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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte RICHARD D. MCCULLOUGH, JOHN BELOT,
REBECCA POTASH, ELIZABETH SEFTON, and
CHRISTIANAM. PETRAK

Appeal 2019-004285
Application 13/777,374
Technology Center 1700

Before DONNA M. PRAISS, N. WHITNEY WILSON, and
MERRELL C. CASHION, JR., *Administrative Patent Judges*.

CASHION, *Administrative Patent Judge*.

DECISION ON REQUEST FOR REHEARING

Appellant¹ requests rehearing² of our Decision³ entered June 4, 2020, affirming the Examiner's decision rejecting claim 76 under 35 U.S.C. §§ 102 and 103 over Nojiri (US 4,939,114, issued July 3, 1990) and claims 1,

¹ We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as Liquid X Printed Metals, Inc. of Pittsburgh, Pennsylvania. Appeal Br. 1.

² Appellant's Request for Rehearing filed August 4, 2020 ("Request" or "Req.").

³ Decision on Appeal mailed June 4, 2020 ("Decision" or "Dec.").

32, and 55 under 35 U.S.C. § 103 over Nojiri in view of McCullough (US 2011/0111138 A1, published May 12, 2011). Req. 1.

We reviewed the Examiner's rejection of independent claim 76 under 35 U.S.C. §§ 102 and 103 and of independent claims 1, 32, and 55 under 35 U.S.C. § 103. App. Br. 11, 15; Final Act. 6, 16; Dec. 7–20.

We have reconsidered our Decision of June 4, 202. We have reviewed the arguments Appellant sets forth in the Request but we deny the requested relief because Appellant has not persuaded us that we misapprehended or overlooked any points of law or fact that would require a different outcome. Therefore, we deny the request to modify our Decision. Our reasoning follows.

Rejection under 35 U.S.C. §§ 102 and 103 over Nojiri

Contention 1-Cavitt's compositions as representative of Nojiri's compositions in the Declaration evidence (Req. 6–8)

Appellant contends that we misapprehended or overlooked arguments in the Appeal Brief and evidence in the Declaration under 37 C.F.R. § 1.132 by Dr. Chengeto Gwengo⁴ (hereinafter referred to as “Declaration” or “Decl.” and to Dr. Gwengo as “Declarant”) demonstrating that Cavitt's compositions are equivalent to the compositions of the primary reference to Nojiri and that support the proposition that Nojiri's compositions are not particle free. Req. 6–8; Appeal Br. 31; Decl. ¶¶ 11–13; Tr.⁵ 8–10.

⁴ Appellant/Applicant submitted the Declaration on December 21, 2017 and the Examiner entered it into the record in the Non-Final Office Action dated February 13, 2018.

⁵ We refer to the “Oral Hearing Transcripts” made of record on April 21, 2020 as “Tr.”

According to Appellant, both Cavitt and Nojiri teach forming mixtures of a silver carboxylate with a small excess of an amine for short times without purification (removal of excess amines). Req. 6; Appeal Br. 29; Nojiri col. 4, ll. 15–45; Cavitt col. 2, l. 54–col. 3, l. 56. Appellant asserts that the Declaration compares Cavitt’s compositions against inventive compositions formed using a larger excess of the amine and purified by removing the excess amines, as disclosed on page 16 of the Specification. Req. 6–7. Appellant asserts that the comparisons in the Declaration are sufficient to indicate that Cavitt and Nojiri disclose similar and comparable compositions and that neither reference considered premature silver particulate formation as a liability in the impregnation of silver catalysts. Req. 7. Appellant further asserts that the comparison in the Declaration is sufficient to establish that compositions, such as Cavitt’s and Nojiri’s, formed without a large excess of amine, were found to precipitate and were thus unsuitable for a purification step. Req. 7. Thus, Appellant argues that the compositions of Cavitt and Nojiri are similar and comparable compositions and neither reference considered premature silver particulate formation as a liability in the impregnation of silver catalysts. Req. 8.

