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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ORSON L. SYDORA

Appeal 2019-001657
Application 12/980,457
Technology Center 1700

Before LINDA M. GAUDETTE, JAMES C. HOUSEL, and
MICHELLE N. ANKENBRAND, *Administrative Patent Judges*.

HOUSEL, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the Examiner's decision under 35 U.S.C. § 103(a) to reject claims 1, 2, 4, 5, 8, 10–14, 16–18, and 20–27 as unpatentable over Zhang (CN 1651142 A, pub. Aug. 10, 2005), and claim 15 as unpatentable over Zhang in view of Blann (Kevin Blann, et al., *Ethylene Tetramerisation: Suble Effects Exhibited by N-*

¹ We use the word Appellant to refer to “applicant” as defined in 37 C.F.R. § 1.42(a). Appellant identifies the real party in interest as Chevron Phillips Chemical Company LP. Appeal Brief (“Appeal Br.”) filed Sept. 6, 2018, p. 4.

substituted Diphosphinoamine Ligands, J. Catalysis 249 (2007), 244–9). We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.²

CLAIMED SUBJECT MATTER

The claims are directed to a process of making and using olefin oligomerization catalysts. Spec. Title; ¶ 2. Appellant discloses a method of forming an olefin oligomerization catalyst comprising forming a mixture of a metal compound, a diphosphino aminyl ligand, and a metal alkyl, aging the mixture in the substantial absence of an olefin monomer, and contacting the aged mixture with an olefin monomer to form an olefin oligomer product. *Id.* ¶ 4. According to Appellant, the oligomer product has a reduced polymer amount when compared to an otherwise similar process wherein the mixture is either not aged or aged in the presence of an olefin oligomer. *Id.*

Sole independent claim 22, reproduced below from the Claims Appendix to the Appeal Brief, is illustrative of the claimed subject matter (paragraphing added to improve readability):

22. A process comprising forming an aged catalyst system mixture that consists essentially of a metal compound, a diphosphino aminyl ligand, a metal alkyl that comprises an aluminoxane, and optionally a hydrocarbon solvent wherein forming the catalyst system mixture comprises:
- a) contacting i) the metal compound, ii) the diphosphino aminyl ligand, and iii) the metal alkyl that comprises the

² Our Decision refers to the Specification (“Spec.”) filed Dec. 29, 2010, the Examiner’s Final Office Action (“Final Act.”) dated Apr. 11, 2018, the Examiner’s Answer (“Ans.”) dated Oct. 25, 2018, and Appellant’s Reply Brief (“Reply Br.”) filed Dec. 17, 2018.

aluminoxane, wherein the molar ratio of the metal of the metal alkyl to the metal compound ranges from 100:1 to 3,000:1; and

b) aging the catalyst system mixture for at least 20 minutes in the substantial absence of an olefin monomer to form the aged catalyst system mixture,

wherein the substantial absence of the olefin monomer is a molar ratio of the olefin monomer to the metal compound up to 5:1,

wherein the process comprises oligomerizing ethylene to form a liquid oligomer product mixture comprising at least 60 wt. % C₆ and C₈ olefins.

OPINION

Appellant argues the limitations of independent claim 22 only. In accordance with 37 C.F.R. § 41.37(c)(1)(iv), dependent claims 1, 2, 4, 5, 8, 10–18, 20, 21, and 23–27 stand or fall with claim 22.

After review of the Examiner's and Appellant's opposing positions and the appeal record before us, we determine that Appellant's arguments are insufficient to identify reversible error in the Examiner's anticipation rejection. *In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011). Accordingly, we affirm the stated obviousness rejections for substantially the fact findings and the reasons the Examiner sets forth in the Examiner's Answer and the Final Office Action. We offer the following for emphasis only.

The Examiner finds that Zhang³ teaches a process for forming an ethylene oligomerization catalyst system to produce greater than 90 wt.%

³ The Examiner relies, without objection, on an English language machine translation of Zhang. However, Appellant's arguments in part include a human translation of relevant portions of Zhang. For purposes of this

C₆–C₈ linear alpha-olefin oligomer product, the process comprising mixing a chromium compound such as CrCl₃ or chromium acetoacetate (“Cr(acac)₃”), a diphosphino aminyl ligand such as Ph₂PN(iPr)PPh₂ or Ph₂PN(Cy)PPh₂, methylaluminoxane (“MAO”), in toluene, stirring the mixture for at least five minutes, and then “standby” at room temperature. Final 4–5. The Examiner further finds that although Zhang does not disclose a time of at least 20 minutes for mixing these catalyst components, Zhang’s aging time overlaps this time range because Zhang teaches that the catalyst system is held in “standby” after mixing for five minutes. *Id.* at 5.

