UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/131,347	08/30/2011	Samuel Devisme	0078840-000032	5151

21839 7590 11/04/2016
BUCHANAN, INGERSOLL & ROONEY PC
POST OFFICE BOX 1404
ALEXANDRIA, VA 22313-1404

EXAMINER
KAUCHER, MARK S

ART UNIT	PAPER NUMBER
1764	

NOTIFICATION DATE	DELIVERY MODE
11/04/2016	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ADIPDOC1@BIPC.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte SAMUEL DEVISME, FABRICE R. CHOP,
JEAN-LAURENT PRADEL, GUILLAUME LE,
THOMAS ROUSSEL, and JEAN-LUC DUBOIS[1]

Appeal 2015-000268
Application 13/131,347
Technology Center 1700

Before CATHERINE Q. TIMM, BEVERLY A. FRANKLIN, and ELIZABETH M. ROESEL, *Administrative Patent Judges*.

TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL[2]

---

[1] Appellants identify the real party in interest as ARKEMA FRANCE. Appeal Br. 2.

[2] In our opinion below, we reference the English language Specification filed May 26, 2011 (Spec.), Final Office Action mailed December 2, 2013 (Final), the Appeal Brief filed April 25, 2014 (Appeal Br.), the Examiner's Answer mailed August 19, 2014 (Ans.), and the Reply Brief filed September 30, 2014 (Reply Br.).

STATEMENT OF CASE

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's decision to reject claims 1–4, 16, 17, and 20–31. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM-IN-PART and ENTER A NEW GROUND OF REJECTION.

The claims are directed to a grafted propylene polymer in which greater than 20% by weight of the carbon of the polymer originates from renewable raw materials as measured by standard ASTM D 6866-6. *See, e.g.*, claim 1. According to the Specification, "[a] renewable raw material is a natural resource, for example, animal or plant, the stock of which can be reformed over a short period on the human scale." Spec. 5:12–14. ASTM D 6866-06 sets forth test methods for carbon dating that can identify whether the carbon originates from renewable raw material or from fossil raw materials (oil) based on the amount of carbon-14 in a sample. Spec. 5:22–7:3. Claim 1 is illustrative:

> 1. A propylene polymer grafted by at least one grafting monomer selected from the group consisting of unsaturated carboxylic acids, functional derivatives of unsaturated carboxylic acids, unsaturated dicarboxylic acids having 4 to 10 carbon atoms, functional derivatives of unsaturated dicarboxylic acids having 4 to 10 carbon atoms, C_1-C_8 alkyl esters of unsaturated carboxylic acids, glycidyl ester derivatives of unsaturated carboxylic acids, metal salts of unsaturated carboxylic acids, and mixtures thereof,
>
> wherein the propylene polymer comprises an amount of carbon resulting from renewable raw materials of greater than 20% by weight relative to the total weight of carbon of the propylene polymer, the

> amount of carbon resulting from renewable raw materials being measured according to the standard ASTM D 6866-06.

Appeal Br. Claims Appendix 1.

The Examiner maintains the following rejections:

A. claims 1–4, 16, 17, 20, 21, and 28 under 35 U.S.C. § 103(a) as obvious over Hwang[3] in view of Braskem;[4] and

B. claims 22–27, and 29–31 over Hwang in view of Braskem, and further in view of Tian.[5]

OPINION

Rejection A: claims 1–4, 16, 17, 20, 21, and 28

At the outset, we note that Appellants do not argue any claim separately from the others when addressing the Examiner's rejection of claims 1–4, 16, 17, 20, 21, and 28 as obvious over Hwang in view of Braskem. Appeal Br. 5–8. We select claim 1 as representative for deciding the issue on appeal. The issue is: Have Appellants identified a reversible error in the Examiner's finding that those of ordinary skill in the art would have had a reasonable expectation of success when using known processes of grafting as taught by Hwang to graft Braskem's propylene polymer?

For the reasons discussed in the Answer, Appellants have not persuaded us of such a reversible error. We add the following primarily for emphasis.

The Examiner finds that Hwang discloses grafting propylene polymers with a grafting monomer such as maleic anhydride, one of the

---

[3] Hwang et al., US 5,424,362, issued June 13, 1995.
[4] Braskem, WO 2008/067627 A2, published June 12, 2008.
[5] Tian et al., US 2003/0236365 A1, published Dec. 25, 2003.

compounds within the scope of the grafting monomers of claim 1. Final 3. The Examiner finds that Hwang is silent as to the origin of the polypropylene. *Id.* Hwang describes grafting by, for instance, introducing the polymer to be grafted into a two-roll mixer, mixing at elevated temperature, adding the grafting monomer (unsaturated organic compound) and optionally initiator, and mixing until grafting is completed. Hwang, col. 4, l. 40-col. 5, l. 3.

