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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/363,132	06/05/2014	Joel A. Getschel	68118US004	1076

32692 7590 12/19/2016
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EXAMINER	
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ART UNIT	PAPER NUMBER
1745	

NOTIFICATION DATE	DELIVERY MODE
12/19/2016	ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte 3M INNOVATIVE PROPERTIES COMPANY

Appeal 2016-008120
Application 14/363,132
Technology Center 1700

Before LINDA M. GAUDETTE, CHRISTOPHER L. OGDEN, and DEBRA L. DENNETT, *Administrative Patent Judges*.

GAUDETTE, *Administrative Patent Judge*.

DECISION ON REQUEST FOR REHEARING

Appellant[1] requests reconsideration of our Decision[2] affirming the Examiner's rejections of claims 1, 2, 4–9, and 11–22 under pre-AIA 35 U.S.C. § 103(a). Request for Rehearing ("Req. Reh'g." or "Request") filed Dec. 2, 2016. Appellant argues that, in determining the claimed invention would have been obvious over the combined teachings of Haverty et al. (US 2008/0254307 A1, pub. Oct. 16, 2008 ("Haverty")) and Longo et al. (US 2010/0003378 A1, pub. Jan. 7, 2010 ("Longo")), we improperly focused on the teachings of Longo and failed to give adequate weight to the teachings of Haverty. *See* Req. Reh'g 2. In our Decision, we found Longo teaches that the "[b]onding of [a] thermoplastic film with [a] foamed polyester sheet can be carried out by any technique conventionally used in the art, including: . . . in-line lamination" (Longo ¶ 58). Dec. 6. Based on this disclosure in Longo, which was not relied upon explicitly by the Examiner in the Final Office Action or the Answer, we were not persuaded by Appellant's argument that the Examiner erred in finding the ordinary artisan reasonably would have expected that an oriented polyester film and a low density polyester foam could be laminated successfully using Haverty's continuous (in-line) lamination device (*see* Haverty Fig. 1). *See* Dec. 5–6; *see also* Examiner's Answer Mailed July 15, 2016 ("Ans."), 3.[3]

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[1] The real party in interest was identified in the Appeal Brief as "3M Company (formerly known as Minnesota Mining and Manufacturing Company) of St. Paul, Minnesota and its affiliate 3M Innovative Properties Company of St. Paul, Minnesota." Appeal Brief filed Jan. 25, 2016 ("App. Br."), 3.
[2] DECISION ON APPEAL ("Dec." or "Decision") mailed October 31, 2016 (denominating the affirmed rejections as NEW GROUNDS OF REJECTION pursuant to 37 C.F.R. § 41.50(b)).
[3] We note that the new arguments advanced by Appellant in this Request are permitted because they are made in response to a new ground of rejection in the Decision. 37 C.F.R. § 41.52(a)(3).

Appellant contends Longo provides a generic list of both oriented and non-oriented thermoplastic film materials that are suitable for bonding to a low density, foamed polyester resin sheet. Req. Reh'g 3 (citing Longo ¶ 56). Appellant further contends Longo lists several different techniques that can be used for bonding these materials, but provides no direction as to which technique(s) would be suitable in the specific case of bonding an oriented polyester film to a foamed substrate. *Id.* Appellant argues Longo does not describe any examples of laminating an oriented polyester film to a low density polyester resin sheet, and that the ordinary artisan would have understood that "Longo's preferred combination (¶ 58) is to bond amorphous (rather than oriented) polyester films to substrates by coextrusion (rather than by in-line lamination)." *Id.* at 3. Appellant contends "[a]n ordinary artisan would . . . reasonably expect that Longo never actually experimentally explored the specific combination of bonding *an oriented, polyester* film to a substrate by *in-line lamination* and that Longo thus never encountered the problem of film shrinkage so copiously documented by Haverty." *Id.*

Appellant argues that, in contrast to Longo, Haverty provides "voluminous, detailed discussion of the issues that arise when attempting to bond an oriented polyester film to a substrate by in-line lamination." *Id.* Appellant thus contends that when considering whether Haverty's in-line lamination technique could be used to bond an oriented polyester film to a low-density polyester foam, the ordinary artisan would have given greater weight to Haverty's teaching that a very high lamination pressure is required to prevent shrinkage of the oriented polyester film. *Id.* According to Appellant, "based on the disclosures of Haverty along with an artisan's background knowledge of the crush strength of low-density polyester foam," one of ordinary skill in the art would have had "no expectation that

Haverty's process could be operated at a pressure low enough to allow a low density polyester foam to survive but high enough to prevent unacceptable shrinking of the oriented polyester film." *Id.* at 4.

