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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte GORAN ZIEGLER, THEIS REENBERG, and HENRIK JENSEN[1]

Appeal 2015-000255
Application 13/015,942
Technology Center 1700

Before CATHERINE Q. TIMM, BEVERLY A. FRANKLIN, and ELIZABETH M. ROESEL, *Administrative Patent Judges*.

TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL[2]

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[1] Appellants identify the real party in interest as Valinge Photocatalytic AB of Viken, Sweden Valinge Photocatalytic AB. Appeal Br. 1.

[2] In our opinion below, we reference the Specification filed January 28, 2011 (Spec.), Final Office Action mailed October 3, 2014 (Final), the Appeal Brief filed May 27, 2014 (Appeal Br.), the Examiner's Answer mailed July 29, 2014 (Ans.), and the Reply Brief filed September 25, 2014 (Reply Br.).

STATEMENT OF CASE

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's decision to reject claims 1–8, 19, 21, 23, and 25 under 35 U.S.C. S 103(a) as unpatentable over Roseeuw[3] in view of Iversen[4] and Kuroda.[5] We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

The claims are directed to a method of manufacturing a sheet containing photocatalytic nanoparticles. *See, e.g.*, claim 1.

According to the Specification, the method is especially useful for distributing the nanoparticles in the upper layer of boards and panels. Spec. 1:7–10. The method involves impregnating a sheet, which may be a sheet of cellulose fibers, with a polymer resin, and before fully drying the resin-impregnated sheet, spraying the sheet with an impregnation fluid composition comprising dispersed photocatalytic nanoparticles. Spec. 3:2–15. According to the Specification, applying the photocatalytic nanoparticles to a wet surface improves the distribution of the nanoparticles. Spec. 3:16–17.

It is the step of spraying onto a wet surface that is the focus of the appeal. Claim 1 is reproduced below:

> 1. Method of manufacturing a sheet comprising photocatalytic nanoparticles, the method comprising the steps of:
>
> impregnating the sheet with a polymer resin;

[3] Roseeuw, WO 2007/144718 A2, pub. Dec. 21, 2007.
[4] Iversen et al., WO 2009/062516 A2, pub. May 22, 2009.
[5] Kuroda, JP 2003-071967, pub. March 12, 2003, as translated.

> spraying the sheet, freshly impregnated with the polymer resin in an uncured and wet state, with an impregnation fluid composition comprising dispersed photocatalytic nanoparticles;
>
> drying and/or at least partly curing said impregnated sheet comprising the polymer resin and the impregnation fluid.

Appeal Br. Claims Appendix 1.

OPINION

There is no dispute that Roseeuw, as found by the Examiner, discloses a method of impregnating a cellulose paper sheet with polymer resin, and applying an impregnation fluid containing dispersed nanoparticles to the resin-impregnated sheet before fully drying. *Compare* Final 2–3 *with* Appeal Br. 4–5. Roseeuw, as found by the Examiner, teaches using titanium dioxide nanoparticles, but does not specify that the nanoparticles are photocatalytic. Final 3. Thus, the Examiner turns to Iversen. Final 3.

There is no dispute on this record that Iversen teaches applying an impregnation fluid that contains photocatalytic titanium dioxide nanoparticles to a surface layer (overlay sheet or décor paper) that is laminated to a board. Spec. 2:25–27; Appeal Br. 6; Iversen, abstract, 17:4–10. The photocatalytic nanoparticles improve a number of properties, including scratch resistance, washing properties (due to increased hydrophilic properties), and antimicrobial/antifungal properties. Iversen, 2:35–39, 4:1–8.

Based on the teachings of the prior art, the Examiner concludes that it would have been obvious to one of ordinary skill in the art at the time of the invention to use photocatalytic nanoparticles in Roseeuw's impregnation

fluid "to provide improved washing, antimicrobial and/or antifungal properties in accordance with the teachings of Iversen." Final 4.

Appellants contend that Roseeuw fails to disclose spraying nanoparticles. Appeal Br. 4 –5. Appellants also contends that Roseeuw teaches away from spraying. Appeal Br. 7–8. Appellants further contend that Iversen does not cure the deficiencies of Roseeuw. Appeal Br. 6.

For the reasons explained by the Examiner, Appellants' arguments are not persuasive of reversible error. Ans. 5–7.

Roseeuw's broad disclosure suggests that spraying a wet sheet with an impregnation fluid (suspension) containing nanoparticles will result in a usable coating. Roseeuw states that "any depositing or application system may be used." Roseeuw 11:28–29. Although Roseeuw then lists a number of preferred methods, including spreading, *id.* at 11:29–12:4, Roseeuw does not disclose that spraying would not work. Instead, Roseeuw states:

> It is noted that it would be better not to use a spraying device for depositing the suspension, as it may have a negative effect on the uniformity of the applied nano-particles. However, the use of such spraying device is not excluded and becomes more interesting the larger the average size of the particles to be applied is. For example, it may be particularly efficient with microparticles.

Roseeuw 12:6–13. Thus, Roseeuw suggests that those of ordinary skill in the art understood the effects of spraying on the uniformity of the applied nanoparticles. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007) (The question to be asked is "whether the improvement is more than the predictable use of prior art elements according to their established functions."). Appellants cite to no particular aspect of their own process that indicates they obtain better uniformity than that of Roseeuw. In fact, their

own Specification discloses that the improved uniformity occurs because the nanoparticles are applied to a wet surface. Spec. 3:16–17. Roseeuw discloses applying the nanoparticle composition onto a wet surface. Roseeuw 8:31–9:15.

Nor does a preponderance of the evidence support Appellants argument that Roseeuw teaches away from spraying. "[I]n general, a reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the applicant." *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994). There is no persuasive evidence that Roseeuw's teachings suggest that spraying would not result in a useful titanium dioxide nanoparticle coating even if the uniformity would be expected to be somewhat less than that of microparticle coatings. Roseeuw expressly states that "the use of such spraying device is not excluded." Roseeuw, 12:6–13.

In the Reply Brief, Appellants urge that Roseeuw's teaching of spraying is limited to non-photocatalytic nanoparticles. Reply Br. 2. Appellants point to a teaching in Iversen that the photocatalytic nanoparticles should be "substantially homogeneously distributed." Reply Br. 2 (quoting Iversen 4:10–11).

Appellants' argument is not persuasive of reversible error. There is no substantial question that those of ordinary skill in the art sought to uniformly disperse the nanoparticles, whether they are used to improve scratch resistance or for their photocatalytic properties. Roseeuw 5:1–7, 5:23–29, 9:7–10, 12:6–15; Iversen 4:10–17, 7:19–26. Iversen teaches that smaller, non-aggregated nanoparticles are easier to disperse homogeneously. Iversen 5:16–22. Roseeuw teaches that applying the nanoparticles in

suspension on the upper side of an already resin-treated-sheet "results in less tendency of these nano-particles to agglomerate, such that a more uniform distribution of the particles is achieved." Roseeuw 5:1–9. The nanoparticles in both references can be titanium dioxide nanoparticles. Roseeuw 4:13–20; Iversen 17:12–13. Taken together the references would have suggested using spraying to obtain a predictable level of uniformity. Appellants have not shown that their claimed process achieves uniformity unexpectedly different from that obtained by the prior art.

CONCLUSION

We sustain the Examiner's rejection.

DECISION

The Examiner's decision is affirmed.

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)(1).

AFFIRMED