Appellants contend that Hwang relates to the grafting of non-renewable (fossil-derived) polypropylene with commonplace methods. Appeal Br. 7, citing Hwang, col. 4, l. 58 to col. 5, l. 14; col. 7, ll. 39–47. Appellants have not persuaded us that the Examiner is incorrect in finding that Hwang is silent regarding the origin of the polypropylene. The portions of Hwang cited by Appellants do not definitively state that the polypropylene originates from non-renewable, fossil-derived, raw materials. Instead, Hwang's disclosure spanning columns 4 and 5 refers to known techniques of grafting, and the column 7 disclosure refers to methods of fabricating articles by molding the resultant polymer. Hwang, col. 4, l. 58 to col. 5, l. 14; col. 7, ll. 39–47. Neither disclosure discusses the origin of the raw material used to form the polypropylene. That being said, we acknowledge that it was common practice in the art to select a propylene derived from fossil feedstock for the polymerization. As discussed in Appellants' Specification, polypropylene was customarily made from non-renewable raw materials by catalytic or thermal cracking of oil fractions. Spec. 1:35–36.

There is no dispute that, as found by the Examiner, Braskem teaches polypropylene produced from propylene of renewable plant-based origin. *Compare* Final 3 *with* Appeal Br. 7.

As pointed out by Appellants, Braskem teaches using a gasification reaction of lignocellulosic materials and/or other organic products to produce olefins. Appeal Br. 7; Braskem 1:5–16. Specifically, Braskem teaches using the gasification process to produce propylene, and optionally, other olefins such as ethylene and butylene. Braskem 1:5–16. Figure 1 of Braskem depicts a block diagram of an integrated method for producing the olefins ethylene and propylene from sugarcane. Braskem 12:19–21. In the embodiment shown in Figure 1, the sugarcane sugars are fermented to obtain ethanol, which is used to produce ethylene, and in a separate stream, excess bagasse and straw are pyrolyzed, gasified, and the resulting synthesis gas further processed and used to produce methanol. Braskem 24:10–17; 33:6–15; Fig. 1. The methanol is used to produce propylene directly, or indirectly from the intermediate dimethyl ether, using known technologies. Braskem 24:14–17.

According to Braskem, "[d]epending on the process conditions (temperature, recycles) and the catalyst used, *the propylene may be obtained with high purity and high yield* or may generate ethylene and butylene as co-products." Braskem 24:19–25:5 (emphasis added). One can control the propylene to ethylene ratio to obtain either "almost pure propylene" or to obtain a ratio of ethylene to propylene. *Id.* Small amounts of butylene in relation to those two monomers may also be obtained, and there are produced, as additional by-products, streams with characteristics similar to those of fossil fuels (natural gas, liquefied petroleum gas (LPG), and

gasoline). *Id.* "The hydrocarbons thus produced are separated by distillation into the various streams of interest." *Id.*

Braskem further discloses using multiple reactors, recycle streams, and distillation steps to convert the methanol and/or dimethyl ether into propylene. Braskem 25:7–23. To obtain high levels of conversion into propylene, Braskem counsels using aluminosilicate-based zeolites of the Pentasil type as described in EP 448000. *Id.* According to Braskem, propylene generated from lignocellulosic materials can be used for the production of polypropylene and its copolymers. *Id.* at 27:12–19. Braskem's Example 1 uses the catalyst and technology described in EP 448000, and upon distillation recovers 30 tons of polymer-grade propylene, 8 tons of gasoline, 3 tons of LPG, and 52 tons of water. Braskem 33:17–23. An additional 14 tons of propylene was generated by reacting carbon dioxide from the fermentation of the juice from the sugarcane with hydrogen. Braskem 33:25–34:2.

Braskem discloses polymerizing a sample of the propylene of Example 1 using a Ziegler-Natta catalyst to produce polypropylene. Braskem 34:9–12.

Appellants contend that Braskem's gasification reaction would result in numerous unwanted compounds, and one of ordinary skill in the art would not use the impure olefins from Braskem with the grafting techniques of Hwang. Appeal Br. 7, citing Le Decl. ¶ 3.[6]

Le declares:

> Based on my review, it is clear that the olefins from Braskem will have significant unwanted compounds that will affect the

[6] Declaration of Guillaume Le, dated Nov. 15, 2013. Evid. Appendix of the Appeal Br.

> nature of the grafting in Hwang. For example, the gasification reaction of Braskem will result in an olefin including numerous unwanted compounds, such as NO_x, CO_2, H_2S, CH_4, and tars with benzenic cycles of raw formula C_nH_m.

Le Decl. ¶ 3.

