

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.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. 25

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte GIANNI PENNINI,
ARRIGO ARLETTI,
and
GIAMPIERO MORINI

Appeal No. 2001-0968
Application No. 08/894,423

HEARD: May 7, 2002

Before KIMLIN, DELMENDO, and NAGUMO, Administrative Patent Judges.

DELMENDO, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1 through 13, which are all of the claims pending in the above-identified application.

The subject matter on appeal relates to: a solid catalyst component for the polymerization of olefins (claims 1-8 and 11-13); a process for the preparation of the solid catalyst component (claim 9); and a process for the polymerization of particular olefins in the presence of the solid catalyst component (claim 10). The solid catalyst component of the

present invention is said to be capable of producing polyolefins in the form of "free-flowing particles having a tamped bulk density higher than 0.5 g/cm³." (Specification, page 3.) Further, the resulting polyolefins are said to contain "a particularly small fraction" of particles having a diameter of 500 Fm or smaller. (Id.) Further details of this appealed subject matter are recited in illustrative claim 1 reproduced below:

1. Solid catalyst component for the polymerization of olefins, comprising the product of the direct reaction, with no subsequent reactions with reducing organometallic compounds, between a titanium compound containing at least one Ti-halogen bond, optionally an electron-donor compound, and a support obtained by contacting a metal oxide containing hydroxyl groups with a solution comprising:

- A) magnesium chloride;
- B) an alcohol in quantities ranging from 1 to 6 moles per mole of magnesium chloride, in an organic solvent C) which is either a halogenated hydrocarbon or an aromatic hydrocarbon, the organic solvent being capable of bringing the magnesium chloride in solution in quantities greater than or equal to 5 g per liter in the presence of the above mentioned quantities of alcohol B), said solvent not being able to form adducts with magnesium chloride.

The examiner relies on the following prior art references as evidence of unpatentability:

Zucchini et al. (Zucchini '840)	4,305,840	Dec. 15, 1981
Zucchini et al. (Zucchini '961)	5,219,961	Jun. 15, 1993
Banzi et al. (Banzi)	5,578,540 (effective filing date Nov. 28, 1994)	Nov. 26, 1996
Werner et al. (Werner)(published European patent publication)	0 274 099 A2	Jul. 13, 1988

Claims 1 through 13 on appeal stand rejected under 35 U.S.C. § 103(a) as unpatentable over Werner in view of Zucchini '961, Zucchini '840, and Banzi.¹ (Examiner's answer, pages 3-4.)

We reverse this rejection. However, we enter below new grounds of rejection pursuant to our authority as set forth in 37 CFR § 1.196(b) (1997).

The Examiner's Rejection

Under 35 U.S.C. § 103, the initial burden of establishing a prima facie case of obviousness rests on the examiner. In re Piasecki, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984). Only when this initial burden is met does the burden of production shift to the applicants to rebut the prima facie case of obviousness, e.g. by presenting evidence of unexpected results. Id. In this case, it is our judgment that the examiner has not met this initial burden of proof.

Werner¹, the principal prior art reference, describes a Ziegler-Natta catalyst system consisting of (1) a titanium component containing titanium, magnesium, and chlorine, as well as a benzene carboxylic acid derivative on an inorganic, oxidic support material, (2) an aluminum component having the formula AlR_3 , wherein R is an alkyl radical having no more than 8 carbon

¹ As in the examiner's answer, our citations to Werner are to the English language translation of record.

atoms, and (3) a silane component having the formula $R^1_nSi(OR^2)_{4-n}$, wherein R^1 is an aryl or alkyl radical having no more than 16 carbon atoms, n is 0-3, with the proviso that the atomic ratio of Ti:Al is 1:10 to 1:800 and the molar ratio of the aluminum component (2) to the silane component (3) is 1:0.03 to 1:0.8.

(Page 5.) The catalyst system is said to be useful for the polymerization of propylene polymers. (Page 1.) Furthermore, like the appellants, Werner teaches that the resulting polymers have a reduced fraction of fine particles as well as high bulk density. (Page 3.)

According to Werner, the titanium component (1) may be prepared by carrying out a three sub-stage preparation process. (Pages 5-7.) Specifically, Werner teaches a first sub-stage in which a fine-particle magnesium chloride and 10 to 80 parts by mole, per 10 moles of the magnesium chloride, of a C_1-C_8 alcohol are continuously mixed in 1000 parts by weight, per 10 parts of the magnesium chloride, of "a liquid, inert hydrocarbon"

(especially an alkane) at a temperature ranging from $0^\circ C$ to $140^\circ C$. (Page 6.) Next, as a second sub-stage, Werner teaches incorporating 20 to 100 parts by weight, per 10 parts by weight

of the magnesium chloride, of a particular inorganic oxide support material having the formula $SiO_2 \cdot aAl_2O_3$, wherein a is 0-2,

into the mixture of the first sub-stage. (Pages 6-7.) Then, as a third sub-stage, Werner teaches combining the solid-phase reaction product of the second-sub-stage with titanium tetrachloride in "a liquid, inert hydrocarbon." (Page 7.) Regarding the "liquid, inert hydrocarbon," Werner teaches (page 9):

The liquid, inert hydrocarbon that is to be used in the preparation of the titanium component can be a hydrocarbon of the type that is commonly combined with titanium components for catalyst systems of the Ziegler-Natta type without causing any damage to the catalyst system or to its titanium component. Examples of suitable hydrocarbons are pentanes, hexanes, benzenes and cyclohexane. [Emphasis added.]