Appellant argues that Zhang teaches aging the catalyst for exactly five minutes, but otherwise fails to teach a range of at least five minutes, let alone a range of at least 20 minutes as claimed. Appeal Br. 9–11. Appellant further argues that Zhang’s disclosure of “standby” or “future use,” without more, is insufficient support for concluding that Zhang’s catalyst system may be aged for an additional, indefinite amount of time. Appeal Br. 12–16; Reply Br. 3–5. Additionally, Appellant contends that one of ordinary skill in the art would not have optimized the aging time in Zhang to be at least 20 minutes because Zhang fails to recognize that aging time is a result-effective variable. Appeal Br. 16–21; Reply Br. 6. Lastly, Appellant argues that only through impermissible hindsight would a skilled artisan have optimized Zhang’s aging time to arrive at a time of at least 20 minutes. Appeal Br. 23.

Appellant’s arguments are not persuasive of reversible error. We note there is no dispute that Zhang teaches the same process as recited in claim 22, with the exception of an explicit teaching that the mixed catalyst should

Decision, we primarily rely on the machine translation, with support from the human translation.

be aged for a period of at least 20 minutes in the substantial absence of olefin monomer. Zhang discloses aging for five minutes, but includes the term, “standby,” according to the machine translation, or the phrase, “for future use,” according to the human translation. Appeal Br. 10–11. The Examiner interprets the modifying language as indicating that the catalyst may be used at some later, indefinite time after the five minutes of stirring/reacting. Ans. 4. Although Appellant argues that Zhang provides no context or disclosure of result as to the amount of time that qualifies as “standby” or “future use,” the Examiner notes that Zhang teaches the oligomerization process using the catalyst system to produce greater than 90 wt. % oligomer. This result provides context for any suitable length of time for which Zhang’s catalyst system is usable.

In addition, Appellant contends, and the Examiner accepts, that the ordinary artisan understood that Zhang’s catalyst system would degrade and become inactive over some indefinite period of time. *Compare* Appeal Br. 15, *with* Ans. 4. Thus, contrary to Appellant’s argument that aging time was not recognized to be a result-effective variable, the knowledge of those skilled in the art that Zhang’s catalyst system would degrade and become inactive over time is an indication that aging time was indeed recognized to be a result-dependent variable. Given Zhang’s objective to achieve greater than 90 wt. % oligomer, the ordinary artisan would have readily understood that the catalyst system should be used between five minutes and a future time at which the catalyst is degraded to a level that this result cannot be achieved. Therefore, the Examiner’s interpretation of “standby” and “future use” as suggesting an indefinite future time is reasonable within the context of Zhang’s disclosure and the knowledge of those skilled in the art. As such,

we are not persuaded that the Examiner's obviousness conclusion employs impermissible hindsight because the Examiner's reasoning is based on this interpretation of Zhang, rather than Appellant's disclosure.

Appellant next asserts that the recited aging process achieves an unexpected result, namely, a reduction in the relative amount of undesirable polymer produced during the oligomerization process, which Appellant supports primarily with citations to Specification Table 3. Appeal Br. 21–22; Reply Br. 6–12. The Examiner responds that these results are not commensurate in scope with claim 22. Ans. 6–7. Specifically, the Examiner sets forth seven features of the results that are not commensurate in scope with claim 22: 1) Claim 22 recites any diphosphino aminyl ligand, though Table 3 used only five different ligands (Spec. ¶ 230); 2) Claim 22 recites any metal compound, though Table 3 used only two different chromium compounds (*id.* ¶¶ 231–233); 3) Claim 22 does not require a solvent but permits any hydrocarbon solvent, though Table 3 used only three different solvents (*id.*); 4) Claim 22 recites any metal alkyl that includes aluminoxane, though Table 3 only used a single modified methylaluminoxane (“MMAO” or “MMAO-3A”) (*id.*); 5) Claim 22 recites an aging time of “at least 20 minutes,” but Table 3 only provided aging times of 0.02 hrs, 0.25 hrs, 1 hr, 2 hrs, and 4 hours; 6) Claim 22 does not recite a temperature either for the aging process or for the oligomerization process, though Table 3 only aged the catalyst system of the invention at 25°C and oligomerized at 45, 70, 85, and 95°C; and 7) Claim 22 recites a range of ratios of the metal of the metal

alkyl to the metal compound from 100:1 to 3,000:1, though Table 3 only provided ratios of 250:1 and 500:1.⁴ Ans. 6–7. We agree with the Examiner.

