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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/422,902	02/20/2015	Martin Bussmann	074008-1638-US-522893	1313
123223	7590	09/26/2019	EXAMINER	
Drinker Biddle & Reath LLP (WM) 222 Delaware Avenue, Ste. 1410 Wilmington, DE 19801-1621			SANDERSON, LEE E	
			ART UNIT	PAPER NUMBER
			1782	
			NOTIFICATION DATE	DELIVERY MODE
			09/26/2019	ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MARTIN BUSSMANN,
UWE WITT, and JÖRG KOHL

Appeal 2019-000341
Application 14/422,902
Technology Center 1700

Before MICHAEL P. COLAIANNI, GEORGE C. BEST, and
DEBRA L. DENNETT, *Administrative Patent Judges*.

BEST, *Administrative Patent Judge*.

DECISION ON APPEAL

The Examiner finally rejected claims 1, 7–11, 13, and 16–21 of Application 14/422,902 under 35 U.S.C. § 103(a) as obvious. Final Act. 2–3, 7, and 8 (Oct. 11, 2017). After Appellant amended the claims, the Examiner modified the grounds of rejection.¹ Adv. Act. 2, 6 (filed Jan. 12, 2018).

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 BASF SE. Appeal Br. 2.

Appellant seeks reversal of these rejections pursuant to 35 U.S.C. § 134(a).²
We have jurisdiction under 35 U.S.C. § 6(b).

For the reasons set forth below, we AFFIRM.

BACKGROUND

The '902 Application describes biodegradable polymer mixtures for the production of thin-walled injection-molded parts. Spec. 1:1–6.

Claim 1 is representative of the '902 Application's claims and is reproduced below from the claims listing in the Corrected Claims Appendix to the Appeal Brief:

1. An injection-molded item that comprises a wall thickness from 0.3 to 0.7 mm, the item formed from a polymer mixture comprising:

(A) from 15 to 50% by weight, based on components A and B, of a biodegradable, aliphatic-aromatic polyester with MFR (190°C/2.16 kg in accordance with ISO 1133) of from [110] to 150 g/10 min comprising:

i. from 52 to 65 mol%, based on components i to ii, of adipic acid and/or of sebacic acid derivatives;

ii. from 48 to 35 mol%, based on components i to ii, of a terephthalic acid derivative;

iii. from 98 to 100 mol%, based on components i to ii, of a C₂–C₈-alkylenediol or C₂–C₆-oxyalkylenediol; and

i[v]. from 0 to 2% by weight, based on the total weight of components i to iii, of a chain extender and/or branching agent selected from the group consisting of: a di- or polyfunctional isocyanate, isocyanurate, oxazoline, epoxide, and carboxylic anhydride, and/or of an at least trihydric alcohol, or of an at least tribasic carboxylic acid;

² Appellant canceled claims 18 and 19 by Amendment (filed Dec. 11, 2017).

(B) from 50 to 85% by weight, based on components A and B, of polylactic acid with MFR (190°C/2.16 kg in accordance with ASTM D1238) of from 5 to 50 g/10 min, a melting point below 240[]°C, and a glass transition temperature above 55[]°C, and the polylactic acid B forms a continuous phase and the polyester A forms the disperse phase,

(C) from 0 to 40% by weight, based on the total weight of components A to D, of an organic filler selected from the group consisting of: native or plastified starch, natural fibers, and wood flour, and/or of an inorganic filler selected from the group consisting of: chalk, calcium carbonate, graphite, gypsum, conductive carbon black, iron oxide, calcium chloride, dolomite, kaolin, silicon dioxide (quartz), sodium carbonate, titanium dioxide, silicate, wollastonite, mica, montmorillonite, talc powder, glass fibers, and mineral fibers, and

(D) from 0 to 3% by weight, based on the total weight of components A to D, of at least one stabilizer, nucleating agent, lubricant and release agent, surfactant, wax, antistatic agent, antifogging agent, dye, pigment, UV absorber, UV stabilizer, or other plastics additive.