The examiner states: "Although Werner et al. generally teach the hydrocarbon compound to be the solvent, they do not particularly point out the hydrocarbon to be aromatic hydrocarbon, they also fail to teach to use a halogenated hydrocarbon as the solvent [sic]." (Examiner's answer, page 3.) In an attempt to account for this perceived difference, the examiner stated (id. at page 4):

[I]t would have been obvious to a skilled artisan at the time the invention was made to employ the aromatic or chlorinated hydrocarbon solvent of Zucchini et al. ('961), Zucchini et al. ('840), or Banzi et al. in Werner et al.'s [sic] process to obtain better solubility of magnesium chloride, thus, resulting more complete reactions and in the absence of showing of criticalities and unexpected results.

The examiner's stated position has no merit. We do not find any teaching or suggestion in the applied prior art that

unpatentable even if the prior art product was made by a process that is different from the process recited in the claims).

Additionally, appealed claim 1 recites: "a metal oxide containing hydroxyl groups." When we read this term in light of the specification, we find that such metal oxides are obtained by not subjecting commercially available support materials (e.g., silica SG332 from W.R. Grace) to any chemical or physical treatment. (Specification, page 5, lines 7-11; Example 1.)

The Dietz Reference

Claims 1 through 4, 7, 9, 10, 12, and 13 are rejected under 35 U.S.C. § 103(a) as unpatentable over Dietz.

Dietz describes a catalyst component produced by swelling a particulate magnesium dihalide (e.g., magnesium dichloride) with a secondary or tertiary alcohol (e.g., 1-propanol), preferably in the presence of a hydrocarbon diluent (e.g., an aromatic hydrocarbon such as benzene or toluene), removing some or all of the unreacted alcohol, and contacting the resulting product with a titanium compound (e.g., titanium tetrachloride). (Column 1, lines 5-27; column 2, lines 32; column 2, line 67 to column 3, line 12.) The molar amount of alcohol per mole of magnesium dihalide is said to be from about 2:1 to about 50:1, with the amount of alcohol associated with the magnesium dihalide as alcohol of crystallization generally varying from about 1 to about 6. (Column 3, lines 31-40.) Dietz further teaches that a diluent in particulate form (e.g., silica) can be admixed with the magnesium dihalide and other catalyst components. (Column 4, lines 48-57.)

In Example 1, Dietz describes a catalyst component obtained by: admixing magnesium dichloride, a 21-molar excess of 1-propanol relative to magnesium dichloride, silica, and n-hexane; removing unreacted alcohol; and then reacting the product with titanium tetrachloride. (Table Ia, Catalyst 4.) With respect to the silica, Dietz does not teach any chemical or physical treatment of the silica and thus, based on the specification description discussed above, it is reasonable to presume that it would necessarily contain surface hydroxyl groups. According to Dietz, Catalyst 4 was combined with triethylaluminum cocatalyst to polymerize ethylene. (Table Ia, Run 4P.)

Thus, we find that Dietz's Catalyst 4 reasonably appears to be the same or substantially the same as the catalyst recited in appealed claim 1, except for the amount of alcohol relative to the amount of magnesium dichloride. It is well settled that when a prior art product reasonably appears to be substantially the same as a product disclosed in the prior art, the burden of proof is on the applicants to prove that the prior art product does not inherently or necessarily possess the characteristics attributed to the claimed product. In re Spada, 911 F.2d 705, 708, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990); In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977). Whether the rejection is

based on inherency under 35 U.S.C. § 102 or on obviousness under 35 U.S.C. § 103, jointly or alternatively, the burden of proof is the same, and its fairness is evidenced by the PTO's inability to manufacture products or to obtain and compare prior art products. Best, 562 F.2d at 1255, 195 USPQ at 433-34.

Although Dietz's Catalyst 4 is made by using n-hexane, as distinguished from an aromatic hydrocarbon or a halogenated hydrocarbon as recited in appealed claim 1, we again point out that the appealed claims do not require the contact of the titanium compound with the specified organic solvent, i.e. the aromatic hydrocarbon or halogenated hydrocarbon. Also, nothing in the record, including the experimental data in the present specification, establishes that the use of an aromatic or halogenated hydrocarbon yields a substantially different catalyst, much less any unexpected result, relative to the use of n-hexane.

