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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte SCOTT BROWN, XIAO JIANG, and GEORGE POLSON¹

Appeal 2018-007221
Application 14/543,999
Technology Center 1600

Before ERIC B. GRIMES, ULRIKE W. JENKS, and
MICHAEL A. VALEK, *Administrative Patent Judges*.

GRIMES, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134(a) involving claims to a biocidal preservative composition, which have been rejected for obviousness and obviousness-type double patenting. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

¹ Appellant identifies the real party in interest as Arch Chemicals, Inc. Appeal Br. 2. We use the word Appellant to refer to “applicant” as defined in 37 C.F.R. § 1.42(a).

STATEMENT OF THE CASE

“In the past, various different preservatives and preservative blends have been suggested. For example, isothiazolin compounds are widely used as biocides.” Spec. ¶ 4. “[I]sothiazolin biocides have been combined with pyrithione biocides.” *Id.* ¶ 5.

The Specification discloses “a composition having biocidal properties. In accordance with the present disclosure, a first biocide comprising an isothiazolin is combined with at least one biocide enhancing agent. The biocide enhancing agent acts as a potentiator and increases the effectiveness of the first biocide against various microorganisms.” *Id.* ¶ 7. “Examples of biocide enhancing agents . . . include 1-dodecylamine, cocodimethylamine oxide, 4-dodecylmorpholine, lauryl dimethyl amine, Bis (3-aminopropyl) dodecylamine, or mixtures thereof.” *Id.* ¶ 10.

Claims 1, 2, 4–8, 10, 11, and 26–28 are on appeal. Claim 1, reproduced below, is illustrative:

1. A composition having biocidal properties comprising:
a first biocide comprising an isothiazolinone;
a second biocide comprising pyrithione; and
a biocide enhancing agent comprising cocodimethylamine oxide, N, N-dimethyloctyl amine-n-oxide, Bis (3-aminopropyl) dodecylamine, or mixtures thereof, wherein the first biocide and the biocide enhancing agent are present in the composition at a weight ratio of from about 1:600 to about 2:1.

The claims stand rejected as follows:

Claims 1, 2, 4–8, 10, 11, and 26–28 under 35 U.S.C. § 103 as obvious based on Hyde,² Greene,³ Choi,⁴ Whittemore,⁵ Chisholm,⁶ and Tseng⁷ (Ans. 4);

Claims 1, 2, 4–8, 10, 11, 26, and 27 for obviousness-type double patenting based on claims 1–18 of U.S. Patent 8,317,912 in view of Greene, Choi, Whittemore, Chisholm, and Tseng (Ans. 13); and

Claims 1, 2, 4–8, 10, 11, 26, and 27 for obviousness-type double patenting based on claims 1–6 of U.S. Patent 5,939,203 in view of Greene, Choi, Whittemore, Chisholm, and Tseng (Ans. 14).

OPINION

Obviousness

Claims 1, 2, 4–8, 10, 11, and 26–28 stand rejected as obvious based on Hyde, Greene, Choi, Whittemore,⁸ Chisholm,⁹ and Tseng. The Examiner

² Hyde et al., US 2012/0247364 A1, Oct. 4, 2012.

³ Greene et al., US 2010/0239679 A1, Sept. 23, 2010.

⁴ Choi et al., US 2008/0063723 A1, Mar. 13, 2008.

⁵ Whittemore et al., US 6,034,081, Mar. 7, 2000.

⁶ Chisholm et al., US 2011/0171279 A1, July 14, 2011.

⁷ Tseng et al., US 6,448,279 B1, Sept. 10, 2002.

⁸ The Examiner cites Choi and Whittemore as providing a reason “to include an alkyl amine with at least 6 carbons such as N-dodecyl morpholine,” apparently with reference to, for example, claim 26. *See* Ans. 9–10. As Appellant has pointed out, however, claim 26 requires an amine *oxide*, not an alkyl amine. *See* Appeal Br. 28. Therefore, we will not further discuss Choi or Whittemore.

