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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte HOWARD J. WALLS, DAVID S. ENSOR, CHRISTOPHER J. OLDHAM, and GREGORY N. PARSONS

Appeal 2018-007928
Application 14/356,755[1]
Technology Center 1700

Before ROMULO H. DELMENDO, DONNA M. PRAISS, and WESLEY B. DERRICK, *Administrative Patent Judges*.

DELMENDO, *Administrative Patent Judge*.

DECISION ON APPEAL

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[1] The subject application has been granted "special" status pursuant to a favorable decision on a Petition filed under 37 C.F.R. § 1.102(c)(1) (Decision on Petition entered May 8, 2018).

The Applicants ("Appellants")[2] appeal under 35 U.S.C. § 134(a) from the Primary Examiner's final decision to reject claims 1, 5–12, 15–25, and 33–37.[3] We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

I. BACKGROUND

The subject matter on appeal relates to chemically-resistant filtration media, which may be used in personal protective equipment to purify air for soldiers and first responders in environments where toxic industrial chemicals or chemical warfare agents may be present (Spec. 1, ll. 16–18; 5, ll. 3–6; 24, ll. 18–22). Representative claim 1 is reproduced from the Claims Appendix to the Appeal Brief, as follows:

> 1. A fiber media comprising:
>
> a fiber mat comprising a plurality of nanofibers formed of a polymer material, having diameters less than 1 micron;
>
> a metal-containing barrier layer disposed on the nanofibers and comprising a conformal coating for the nanofibers, *said barrier layer preventing dissolution of the nanofibers in the fiber mat upon exposure of the fiber mat to a solvent of the polymer material*; and

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[2] The Appellants are the Applicants, Research Triangle Institute and North Carolina State University, which, according to the Brief, are also the real parties in interest (Appeal Brief filed May 24, 2018 ("Appeal Br.") at 3; Application Data Sheet filed May 7, 2014 at 5–6). In addition, the Specification states that the "invention was made with government support under DTRA contract HDTRA1-07-C-0058," and therefore, "[t]he U.S. Government has certain rights in this invention" (Specification filed May 7, 2014 ("Spec.") at 1, ll. 11–14).

[3] Appeal Br. 11, 15–27; Reply Brief filed July 30, 2018 ("Reply Br.") at 3–18; Final Office Action entered March 9, 2018 ("Final Act.") at 3–20; Examiner's Answer entered June 21, 2018 ("Ans.") at 3–21.

the barrier layer coated nanofibers having a maximum strain before breakage ranging between 2% and 50%.

(Appeal Br. 28; emphases added.)

II. REJECTIONS ON APPEAL

On appeal, the Examiner maintains only two rejections—both under pre-AIA 35 U.S.C. § 103(a):[4]

A. Claims 1, 5–7, 10–12, 15–25, and 33–37 as unpatentable over McLellan et al.[5] ("McLellan") in view of Weimer et al.[6] ("Weimer"); and

B. Claims 8 and 9 as unpatentable over McLellan, Weimer, and Lawton et al.[7]

(Ans. 3–8, 9–21; Final Act. 4–20.)

III. DISCUSSION

1. Grouping of Claims

The Appellants concede that claims 1 and 27 stand or fall together (Appeal Br 15), relying on the same arguments for all claims on appeal except that an additional argument is offered for claims 7, 9, and 21 as a group (*id.* at 15–27). Absent other arguments for separate patentability within the meaning of 37 C.F.R. § 41.37(c)(1)(vii), we limit our discussion to claim 1 and to claims 7, 9, and 21 collectively.

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[4] The Examiner states that a rejection under 35 U.S.C. § 112, ¶ 1 (lack of written description), and a rejection under 35 U.S.C. § 112, ¶ 2 (indefiniteness), have been withdrawn (Ans. 9).

[5] US 2011/0226697 A1, published September 22, 2011.

[6] US 2012/0201860 A1, published August 9, 2012.

[7] WO 01/68755 A1, published September 20, 2001.

2. The Examiner's Position

The Examiner finds that McLellan describes a fiber media comprising a fiber mat that includes a plurality of polymeric nanofibers having diameters of 50 nm to 1 μm and a conformal metal oxide layer and/or a polymer coating disposed on the nanofibers (Ans. 3). The Examiner finds that McLellan does not teach a barrier layer comprising self-limiting layer-by-layer deposits with atomic or molecular layers deposited one monolayer at a time (*id.*), which appear to be limitations recited in dependent claim 33 (Appeal Br. 30–31). To resolve this difference, the Examiner relies on Weimer and finds that it teaches atomic layer deposition (ALD), which is a self-limiting layer-by-layer deposition technique for depositing ultrathin layers of inorganic materials, organic polymers, or inorganic-organic hybrid materials onto various substrates (Ans. 3–4).

