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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte DOMINIQUE PONSOLLE,
ROBERT BLACKBURN, BILLY HARMON,
RICHARD PRICE, and MARC DOYLE

Appeal 2019-000567
Application 13/307,383
Technology Center 1700

Before ROMULO H. DELMENDO, CHRISTOPHER C. KENNEDY, and AVELYN M. ROSS, *Administrative Patent Judges*.

ROSS, *Administrative Patent Judge*.

DECISION ON APPEAL[1]

Appellant[2] appeals under 35 U.S.C. § 134(a) from a final rejection of claims 1, 4–6, and 8. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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[1] In our Decision below we refer to the Specification filed November 30, 2011 (Spec.), the Final Office Action mailed December 12, 2017 (Final Act.), the Appeal Brief filed May 14, 2018 (Appeal Br.), and the Examiner's Answer mailed August 15, 2018 (Ans.).

[2] 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 Cytec Technology Corp. Appeal Br. 2.

STATEMENT OF CASE

In a prior appeal, we reversed the Examiner's decision to reject the claims under pre-AIA 35 U.S.C. § 103(a). *See* Decision on Appeal entered November 30, 2016. In this appeal, however, the Examiner relies on an additional prior art reference and new reasoning in support of the obviousness rejections, as discussed below.

The claims are directed to melt-blown and calendared resin-soluble veils useful in the manufacture of composite articles. Spec. ¶¶ 7–12. According to the Specification, the "non-woven engineered veils according to the embodiments of the invention have improved characteristics including, . . . increased uniformity and decreased thickness" as well as "functioning as a toughing agent in the composites." *Id.* ¶ 27. "These characteristics translate into improvements in the processing of a composite article including, . . . a substantial or complete elimination in premature dissolution of the veil during cure." *Id.* Claim 1, reproduced below, is illustrative of the claimed subject matter:

> 1. A non-woven engineered veil manufactured by a melt-blown process followed by a calendering process, the veil comprising a plurality of fibers having a mean diameter of between 10 μm and 16 μm, wherein less than 20% of the fibers have a diameter of less than 8 μm,
>
> wherein the veil has a fabric areal weight of between 5 grams per square meter and 80 grams per square meter, a fabric areal weight variation of less than 10% across the width of the veil, and a thickness of between 20 μm and 90 μm, which is achieved by a calendering process, and
>
> wherein the plurality of fibers are formed from a polymer having a native solid phase and adapted to undergo at least partial phase transition to a fluid phase on contact with a component of a curable composition in which the polymer is soluble at a temperature which is less than the temperature for substantial

> onset of curing of the curable composition and which temperature is less than the inherent melting temperature of the non-woven engineered veil.

Claims Appendix at Appeal Br. 10.

REJECTIONS

The Examiner maintains the following rejections:

A. Claims 1, 4–6, and 8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over LoFaro[3] in view of Haque[4] and Burrows.[5] Final Act. 2.

B. Claims 1, 4–6, and 8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over LoFaro in view of Burrows and Raghavendran.[6] *Id.* at 5.

OPINION

Rejection A — Obviousness (claims 1, 4–6, and 8)

The Examiner rejects claims 1, 4–6, and 8 as obvious over LoFaro in view of Haque and Burrows. Final Act. 2. The Examiner finds that LoFaro teaches

> a resin-soluble thermoplastic veil toughening element for a curable composition, wherein the polymer element is a non-woven veil in solid phase adapted to undergo at least partial phase transition to fluid phase on contact with a component of the curable resin matrix composition in which it is soluble at a temperature which is less than the temperature for substantial

[3] LoFaro et al., US 2006/0252334 A1, published November 9, 2006 ("LoFaro").
[4] Enamul Haque, US 7,252,729 B2, issued August 7, 2007 ("Haque").
[5] Robert D. Burrows, US 2005/0064166 A1, published March 24, 2005 ("Burrows").
[6] Raghavendran et al., US 2006/0240242 A1, published October 26, 2006 ("Raghavendran").

> onset of curing of the curable composition and which temperature is less than the polymer elements melt temperature (LoFaro, Abstract).

