to claim 2, that "McReynolds discloses that its flocculent should comprise cationic latex when the binding latex has anionic groups. Therefore, it would have been obvious for the latex used as Howorth's binder to have anionic groups." *Id.* at 5 (internal citation omitted). In the Answer, the Examiner finds that McReynolds teaches that when a latex binder is used, it should be maintained by ionic stabilization so that it remains dispersed in the slurry prior to addition of the flocculant. Answer 16 (citing McReynolds col. 3, ll. 34–37, col. 6, ll. 35–43).

Appellant argues that "Howorth does not teach the use of any anionic polymeric binders." Appeal Br. 7. Appellant further argues that "the Examiner assumes the person skilled in the art of Howorth would use the

organic binders of McReynolds. However, the Examiner provides no support for this conclusion." *Id.*

Appellant's arguments are not persuasive. The Examiner relies on McReynolds as teaching the selection of an ionic binder. Answer 16 ("when a latex binder is used with a similar process, the latex binder should be maintained within the aqueous solution by ionic stabilization"). This maintains the binder in a dispersed state. *Id.* McReynolds further teaches that the latex coagulant should have a charge which is opposite to that of the latex binder. *Id.* (citing McReynolds col. 5, ll. 51–53). Thus, McReynolds teaches using an anionic binder in conjunction with a cationic flocculant. As we discussed above, a preponderance of the evidence supports the Examiner's finding of a suggestion to look to the teachings of McReynolds.

Considered as a whole, the teachings of the references support the Examiner's findings regarding the subject matter of claim 2. Accordingly, Appellant has not shown error in this regard.

CONCLUSION

The Examiner's rejections are affirmed.

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1–12, 15–17, 53–59	103(a)	Howorth, McReynolds	1–12, 15–17, 53–59	

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