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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ROBERT L. BALLARD, BRUCE L. ANNEAUX,
JOSHUA L. MANASCO, DAVID P. GARNER, and PING HAO

Appeal 2018-009241
Application 13/749,823
Technology Center 1700

Before DONNA M. PRAISS, CHRISTOPHER C. KENNEDY, and
JEFFREY R. SNAY, *Administrative Patent Judges*.

SNAY, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the
Examiner's decision to reject claims 4–14, 26–34, 56–65, 72, 73, 75, and 76.
We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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

BACKGROUND

The invention relates to porous media, such as a filter or filtration medium for removing particulates from a gas or liquid stream. Spec. 1:20–22. According to the Specification, poly(tetrafluoroethylene) (PTFE) offers certain advantageous properties, but cannot be processed by conventional molten polymer techniques. *Id.* at 3:5–9. The Specification describes forming a nonwoven mat comprising electrospun PTFE fibers, which mat can be useful as a filtration medium. *Id.* at 4:2–5. Independent claims 4 and 65 read:

4. A filtration medium comprising:
a mat comprising nonwoven, electrospun poly(tetrafluoroethylene) (PTFE) fibers in an arrangement within the mat, wherein the electrospun PTFE comprised in the mat is sintered in such a manner that removes substantially all of a fiberizing polymer, wherein the arrangement of nonwoven, electrospun PTFE fibers within the mat is such that the mat meets HEPA standard IEST-RP-CC001.3, wherein the fibers of the mat comprise nonwoven, electrospun PTFE fibers having an average fiber diameter between about 250 nm and about 1500 nm, and wherein an average thickness of the mat is about 200 μm or less.

65. A nonwoven fabric comprising:
a nonwoven mat comprising electrospun poly(tetrafluoroethylene) PTFE fibers arranged within the mat, wherein the electrospun PTFE comprised in the mat is sintered in such a manner that removes substantially all of a fiberizing polymer, wherein the arrangement of fibers within the mat is such that the nonwoven mat both
passes the blood penetration test of ASTM F1670,
and
provides air permeability of at least about 2.5 cfm.

Appeal Br. 27, 32 (Claims Appendix).

Independent claim 26 recites essentially the same filtration medium as in claim 4, except that the recited mat meets a ULPA filter standard. Independent claim 56 essentially combines the filtration media of claims 4 and 26. Each remaining claim on appeal depends from claim 4, 26, or 56.

REJECTIONS

- I. Claims 4–14, 26–34, 56–64, 72, 73, 75, and 76 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Walls² and Xiong.³
- II. Claim 65 stands rejected under 35 U.S.C. § 103 as unpatentable over Martin⁴ and Wadsworth.⁵

OPINION

Rejection I: obviousness over Walls and Xiong

With regard to the Examiner’s rejection over Walls and Xiong, Appellant argues the rejected claims as a group, with separate additional arguments directed to each of independent claims 4, 25, and 56. *See* Appeal Br. 6–21. Appellant does not separately argue any dependent claim. We address Appellant’s arguments in connection with independent claims 4, 26, and 56 below. Each of claims 5–14, 27–34, 57–64, 72, 73, 75, and 76 stands or falls with the independent claim from which it depends.

Claim 4

With regard to claim 4 and relevant to Appellant’s arguments on appeal, the Examiner finds that Walls discloses a filtration mat formed from

² US 2011/0174158 A1, published July 21, 2011 (“Walls”).

³ CN 101530750 A, published September 16, 2009, as translated (“Xiong”).

⁴ US 4,043,331, issued August 23, 1977 (“Martin”).

⁵ US 2005/0079379 A1, published April 14, 2005 (“Wadsworth”).

electrospun polymer fibers that meets all of the recited dimensions and characteristics, except Walls does not specify that the electrospun fibers are PTFE. Final Act. 4. The Examiner finds Xiong teaches that electrospun PTFE fibers exhibit chemical stability and wide operating temperatures in sintered nonwoven filtration mats and, therefore, would have provided a reason to use PTFE for the electrospun fibers in Walls' filtration mat. *Id.*

Appellant argues there would have been no reason to combine the teachings of Walls and Xiong because Walls' electrospinning process is solution-based whereas that of Xiong is dispersion-based. Appeal Br. 8. Appellant contends that one of ordinary skill would have had "no motivation to turn from the Walls reference to the Xiong reference, and to incorporate materials from the Xiong reference, which are prepared via a fundamentally different type of electrospinning." *Id.* We disagree. Both Walls and Xiong disclose electrospinning fibers from a polymer-containing source. Walls ¶ 62 ("A polymer solution . . . from reservoir 3 flows to electrospinning emitter/orifice 2."); Xiong 2 ("charging the spinning solution into a liquid storage device, which was then transported to a spinning nozzle"). Appellant presents no evidence or technical reasoning to support the contention that the electrospinning process would have been materially affected by whether the polymer source included a solution or a dispersion. To the contrary, Appellant, in the Specification, essentially equates these two sources for electrospinning fibers. Spec. 11:12–14 ("Electrospun mats can be prepared by drawing material by electrical charge from a dispersion (e.g., solution or suspension/dispersion.").

Appellant also argues that Xiong uses water as a solvent in the PTFE polymer source, and water solvent would have precluded Walls' desired

charge retention on the filtration mat. Appeal Br. 10. Here too, Appellant presents no evidence to support the contention. *See id.* (“Water, as employed in the methods of the Xiong reference for electrospinning polytetrafluoroethylene, *would be understood* to disperse the charge.”) (emphasis added). Moreover, the Examiner finds that Walls discloses an alternative in which any desired charge may be applied to the filtration mat after the electrospinning process, such that any inhibitory effect of water solvent during electrospinning would have been rendered moot. Ans. 24 (citing Walls ¶ 140). Appellant does not persuasively dispute this finding in the Reply Brief.