⁹ The Examiner cites Chisholm as disclosing biocides comprising polyethyleneimine, as recited in certain dependent claims. *See* Ans. 7–8.

finds that Hyde discloses an antimicrobial composition comprising an isothiazolin-3-one (i.e., an isothiazolinone as recited in the claims), a pyrithione, and a zinc compound. Ans. 4. The Examiner finds that Hyde teaches that its compositions “may find utility in a variety of compositions in which biocides are commonly used including, but not limited to polymer latex, **paints, coatings**, adhesives,” etc. *Id.* at 5.

The Examiner finds that Hyde does not “teach cocodimethylamine oxide as well as its ratio with isothiazolin-3-one.” *Id.* at 8. However, the Examiner finds that Tseng “teaches a wood preservative composition comprising an amine oxide and an isothiazolone.” *Id.*¹⁰ “[n] example 1, cocodimethylamine oxide is recited as specific amine oxide.” *Id.* The Examiner finds that Tseng also teaches that “[t]he weight ratio of said amine oxide to said isothiazolone ranges from about 100:1 to about 1:1.” *Id.* Finally, the Examiner finds that Tseng “teaches amine oxides enhance the performance of isothiazolones as wood preservatives and provide waterproofing properties.” *Id.*¹¹

Appellant does not separately argue the dependent claims. *See* Appeal Br. 31–32. Therefore, we will not further discuss Chisholm.

¹⁰ The Examiner finds that “[i]sothiazolones is other name of isothiazolin-3-one.” Ans. 8. Appellant does not dispute this finding. *See* Appeal Br. 9 (“Tseng is solely directed to a composition that contains an amine oxide and an isothiazolone for penetration of an isothiazolone into wood substrates[,] . . . enhancing a wood preservative by improving the penetration of isothiazolinone into a wood substrate.”).

¹¹ The Examiner cites Greene for its disclosure that “Alkyl (C10–16) dimethyl amine oxide . . . and isothiazolinone . . . both act as biocide.” Ans. 5. This disclosure is cumulative in view of Tseng’s disclosure of cocodimethylamine oxide. Therefore, we will not further discuss Greene.

The Examiner concludes that it would have been obvious to modify Hyde's composition "to include amine oxide with at least 6 carbons because Tseng et al. teaches amine oxides (e.g. cocodimethylamine oxide) enhanc[e] the performance of isothiazolones (isothiazolin-3-one) as wood preservatives and it is [an] advantage for [a] biocidal composition [such] as paint (wood coating) to include amine oxide for enhanced performance." *Id.* at 9. The Examiner also concludes that, "[r]egarding the ratio of the first biocide and amine oxide," it would have been obvious to use the agents at the "weight ratio of amine oxide to isothiazolone from about 100:1 to about 1:1" taught by Tseng, "and produce the instant claimed invention with reasonable expectation of success." *Id.* at 11.

We agree with the Examiner that Hyde and Tseng support a prima facie case of obviousness with respect to claim 1. Hyde discloses "an antimicrobial composition comprising (a) from about 15 ppm to about 50 ppm of at least one isothiazolin-3-one, [and] (b) from about 15 ppm to about 50 ppm of a pyrithione salt or pyrithione acid," along with a zinc compound and an anionic surfactant. Hyde ¶ 5. Hyde also states that its "antimicrobial compositions . . . may find utility in a variety of compositions in which biocides are commonly used including, but not limited to polymer latex, paints, coatings," etc. *Id.* ¶ 22. Hyde additionally states that its "antimicrobial compositions . . . are suitably used to preserve mineral slurries." *Id.* ¶ 23.

Tseng discloses "a composition comprising an amine oxide and an isothiazolone." Tseng 1:36–37. Tseng discloses that the combination has a number of advantageous properties: (a) "amine oxides enhance the

performance of isothiazolones as wood preservatives and provide waterproofing properties,” (b) “[t]he amine oxide enhances penetration of the isothiazolone into wood substrates and improves leach resistance,” and (c) “the amine oxides aid[] in solubilizing the isothiazolone in water,” forming “aqueous solutions . . . which have only one phase.” *Id.* at 1:32–34, 49–54.