Appellant acknowledges that the Examiner addressed each of these seven features in both the Final Office Action and the Examiner’s Answer. Reply Br. 6–9. Although Appellant states that it addressed the Examiner’s position from the Final Office Action in the Appeal Brief (*id.* at 9, citing Appeal Br. 13–14), no such response is present in the Appeal Brief. In fact, pages 13 and 14 of the Appeal Brief address the Examiner’s interpretation of “standby” and “future use,” not the Examiner’s position that the results in Table 3 are not commensurate in scope with claim 22. Thus, Appellant presents a new argument not raised in the Appeal Brief addressing for the first time the Examiner’s position on commensurate in scope. Under regulations governing appeals to the Board, we do not consider new argument not timely presented in the Appeal Brief when filed in a Reply Brief, absent a showing of good cause explaining why the argument could not have been presented in the Appeal Brief. *See Ex parte Borden*, 93 USPQ2d 1473, 1476–77 (BPAI 2010) (informative); *see also* 37 C.F.R. § 41.37 and § 41.41. Appellant has provided this record with no such showing and, therefore, has waived this argument.

Further, even if considered, Appellant’s argument is not persuasive. The burden is on Appellant to explain why the results using only specific compounds and conditions are representative of the entire scope of the claims, such that one skilled in the art would reasonably expect any improvement in the results to be present over the entire range of compounds

⁴ Further, relative to the seventh feature, the alleged inventive runs were performed only with a ratio of 500:1. *See* Spec. ¶ 235, Table 3.

and conditions recited in the claims. A party asserting unexpected results as evidence of nonobviousness has the burden of proving that the results are unexpected. *In re Geisler*, 116 F.3d 1465, 1469–70 (Fed. Cir. 1997). Such burden requires Appellant to proffer factual evidence that actually shows unexpected results relative to the closest prior art, *see In re Baxter Travenol Labs.*, 952 F.2d 388, 392 (Fed. Cir. 1991), and that is reasonably commensurate in scope with the protection sought by the claims on appeal, *In re Grasselli*, 713 F.2d 731, 743 (Fed. Cir. 1983); *In re Clemens*, 622 F.2d 1029, 1035 (CCPA 1980); *In re Hyson*, 453 F.2d 764, 786 (CCPA 1972). “[I]t is not enough to show that results are obtained which differ from those obtained in the prior art: that difference must be shown to be an unexpected difference.” *In re Klosak*, 455 F.2d 1077, 1080 (CCPA 1972). The extent of the showing on which an Appellant relies also must reasonably support the entire scope of the claims at issue. *See In re Harris*, 409 F.3d 1339, 1344 (Fed. Cir. 2005). Appellant has not carried its burden here.

Appellant invites comparison of Runs 14 and 15, Runs 18 and 22, and Runs 24 and 25 of Table 3, which Appellant contends show that a catalyst system mixture that is aged for at least 20 minutes has a significant decrease in the relative amount of undesirable polymer produced during the oligomerization process. Appeal Br. 22. Though run 15 has an eight-fold relative reduction in polymer produced as compared to run 14, run 14 was only aged for 0.02 hrs (or 1.2 minutes, less than Zhang’s stirring time of 5 minutes) and run 15 was aged for 4 hrs (far more than the 20 minute low end point of claim 22). We note runs 16 and 17 were aged for the same times as runs 14 and 15, respectively, yet run 17 only presents less than a three-fold relative reduction in polymer produced. *See Spec.* ¶ 135, Table 3.

Similarly, runs 18 and 22, as well as runs 25 and 24, were also aged for the same times as runs 14 and 15, respectively, yet runs 22 and 24 present a nine-fold and a two-fold relative reduction in polymer produced, respectively. *See* Spec. ¶ 235, Table 3. On the other hand, we note run 19, which is aged for 1.2 minutes presents the lowest relative production of polymer of any of the three component catalyst system runs, which suggests that improved results are not necessarily dependent on aging time for all compounds and conditions within the scope of claim 22.

Additionally, we note that Appellant fails to present any evidence that the results, even if commensurate in scope with claim 22, were unexpected or surprising to those skilled in the art. “[I]t is well settled that unexpected results must be established by factual evidence. ‘Mere argument or conclusory statements in the specification does not suffice.’” *Geisler*, 116 F.3d at 1470 (quoting *In re De Blauwe*, 736 F.2d 699, 705 (Fed. Cir. 1994)); *see also In re Pearson*, 494 F.2d 1399, 1405 (CCPA 1974) (“Attorney’s argument in a brief cannot take the place of evidence.”).

CONCLUSION

Upon consideration of the record, and for the reasons given above and in the Final Office Action and the Examiner’s Answer, the decision of the Examiner rejecting claims 1, 2, 4, 5, 8, 10–18, and 20–27 under 35 U.S.C. § 103(a) as unpatentable over Zhang, alone or in view of Blann, is *affirmed*.

DECISION SUMMARY

In summary:

Claims Rejected	35 U.S.C. §	Basis/References	Affirmed	Reversed
1, 2, 4, 5, 8, 10–14, 16–18, 20–27	103(a)	Zhang	1, 2, 4, 5, 8, 10–14, 16–18, 20–27	
15	103(a)	Zhang, Blann	15	
Overall Outcome			1, 2, 4, 5, 8, 10–18, 20–27	

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). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED