

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 29

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MAKOTO SONE, SAIKI HASEGAWA,
SATORU YAMADA and AKIHIRO YANO

Appeal No. 1999-2506
Application No. 08/545,254

HEARD: January 24, 2002

Before, WARREN, OWENS and LIEBERMAN, Administrative Patent Judges.

LIEBERMAN, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the rejection of the examiner refusing to allow claims 7, 9, 10, 13, 15 through 20, 22 through 24, 26 through 28, 31 through 38, 40 and 41, as amended subsequent to the final rejection, which are all the claims pending in this application. ¹

¹Claims 21 and 39 were canceled by an amendment received January 20, 1998 and entered by the examiner. Claim 32 remains pending.

THE INVENTION

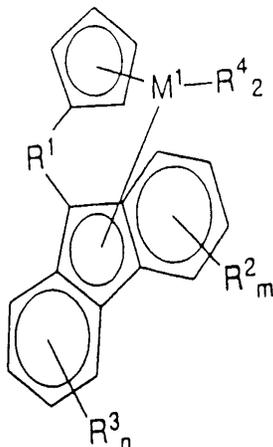
The invention is directed to a process for polymerizing an olefin monomer. The olefin monomer to be polymerized includes ethylene, an alpha olefin having three or more carbon atoms or both. The catalyst utilized in the polymerization process comprises a metallocene compound having an unsubstituted or substituted fluorenyl moiety, a dicyclopentadienyl moiety and containing a diarylsilanediy bridging moiety. Additional limitations are disclosed in the following illustrative claim.

THE CLAIM

Claim 7 is illustrative of appellants' invention and is reproduced below.

7. A process for producing an olefin polymer, which comprises polymerizing ethylene or an alpha-olefin of three or more carbons or both at a polymerization temperature of not lower than 120°C with a catalyst, said catalyst comprising:

(a) a metallocene compound having an unsubstituted or substituted fluorenyl group having the formula (I):



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wherein R^1 is a diarylsilanediyyl group which forms a bridge between the C_5H_4 group and the $C_4H_{4-m}R_m^2C_5C_4HR_{4-n}R_n^3$ group to increase steric rigidity of said compound of the formula (1); wherein C_5H_4 is a cyclopentadienyl group; $C_4H_{4-m}R_m^2C_5C_4HR_{4-n}R_n^3$ is a substituted fluorenyl group; R^2 and R^3 are independently a substituent on the benzo ring moiety of the substituted fluorenyl group, which substituent is an alkyl group, a halogenated alkyl group, an aryl group or a halogenated aryl group; M^1 is Ti, Zr or Hf; each of R^4 is independently a hydrogen atom, a hydrocarbon group, an amino group of 1 to 20 carbons, an oxygen-containing hydrocarbon group of 1 to 20 carbons, or halogen; m is an integer of from 0 to 4; and n is an integer of from 0 to 4; and

(b) a compound which reacts with the metallocene compound to form a cationic metallocene compound.

THE REFERENCES OF RECORD

As evidence of obviousness, the examiner relies upon the following references.

Matsumoto et al. (Matsumoto)	5,369,196	Nov. 29, 1994
Brekner et al. (Brekner)	5,545,829	Aug. 13, 1996
Palackal et al. (Palackal)	EP 0 628 577	Dec. 14, 1994
Hasegawa et al. (Hasegawa)	EP 0 612 768	Aug. 31, 1994

THE REJECTION

Claims 7, 9, 10, 13, 15 through 20, 22 through 24, 26 through 28, 31 through 38, 40 and 41 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hasegawa in view of Palackal, Matsumoto and Brekner.^{2 3}

OPINION

We have carefully considered all of the arguments advanced by the appellants and the examiner and agree with the examiner essentially for the reasons set forth in the Answer that the rejection of the claims under § 103(a) is well founded. Accordingly, we affirm this rejection and add the following comments for emphasis.

As an initial matter the appellants state that, “[c]laims 7, 9, 10, 13, 15-24, 26-28, 31 and 33-41 will stand or fall independently of each other.” See Brief, page 5. The only argument presented with respect to any of the dependent claims however, is a recitation of the limitation of the claimed subject matter followed by the sentence, “[t]his aspect of the present invention is neither disclosed nor suggested by any of the cited

²The rejections under 35 U.S.C. § 112, first and second paragraphs have been withdrawn.