In assessing the probative value of declaratory evidence, one must consider the nature of the matter sought to be established as well as the strength of the opposing evidence. *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978). Here, Braskem specifically discloses using renewable raw materials to produce propylene "with high purity" or "almost pure propylene." Braskem 24:19–27. Braskem also details specific synthesizing and distilling steps for obtaining the highly pure propylene that is sufficient for polymerization to polypropylene. Braskem, 25:7–23; Examples 1 and 2. Hwang teaches grafting by mixing the polymer, e.g., polypropylene with the grafting monomer so they react. Hwang, col. 4, l. 58-col. 5, l. 3. Declarant Le, on the other hand, does not provide an adequate factual basis to support a finding that NO_x, CO_2, H_2S, CH_4, and tars with benzenic cycles of raw formula C_nH_m would remain present in Braskem's polypropylene in amounts sufficient to prevent grafting after the synthesis and purification steps suggested by Braskem. Moreover, Le's declaration that, according to Le's knowledge, "[i]t was commonly understood by one skilled in the art that propylene, obtained from a gasification reaction of lignocellulosic materials and/or other organic components, was of generally low purity, even if possible to use in industrial process," Le Decl. ¶ 5, is outweighed by the disclosure in Braskem of producing high purity propylene from lignocellulosic materials and using such propylene to synthesize

polypropylene, and the lack of disclosure in Hwang of a purity requirement for the starting polypropylene subjected to grafting.

After considering the evidence as a whole, we determine a preponderance of the evidence supports the Examiner's finding of a reason to use propylene from a renewable raw material to form polypropylene which is in turn subjected to a grafting step. Although Appellants contend that it would have been merely "obvious to try" to reach the purity levels needed to form the grafted polypropylene,[7] the purification steps and disclosure of using "high purity" or "polymer-grade" propylene in Braskem, Braskem 24:20, 33:20, provide sufficient guidance to establish that there would have been a reasonable expectation that the polypropylene formed by Braskem would be adequate for use in the grafting process of Hwang.

Rejection B: claims 22–27, and 29–31

The Examiner rejects claims 22–27, and 29–31 over Hwang in view of Braskem, and further in view of Tian. Claim 22, like claim 1, is directed to a grafted propylene polymer.

Claim 22, with key limitations highlighted, reads:

> 22. *A propylene polymer* grafted by at least one grafting monomer selected from the group consisting of unsaturated carboxylic acids, functional derivatives of unsaturated carboxylic acids, unsaturated dicarboxylic acids having 4 to 10 carbon atoms, functional derivatives of unsaturated dicarboxylic acids having 4 to 10 carbon atoms, C_1-C_8 alkyl esters of unsaturated carboxylic acids, glycidyl ester derivatives of unsaturated carboxylic acids, metal salts of unsaturated carboxylic acids, and mixtures thereof,
>
> wherein *the propylene polymer* comprises an amount of carbon resulting from renewable raw materials of greater than

[7] Reply Br. 3–6.

> 20% by weight relative to the total weight of carbon of the propylene polymer, the amount of carbon resulting from renewable raw materials being measured according to the standard ASTM D 6866-06, *wherein the propylene polymer has a degree of purity greater than 95% by weight*.

Appeal Br. Claims Appendix 2–3 (emphasis added).

Claims 22 requires that "the propylene polymer" i.e., the "propylene polymer grafted by at least one grafting monomer," have a degree of purity greater than 95% by weight.

The Examiner finds that "Braskem generally embraces improving the purity of the propylene to 'high' purity via removing gas impurities by known methods" (Ans. 7) and relies upon a teaching in Tian of purifying monomer that is to be polymerized to form polyolefins such as polypropylene, and stating that, "[f]or example, when the monomer is propylene, polymer grade propylene having a minimum purity of 99.5 wt % was used after further purification." Tian ¶ 25. According to Tian, polymer grade propylene was further purified to remove known catalytic poisons to parts per billion levels. *Id.*

The Examiner finds that Tian provides a suggestion for increasing the purity to 99.5 wt% or greater "in order to efficiently produce the polymer (and graft copolymer) and thereby arrive at the claimed invention because one would want to improve the efficiency of the polymziation [sic] and remove poisonous impurities." Final 5. Tian, as well as the prior art cited by Appellants,[8] supports a finding that those of ordinary skill in the art understood that impurities would poison the Ziegler-Natta catalyst Braskem uses to polymerize propylene and thus the ordinary artisan would have

[8] Appeal Br. 11–12.

sought to use highly pure propylene. Tian ¶ 25; Ewen, col. 2, ll. 19–32 and col. 11, ll. 31–42;[9] Tangjituabun, in its entirety.[10,11] However, there is a problem. Claim 22 is not directed to the degree of purity of the *propylene*, but to the degree of purity of the *grafted propylene polymer*. On the other hand, Appellants do not distinguish between the purity of the propylene and the purity of the grafted propylene polymer in their arguments. Appeal Br. 9–12.

