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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MARUTI BHANDARKAR, ELIZABETH ANN BENHAM, REBECCA A. GONZALES, SCOTT E. KUFELD, JOEL A. MUTCHLER, CATHERIN M. GILL, THANH T. NGUYEN, and TIMOTHY O. ODI

Appeal 2019-002209
Application 15/269,050
Technology Center 1700

Before JEFFREY T. SMITH, DONNA M. PRAISS, and MERRELL C. CASHION, JR., *Administrative Patent Judges.*

PRAISS, *Administrative Patent Judge.*

DECISION ON APPEAL[1]

Appellant[2] appeals under 35 U.S.C. § 134(a) from the Examiner's decision rejecting claims 1 and 3–35 under 35 U.S.C. § 103(a). An oral hearing was held on March 17, 2020. We have jurisdiction over the appeal under 35 U.S.C. § 6(b). We REVERSE.

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[1] Our Decision refers to the Specification ("Spec.") filed Sept. 19, 2016, the Final Office Action ("Final Act.") dated May 14, 2018, the Advisory Action ("Adv. Act.") dated July 27, 2018, Appellant's Appeal Brief ("Appeal Br.") filed Oct. 22, 2018, the Examiner's Answer ("Ans.") dated Nov. 23, 2018, and Appellant's Reply Brief ("Reply Br.") filed Jan. 17, 2019.

[2] We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42. Appellant is Chevron Phillips Chemical Company LP, which is also identified as the real party in interest. Appeal Br. 2.

STATEMENT OF THE CASE

The invention relates to polyolefin production, specifically, coupling and decoupling of polymerization reactors and downstream processing in a polyolefin production system. Spec. ¶ 2.

Claim 1, reproduced below from the Claims Appendix to the Appeal Brief, is illustrative (emphases added).

> 1. A polyolefin production system comprising:
>
> *a first loop slurry reactor configured to produce a first reactor discharge comprising a first solid polyolefin*;
>
> *a second loop slurry reactor configured to produce a second reactor discharge comprising a second solid polyolefin*; and
>
> a post-reactor treatment zone configured to receive the first reactor discharge and the second reactor discharge, wherein the first and second loop slurry reactors are configured to allow the first reactor discharge to be (a) transferred to the second reactor and, alternatively, (b) diverted to by-pass the second reactor and fed into the post-reactor treatment zone wherein to the first and second solid polyolefins are first contacted in the post-reactor treatment zone, and
>
> wherein the first solid polyolefin is 30 weight% to 70 weight% of the second.

ANALYSIS

We review the appealed rejection for error based upon the issues Appellant identifies, in light of the arguments and evidence produced thereon. *Ex parte Frye*, 94 USPQ2d 1072, 1075 (BPAI 2010) (precedential) (*cited with approval in In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011) ("[I]t has long been the Board's practice to require an applicant to identify the alleged error in the examiner's rejections.")). After considering the argued claims in light of the case law presented in this Appeal and each of Appellant's arguments, we are persuaded of reversible error in the Examiner's rejection.

The Examiner rejects claims 1 and 3–35 under 35 U.S.C. § 103(a) over the combination of Harrington[3] and Fouarge[4] for the reasons stated on pages 3–16 of the Final Office Action.

Appellant asserts the Examiner erred in finding that Harrington broadly discloses a system for producing two different polymers by bypassing a portion of the first polymer to a post reactor treatment zone. Appeal Br. 4 (citing Adv. Act. 3). According to Appellant, Harrington discloses a very specific solution phase system wherein polyolefins produced are dissolved in a solution within the reactors. *Id.* at 5. Appellant asserts that Harrington's discovery "hinged" on the solution phase process. *Id.* Appellant contends Harrington is clear that its systems require solution phase reactors because it is the only type of reactor disclosed which provides "an intimate blending of the low crystallinity and high crystallinity polymers" while the polymeric components are in solution. *Id.*; Reply Br. 3 (quoting Harrington ¶¶ 3, 7, 26–29, 31, 56, 65, 70, 76, 89).

Appellant argues that a solution phase reactor is not a "loop slurry reactor" as the claims recite because the reactors operate in different conditions and require different post-processing steps. Appeal Br. 5. Appellant further distinguishes the claims on the basis that the claimed reactors produce a discharge comprising a *solid* polyolefin, which Appellant

[3] US 2006/0183861 A1, published Aug. 17, 2006.
[4] US 2011/0124828 A1, published May 26, 2011.

asserts is suspended in liquid as a slurry and not a solution. *Id.* Appellant argues that this is a structural claim limitation. *Id.* at 6.

Appellant contends that the Examiner's rejection lacks a reasonable basis for modifying Harrington's reactors with Fouarge's loop slurry reactors because Harrington's reactors do not produce a polymer slurry, therefore, a skilled artisan would not have been motivated to improve the removal of something that does not exist in Harrington's system. *Id.* Appellant further argues that the addition of solid polyolefin to Harrington's phase separator, devolatizer, or fractionator would render the equipment inoperable because they are designed to handle only liquid and vapor streams. *Id.* at 6–7 (citing Harrington ¶ 32).

