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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte TAKUJI OHWADA and KAZUYUKI ENDO

Appeal 2020-001668
Application 15/036,980
Technology Center 1600

Before DONALD E. ADAMS, ERIC B. GRIMES, and TAWEN CHANG,
Administrative Patent Judges.

CHANG, *Administrative Patent Judge.*

DECISION ON APPEAL

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

We REVERSE.

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 Obihiro University of Agriculture and Veterinary Medicine and Nihon Plast Co., Ltd. Appeal Br. 1.

STATEMENT OF THE CASE

Polyurethane, sometimes referred to as urethane, is “a polymer having a urethane bond.” Spec. ¶ 2. Because leaked polyurethane may cause serious environmental pollution, polyurethane is generally caused to be adsorbed in soil and then recovered and further treated. *Id.* According to the Specification, the inventors had previously discovered that a novel actinomycete microorganism, belonging to the genus *Streptomyces*, “exhibits an adsorption capacity and a decomposing function to urethane.” *Id.* ¶ 3–4. The Specification states, however, that “in order to industrially use the microorganism, the urethane decomposition rate is required to be further improved.” *Id.* Further according to the Specification, the inventors discovered that pretreating urethane with oleic acid, an unsaturated fatty acid, is effective in allowing urethane to be easily decomposed by the actinomycete microorganism. *Id.* ¶ 6.

CLAIMED SUBJECT MATTER

The claims are directed to a urethane decomposing method. Claim 1 is illustrative:

1. A urethane decomposing method comprising the steps of: treating a urethane-containing material by immersing the urethane-containing material in a treatment liquid containing an unsaturated fatty acid; and allowing a microorganism, belonging to a *Streptomyces* genus and exhibiting a urethane decomposing function, to act on the urethane-containing material treated with the unsaturated fatty acid.

Appeal Br. Claims App. 1.

REJECTIONS²

- A. Claims 1, 2, 4–14, 16, 17, 19, and 20 are rejected under 35 U.S.C. § 103 as being unpatentable over Owada³ and Saya.⁴ Ans. 4.
- B. Claims 1 and 3 are rejected under 35 U.S.C. § 103 as being unpatentable over Owada, Saya, and Yagi.⁵ Ans. 7.
- C. Claims 1, 2, and 4–18 are rejected under 35 U.S.C. § 103 as being unpatentable over Owada and Tiwari.⁶ Ans. 7.
- D. Claims 1 and 3 are rejected under 35 U.S.C. § 103 as being unpatentable over Owada, Tiwari, and Yagi. Ans. 8.

OPINION

A. Obviousness rejections over Owada and Saya (claims 1, 2, 4–14, 16, 17, 19, and 20) and Owada, Saya, and Yagi (claims 1, 3)

1. Issue

The Examiner finds that Owada teaches “a method for absorbing and purifying substances contaminated with urethane/polyurethane using a *Streptomyces* strain” encompassed by the claims. Final Act. 8–9; Ans. 5. The Examiner finds that these microorganisms “can be placed in a

² We understand that the Examiner has withdrawn the rejection of claims 19 and 20 under 35 U.S.C. § 112(a) or 35 U.S.C. § 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. Ans. 9–10.

³ Owada et al., JP2010-220610, published Oct. 7, 2010. References to Owada in this opinion are to the machine-generated English language translation of Owada attached to Appellant’s Response to Office Action dated Mar. 2, 2017.

⁴ Saya et al., US 2005/0020701 A1, published Jan. 27, 2005.

⁵ Yagi et al., US 6,313,194 B1, issued Nov. 6, 2001.

⁶ Tiwari et al., US 2011/0014664 A1, Jan. 20, 2011.

supportive culture medium” when they “come into contact with . . . urethane waste materials” and further finds that, in one embodiment, Owada teaches that the medium may contain fatty acids and/or alcohols. Final Act. 8–9; Ans. 5.

The Examiner finds that Owada “does not go into more specific detail concerning the specific fatty acids and alcohols that are included.” Final Act. 9; *see also* Ans. 5. However, the Examiner finds that Saya “teaches a method of breaking down urethane/polyurethane containing material” using decomposing agents including ethanol and oleic acid, which is an unsaturated fatty acid. Final Act. 9–10, Ans. 5–6.

Citing *In re Kerkhoven*, 626 F.2d 846, 850 (CCPA 1980), which held that “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 to be used for the very same purpose,” the Examiner concludes that:

[i]t would have been obvious to have combined the action of the *Streptomyces* that can specifically breakdown the urethane/polyethylene [sic] material with other components that can degrade such as oleic acid and/or ethanol. The Owada reference mentions that *Streptomyces* can be cultured in a medium with fatty acid and an alcohol and it would have been obvious to have used oleic acid and ethanol specifically because they can also help degrade such components.

Final Act. 10; Ans. 6.

Appellant contends among other things that “the process disclosed in Saya . . . is completely different from that of the present invention.” Appeal Br. 4. Appellant contends that, in any event, the subject matter of the

invention exhibits unexpected synergistic results that overcome any showing of prima facie obviousness. Appeal Br. 5.