Id. The Examiner finds that LoFaro teaches a veil that has an areal weight from about 2 to 150 grams per square meter and where the fibers have a preferred diameter of 1.0 to about 50 microns. *Id*. While LoFaro does teach the diameter of its fibers, the Examiner acknowledges that LoFaro does not "specifically disclose the claimed *mean diameter*." *Id.* at 3 (emphasis added). But, the Examiner finds that Burrows teaches a similar fibrous veil that includes fibers having an average diameter between 11 to 14 micrometers. *Id.* at 3–4. The Examiner further finds that "Haque teaches a polymer mat for use in sheet molding compounds, formed of reinforcing fibers and bonding materials" where "the reinforcing fibers have diameters of from 8–35 microns, and more preferably diameters of from 12–23 microns" and stresses that Haque "does not recite that the aforementioned fiber diameters are averages." *Id.* at 3. The Examiner explains that Haque discloses the "less than 20% of the fibers have a diameter of less than 8 μm," as claimed, because the claim language necessarily includes 0% of the fibers having a diameter of less than 8 microns. *Id*. According to the Examiner, because Haque teaches an *actual* diameter of between 8 to 23 microns (and preferably 12 to 23 microns) as opposed to an *average* diameter, Haque teaches 0% of the fibers have a diameter less than 8 microns. *Id.* The Examiner reasons that one of ordinary skill in the art would have had reason to

> adjust[], vary[], and optimiz[e] the fiber diameter such that all of the fibers comprise a fiber diameter [of LoFaro], such as only within the claimed range, as taught by Burrows and Haque, motivated by the desire of forming a conventional nonwoven veil

> having a fiber diameter known in the art as being predictability suitable for resin impregnated nonwoven veils, based on the desired physical properties of the veil and resulting in improved and uniform properties, suitable for the intended application.

Id. at 4–5. The Examiner also finds that "Haque teaches thermal bonding the sheet using calendaring." *Id.* at 4.

Appellant argues that "Haque does not disclose a non-woven veil comprising fibers having similar diameters of 10–16 μm 'wherein less than 20% of fibers have a diameter of less than 8 μm' as claimed." Appeal Br. 4. Rather, Appellant contends that "Haque discloses a molding mat composed of reinforcing fibers with a much wider range of fiber diameters, 8–35, preferably 12–23 microns" and where the reinforcing fibers have varying lengths and diameters from each other within the mat. *Id.* As a result, Appellant alleges that the "disclosure by Haque is contrary to the concept of having a substantial amount of veil fibers with similar diameters." *Id.* And, while "Haque does mention uniform or substantially uniform ***distribution*** of fiber bundles and bonding fibers . . . such uniform distribution of fibers does not mean substantially uniform fiber diameters." *Id.* at 6. Appellant also asserts that the Examiner's finding that Haque describes a mat having 0% of the fibers having a diameter of 8 microns or less is unfounded because "Haque does not expressly state that the fiber diameters for <u>all</u> fibers in the molding are 'necessarily 8 microns or above'" or "that <u>all</u> ***reinforcing fibers*** must have a fiber diameter of 8 microns of higher." *Id.* at 5. Finally, Appellant contends that "the reinforcing fibers disclosed by Haque are not relevant to LoFaro's resin-soluble veil of the claimed resin-soluble veil," because its preferred reinforcing fibers are resin insoluble glass fibers and

"the intended purpose of Haque's molding mat is quite different from the purpose of LoFaro's resin-soluble veil." *Id.* at 6.

Appellant's arguments do not persuade us of reversible error by the Examiner. The claims do not require the veil fibers to have a substantially uniform diameter as Appellant alleges (Appeal Br. 6). That the mat fibers of Haque include "a much wider range of fiber diameters" and include varying lengths and diameters, is based on a misunderstanding of Haque's teachings and the scope of the instant claims. *See id.* at 4. Rather, the claims require only that *a plurality* of fibers comprising the veil have a mean diameter between 10μm to 16μm—not a majority or substantially all of the veil fibers—and less than 20 % of the plurality of fibers have a diameter less than 8μm. Here, the Examiner finds that Haque describes the reinforcing fibers forming its polymer mat as having diameters between 8–35 microns and more preferably from 12–23 microns. *See* Final 3–4; Ans. 10–11. Because the recited diameter ranges are not described as mean or average diameters for all fibers but rather only to a plurality of fibers, the Examiner finds that 0% of the fibers taught in Haque have a diameter of 8 microns, thus meeting the claim language requiring "less than 20% of the fibers have a diameter of less than 8 μm." Final 4; Ans. 11. We find no reversible error in the Examiner's reasoning.