Corrected Appeal Br., Claims App. 3–4.

REJECTIONS

On appeal, the Examiner maintains the following rejections:

1. Claims 1, 7–11, 16, 17, 20, and 21 are rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Hale,³

³ US 2005/0137356 A1, published June 23, 2005.

Bastioli,⁴ Knights,⁵ and Sudo,⁶ as evidenced by Ingeo 3251D Technical Data Sheet.⁷ Answer 3.

2. Claim 13 is rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Hale, Bastioli, Knights, Sudo, and Murphy.⁸ Answer 7.

DISCUSSION

Appellant argues for the reversal of the rejection of claims 1, 7–11, 16, and 17 on the basis of limitations recited in claim 1. Appeal Br. 5–15. Appellant presents additional arguments for reversal of the rejections of claims 13, 20, and 21. *Id.* at 15–18. We shall address these additional arguments below.

Rejection 1. The Examiner rejected claims 1, 7–11, 16, 17, 20, and 21 as obvious over the combination of Hale, Bastioli, Knights, and Sudo, as evidenced by Ingeo 3251D Technical Data Sheet. Answer 3.

⁴ US 2008/0194770 A1, published Aug. 14, 2008.

⁵ Knights, M., *Injection Molding Biopolymers: How to Process Renewable Resin*, Plastic Technology, 1–11 (2009) (hereinafter “Knights”).

⁶ US 2008/0195059 A1, published Aug. 14, 2008.

⁷ *Ingeo™ Biopolymer 3251 D Technical Data Sheet*, available at https://web.archive.org/web/20140323015638/http://www.natureworksllc.com/~media/Technical_Resources/Technical_Data_Sheets/TechnicalDataSheet_3251D_injection-molding_pdf.pdf, last visited Sept. 3, 2019 (hereinafter “Ingeo 3251D Technical Data Sheet”).

⁸ Murphy, J., *Chapter 4. Modifying Specific Properties: Mechanical Properties — Fillers*, *Additives for Plastics Handbook* 20–2135 (2nd ed. Elsevier 2001) (hereinafter “Murphy”).

Claim 1

In rejecting claim 1, the Examiner found that Hale describes or suggests every component and limitation of the claimed injection-molded item, with the exception of: (i) the wall thickness of the item; and (ii) two properties exhibited by polymer mixture components, which form the item. Answer 3–4. Regarding these missing properties, the Examiner specifically found that Hale is silent regarding the melt flow rates (MFR) of the copolyester (A) and the polylactic acid (B) components. *Id.* at 4.

The Examiner found Sodu teaches that an injection-molded syringe comprising a barrel portion having a hexagonal shape, with sidewalls having a thickness of 0.5 to 4 mm, reduces the amount of material used to produce the syringe. *Id.* (citing Sodu ¶¶ 1, 7, 8, 16, 21, 25–27, and Fig. 3). The Examiner concluded that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed Hale’s syringe in Sudo’s configuration in order to reduce the amount of material used to produce the syringe. Answer 5.

With respect to the copolyester (A) component’s MFR, the Examiner found Bastioli teaches that polyesters comprising a biodegradable and flexible copolyester (A) component having an MFR between 1–500 g/10 min as measured at 190°C/2.16 kg were known to be useful for injection-molding applications. Answer 4 (citing Bastioli ¶¶ 1, 12–36, 93, 94, and Abstract). The Examiner determined that it would have been obvious to the ordinarily skilled artisan to have modified Hale’s composition by selecting Bastioli’s biodegradable and flexible copolyester (A) component, which exhibits an MFR between 1–500 g/10 min as measured at 190°C/2.16 kg, because it was known in the art that polyester resins that exhibit an MFR in

this range are suitable for injection-molding applications. Answer 5. The Examiner concluded that the MFR of Bastioli's modified resin would have rendered obvious the MFR range recited in claim 1. *Id.* at 6.