The issue with respect to these rejections is whether a preponderance of evidence of record supports the Examiner's conclusion that the claims are prima facie obvious over the combination of Owada and Saya.

2. *Analysis*

We find Appellant to have the better position. As we understand it, the Examiner's position is that, because Owada "mentions that *Streptomyces* can be cultured in a medium with fatty acid and an alcohol," it would have been obvious for a skilled artisan to use oleic acid as the fatty acid and ethanol as the alcohol⁷ in the medium, respectively, because Saya teaches that "they can also help degrade [urethane]." Final Act. 10; Ans. 6.

We acknowledge that Saya teaches using oleic acid as a decomposing agent for urethane. Saya ¶ 43. However, the Examiner has not persuasively explained why a skilled artisan, based on the disclosures of Saya, would have reasonably expected oleic acid to act as a decomposition agent when present in the medium under conditions suitable for supporting the maintenance and/or growth of *Streptomyces* microorganisms. For example, Saya describes its decomposition reaction as progressing by kneading and heating. Saya ¶ 29; *see also id.* ¶ 31 (suggesting that "decomposition reaction can be terminated instantly" when "the intermediate product is . . . released from the kneading and rapidly cooled down to room temperature").

The Examiner asserts that:

⁷ Some dependent claims add a requirement for an alcohol such as ethanol in the claimed method.

the instant set of claims are not addressing what temperature the fatty acid/microorganism are exposed to nor do the instant set of claims exclude kneading and/or heating. Thus, appellants' arguments are not commensurate in scope with the instant set of claims.

The instant set of claims just mention that the unsaturated fatty acid needs to be present. The claims do not specifically establish a precise role for the fatty acid solution. Therefore, the fatty acids could be added to facilitate a host of purposes such as degradation, nutrient support for the microorganism, etc. The instant set of claims do not specifically state that the fatty acids must be used as a pretreatment before the addition of the *Streptomyces*.

Ans. 11.

We are not persuaded. It is true that the claims neither include nor exclude limitations regarding reaction conditions, such as temperature or kneading, and also do not specifically state the role of the unsaturated fatty acid in the urethane decomposition method. Nevertheless, the stated reason for combining Saya with Owada, and for using oleic acid in the medium for the *Streptomyces* microorganism described in Owada, is that oleic acid is also a known urethane decomposition agent. Without an explanation why a skilled artisan would have expected oleic acid to act as a decomposition agent in the medium, there is insufficient support for the Examiner's stated reason to combine the cited prior art.⁸

⁸ In the Final Action, the Examiner also asserts that "the Saya reference states that oleic acid has decomposition properties and does not specifically state that decomposition can only occur with the addition of heat and/or kneading." Final Act. 4. We are not persuaded, however, that the Examiner has sufficiently articulated a reason why a skilled artisan would understand, based on the disclosures in Saya, that oleic acid would have decomposition

“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). Accordingly, we reverse the Examiner’s rejection of independent claims 1 and 12, which contain similar limitations, as obvious over Owada and Saya. We likewise reverse the rejection of claims 2, 4–11, 13, 14, 16, 17, 19, and 20, which depend directly or indirectly from claims 1 or 12, over Owada and Saya. *In re Fine*, 837 F.2d 1071, 1076 (Fed. Cir. 1988) (“Dependent claims are nonobvious under section 103 if the independent claims from which they depend are nonobvious.”)

The Examiner rejects claims 1 and 3 as obvious over Owada, Saya, and Yagi. The Examiner cites Yagi only for the proposition that “an alcohol pretreatment would have been obvious.” Final Act. 12; Ans. 7. Thus, Yagi does not cure the deficiencies noted above with respect to the combination of Owada and Saya. We therefore reverse the rejection of claims 1 and 3 over Owada, Saya, and Yagi as well.

*B. Obviousness rejection over Owada and Tiwari (claims 1, 2, 4–18)
and Owada, Tiwari, and Yagi (claims 1 and 3)*

1. Issue

As with the rejection over Owada and Saya, the Examiner finds that Owada teaches “a method for absorbing and purifying substances

properties for urethane outside of the context of the methods described in Saya.

contaminated with urethane/polyurethane using a *Streptomyces* strain” encompassed by the claims. Final Act. 8–9, 11; Ans. 5, 8. The Examiner also finds Owada teaches that these microorganisms “can be placed in a supportive medium that contains an alcohol and an unsaturated fatty acid.” Final Act. 11; Ans. 8.

The Examiner further finds that Tiwari teaches that “the ability of *Streptomyces* to grow and produce useful products could be enhanced through ‘a combinatorial feeding’” of (1) linoleic acid, which is an unsaturated fatty acid, or its esters or salts thereof, and (2) an omega-9 fatty acid, which is also an unsaturated fatty acid and includes, e.g., oleic acid. Final Act. 12; Ans. 8. The Examiner concludes that “[t]he use of such components would help maintain the organism and support its growth so it would have been obvious to have added such fatty acids to support the growth of the *Streptomyces*.” Final Act. 12; Ans. 8.