We are similarly unpersuaded by Appellant's argument that Haque does not state that all the fibers have a diameter of 8μm or above because other fibers, i.e., bonding materials, may be present. Appeal Br. 5. The Examiner does not rely on Haque to describe the total composite characteristics of non-woven engineered veil. *See generally* Final 2–6. Rather, the Examiner relies on Haque to suggest diameters for reinforcing

fibers that are useful in preparing polymer fiber mats. *Id.* at 3; Ans. 14–15. Further, Haque explains that "[t]he reinforcing fibers may be present in the molding mat in an amount from about 80–98% by weight of the total fibers, and are preferably present in the molding mat in an amount of from 85%–95% by weight." Haque, 5:4–7. Therefore, the remaining fibers, i.e., bonding fibers, are present in an amount ranging from 2–20% by weight. Even if nearly all the bonding fibers of Haque had diameter less than 8μm—Haque is silent in this regard—the claim language requiring "less than 20% of the fibers have a diameter of less than 8 μm," is met. Additionally, even if we were to assume that Haque does not teach a mat with 0% of the fibers having a diameter of 8 microns or less, Haque's disclosure that "reinforcing fibers may have diameters of from 8–35 μm, and preferably have diameters of from 12–23 μm," suggests, at a minimum, that fibers having diameters less than 8 μm are undesirable.

Lastly, that Haque prefers glass fibers is of little consequence. Haque describes a broad range of suitable organic, inorganic, and natural fibers, including "nylon fibers, rayon fibers, and polymer based thermoplastic materials such as, but not limited to, polyester fibers, polyethylene fibers, polypropylene fibers, polyethylene terephthalate (PET) fibers, polyphenylene sulfide (PPS) fibers, polyvinyl chloride (PVC) fibers, and ethylene vinyl acetate/vinyl chloride (EVA/VC) fibers, and mixtures thereof." Haque, 4:45–55; *see* LoFaro ¶¶ 76, 78 (describing polyamides, i.e., nylon, as a suitable resin-soluble polymer). Further, Appellant's argument that the reinforcing fibers of Haque are not relevant to LoFaro (Appeal Br. 6), is unpersuasive because the Examiner relies on Haque to describe fiber diameter suitable for molding mats and not the resin soluble

polymer. Final 4. The Examiner reasons that employing the diameter ranges of Haque results in a "uniform distribution of reinforcement fibers providing improved strength, stiffness, impact resistance, and surface qualities, in addition to uniform weight consistency and uniform properties." Final 4 (citing Haque, 3:25–33).

Accordingly, we discern no reversible error in the Examiner's findings or reasoning and we sustain the Examiner's rejection of claims 1, 4–6, and 8 as obvious over LoFaro in view of Haque and Burrows.

Rejection B — Obviousness (claims 1, 4–6, and 8)

The Examiner rejects claims 1, 4–6, and 8 as obvious in view of LoFaro, Burrows, Haque, and Raghavendran. Final Act. 5. In addition to the findings above for Rejection A, the Examiner further finds that Raghavendran teaches a fiber reinforced thermoplastic sheet that forms a skin where "the skins have a thickness of about 25 micrometers to about 2.5 mm." *Id.* at 6. The Examiner explains that because LoFaro is silent as to the thickness of the veil, a person of skill in the art would have looked to thicknesses used in the prior art. The Examiner reasons that the skilled artisan would have adjusted and varied the thickness of the veil "motivated by the desire of forming a conventional nonwoven veil having a thickness known in the art as being predictably suitable for similar fabrics having similar properties, based on the desired application." *Id.* at 7.

Appellant asserts that "Raghavendran does not cure the deficiencies of LoFaro, Burrows, and Haque" and "Raghavendran fails to disclose or teach the claimed limitation of 'fibers having a mean diameter of between 10 μm and 16 μm, wherein less than 20% of the fibers have a diameter of less than 8 μm.'" Appeal Br. 7. Appellant acknowledges that the Examiner relies on

Raghavendran to address the thickness of the nonwoven fabric, not the fiber diameter limitations. *Id.*

For the same reasons discussed above in addressing Rejection A, we are not persuaded the Examiner reversibly erred in Rejection B. Accordingly, we sustain the Examiner's rejection of claims 1, 4–6, and 8 as obvious over LoFaro and in view of Burrows, Haque, and Raghavendran.

CONCLUSION

In summary:

Claim(s) Rejected	**35 U.S.C. §**	**Reference(s)/Basis**	**Affirmed**	**Reversed**
1, 4–6, and 8		LoFaro, Burrows, Haque	1, 4–6, and 8	
1, 4–6, and 8		LoFaro, Burrows, Haque, Raghavendran	1, 4–6, and 8	
Overall Outcome			1, 4–6, and 8	

DECISION

For the above reasons, the Examiner's rejection of claims 1, 4–6, and 8 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