There is a further disconnect between what is claimed and what is disclosed in the Specification. Appellants' Specification is, similarly to the Examiner and Appellants, concerned with the purity of the propylene, and not the purity of the polymer end product. The Specification discloses optional purification steps (purification of alcohols produced by fermentation to separate the desired alcohol(s) from the other alcohols, and purification of an alkene (propylene) or mixture of alkenes formed from the alcohol) in the process of producing the propylene. Spec. 4:9–31; 9:29–31; 10:30–34; 12:7–11. The purpose of the optional purification step(s) is to

---

[9] Ewen et al., US 5,614,457, patented Mar. 25, 1997.
[10] Tangjituabun et al., *Poisoning of Active Sites on Ziegler-Natta Catalyst for Propylene Polymerization*, 26 Chinese Journal of Polymer Science 547–552 (2008).
[11] Appellants do not provide any indication that Ewen and Tangjituabun were filed or relied upon prior to the filing of the Appeal Brief. Although 37 C.F.R. § 41.33(d)(2) states that such late-filed evidence will not be admitted (except under some circumstances not met in this appeal), the Examiner has considered Ewen and Tangjituabun (Ans. 9) instead of issuing a Notice of Non-compliant Appeal Brief or refusing to consider the evidence. Given that the Examiner has considered the evidence, and due to the nature of the way we dispose of the issues in this appeal, we consider the evidence as well.

> obtain propylene having a sufficient degree of purity to carry out a polymerization or a copolymerization. Obtaining propylene having a degree of purity of greater than 85% by weight, preferably greater than 95% by weight, preferably greater than 99% by weight and very preferably greater than 99.9% by weight will be preferred.

Spec. 12:13–21.

We find no support in Appellants' original Specification for using Appellants' process to produce the *grafted propylene polymer* with a "degree of purity greater than 95% by weight," as recited in claim 22. Only the purity of the propylene monomer is discussed. The purity of the end product grafted polymer would appear to depend on not just the purity of the starting propylene, but also on the purity of the grafting monomer, and the purity of the polypropylene, as well as on the extent of the polymer reactions. The Specification does not discuss purity in the context of the grafting monomer, polypropylene, or the grafted propylene polymer.

The situation in this case leaves us in a conundrum. The Examiner's rejection is inadequate because the rejection focuses only on propylene purity, but Appellants have not identified an error in the rejection regarding a lack of findings on polymer purity. Both the Examiner and Appellants focus on a limitation that is not in the claim, i.e., a limitation on propylene purity. In this case, we overturn the Examiner's rejection and enter a new ground of rejection under 35 U.S.C. § 112 ¶ 1 as follows.

We reject claims 22–27 and 29–31 under 35 U.S.C. § 112 ¶ 1 as lacking written descriptive support. As we explained above, the original Specification fails to reasonably convey that Appellants had possession at the time of their filing date of a propylene polymer grafted by at least one grafting monomer ("the propylene polymer") having "a degree of purity

greater than 95% by weight" as recited in claim 22 or the degrees of purity recited in claims 23 and 24.

CONCLUSION

We sustain the Examiner's rejection of claims 1–4, 16, 17, 20, 21, and 28 under 35 U.S.C. § 103(a) as obvious over Hwang in view of Braskem, but we do not sustain the Examiner's rejection of claims 22–27 and 29–31 under 35 U.S.C. § 103(a) as obvious over Hwang in view of Braskem, and further in view of Tian. We make a new ground of rejection of claims 22–27 and 29–31 under 35 U.S.C. § 112 ¶ 1 as lacking written descriptive support.

DECISION

The Examiner's decision is affirmed-in-part and a new ground of rejection is entered pursuant to our authority under 37 C.F.R. § 41.50(b).

This decision contains a new ground of rejection pursuant to 37 C.F.R. § 41.50(b), which provides that a "new ground of rejection pursuant to this paragraph shall not be considered final for judicial review."

37 C.F.R. § 41.50(b) also provides that the appellant, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of the appeal as to the rejected claims:

> (1) Reopen prosecution. Submit an appropriate amendment of the claims so rejected or new evidence relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the proceeding will be remanded to the examiner. . . .

> (2) Request rehearing. Request that the proceeding be reheard under § 41.52 by the Board upon the same record. . . .

Should the appellant elect to prosecute further before the Examiner pursuant to 37 C.F.R. § 41.50(b)(1), to preserve the right to seek review under 35 U.S.C. §§ 141 or 145 with respect to the affirmed rejection(s), the effective date of the affirmance is deferred until conclusion of the prosecution before the Examiner unless, as a mere incident to the limited prosecution, the affirmed rejection is overcome.

If the Appellants elect prosecution before the Examiner and this does not result in allowance of the application, abandonment, or a second appeal, this case should be returned to the Patent Trial and Appeal Board for final action on the affirmed rejection, including any timely request for rehearing thereof.

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-IN-PART; NEW GROUND OF REJECTION