Tseng states that “[t]he weight ratio of amine oxide to isothiazolone broadly ranges from about 100:1 to about 1:1 and preferably from about 50:1 to 5:1.” *Id.* at 4:9–11. Tseng also states that “[o]ther biocides, fungicides and insecticides may be include[d] in the composition.” *Id.* at 4:27–29. Tseng’s Example 1 reads as follows:

0.9 g of a 50% (w/w) 4,5-dichloro-2-n-octyl-3-*isothiazolone* solution in xylene was dissolved in 30 g of a 30% (w/w) *cocodimethylamine oxide* (coco-DMAO) solution in water and 14.1 g of water with stirring to yield solution containing 20% by weight of coco-DMAO and 1% by weight of 4,5-dichloro-2-n-octyl-3-*isothiazolone*.

Id. at 4:64 to 5:2 (emphasis added). Tseng describes the antifungal efficacy of compositions comprising coco-DMAO and either 1,2-benzisothiazolone or 4,5-dichloro-2-n-octyl-3-*isothiazolone*, “determined using the agar dilution plate method.” *Id.* at 6:10–11, Tables 1 and 2.

Based on Tseng’s teachings, it would have been obvious to add cocodimethylamine oxide to Hyde’s composition, because Hyde teaches that its composition is useful in paints and coatings, and Tseng teaches that an amine oxide such as cocodimethylamine oxide enhances the performance of isothiazolones as wood preservatives, improves leach resistance, and aids in solubilizing the isothiazolone in water. Because wood is a common substrate

for paints and coatings, a skilled artisan would appreciate that enhanced wood preservation and decreased leaching would be desirable properties in a paint or coating.

Tseng would also have made obvious the weight ratio recited in claim 1, because it discloses a weight ratio of amine oxide to isothiazolone between 100:1 and 1:1. This range of ratios corresponds to ratios between 1:100 and 1:1 of first biocide (isothiazolinone) to biocide enhancing agent (cocodimethylamine oxide), in the language of claim 1. Thus, Tseng's range of ratios is entirely encompassed by the recited range of 1:600 to 2:1. "Selecting a narrow range from *within* a somewhat broader range disclosed in a prior art reference is no less obvious than identifying a range that simply *overlaps* a disclosed range." *In re Peterson*, 315 F.3d 1325, 1329–30 (Fed. Cir. 2003).

Appellant argues that "Tseng is solely directed to a composition that contains an amine oxide and an isothiazolone for penetration of an isothiazolone into wood substrates," while "Hyde is directed to an antimicrobial composition for an aqueous slurry, not a wood preservative." Appeal Br. 9. Appellant argues that "one having skill in the art would not be prompted to include an amine oxide into the composition of Hyde for the known use as a wood penetrant." *Id.* at 10. Appellant argues that "no articulated reasoning has been provided as to the motivation to pick an adjuvant for wood preservatives for incorporation into a reference such as Hyde, that contains absolutely no teaching or suggestion of use with wood or wood products." *Id.* at 11.

These arguments are not persuasive. Hyde states that its antimicrobial composition is suitable for use in mineral slurries, but does not limit the use of its compositions to such slurries. For example, Hyde states that mineral slurries comprising its composition “can be used in the manufacturing of papers, pigments, fillers, etc.” Hyde ¶ 23. Hyde also states, however, that its “antimicrobial compositions . . . may find utility in a variety of compositions in which biocides are commonly used,” without limiting such compositions to ones that include a mineral slurry. *Id.* ¶ 22. Thus, Hyde suggests using its composition in “polymer latex, paints, coatings, adhesives, functional fluids, and aqueous systems having suitable conditions conducive to the growth of microorganisms” generally. *Id.* A reference’s teachings are not limited to its preferred embodiments, *Merck & Co. Inc. v. Biocraft Labs., Inc.*, 874 F.2d 804, 807 (Fed. Cir. 1989), and when Hyde is viewed as a whole, its disclosure is not limited to an antimicrobial composition for use in mineral slurries.