We have considered Appellant's arguments, but are not convinced of error in our Decision.

Haverty describes a continuous lamination technique for bonding an "oriented semi-crystalline thermoplastic, such polyethylene terephthalate (PET), . . . polypropylene (PP)" (Haverty ¶ 18), "polybutylene terephthalate (PBT), or other like materials" (*id.* ¶ 50) to a secondary material (*id.* ¶¶ 18, 53). According to Haverty,

> [o]rientation (or 'molecular orientation') generally refers to the alignment of molecules within a particular piece of plastic material. As the molecules are aligned, the orientation arid crystalline structure of the polymer chains within the piece of plastic increases. The degree of the orientation and crystallization dictates the strength of the plastic.

Id. ¶ 7.

Haverty discloses that, for purposes of forming a rigid unitary member (Abstract), PET is a preferred material because "[t]he strength of oriented PET makes it particularly well-suited for applications requiring high-strength, resilient materials." *Id.* ¶¶ 50–51. According to Haverty, "PET must be significantly stretched to obtain optimal polymer chain alignment arid resulting strength, and tremendous force must be used to orient the material." *Id.* ¶ 51. Haverty describes the general processing conditions used for the continuous lamination of a "sheet of oriented thermoplastic" to the same or another material. *See* ¶¶ 52–66. Haverty also describes several specific processing conditions required when the sheet of oriented thermoplastic is PET. *See id.* ¶ 58 ("The temperature of each heater can be varied, and the temperature depends on the material being combined. For instance, PET has a melting point of approximately 500° F.), ¶ 63 ("While a varying range of pressures may be used to combine the layers 101*a-c*, a pressure P_1 of between about 5-75 psi is preferable for PET layers with thicknesses of approximately 0.040 inch."). Haverty discloses applying a pressure P_1 to the laminate to bond the layers. *Id.* ¶ 63. Haverty discloses that "[w]hen oriented thermoplastic is heated, it tends to contract and shrink" (*id.* ¶ 57) and, therefore, applying a pressure P_2 that "is much greater than P_1" "should be used to restrict the movement and shrinking of the layers" during a subsequent heating stage (*id.* ¶ 65). Haverty discloses that preventing shrinkage "helps retain the degree of orientation of the polymer chains within the surfaces of the layers and members, and thus preserves the strength benefits within the material." *Id.* Haverty discloses that "the value of P_2 will vary as a function of the material used for the oriented layers . . . , the speed of the material through the lamination device . . . , and the temperatures generated by the heaters." *Id.*

Based on the foregoing disclosure in Haverty, we find that Haverty is concerned primarily with forming laminates comprising "[c]ertain forms of . . . thermoplastics," i.e., "semi-crystalline thermoplastic sheets," in particular, semi-crystalline PET, and that Haverty focuses on the process conditions needed to successfully laminate these particular materials. *See id.* ¶¶ 51–52. Haverty clearly teaches, however, that the continuous lamination device of Figure 1 may be used with "virtually any thermoplastic material." *Id.* ¶ 50. As indicated in our Decision (*see* Dec. 6), the Examiner's rejection was based on a finding that the ordinary artisan would have used Haverty's continuous lamination device/method to form one of the laminates described in Longo, e.g., a low-density polyester foam and an oriented polyester film. *See* Final Act. 3. Longo discloses laminates comprising a low-density polyester foam layer (Longo ¶ 54) and a "thermoplastic film [that] may be selected from a wide variety of oriented and non-oriented films of homo-polymers, co-polymers, and mixtures thereof[,] . . . includ[ing] polyesters" (*id.* ¶ 56). Longo does not describe the crystallinity of the material used for the thermoplastic film (*see id.*), but discloses that the polyester sheet used for the foam layer has low crystallinity (*id.* ¶ 43).