The Examiner responds that, because Harrington does not require the use of a solution phase reactor in its system, a person having ordinary skill in the art would have recognized the suitability of both solution phase reactors and loop slurry reactors for forming polyolefins. Ans. 16–17. The Examiner relies on Fouarge to show that it was conventional in the art at the time of the invention to use loop slurry reactors for olefin polymerizations. *Id.* at 16 (citing Fouarge ¶ 2). The Examiner notes a similar rejection set forth in the parent application was affirmed by the Board. *Id.* at 15 (citing *Ex parte Maruti Bhandarkar*, Appeal 2017-003527 (PTAB Aug. 23, 2016) ("Decision")).

In the Reply Brief, Appellant argues Harrington's disclosure regarding solutions used "[i]n *certain embodiments*" was taken out of context by the Examiner and the prior Board decision. Reply Br. 3 (quoting Appeal 2017-003527 (PTAB Aug. 23, 2016), 4; Harrington ¶ 26). According to Appellant, the embodiments Harrington references are producing polymers in separate series or parallel polymerizations, not that solutions of polymers are an optional embodiment. *Id.* (citing Harrington ¶ 26). Appellant directs us to Harrington's paragraph 27 as describing in more detail the parallel polymerization stages first mentioned in paragraph 26. *Id.* Appellant acknowledges that Harrington states its polymers "may" be produced in solution phase reactors, but asserts that Harrington's polymers "must" be produced in solution phase reactors, otherwise its system would be inoperable due to the downstream components designed to receive a liquid or vapor stream. *Id.* at 4.

Based on the cited record in this Appeal, we are persuaded that the Examiner reversibly erred in selecting Fouarge's loop reactors for modifying Harrington's solution reactors. Because each of independent claims 1, 13, and 23 require each claimed reactor to be configured to produce a discharge slurry comprising solid polyolefin, our discussion focuses on claim 1.

In rejecting claims under 35 U.S.C. § 103(a), it is incumbent upon the Examiner to establish a factual basis to support the legal conclusion of obviousness. *See In re Fine*, 837 F.2d 1071, 1073 (Fed. Cir. 1988). In so doing, the Examiner must make the factual determinations set forth in *Graham v. John Deere Co*., 383 U.S. 1, 17 (1966) (noting that 35 U.S.C. § 103 leads to three basic factual inquiries: (1) the scope and content of the prior art; (2) the differences between the prior art and the claims at issue; and (3) the level of ordinary skill in the art). Furthermore, the Examiner's obviousness rejection must be based on

> "some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness" . . . . [H]owever, the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can

> take account of the inferences and creative steps that a person of ordinary skill in the art would employ.

KSR Int'l Co. v. Teleflex, Inc., 550 U.S. 398, 418 (2007) (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

If the Examiner's burden is met, the burden then shifts to the Appellant to overcome the prima facie case with argument and/or evidence. Obviousness is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. *See In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992).

Although Harrington and Fouarge both disclose methods for polyolefin production, the Examiner's basis for selecting Fouarge's loop slurry reactors for use in Harrington's system is not reasonable based on the cited record in this Appeal. The Examiner finds that it would have been obvious to a person having ordinary skill in the art to choose Fouarge's reactors to "provide improvements in the removal of polymer slurry from the reactor." Final Act. 5. However, the Examiner does not explain adequately why Harrington's system would require removal of polymer slurry. We are persuaded by Appellant that Harrington does not teach or suggest a reactor effluent stream or subsequent stream containing solid polyolefin because Harrington dissolves polymers in a liquid solution whereby no slurry is created. Appeal Br. 6–7.

As Appellant points out, Harrington's reference to "certain embodiments" in paragraph 26 begins a discussion of producing low crystallinity polymers and high crystallinity polymers is separate series or parallel polymerization stages, not different types of reactors. Harrington teaches that the effluent from reactors is a solution in the series reactor process. Harrington ¶ 26. Harrington teaches that the effluents from each reactor in the parallel polymerization processes are likewise solutions. *Id.* ¶ 29. In addition, Harrington discloses that "[c]ombining the solutions of the polymeric components resulting from these processes provides an intimate blending of the low crystallinity and high crystallinity polymers during polymerization." *Id.* ¶ 27. Thus, the use of solution polymerization reactors for both the low crystallinity polymer and the high crystallinity polymer is taught by Harrington for this purpose. Appellant's position that Harrington requires reactors that produce polymer solutions is therefore supported by the preponderance of the evidence cited in this Appeal. Harrington ¶¶ 7, 26–29, 31, 56, 65, 70, 76, 89.

Although the Examiner notes (Ans. 15) that the parent application's claims were rejected over the same combination of prior art references and affirmed by the Board, the Examiner does not adequately explain why the rejection should similarly apply to the claims in this Appeal which require (1) loop *slurry* reactors and (2) effluents from each claimed reactor comprising *solid* polyolefin. Moreover, the Examiner has not explained adequately why a person of ordinary skill in the art would have reasonably expected that the reactor type disclosed by Fouarge would have been recognized as a suitable alternative for the solution polymerization reactor disclosed by Harrington.

For these reasons, we reverse the Examiner's rejection of claims 1 and 3–35 under 35 U.S.C. § 103(a) over Harrington and Fouarge.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 3–35	103(a)	Harrington, Fouarge		1, 3–35

REVERSED