In addition, Tseng’s disclosure is not limited to using an amine oxide to enhance penetration of an isothiazolone into wood, as Appellant argues. Tseng discloses that an amine oxide also improves leach resistance and aids in solubilizing an isothiazolone in water, which provide additional reasons for including an amine oxide in Hyde’s composition. In addition, Tseng’s tests showing the improved antifungal activity of amine oxide/isothiazolone combinations were carried out on agar plates in vitro, and therefore the improved results shown were not due to enhanced penetration in wood. *See* Tseng, Examples 6 and 7, Tables 1 and 2.

Appellant also argues that “the Declaration of Helen Hyde^[12] persuasively shows a lack of motivation to combine Hyde and Tseng.”

Appeal Br. 12. Appellant argues that

Helen Hyde is the primary inventor of the Hyde reference. . . . In the Declaration, Ms. Hyde states in regards to Tseng, “One with ordinary skill in the art would not combine the amine oxide in Tseng with the invention contained in Hyde, as there would be no motivation to modify an aqueous slurry with a penetrating adjuvant or waterproofing agent for wood.” One with ordinary skill in the art would have no such motivation because “the invention in Hyde . . . would have no need for a penetrating adjuvant.”

Id. at 12–13. Appellant argues that “the Declaration shows that, not only one having skill in the art, but the actual inventor of the cited reference would have had no motivation to modify Hyde as asserted by the Office Action.”

Id. at 14.

This argument, and the declaration on which it is based, are unpersuasive, because they are again based on reading Hyde as limited to using its antimicrobial composition in mineral slurries. As previously discussed, however, Hyde suggests using its composition in “a variety of compositions in which biocides are commonly used,” without limiting such compositions to ones that include a mineral slurry. Hyde ¶ 22. The argument, being based on an unduly narrow interpretation of the references, is unpersuasive.

Appellant also argues that Choi, Greene, Whittemore and Chisholm do not adequately support the rejection of the independent claims. Appeal Br. 16–22. As discussed above, however, we conclude that Hyde and Tseng

¹² Filed April 4, 2017.

provide adequate evidence to support a prima facie case of obviousness with respect to claim 1. Appellant's separate arguments with respect to independent claims 26 and 28 are addressed below.

Appellant also argues that

[t]he examples contained in the present application demonstrate results that would be unexpected. . . . The present inventors found unexpectedly that the combination of an isothiazolinone, a pyrithione, and at least one amine oxide can reduce the amounts of each of the components needed to be effective compared to what would be initially expected if the effects were additive. Therefore, the claimed combination of components produces synergistic results.

Appeal Br. 23.

Appellant points to results shown in the Specification's working examples, including Tables 5 and 9. *Id.*¹³ Appellant also points to the Brown Declaration¹⁴ as evidence that, "in Mr. Brown's opinion, the combination of an isothiazolinone, a pyrithione, and at least one amine oxide exhibits better results than would be expected from their individual results and properties." *Id.* at 24–25.

We have considered the evidence presented in the Specification and in the Brown Declaration but conclude that a preponderance of the evidence weighs in favor of obviousness. "To be particularly probative, evidence of unexpected results must establish that there is a difference between the results obtained and those of the closest prior art, and that the difference would not have been expected by one of ordinary skill in the art at the time

¹³ However, the results that Appellant points to in Table 5 seem to correspond to those shown in Table 6.

¹⁴ Filed April 4, 2017.

of the invention.” *Bristol-Myers Squibb Co. v. Teva Pharms. USA, Inc.*, 752 F.3d 967, 977 (Fed. Cir. 2014).

Here, the closest prior art embodiment is provided by Hyde, which describes a sample referred to as Biocide A (0.046%), and consists of 25 ppm 1,2-benzisothiazolin-3-one (BIT), 25 ppm zinc pyrithione (ZPT), and 68 ppm zinc oxide. Hyde ¶ 27, Table 1.