Regarding the polylactic acid (B) component's MFR, the Examiner found Knights teaches that NatureWorks made an injection-molding grade polylactic acid resin commercially available under the tradename Ingeo 3251D. *Id.* at 4 (citing Knights 8). The Examiner found that Knights discloses that this resin is "useful for forming thin walled injection molded articles and exhibits good toughness as well as a high modulus." Answer 4 (citing Knights 8). The Examiner found that Ingeo 3251D Technical Data Sheet provides evidence that the polylactic acid resin possesses an MFR of 35 g/10 min (as measured at 190°C/2.16 kg), a T_m of 155–170°C, and a T_g of 55–60°C. Answer 4 (citing Ingeo 3251D Technical Data Sheet 1). The Examiner determined that

[i]t would have been obvious to one of ordinary skill in the art at the time the invention was made [to have] modified [Hale's] composition . . . with teachings of Knights by utilizing NatureWorks Ingeo 3251D as the PLA component in the composition because it was known to be suitable for use in injection molding applications ([*see*] MPEP §[2144.07) and because it exhibits good toughness and a high modulus.

Answer 5. The Examiner concluded that the MFR, T_g , and T_m of Bastioli's resin, modified by Knights' polylactic acid resin, would have met the MFR, T_g , and T_m requirements of polylactic acid component (B) recited in claim 1. *Id.* at 6.

Appellant admits that Hale discloses aliphatic-aromatic polyester components of the disclosed composition. Appeal Br. 8. Appellant, however, argues that this component exhibits a maximum MFR of 6 g/10 min, which

is about 20 times lower than the minimum claimed MFR value. Appeal Br. 8–10; *see also* Reply Br. 2.

Appellant’s arguments are not persuasive because Hale’s aliphatic-aromatic polyester, which exhibits an MFR of about 1.8–6 g/10 min, is merely a preferred embodiment. In other words, Hale’s disclosure is not limited to this preferred embodiment having “a very low MFR.” Reply Br. 2; *see also In re Lamberti*, 545 F.2d 747, 750 (CCPA 1976) (“[A]ll disclosure of the prior art, including unpreferred embodiments, must be considered.”). We, moreover, agree with the Examiner that the ordinarily skilled artisan would have been motivated to look to Bastioli, Knights, and Sudo for teachings regarding suitable MFR values for an injection-molded application. Answer 9.

Appellant argues that Sudo’s disclosure is “very general” and “does not specifically disclose” forming a syringe barrel from the claimed polymer composition. Appeal Br. 10. Appellant further argues that Sudo does not teach or suggest biodegradable polymers and, thus, cannot direct the ordinarily skilled artisan to the claimed injection-molded item. Reply Br. 3.

We are not persuaded by these arguments because the Examiner relied upon Sudo only to teach an injection-molded syringe barrel having a wall thickness of 0.5–4.0 mm. *See generally* Answer 3–7. The Examiner, moreover, did not rely on Sudo for teaching or suggesting the claimed composition. *Id.*

Appellant argues that Knights teaches that biopolymers cannot simply be used as drop-in substitutes for familiar resins, such as polypropylene. Appeal Br. 11–12. Appellant argues that Knights discloses that one biopolymer cannot be simply substituted for another biopolymer. *Id.* at 12.

Appellant's arguments are not persuasive because the Examiner does not propose mere substitution of one biopolymer for another. Answer 10. Appellant, therefore, has not identified reversible error in the Examiner's rejection, which is based on selecting specific grades of polylactic acid and aliphatic-aromatic polyester resins, each having the claimed MFR values. *Id.* As the Examiner found, these grades were known to those of ordinary skill in the art as suitable for injection-molding. *Id.*

Although Appellant acknowledges Knights discloses that the polylactic acid grade "INGEO® 3251 is suitable for thin wall application[s]," Appellant argues that Knights "does not define the size of the wall." Reply Br. 3.