Appellant argues that Walls requires a level of control of relative humidity in the electrospinning chamber that would be impossible in the presence of a polymer solution/dispersion that includes water solvent. Appeal Br. 13 (citing Walls ¶¶ 76, 77). Appellant additionally argues there would have been no reason to expect that a mat comprising electrospun PTFE fibers could perform the filtration function desired by Walls. *Id.* at 14. Appellant also argues that Xiong fails to teach sintering in a manner that removes substantially all of a fiberizing polymer. *Id.* at 15. These arguments are not persuasive of reversible error. Walls discusses humidity control in “one embodiment” as a way to achieve fibers with fewer surface defects rather than as a requirement for electrospinning PTFE fibers. Walls ¶ 76. Moreover, even if electrospinning PTFE fibers somehow inhibited humidity control as Appellant suggests, a tradeoff of one advantage (reduction of surface defects) for another (e.g. chemical stability of PTFE) is not persuasive of reversible error in the Examiner’s obviousness determination. *See Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165

(Fed. Cir. 2006) (“[A] given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine.”). Regarding a reasonable expectation of success to achieve a desired filtration capability, both Walls and Xiong disclose nonwoven electrospun fiber mats for the express purpose of filtration. Regarding removal of fiberizing polymer, Xiong expressly teaches “sintering the composite superfine fiber porous membrane in a conventional sintering apparatus *to remove the matrix polymer.*” Xiong 2.

Lastly, Appellant argues unexpected results, but fails to present or point to any supporting data or evidence. Appeal Br. 20. “It is well settled that unexpected results must be established by factual evidence. Mere argument or conclusory statements in the specification does not suffice.” *In re De Blauwe*, 736 F.2d 699, 705 (Fed. Cir. 1984) (citing *In re Lindner*, 457 F.2d 506, 508 (CCPA 1972)).

Claims 26 and 56

With regard to each of claims 26 and 56, Appellant relies on the same arguments presented for claim 4. *See* Appeal Br. 6–15. These arguments are not persuasive for the reasons given above.

Appellant additionally argues that neither Walls nor Xiong discloses the ULPA filtration standard recited in claim 26. *Id.* at 18. However, Appellant does not persuasively challenge the Examiner’s reasoning that meeting known ULPA standards would have resulted from the obvious adjustment of fiber diameter and packing density in Walls for the disclosed objective of removing the highest quantity of particles from air as possible. *See* Final Act. 9 (citing Walls ¶ 11). Nor does Appellant point to any structural difference between the nonwoven mat recited in claim 26 and that

which would have resulted from the combined teachings of Walls and Xiong that could account for any meaningful difference in ability to meet a given ULPA standard.

With regard to claim 56, Appellant argues, without elaboration beyond pointing to arguments presented in connection with claims 4 and 26, that neither Walls nor Xiong discloses the recited combination of HEPA and ULPA standard compliance. Appeal Br. 19. That argument is not persuasive for the reasons given above in connection with claims 4 and 26. *See In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986) (“Non-obviousness cannot be established by attacking references individually where the rejection is based upon the teachings of a combination of references.”) (citing *In re Keller*, 642 F.2d 413, 425 (CCPA 1981) (“[T]he test [for obviousness] is what the combined teachings of the references would have suggested to those of ordinary skill in the art.”))).

For the foregoing reasons, Appellant does not persuade us of reversible error in the Examiner’s rejection of claims 4–14, 26–34, 56–64, 72, 73, 75, and 76 over Walls and Xiong. Rejection I is sustained.

Rejection II: obviousness over Martin and Wadsworth

With regard to claim 65 and relevant to Appellant’s arguments on appeal, the Examiner finds that Martin discloses a nonwoven fabric of electrospun PTFE fibers, arranged in a mat such that blood and other body fluids are excluded and oxygen is allowed to pass. Final Act. 20–21. The Examiner reasons that it would have been obvious to adjust pore size and thickness of Martin’s fabric to assure compliance with the blood penetration test of ASTM F1670, and to maximize air permeability, consistent with

Martin's objective of precluding blood and other body fluids while allowing passage of oxygen. *Id.* at 21.

Appellant argues neither reference teaches the recited specific value of 2.5 cfm, and "there is no teaching or suggestion in the cited art that a material meeting both limitations of pending claim 65 can be provided according to the teachings of the Martin and Wadsworth references." Appeal Br. 23. Appellant's arguments do not persuasively refute the rationale set forth by the Examiner. The Examiner identifies a technical basis in Martin for a reason to maximize air permeability, sufficient to support a prima facie determination that it would have been obvious to provide air flow of 2.5 cfm or greater. The Examiner also identifies a technical basis in the combined teachings of Martin and Wadsworth to provide compliance with a known ASTM blood penetration test. An express suggestion or motivation in the prior art is not a requirement for an obviousness determination. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007) ("A person of ordinary skill is also a person of ordinary creativity, not an automaton.").

Rejection II also is sustained.

CONCLUSION

The Examiner's decision rejecting claims 4–14, 26–34, 56–64, 72, 73, 75, and 76 is affirmed.

DECISION SUMMARY

In summary:

Claim(s) Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
4-14, 26-34, 56-64, 72, 73, 75, 76	103(a)	Walls, Xiong	4-14, 26-34, 56-64, 72, 73, 75, 76	
65	103(a)	Martin, Wadsworth	65	
Overall Outcome			4-14, 26-34, 56-65, 72, 73, 75, 76	

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)(iv).

AFFIRMED