Appellant’s Table 6 shows the biocidal effect of 25 ppm ZPT plus 25 ppm BIT in acrylic paint. Spec. Table 6, line 8. This sample, which corresponds to Hyde’s composition, showed no contamination (“0”) for all “1st inoculation” time points and severe contamination (“5”) for all time points in the 2nd and 3rd inoculations. *Id.* By comparison, the sample containing 25 ppm each of ZPT and BIT, plus 1200 ppm cocodimethylamine oxide (“CDMA Oxide”), showed show no contamination for all 1st inoculation time points, moderate contamination (“3”) for the first 2nd inoculation time point (24 hours), and severe contamination for all remaining 2nd and 3rd inoculation time points. *Id.* at Table 6, line 12. The Specification’s Table 9 shows results for another sample containing 25 ppm each of ZPT and BIT, plus 1200 ppm cocodimethylamine oxide; for this sample showed no contamination at the time points in the 1st and 2nd inoculations, and severe contamination at all time points in the 3rd inoculation. *Id.* at Table 9, line 19.

Appellant cites the Brown Declaration as evidence that the results shown are better than expected. Mr. Brown discusses the results shown in the Specification’s Tables 6 and 9. Brown Decl. ¶¶ 8–10. Mr. Brown states that “Table 6 show[s] that a combination of two biocides in amounts up to

50 ppm are also below the effectiveness at controlling bacterial growth exhibited by a combination including a fatty amino oxide.” *Id.* ¶ 8. Mr. Brown also states that Tables 6 and 9 show that, “when all three components are combined, the preservative blend is more effective than any of the components used alone or the combination of the two biocides without the amine oxide.” *Id.* ¶ 9.

Mr. Brown concludes that “[t]his result is unexpected as CDMA oxide is not a biocide in itself.” *Id.* Mr. Brown also states that “in my opinion, the combination of an isothiazolinone, a pyrithione, and at least one amine oxide exhibits better results that would be expected.” *Id.* ¶ 11.

We find the results cited by Appellant to be, at best, dubious evidence of unexpected results when viewed in light of the cited prior art. While it might be, as Mr. Brown states, that cocodimethylamine oxide is not itself a biocide, Tseng discloses that “amine oxides enhance the performance of isothiazolones as wood preservatives.” Tseng 1:32–33. Tseng also shows that cocodimethylamine oxide (“Coco-DMAO”) increases the antifungal efficacy of two specific isothiazolones. *Id.*, Tables 1 and 2.

Moreover, even accepting that the results shown in the Specification are better than would have been expected, we conclude that they are inadequate to support the nonobviousness of the claimed composition. “Evidence of unexpected results must be reasonably commensurate with the scope of the claims.” *In re Huai-Hung Kao*, 639 F.3d 1057, 1068 (Fed. Cir. 2011). Appellant points to the Specification’s data regarding the combination of cocodimethylamine oxide with an isothiazolinone and a pyrithione. None of the claims on appeal, however, limits the biocide

enhancing agent to cocodimethylamine oxide. Independent claims 1 and 28 recite “a biocide enhancing agent comprising cocodimethylamine oxide, N, N-dimethyloctyl amine-n-oxide, Bis (3-aminopropyl) dodecylamine, or mixtures thereof,” and independent claim 26 recites “a biocide enhancing agent comprising an amine oxide, the amine oxide having a carbon chain length of at least 6 carbon atoms.”

In contrast to the broader scope of the claims, Appellant’s evidence of unexpected results is limited to cocodimethylamine oxide. Appellant has not pointed to evidence of unexpectedly superior results for either of the other two species recited in claims 1 and 28, or any of the other species within the genus recited in claim 26. Nor has Appellant pointed to evidence or provided sound technical reasoning to show that a skilled artisan would expect other enhancing agents encompassed by the claims to provide results similar to those of cocodimethylamine oxide.

In addition, Appellant’s evidence only shows a limited range of isothiazolinone-to-amine oxide ratios. The Specification’s Table 6 only shows results for the combination of 25 ppm BIT to 1200 ppm CDMA Oxide, a ratio of 1:48. Spec. Table 6, lines 12–13. The Specification’s Table 9 includes ratios of 1:240 (5 ppm BIT:1200 ppm CDMA Oxide) and 1:27 (several, including 10 ppm BIT:270 ppm CDMA Oxide). *Id.* Table 9, lines 9, 11–18.