Appellant, however, fails to identify error in the Examiner's reasons for combining Knights' teachings with Hale's. As the Examiner found, the ordinarily skilled artisan would have been motivated to modify Hale's composition to incorporate Knights' Ingeo 3251D because doing so would have provided a thin walled injection-molded article, which exhibits good toughness as well as a high modulus. *See Answer 4; see also, e.g., KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) ("[I]t can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.").

Appellant argues that the Specification provides data showing the criticality of the MFR range of the claimed polyester (A). Appeal Br. 13. According to Appellant, the claimed polymer mixture results in "unexpected superior results." *Id.* at 15. Appellant "believes that maybe the combined teaching of Hale and Bastioli might lead to reasonable results with a wall

size of approx. 1 mm[,] but not with a thin wall.” Reply Br. 2. In contrast, Appellant asserts that the claimed aliphatic-aromatic polyester provides “for a thin wall from 0.3 to 0.7 mm[,] which delivered surprisingly better results.” *Id.* at 3, 13–15.

Appellant’s arguments are not persuasive, *inter alia*, because “arguments of counsel cannot take the place of evidence lacking in the record.” *Estee Lauder Inc. v. L’Oreal, S.A.*, 129 F.3d 588, 595 (Fed. Cir. 1997).

We, furthermore, agree with the Examiner that Appellant has not provided sufficient evidence showing criticality with respect to the MFR value of *from 110 to 150 g/10 min* as claimed. *See* Appeal Br. 15 (describing that the MFR for inventive polyester A1 exhibited an MFR of 129–130 g/10 min, but the MFR for comparative example 2 exhibited an MFR of 83–84.5 g/10 min), 13; *see also* Answer 11. On this evidence, Appellant has not sufficiently demonstrated that the allegedly unexpected results of thin walls and reductions in injection pressure and mold fill occur across the claimed MFR range of 110–150g/ 10 min., but do not occur below *and* above that range. *See In re Harris*, 409 F.3d 1339, 1344 (Fed. Cir. 2005) (Unexpected results must also be “commensurate in scope with the degree of protection sought by the claims on appeal.”); *see also In re Graselli*, 713 F.2d 731, 743 (Fed. Cir. 1983) (It is well settled “that objective evidence of non-obviousness must be commensurate in scope with the claims which the evidence is offered to support.”).

Thus, when we consider all of the evidence, we determine that the preponderance of the evidence supports the Examiner’s conclusion of obviousness for claim 1.

We, therefore, affirm **Rejection 1** of claim 1. Thus, we also affirm **Rejection 1** of claims 7–11, 16, and 17, which ultimately depend from claim 1. 37 C.F.R. § 41.37(c)(1)(iv).

Claims 20 and 21

Claims 20 and 21 are reproduced below from the claims listing in the Corrected Claims Appendix to the Appeal Brief:

20. The injection-molded item according to claim 1, wherein the MFR (190°C/2.16 kg in accordance with ISO 1133) of the biodegradable, aliphatic-aromatic polyester is from 110 g/[10 min to 130 g/10 min.

21. The injection-molded item according to claim 1, wherein the MFR (190°C/2.16 kg in accordance with ISO 1133) of the biodegradable, aliphatic-aromatic polyester is from 129 to 150 g/10 min.

Appeal Br., Claims App. 5.

Appellant relies on the same evidence for reversal of the rejection of independent claim 1. Appeal Br. 17–18. In other words, Appellant argues that data provided in the Specification demonstrates the criticality of the claimed MFR ranges. *Id.*

For the reasons set forth above, the preponderance of the evidence supports the Examiner’s conclusion of obviousness for claims 20 and 21. On this record, Appellant has not sufficiently demonstrated that the allegedly unexpected results of thin walls and reductions in injection pressure and mold fill occur across the claimed MFR ranges of: (i) 110–130g/10 min and (ii) 129–150 g/10 min, but do not occur outside of these ranges. *See* Appeal Br. 13–15.

We, therefore, affirm **Rejection 1** of claims 20 and 21.