Appellant notes that Tiwari is “directed to a process for the production of lipase inhibitors by a fermentation process.” Appeal Br. 13. Appellant contends that “[t]here is no teaching or suggestion [in Tiwari] that omega-9 fatty acids used in combination with other components can provide supportive growth for *Streptomyces* strains.” *Id.* at 15. Appellant further contends that, even if a skilled artisan would understand from Tiwari that omega-9 fatty acids can improve the growth of some *Streptomyces* microorganisms, there is no evidence that this finding would apply to the particular urethane-decomposing *Streptomyces* microorganisms of the claims or that use of omega-9 fatty acid as taught in Tiwari would enhance the decomposition of urethane. *Id.* at 15–16. Finally, Appellant contends as above that the subject matter of the invention exhibits unexpected

synergistic results that overcome any showing of prima facie obviousness.
Id. at 14.

The issue with respect to these rejections is whether a preponderance of evidence of record supports the Examiner's conclusion that the claims are prima facie obvious over the combination of Owada and Tiwari.

2. *Analysis*

Tiwari teaches a process for producing lipase inhibitors via fermentation. Tiwari Abstract. We acknowledge that Tiwari teaches using a *Streptomyces* microorganism in its fermentation process. *Id.* ¶ 63. We also acknowledge that Tiwari teaches that its process uses a “combinatorial feeding” of (1) “linoleic acid or its esters or salts thereof” and (2) “an omega-9 fatty acid, preferably oleic acid and/or its derivatives,” which results in an improved yield coefficient and productivity and further provides ease of operation. *Id.* at Abstract. However, we find Appellant to have the better position.

As an initial matter, under the analogous arts test, the Examiner must show that “a reference is either in the field of the applicant's endeavor or is reasonably pertinent to the problem with which the inventor was concerned in order to rely on that reference as a basis for rejection.” *In re Kahn*, 441 F.3d 977, 986–87 (Fed. Cir. 2006). While the claimed invention and Owada are both drawn to the field of urethane processing, Tiwari is drawn to the field of lipase inhibitor production. Moreover, while *Streptomyces* microorganisms are used in Tiwari as well as in Owada and the claimed invention, we are not persuaded that Tiwari is reasonably pertinent to the problem with which either the inventors or Owada is concerned, i.e., the processing of urethane.

Furthermore, assuming for argument's sake that Tiwari is analogous art, the Examiner has not provided persuasive evidence that, based on the teachings of Tiwari, a skilled artisan would have had reason to use omega-9 fatty acids to culture the *Streptomyces* microorganisms recited in the claimed urethane decomposing methods. As Appellant points out, Tiwari appears to teach adding linoleic acid and omega-9 fatty acids as precursors for the production of the lipase inhibitor lipstatin. Appeal Br. 15; Tiwari ¶ 4 (“linoleic acid forms the backbone of the final molecule”), ¶ 6 (describing fatty acids such as linoleic acid as “precursors or starting material” for lipstatin production), ¶ 64 (describing the inventive process as first growing the lipstatin producing microorganisms in a basal/seed medium and then adding certain components that serve as biochemical precursors). Such use of omega-9 fatty acids would not appear to be relevant to the use of *Streptomyces* microorganisms to process urethane.

In response to Appellant's arguments, the Examiner asserts Tiwari teaches using omega-9 fatty acids as a nutrient for *Streptomyces* microorganisms, because Tiwari's title refers to fatty acids being “consumed” and because Tiwari teaches *Streptomyces* fermentation as including a combinatorial feeding of linoleic acid and omega-9 fatty acid. Ans. 12. We are not persuaded. The statements cited by the Examiner do not distinguish between omega-9 fatty acids being “consumed” as a nutrient or as a precursor for lipstatin production, and the Examiner does not address other statements in Tiwari suggesting that omega-9 fatty acids are used as biochemical precursors, rather than nutrients, in the fermentation process for producing lipstatin.

Accordingly, we reverse the Examiner’s rejection of independent claims 1 and 12, which contain similar limitations, as obvious over Owada and Tiwari. We likewise reverse the rejection of claims 2, 4–11, and 13–18, which depend directly or indirect from claims 1 or 12, over Owada and Tiwari. *In re Fine*, 837 F.2d 1071, 1076 (Fed. Cir. 1988) (“Dependent claims are nonobvious under section 103 if the independent claims from which they depend are nonobvious.”)

The Examiner rejects claims 1 and 3 as obvious over Owada, Tiwari, and Yagi. The Examiner cites Yagi only for the proposition that “an alcohol pretreatment would have been obvious.” Final Act. 12; Ans. 9. Thus, Yagi does not cure the deficiencies noted above with respect to the combination of Owada and Tiwari. We therefore reverse the rejection of claims 1 and 3 over Owada, Tiwari, and Yagi as well.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/ Basis	Affirmed	Reversed
1, 2, 4–14, 16, 17, 19, 20	103	Owada, Saya		1, 2, 4–14, 16, 17, 19, 20
1, 3	103	Owada, Saya, Yagi		1, 3
1, 2, 4–18	103	Owada, Tiwari		1, 2, 4–18
1, 3	103	Owada, Tiwari, Yagi		1, 3
Overall Outcome				1–20

REVERSED