Appellants have not argued persuasively that it was erroneous or unreasonable for the Examiner to find that the ordinary artisan would have recognized that the high pressure P_2 used by Haverty to restrict the movement and shrinking of a *semi-crystalline*, oriented thermoplastic sheet (such as semi-crystalline, oriented PET) would not be required when laminating a low-density polyester foam and an oriented polyester film as described in Longo, given Longo's explicit teaching that in-line lamination techniques can be used. In other words, we are not persuaded that the ordinary artisan would have focused more heavily on Haverty's disclosure in considering whether to laminate the materials described in Longo, since Appellant has not shown that the same high pressure P_2 would be required when laminating materials that are not semi-crystalline, oriented PET, or other *semi-crystalline* oriented thermoplastics.

We also have considered, but are not persuaded by Appellant's argument that Longo provides no direction to use in-line lamination in the specific case of bonding an oriented polyester film to a foamed substrate. Req. Reh'g 3. As an initial matter, we note that Appellant's argument is not commensurate in scope with claim 1, because claim 1 does not require an *oriented* polyester film.[4]

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[4] Appellant's arguments in the Appeal Brief were directed solely to limitations in claim 1, i.e., Appellant did not present separate arguments in support of patentability of any dependent claims. *See* App. Br. 5–11.

Claim 1 recites a method of forming a polyester laminate comprising a "first polyester substrate" and a "second polyester substrate," "wherein the first polyester substrate and/or the second polyester substrate comprises a polyester foam with a density of less than 0.2 g/cc." App. Br. 13 (Claims App'x). The Specification defines "polyester laminate" as "a multilayer structure comprising at least two layers of polyester material (e.g., polyester films and/or cellular polyester materials) that are bonded to each other. Specification filed June 5, 2014 ("Spec."), 2:18–19. The Specification defines "polyester" as "any material in which at least about 70 % by weight of the material is a homopolymer and/or copolymer (e.g., synthetic homopolymer or copolymer) having ester linkages, as may be formed e.g. by condensation polymerization methods." *Id.* at 7:14–16. The Specification discloses that "[i]n some embodiments a polyester substrate may be thermoformable, meaning that it is made of a thermoplastic material that can be heated to a softening temperature at or above which it can be formed to a shape, and can then be cooled to maintain the structure in the formed shape." *Id.* at 9:25–27; *see also id.* at 11:25–26. The Specification further discloses that

> [i]n some embodiments, a polyester substrate to be bonded . . . may be a polyester film substrate that comprises at least one oriented polyester film. By 'oriented' polyester film is meant polyester film that has been subjected at least to a uniaxial orienting process optionally followed by heat-setting. . . . In some embodiments, the oriented polyester film is a biaxially-oriented polyester film.

Id. at 10:19–26. The Specification discloses that "[i]n various embodiments, the biaxially oriented polyester film may comprise a % crystallinity of at least about 10, 20, 30, 40, or 50 %." *Id.* at 10:32–33.

The above-cited disclosure in the Specification supports a conclusion that claim 1, given its broadest reasonable construction, is not limited to a laminate comprising an oriented film, or a film having a particular degree of crystallinity.[5]

Turning now to the merits of Appellant's argument that Longo provides no direction to select the particular substrate materials recited in claim 1 and an in-line lamination technique, we find that although Longo discloses that the thermoplastic film may be selected from a wide variety of materials, Longo specifically identifies polyesters as the first material in a very limited list of exemplary materials. *See* Longo ¶ 56. Similarly, although Longo states that any conventional technique can be used to bond the thermoplastic film to a foamed sheet, Longo specifically cites in-line lamination in a limited list of exemplary techniques. *Id.* ¶ 58. Longo's preferred laminate, comprising "a thermoplastic film of amorphous polyester with [a] foamed polyester sheet" (*id.* ¶ 58), falls within the scope of claim 1, which, as discussed above, does not require an oriented film or particular degree of crystallinity. Although Longo describes coextrusion of these materials as preferred, Appellant has not identified, nor do we find, a teaching away from using in-line lamination. *See In re Gurley* 27 F.3d 551, 553 (Fed. Cir. 1994) ("A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.").

[5] In fact, the only claims that require an oriented polyester substrate are dependent claims 9 and 19. App. Br. 15–16 (Claims App'x).

In conclusion, based on the foregoing, we have granted Appellant's Request to the extent that we have reconsidered our Decision, but we deny Appellant's request to make any change therein.

DENIED