We are unpersuaded. Our Decision clearly indicates that we gave appropriate weight to the Declaration evidence, including the discussion as to whether Cavitt’s compositions are adequate to represent the compositions of the primary reference to Nojiri. Dec. 11–12. As our Decision states, “[t]he Appeal Brief, Reply Brief, and Declaration [] fail to explain how or why Cavitt's compositions are representative of Nojiri's compositions.” Dec. 11. In the Request and at Oral Hearing, Appellant presents no evidence supporting the assertion that Cavitt’s compositions are equivalent

to Nojiri's composition other than they both teach making the composition with a small excess of amine without purification. Req. 7; Tr. 8–10. In fact, Appellant concedes in the Request and at Oral Hearing that the compositions are only “comparable” (Req. 8) “[t]o some extent” (Tr. 10). Moreover, as we state in our Decision (Dec. 12), “Appellant does not provide an adequate explanation why the fact that both references use 30% of an amine ligand to make the metal complexes is sufficient for one skilled in the art to understand that Cavitt's compositions are representative of Nojiri's compositions.”

Therefore, contrary to Appellant's contentions, we gave appropriate weight to the Declaration evidence, including the allegation that Cavitt's compositions are representative of Nojiri's compositions.

Contention 2- Nojiri does not teach a particle-free composition (Req. 4–5)

Appellant contends that we misapprehended or overlooked specific discussion provided in the Appeal Brief and Declaration evidence demonstrating that Nojiri does not teach a particle-free composition. Req. 4. Specifically, Appellant contends that (1) Section VII(2)(c) of the Appeal Brief includes a discussion explaining that Nojiri's compositions would not be particle-free because Nojiri's methods leave unreacted excess amine in solution that would lead to the formation of carbamates that destabilize the silver species resulting in the formation of silver particulates (Req. 4; Appeal Br. 13), (2) the Declaration shows that solutions made from a mixture of a silver carboxylate and a slight excess of diamine in a aqueous solvent system were found to quickly form silver mirrors and silver particles in solution

even before the solution could be deposited (Req. 4; Declaration ¶¶ 13, 15, 16, Tables 1, 3, 4), and (3) the examples in the Declaration are reasonably commensurate with the broad scope of the presently claimed invention because they include specific comparative examples to the cited prior art of Nojiri comprising only a small excess of the amine, examples of the presently claimed invention, and an intermediate example to demonstrate that the excess amount of amine required to form the presently claimed stoichiometric complexes far exceeds the amounts indicated in the cited prior art. Req. 4–5.

We remain unpersuaded. The Declaration evidence that Appellant relies upon to support these arguments is insufficient to establish that Nojiri’s compositions are particle free for the reasons we give with respect to Contention 1 above and in our Decision (Dec. 11–12).

Therefore, Appellant’s arguments with respect to Contention 2 are not substantiated by the Declaration evidence because it does not show adequately that Nojiri’s compositions are not particle free nor does it compare the closest prior art (Nojiri) to the comparative examples.

Contention 3- Claim limitation “formulated for deposition on a substrate and conversion of the deposit to a continuous-conductive metal film” denotes an actual state of configuration of the composition that fundamentally ties formation of a continuous-conductive film to the physical characteristics of the composition being particle-free (Req. 5–6)

Appellant contends that we misapprehended or overlooked arguments in the Appeal Brief that the claim limitation “formulated for deposition on a substrate and conversion of the deposit to a continuous-conductive metal film” specifically “denotes an actual state of configuration of the

composition that fundamentally ties formation of a continuous-conductive film to the physical characteristics of the composition (i.e., that the compositions of the presently claimed invention are particle-free).” Req. 5. According to Appellant, the examples provided in the Declaration specifically address that Nojiri’s compositions were not capable of forming continuous-conductive metal films. Req. 5 (citing to Appeal Br. 12, 14 and Decl. ¶ 16 and Table 4). Appellant additionally argues that Nojiri’s conversion or heat treatment is essentially the same as the presently claimed invention and that one of skill in the art would understand that according to the disclosure in the specification and full record of the instant application, the claim element “formulated for deposition on a substrate and conversion of the deposit to a continuous-conductive metal film” does not describe a result of heat treatment of the composition but rather describes a property of the composition, i.e., that the composition is particle-free and is capable of forming a continuous-conductive metal film. Req. 5–6.

We have considered Appellant’s arguments for Contention 3 and remain unpersuaded. Appellant again relies on the Declaration evidence as specifically addressing that Nojiri’s compositions were not capable of forming continuous-conductive metal films. Req. 5. However, as we discuss above, the Declaration evidence is insufficient to establish that Nojiri’s compositions are particle free for the reasons we give with respect to Contention 1 above and in our Decision (Dec. 11–12).