Claim 1, however, encompasses weight ratios of isothiazolinone to biocide enhancing agent ranging from 1:600 to 2:1. The results shown in the Specification do not demonstrate any results, let alone unexpectedly superior results, for ratios of isothiazolinone to biocide enhancing agent higher than

1:27, such as equal amounts (a 1:1 ratio) of isothiazolinone and biocide enhancing agent.

Thus, Appellant's evidence is not commensurate with the scope of the claims, with respect to either the identity of the biocide enhancing agent or the ratio of isothiazolinone to biocide enhancing agent.

With regard to claim 26, Appellant argues that the Examiner "appears to be asserting . . . that reference to Choi and/or Whittemore teach an amine oxide having greater than 6 carbon atoms. However, Appellant notes that the rejection is directed to an alkyl amine, whereas the present claims recite an amine oxide." Appeal Br. 28. However, the Examiner expressly stated that it would have been obvious modify Hyde's composition "to include [an] amine oxide with at least 6 carbons," as recited in claim 26, "because Tseng et al. teaches amine oxides (e.g. cocodimethylamine oxide)." Ans. 9. Thus, regardless of what Choi and Whittemore disclose, the Examiner found that Tseng discloses the disputed limitation as well. Appellant's argument is therefore unpersuasive.

With regard to claim 28, Appellant argues that the Specification shows unexpected results over the claimed range of first biocide concentration (i.e., 5–15 ppm). Appeal Br. 29–31. As discussed above, however, Appellant's evidence of unexpected results is not commensurate with the scope of the claims, with respect to either the identity of the biocide enhancing agent or the ratio of isothiazolinone to biocide enhancing agent. These considerations apply equally to claim 28, and Appellant's argument is therefore unpersuasive.

Obviousness-type Double Patenting

Claims 1, 2, 4–8, 10, 11, 26, and 27 stand rejected based on the claims of either U.S. Patent 8,317,912 or U.S. Patent 5,939,203, in view of Greene, Choi, Whittemore, Chisholm, and Tseng. The Examiner cites claims in both the '912 and '203 patents to compositions that include an isothiazolinone and a pyrrithione, and concludes that adding an amine oxide to the composition would be an obvious variant in view of the other cited references, for the same reasons discussed above with respect to obviousness. Ans. 13–14. We agree with the Examiner's reasoning and conclusion.

Appellant argues that, “as not a single claim in [either the '912 patent or the '203 patent] recites cocodimethylamine oxide, N, N-dimethyloctyl amine-n-oxide, or Bis (3-aminopropyl) dodecylamine, . . . the present claims are not only patentably distinct, they are also directed to a completely different invention.” Appeal Br. 33. Appellant also argues that both double patenting rejections should be reversed “for at least the reasons discussed above.” *Id.* at 33–34.

We are not persuaded. The claims of the '912 patent and the '203 patent use open claim language that encompasses components in addition to those recited, and the Examiner has presented sufficient evidence to show that a composition within the scope of the issued claims, and also comprising a biocide enhancing agent, as recited in the instant claims, would have been an obvious variant in view of, for example, Tseng. We therefore affirm both of the rejections for obviousness-type double patenting.

DECISION SUMMARY

In summary:

| Claims Rejected | 35 U.S.C. § | Reference(s)/Basis | Affirmed | Reversed |
|---------------------------------|--------------------|---|---------------------------------|-----------------|
| 1, 2, 4–8, 10, 11, 26– 28 | 103 | Hyde, Greene, Choi, Whittemore, Chisholm, Tseng | 1, 2, 4–8, 10, 11, 26– 28 | |
| 1, 2, 4–8, 10, 11, 26, 27 | | Obviousness-type double patenting; 8,317,912, Greene, Choi, Whittemore, Chisholm, Tseng | 1, 2, 4–8, 10, 11, 26, 27 | |
| 1, 2, 4–8, 10, 11, 26, 27 | | Obviousness-type double patenting; 5,939,203, Greene, Choi, Whittemore, Chisholm, Tseng | 1, 2, 4–8, 10, 11, 26, 27 | |
| Overall Outcome | | | 1, 2, 4–8, 10, 11, 26– 28 | |

TIME PERIOD FOR 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).

AFFIRMED