The Examiner concludes from these findings that a person having ordinary skill in the art would have implemented ALD, as disclosed in Weimer, to provide the conformal barrier layer coating on the nanofibers in McLellan in order to allow precise control over the coating thickness and to form ordered structures (*id.* at 4). Regarding the barrier layer's nanofiber dissolution prevention characteristic and the maximum strain before breakage for the barrier layer-coated nanofibers recited in claim 1, the Examiner finds that these limitations would be inherent in the prior art because McLellan describes nanofibers and a barrier layer that are identical to those disclosed for the claimed invention (*id.* at 4, 11–12).

3. The Appellants' Position

First, the Appellants contend that the Examiner's inherency findings as to the limitation recited in claim 1 are not adequately based on evidence

or scientific reasoning (Appeal Br. 17). Second, the Appellants argue that McLellan teaches sol gel films, which are known to be porous, and, therefore, such films would not be capable of preventing dissolution as required by the claims (*id.* at 17–18). Third, in the Appellants' view, neither McLellan nor Weimer enables a person having ordinary skill in the art to produce a metal-containing barrier layer that is conformally deposited on the nanofibers to prevent dissolution of the nanofibers in a solvent (*id.* at 21–22). And, the Appellants argue that "McLellan . . . do[es] not enable the formation of a metal-containing barrier layer having the claimed range of maximum strain before breakage" (*id.* at 22). Fourth, the Appellants argue that "if the Examiner-proposed modification . . . were to successfully produce barrier layer preventing dissolution of the nanofibers in the fiber mat, such a modification would render Weimer . . . unsatisfactory for its intended purpose of making films for selective dissolution" (*id.* at 23). Fifth, the Appellants argue that they have demonstrated unexpected results (*id.* at 24–25).

3. Opinion

The Appellants' arguments fail to identify any reversible error in the Examiner's rejection as maintained against claim 1. *In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011).

McLellan describes mats comprising functional nanofibers, which have a mean diameter of about 50 nm to about 1 µm, suitable for use as filters and membranes (McLellan ¶ 3). McLellan teaches many of the same polymers (e.g., polysulfone, polyethylene, polypropylene, polyethylene terephthalate, polystyrene, or polyvinyl chloride) disclosed as suitable nanofiber materials in the current Specification (*compare id.* ¶¶ 53, 55, *with*

Spec. 16, l. 23–17, l. 11). In addition, McLellan teaches many of the same metal-containing materials (e.g., silica, titania, alumina, or zirconia) disclosed as suitable metal-containing barrier layer materials in the current Specification (*compare* McLellan ¶ 97, *with*, e.g., Spec. 22, ll. 5–11). Furthermore, McLellan teaches various techniques—not solely a sol gel technique—to produce the conformal metal oxide coating (McLellan ¶¶ 128, 179 (Example 9)). By comparison, the current Specification also does not limit the techniques that may be used to deposit the conformal coating, although it lists a few examples such as ALD (Spec. 4, l. 25–5, l. 2).

Because McLellan's filters and membranes are compositionally and structurally the same as or similar to the claimed fiber media, as further described in the current Specification, the Examiner correctly shifted the burden of production to the Appellants to provide evidence (e.g., comparative experimental evidence) indicating that McLellan's filters and membranes would not inherently or necessarily possess the same characteristics recited in claim 1.[8] *In re Spada*, 911 F.2d 705, 708 (Fed. Cir. 1990) ("[W]e conclude that the Board correctly found that the virtual identity of monomers and procedures sufficed to support a *prima facie* case of unpatentability of Spada's polymer latexes . . . ."); *In re Best*, 562 F.2d 1252, 1255 (CCPA 1977) ("Where . . . the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO can require an applicant to prove

[8] The Appellants argue that "McLellan et al do not enable the formation of a *metal-containing barrier layer* having the claimed range of maximum strain before breakage" (Appeal Br. 22; emphasis added). Claim 1, however, recites "*the barrier layer coated nanofibers* having a maximum strain before breakage ranging between 2% and 50%" (emphasis added).

that the prior art products do not necessarily or inherently possess the characteristics of his claimed product."); *In re Thorpe*, 777 F.2d 695, 697 (Fed. Cir. 1985) ("If the product in a product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.").