Appellant additionally asserts that Nojiri’s heat treatment step is the same as the claimed invention and both result in different outcomes (particle v. particle free). Req. 5. This argument does not address the finding that Nojiri’s disclosure suggests that deposition of the metal in a specific form

depends on the treatment of the solution after impregnation. Dec. 10; Nojiri col. 4, ll. 41–45. This finding is consistent with the Examiner’s explanation that Nojiri’s composition is free of particles before being subjected to the requisite treatment to form the particles. Ans. 17 (“The prior art composition, which contains the silver complex compound dissolved a solvent, is capable of being formed into a conductive film by a person of ordinary skill in the art through routine experimentation”), 18.

Rejection under 35 U.S.C. § 103 over Nojiri and McCullough

Contention 1- Nojiri teaches a non-stoichiometric complex (Req. 11)

Appellant contends that we misapprehended or overlooked Declaration evidence demonstrating that (1) forming metal complexes using only a small excess of the amine likely does not lead to production of stoichiometric metal complexes (Req. 11; Decl. ¶ 16 (“likely failed to promote complete conversion of all reactants to products, which is observed by limited solubility”)) and (2) failure to remove the excess unreacted amine leads to compositions comprising particles (Req. 11; Decl. ¶ 13 (“amines absorb moisture and carbon dioxide resulting in formation of unstable carbamates. Such speciation of amines may destabilize diaminosilver (I) carboxylates, which often results in ... particle formation”)).

We are unpersuaded. Our Decision indicates that we gave appropriate weight to the Declaration evidence consistent with our discussion above with respect to Contention 1 of the §§ 102 and 103 rejections over Nojiri alone. Dec. 17 (“We again find the evidence insufficient to overcome a prima facie case of obviousness for the reasons we give in our previous

discussion of the Declaration related to the anticipation/ obviousness rejections of claim 76”).

Contention 2- Nojiri provides no motivation to purify the complex from any excess amine (Req. 8–9)

Appellant contends that Nojiri provides no motivation to purify the complex from any excess amine and that one of skill in the art would not have had a reasonable expectation of success that a composition absent solubilizing amount of amines would be stable, whether formed or solubilized in a polar or nonpolar solvent system. Req. 8; Appeal Br. 21.

We are again unpersuaded. As we indicate in our Decision, this argument lacks persuasive merit because they do not address the rejection the Examiner presents. Dec. 15–16. Our Decision states that

[t]he Examiner's rejection is based on the combined teachings of Nojiri and McCullough. 7 Final Act. 7-8. The Examiner relies on McCullough's teachings to establish that it is known to remove excess unreacted amine after formation of a silver complex compound by evaporation under vacuum. Ans. 19; McCullough, ¶ 267. Moreover, like McCullough, Nojiri teaches the use of excess amines in forming metal complexes. Nojiri col. 4, 11. 39–41.

One skilled in the art would have reasonably expected that some of Nojiri's excess amines would remain unreacted after forming the desired complexes.

Thus, Appellant does not explain adequately why one skilled in the art, using no more than ordinary creativity, would not have been able to modify Nojiri's teachings to incorporate McCullough's technique for removing unreacted amines as taught by McCullough.

Dec. 16–17.

To the extent that Appellant is relying on the Declaration evidence in support of the noted arguments, we maintain our position that the Declaration evidence is insufficient to support these arguments for the reasons we give above.

Contention 3- One skilled in the art would find it burdensome to arrive at the claimed invention from the combined teachings of Nojiri and McCullough (Req. 9–11)

Appellant contends that it would be burdensome for one skilled in the art to arrive at the claimed invention from the teachings of the cited art because the skilled artisan would have to make a series of specific selections from the possible nonpreferred aspects of the cited prior art. Req. 9–11.

We have considered Appellant’s arguments for Contention 3 and remain unpersuaded. In our Decision, we addressed Nojiri’s teachings of adding an amine ligand at any stage in the formation of the silver catalyst that Appellant notes. Req. 9 (citing to Appeal Br. 18 and Nojiri col. 4, ll. 4–6.) Specifically, our Decision states that

this would only mean that Nojiri contemplates a number of different embodiments, including Appellant’s technique for adding the amine ligand. Appellant does not explain adequately why such a broader teaching would lead one skilled in the art away from any specifically disclosed technique for the addition of an amine ligand.