Rejection 2. The Examiner rejected claim 13 as obvious over the combination of Hale, Bastioli, Knights, Sudo, and Murphy. Answer 7.

Claim 13

Claims 9 and 13 are reproduced below from the claims listing in the Corrected Claims Appendix to the Appeal Brief:

9. The injection-molded item according to claim 1, where filler C includes the calcium carbonate and/or the chalk present from 5 to 30% by weight.

13. The injection-molded item according to claim 9, where filler C further include[s] talc, where a weight ratio of chalk:talc is from 2:5 to 5:1.

Appeal Br., Claims App. 4.

In rejecting claim 13, the Examiner found that modified Hale teaches or suggests every limitation of the polymer mixture composition that forms an injection-molded item recited in claims 1 and 9. Answer 7. Although Hale teaches incorporating 0–30 wt% of one or more fillers (such as calcium carbonate and talc) into the composition, the Examiner found that modified Hale is silent regarding the selection of the specific ratio of fillers recited in claim 13. *Id.*

The Examiner, however, relied upon Murphy's teachings that calcium carbonate is useful as a pigment, while talc improves the stiffness, creep resistance, and tensile strength of polymer compositions. Answer 7–8 (citing Murphy 20–21, Table 4.2). The Examiner determined, *inter alia*, that

[i]t would have been obvious to one of ordinary skill in the art at the time of invention to have adjusted the amounts of calcium carbonate and talc added to the composition of modified Hale through routine experimentation in order to arrive at a desired level of pigmentation and stiffness or tensile strength.

Answer 8.

Appellant argues that an ordinarily skilled artisan would have had no reason to modify the ratio of chalk to talc as claimed because Murphy “discloses a laundry list of . . . [19 types of fillers].” Appeal Br. 16 (citing Murphy 20), 17. Appellant further argues that Murphy neither discloses nor teaches that chalk:talc is present in a ratio from 2:5 to 5:1 as required by claim 13.

Appellant’s arguments fail to identify reversible error in the Examiner’s reasoning that one of ordinary skill in the art would have been motivated to vary the amounts of chalk and talc through routine experimentation in order to arrive at a desired balance between whiteness and stiffness. *See* Murphy 24, 26; *see also* Answer 8.

We, furthermore, are not persuaded by Appellant’s assertion that Murphy’s disclosure of 19 types of fillers detracts from the obviousness of claim 13. Appeal Br. 16–17. On these facts, we agree with the Examiner that selection of the 2 claimed ingredients to balance whiteness and stiffness out of Murphy’s 19 possible options would have provided one of ordinary skill in the art at the time of the invention with a predictable outcome. Answer 8; *see KSR*, 550 U.S. at 421 (explaining that where a skilled artisan merely pursues “known options” from “a finite number of identified, predictable solutions,” the resulting invention is obvious under Section 103); *see also In re Corkill*, 771 F.2d 1496, 1500 (Fed. Cir. 1985) (Obviousness rejection of claims affirmed in light of prior art teaching that “hydrated zeolites will work” in detergent formulations, even though “the inventors selected the zeolites of the claims from among ‘thousands’ of compounds.”); *and In re Susi*, 440 F.2d 442, 445 (CCPA 1971) (Obviousness rejection affirmed where the disclosure of the prior art was “huge, but it undeniably include[d]

at least some of the compounds recited in [A]ppellant’s generic claims and [was] of a class of chemicals to be used for the same purpose as [A]ppellant’s additives.”).

We, therefore, affirm the Examiner’s **Rejection 2** of claim 13.

CONCLUSION

In summary:

Claims Rejected	Basis	Affirmed	Reversed
1, 7–11, 16, 17, 20, and 21	§ 103(a) Hale Bastioli Knights Sudo	1, 7–11, 16, 17, 20, and 21	
13	§ 103(a) Hale Bastioli Knights Sudo Murphy	13	
Overall Outcome		1, 7–11, 13, 16, 17, 20, and 21	

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