Although the Examiner's rejection is based on obviousness in view of multiple references, the burden of production is the same. Our reviewing court explained:

> This court, in reconsidering this case *in banc*, reaffirms that ***structural similarity between claimed and prior art subject matter, proved by combining references or otherwise, where the prior art gives reason or motivation to make the claimed compositions, creates a prima facie case of obviousness, and that the burden (and opportunity) then falls on an applicant to rebut that prima facie case***. Such rebuttal or argument can consist of a comparison of test data showing that the claimed compositions possess unexpectedly improved properties or properties that the prior art does not have . . . There is no question that all evidence of the properties of the claimed compositions and the prior art must be considered in determining the ultimate question of patentability, but it is also clear that the discovery that a claimed composition possesses a property not disclosed for the prior art subject matter, does not by itself defeat a *prima facie* case.

In re Dillon, 919 F.2d 688, 692–93 (Fed. Cir. 1990) (en banc) (bolded italics added for emphasis).

We have fully considered the Appellants' arguments based primarily on Inventor Howard J. Walls's Declaration filed September 20, 2016 ("Walls Decl."), which states that McLellan's coated fibers produced by sol gel process "would not necessarily have had both the claimed resistance to dissolution and the claimed strain before breakage" (¶ 4). Consistent with

the Examiner's position (Ans. 16), the Appellants fail to direct us to evidence to show that the closest prior art—i.e., McLellan (e.g., Example 9, which does not use a sol gel process)—does not possess the characteristics recited in claim 1. *Dillon*, 919 F.2d at 692–93.

Because the Appellants do not provide evidence that compares the claimed invention against the closest prior art, the Appellants' allegation that unexpected results are achieved has no merit. *In re Baxter Travenol Labs.*, 952 F.2d 388, 392 (Fed. Cir. 1990) ("[W]hen unexpected results are used as evidence of nonobviousness, the results must be shown to be unexpected compared with the closest prior art . . . ."). *See also In re Geisler*, 116 F.3d 1465, 1470 (Fed. Cir. 1997) (mere lawyer's arguments and conclusory statements, which are unsupported by concrete factual evidence, are entitled to little probative value).

Moreover, we are in complete agreement with the Examiner's view (Ans. 20) that the proffered experimental evidence showing a polysulfone nanofiber with an alumina barrier layer having a particular thickness is far from being commensurate in scope with claim 1. *In re Greenfield*, 571 F.2d 1185, 1189 (CCPA 1978) ("Establishing that one (or a small number of) species gives unexpected results is inadequate proof, for 'it is the view of this court that objective evidence of non-obviousness must be commensurate in scope with the claims which the evidence is offered to support.'") (quoting *In re Tiffin*, 448 F.2d 791, 792 (CCPA 1971)).

Also, we have not been directed to any evidence establishing that any difference in results between the claimed media and the closest prior art would have been considered unexpected by one of ordinary skill in the art (as opposed to unexpected in the view of the Inventors, who are interested

parties) (Walls Decl. ¶ 7). *See, e.g.*, *In re Klosak*, 455 F.2d 1077, 1080 (CCPA 1972) ("[I]t is not enough to show that results are obtained which differ from those obtained in the prior art: that difference must be shown to be an *unexpected* difference.").

We are unpersuaded by the Appellants' argument that Weimer cannot be combined with McLellan in the manner claimed by the Inventors because it would render Weimer unsatisfactory for its intended purpose (Appeal Br. 23). As the Examiner points out (Ans. 15), Weimer was cited to show that ALD provides precise control in the coating thickness (Weimer ¶ 7). That Weimer teaches coatings that are porous does not negate Weimer's plain disclosure on the advantage in using ALD for precise control of film thickness. *In re Keller*, 642 F.2d 413, 425 (CCPA 1981).

Finally, regarding claims 7, 9, and 21, the Appellants assert merely that the specified "features [in the claims] are not enabled from a combination of McLellan . . . and Weimer" (Appeal Br. 25). Such a skeletal argument—without any attempt to show undue experimentation—is ineffective to reveal any error in the Examiner's rejection. *Cf. In re Lovin*, 652 F.3d 1349, 1357 (Fed. Cir. 2011). *See also In re Antor Media Corp.*, 689 F.3d 1282, 1288 (Fed. Cir. 2012) ("[A] prior art printed publication cited by an examiner is presumptively enabling barring any showing to the contrary by a patent applicant or patentee.").

For these reasons, we uphold the Examiner's rejections.

IV. SUMMARY

Rejections A and B are sustained. Therefore, the Examiner's final decision to reject claims 1, 5–12, 15–25, and 33–37 is affirmed.

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