Dec. 17.

Moreover, the test for obviousness is not whether it would be burdensome for one skilled in the art to arrive at the claim invention from the teachings of the prior art. Instead, “the test [for obviousness] is what the combined teachings of the references would have suggested to those of ordinary skill

in the art.” *In re Keller*, 642 F.2d 413, 425–426 (CCPA 1981). Further, it has been established that “the [obviousness] analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007). Appellant’s arguments do not explain adequately why it would be burdensome for one skilled in the art to modify the teachings of Nojiri by removing the excess amine, as taught by McCullough, and arrive at the claimed invention. Nor does Appellant address adequately the reasons the Examiner presents for combining the teachings of the cited art. Final Act. 7–8.

Therefore, Appellant has not established that our Decision misapprehended or overlooked any particular point of law or fact that would require a different outcome. The factual findings the Examiner relies upon are supported amply by the record and are sufficient, when considered in light of all of the evidence of record, to establish the anticipation and/or obviousness for the subject matter of claims 1, 32, 55, and 76 as well as their respective dependent claims. Final Act. 6–17; Ans. 15–23; Dec. 7–23.

CONCLUSION

In summary:

Outcome of Decision on Rehearing:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Denied	Granted
76	102(b)/103(a)	Nojiri	76	

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Denied	Granted
1-5, 7, 8, 13, 15-23, 25, 27-30, 32-35, 37, 39, 40, 54, 55, 73-75	103(a)	Nojiri, McCullough	1-5, 7, 8, 13, 15-23, 25, 27-30, 32-35, 37, 39, 40, 54, 55, 73-75	
6, 41	103(a)	Nojiri, McCullough, Takano	6, 41	
36	103(a)	Nojiri, McCullough, Jan	36	
14, 38	103(a)	Nojiri, McCullough, Cavitt	14, 38	
1-5, 7, 8, 13, 15-23, 25, 27-30, 32-35, 37, 39, 40, 54, 55, 73-75	103(a)	Nielsen	1-5, 7, 8, 13, 15-23, 25, 27-30, 32-35, 37, 39, 40, 54, 55, 73-75	
6, 41	103(a)	Nielsen, Takano	6, 41	
36	103(a)	Nielsen, Jan	36	
14, 38	103(a)	Nielsen, Cavitt	14, 38	
Overall Outcome			1-8, 13-23, 25, 27-30, 32-41, 54, 55, 73-76	

Final Outcome of Appeal after Rehearing:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1-8, 13-23, 25, 27-30,	112, first paragraph	Written Description		1-8, 13-23, 25, 27-30,

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
32–41, 54, 55, 73–75				32–41, 54, 55, 73–75
76	102(b)/103(a)	Nojiri,	76	
1–5, 7, 8, 13, 15–23, 25, 27–30, 32–35, 37, 39, 40, 54, 55, 73–75	103(a)	Nojiri, McCullough	1–5, 7, 8, 13, 15–23, 25, 27–30, 32–35, 37, 39, 40, 54, 55, 73–75	
6, 41	103(a)	Nojiri, McCullough, Takano	6, 41	
36	103(a)	Nojiri, McCullough, Jan	36	
14, 38	103(a)	Nojiri, McCullough, Cavitt	14, 38	
1–5, 7, 8, 13, 15–23, 25, 27–30, 32–35, 37, 39, 40, 54, 55, 73–75	103(a)	Nielsen	1–5, 7, 8, 13, 15–23, 25, 27–30, 32–35, 37, 39, 40, 54, 55, 73–75	
6, 41	103(a)	Nielsen, Takano	6, 41	
36	103(a)	Nielsen, Jan	36	
14, 38	103(a)	Nielsen, Cavitt	14, 38	
Overall Outcome			1–8, 13–23, 25, 27–30, 32–41, 54, 55, 73–76	

This Decision on the Request for Rehearing incorporates our Decision, mailed June 4, 2020, and is final for the purposes of judicial review. *See* 37 C.F.R. § 41.52(a)(1).

DENIED