³Although Palackal has a publication date of December 14, 1994, subsequent to appellants’ priority date, said priority date has not been perfected. Accordingly, Palackal is available as a reference. We further note that a counterpart of Palackal has issued in the United States. See US Patent No. 5, 401,817 bearing a filing date of May 20, 1993.

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references.” See Brief, pages 10-13. Accordingly, we select claim 7, one of the independent claims as representative of the claimed subject matter before us and limit our consideration thereto. See 37 CFR § 1.192 (c)(7)(1998).

Rejection under 35 U.S.C. § 103(a)

Hasegawa discloses a process for the polymerization of an ethylene, alpha olefin copolymer at a polymerization temperature not lower than 120°C as required by the claimed subject matter. See Abstract and page 2. We find that the catalyst comprises both a metallocene compound and an organoaluminum compound which is capable of changing the metallocene compound into cationic form. *Id.* The specific metallocene compounds are disclosed on page 2, line 33 through page 4, line 3 and claim 1. Claim 1 is directed to a metallocene compound of formulas (1) and (2). We directed our findings to formula (1). We find that the metallocene compound is a hafnium compound. See claim 1. We find that the hafnium compound is connected to moieties C_p^1 and C_p^2 which are independently cyclopentadienyl or fluorenyl moieties. *Id.* We find that a bridging moiety R^1 connecting both C_p moieties includes dialkylsilanediyyl among a limited number of bridging moieties. *Id.* We further find that the catalyst comprises an organo aluminum compound which reacts with the metallocene compound to form a cationic metallocene compound. *Id.* See also page 3, line 38 to page 4, line 23.

Based upon the above findings we conclude that Hasegawa discloses each of the limitations of the claimed subject matter other than a disclosure of a diarylsilanediyyl bridging moiety, Hasegawa being directed to a dialkylsilanediyyl bridging moiety.

Palackal is relied upon by the examiner to disclose the equivalency of the dialkyl and diarylsilanediyyl bridging moiety in the metallocene formula I of Hasegawa. See Answer, page 4. We find that Palackal similar to Hasegawa is directed to the polymerization of olefins using metallocene catalysts. See page 2, lines 6-8. We find that the metallocene catalysts of Palackal have a bridging moiety as required by the claimed subject matter and directed to a diorgansilyl bridge. See page 2, lines 6-9, and page 3, lines 1-4 and 26-48. We find that the bridging moiety designated as R' is preferably selected from the group consisting of alkyl radicals having 1 to 6 carbon atoms and aryl carbon radicals having 6 to 10 carbon atoms. See page 4, lines 9-11. We find that the preferred metals in the catalyst include titanium, zirconium and hafnium as required by the claimed subject matter. See page 5, lines 20-21. We further find that the most preferred cocatalyst is aluminoxane. See page 5, lines 16-33. In this respect, we note that aluminoxane is the compound of appellants' claim 10. We find that an olefin polymerization is exemplified by a metallocene catalyst containing either a dialkylsilanediyyl bridging moiety as disclosed by Hasegawa or a diarylsilanediyyl moiety. See Example V and Table I. We find that the polymerization temperature of the example is 70°C. Palackal however, disclose polymerization temperatures of -60°C to about

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320°C which exceeds the minimum requirement of the claimed subject matter for a polymerization temperature not lower than 120°C. See page 7, lines 1-6. Based upon the above findings and analysis it would have been obvious to the person having ordinary skill in the art to have substituted a diarylsilanediy l bridging moiety for the dialkyl bridging moiety since the evidence of record as disclosed by Palackal establishes that each bridging moiety in the otherwise identical formula within the scope of the claimed subject matter may be utilized in the polymerization of olefin monomers.

Accordingly, we conclude based on the totality of the record before us, that the disclosure of Hasegawa in combination with Palackal is sufficient to establish a prima facie case of obviousness. The burden accordingly shifts to appellants to overcome the presumption of obviousness that has been created. Having reviewed the data present, we conclude that appellants have not met their burden of showing unexpected results. In re Klosak, 455 F.2d 1077, 1080, 173 USPQ 14, 16 (CCPA 1972). It is not sufficient to assert that the results obtained are unusual or unexpected. The burden of showing unexpected results rests on those who assert them.

The appellants rely on an executed Rule 132 Declaration of record and argue that the Declaration shows five runs conducted with a diphenylsilanediy l bridging moiety of the present invent compared with five runs of Hasegawa directed to a diphenylmethylene bridging moiety of Hasegawa. See Brief, page 9. We find however that Hasegawa neither exemplifies nor

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claims a diphenylmethylen bridging moiety. The disclosure in the paragraph bridging pages 2 and 3 of the specification and claim 1 state that, "R' is a substituted or unsubstituted lower alkylene group, a dialkylsilanediyl group, a dialkylgermandiyl group, an alkylphosphinediyl group, or an alkylimino group." There is no exemplification of a diphenylmethylen group. Moreover there is no disclosure of a diphenylmethylen(cyclopentadienyl)(fluorenyl)zirconium dichloride. Accordingly the Declaration fails to compare the present invention with the closest prior art of record, i.e., a dialkylsilanediyl bridging moiety or the exemplified isopropylidene bridging moiety of Example 4. Furthermore, it fails to compare the present invention with any metallocene compound specifically disclosed by Hasegawa. See In re Baxter Travenol Labs., 952 F.2d 388, 392, 21 USPQ2d 1281, 1285 (Fed. Cir. 1991); In re De Blauwe, 736 F.2d 699, 705, 222 USPQ 191, 196 (Fed. Cir. 1984).

We furthermore adopt the Examiner's findings and conclusions regarding the Declaration under 37 CFR 1.132 as not being commensurate in scope with the claimed subject matter. See Answer, last paragraph, page 6 through page 8. See In re Grasselli, 713 F.2d 731, 743, 218 USPQ 769, 778 (Fed. Cir. 1983); In re Tiffin, 448 F.2d 791, 792, 171 USPQ 294, 294 (CCPA 1971). It is well settled that "objective evidence of nonobviousness must be commensurate in scope with the claims." In re Lindner, 457 F.2d 506, 508, 173 USPQ 356, 358 (CCPA 1972); In re Dill, 604 F.2d 1356, 1361, 202

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USPQ 805, 808 (CCPA 1979) ("The evidence presented to rebut a prima facie case of obviousness must be commensurate in scope with the claims to which it pertains.")

The appellants further argue that Palackal is directed to the stereospecific polymerization of propylene, a limited area of olefin polymerization. However, the scope of the claimed subject matter includes both the polymerization of propylene and stereospecific polymerizations.

The appellants further argue that the polymer produced according to the present invention has a substantially higher molecular weight than that produced by Hasegawa, Brief, page 6 and that of Palackal. See Brief, page 7. The polymers of Palackal however are directed to stereospecific polypropylene. Although these polymers fall within the scope of the claimed subject matter, one cannot directly compare the molecular weight obtained from the polymerization of a propylene monomer with that obtained from the polymerization of an ethylene monomer. Indeed, the single example within the scope of Hasegawa, Example 4, directed to the polymerization of ethylene and utilizing a bridged moiety between a fluorenyl moiety and a cyclopentadienyl moiety results in a polyethylene having a molecular weight exceeding that obtained and disclosed by the appellants in Table 1 of the specification. Accordingly, it is reasonable to conclude that metallocene catalysts having bridged fluorenyl and cyclopentadienyl moieties could be used to produce polyethylene polymers having higher molecular weight than the corresponding polypropylene polymers.

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Based upon the above reasons and those set forth in the Answer, we have determined that the examiner has established a prima facie case of obviousness. Upon reconsideration of all the evidence and argument submitted by appellants, we have determined from the totality of the record that the preponderance of the evidence weighs in favor of obviousness within the meaning of 35 U.S.C. § 103. See In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). Accordingly, the decision of the examiner is sustained.

A discussion of the references to Matsumoto and Brekner are not necessary in reaching our determination of obviousness.

OTHER MATTERS

In the event of further prosecution, the examiner should consider entering a rejection on the ground of anticipation over Palackal as it discloses each of the elements required by the claimed subject matter including the requisite polymerization temperature.

DECISION

The rejection of claims 7, 9, 10, 13, 15 through 24, 26 through 28, 31 through 38, 40 and 41 under 35 U.S.C. § 103(a) as being unpatentable over Hasegawa in view of Palackal, Matsumoto and Brekner is affirmed.

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The decision of the examiner is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED

CHARLES F. WARREN)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
TERRY J. OWENS)	APPEALS
Administrative Patent Judge)	AND
)	INTERFERENCES
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PAUL LIEBERMAN)	
Administrative Patent Judge)	

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