Even assuming that the use of the recited solvents imparts a structural difference relative to n-hexane, Dietz teaches the use of an aromatic hydrocarbon (e.g., benzene or toluene) as the solvent. Under these circumstances, one of ordinary skill in the art would have found it prima facie obvious to replace the n-hexane of Example 1 with benzene or toluene, with the reasonable expectation that these solvents would provide substantially similar results relative to n-hexane as expressly taught by Dietz. In re Longi, 759 F.2d 887, 897, 225 USPQ 645, 651-52 (Fed. Cir. 1985)(holding that the use of nitrogen-containing titanium compounds in a Ziegler-Natta catalyst in lieu of other titanium compounds would have been prima facie obvious to one of ordinary skill in the art); In re Mayne, 104 F.3d 1339, 1342-43, 41 USPQ2d 1451, 1454-55 (Fed. Cir. 1997)(holding that the substitution of a peptide for another functionally equivalent peptide in recombinant DNA art would have been prima facie obvious to one of ordinary skill in the art).

As to the amount of alcohol, Dietz teaches that the amount of alcohol may be as little as 2 moles per mole of magnesium dichloride. Accordingly, we determine that one of ordinary skill in the art would have found it prima facie obvious to use an amount as low as 2 moles of alcohol per mole of magnesium dichloride, as expressly suggested in the reference. In re Geisler, 116 F.3d 1465, 1469, 43 USPQ2d 1362, 1365 (Fed. Cir. 1997)(explaining that a claimed invention is rendered prima facie obvious when the teachings of a prior art reference discloses a range that touches or overlaps the range recited in the claim).

Claim 2 recites the presence of "up to 15 mmoles" of "chemically not combined water" per gram of metal oxide. We hold that the recitation "up to 15 mmoles" reads on 0 mmole. Even if a positive amount up to 15 mmoles had been recited, we determine that the use of commercially available silicas in Dietz would meet this limitation for the reasons discussed above with respect

to the absence of chemical or physical treatment of Dietz's support.

The limitations of claims 3, 4, 7, 9, 10, 12, and 13 are covered by our discussions above.

Werner Combined with Dietz and Noristi

Claims 1 through 10, 12 and 13 are rejected under 35 U.S.C. § 103(a) as unpatentable over the combined teachings of Werner, Dietz, and U.S. Patent 5,244,854 to Noristi issued on Sep. 14, 1993 and already made of record.

We refer to our factual findings above with respect to the teachings of Werner and Dietz.

Werner does not teach the use of an aromatic or halogenated hydrocarbon solvent and does not state that the inorganic oxide support has surface hydroxyl groups. Regarding the surface hydroxyl groups, we note that the appellants have withdrawn their argument that Werner does not disclose or suggest silica having surface hydroxyl groups.² (Reply brief, pages 1-2.) On this point, we further note that metal oxide supports with surface hydroxyl groups and chemically uncombined water are commonly used in the preparation of catalyst components that are similar to those described by Werner. (Noristi, column 3, lines 7-34, 58-68.)

Regarding the solvent, we again emphasize that the appealed claims do not require the contact of the titanium compound with the specified organic solvent, i.e. the aromatic hydrocarbon or halogenated hydrocarbon. Here, the appellants have not pointed to any evidence in the record to establish that the use of an aromatic hydrocarbon or halogenated hydrocarbon solvent, relative to an alkane, would lead to a structurally different catalyst.

Even assuming that the use of the recited solvents imparts a structural difference, Werner teaches that the solvent may be any solvent commonly used for Ziegler-Natta catalyst, provided that it does not damage the catalyst. (Page 9.) Also, Dietz teaches the preparation of a similar Ziegler-Natta catalyst in which an aromatic hydrocarbon (e.g., benzene or toluene) and alkanes are taught as interchangeable solvents. (Column 3, lines 2-7.) Accordingly, one of ordinary skill in the art would have found it prima facie obvious to replace the alkanes of Werner with benzene or toluene, thus arriving at a catalyst within appealed claims 1 and 12 or a process within appealed claim 9, with the reasonable expectation that these solvents would provide substantially similar results relative to alkanes as suggested by Dietz.

With respect to claim 2, the reasons given above in the rejection based on Dietz alone apply equally here. Moreover, Noristi teaches that the presence of chemically uncombined water is preferred in the preparation of catalysts that are similar to those described in Werner. (Column 3, lines 65-68.)

The limitations recited in claims 3 and 4 are taught by Werner.

As to claim 5, Noristi teaches that the recited ethers are electron donors for catalysts that are similar to those of Werner. (Column 5, lines 37-66.) Accordingly, one of ordinary skill in the art would have found it prima facie obvious to use the ethers described in Noristi in the preparation of the solid catalyst component described in Werner, with the reasonable expectation that an ether would provide substantially the same results as the phthalate described in Werner.

The limitations recited in claims 6 through 8, 10 and 13 are taught by Werner.
The subject matter of appealed 11 appears to be free from the applied prior art.

Time for taking action

This decision contains new grounds of rejection pursuant to 37 CFR § 1.196(b). 37 CFR § 1.196(b) provides that "[a] new ground of rejection shall not be considered final for the purposes of judicial review."

37 CFR § 1.196(b) also provides that the appellants, 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 proceedings (37 CFR § 1.197(c)) as to the rejected claims:

(1) Submit an appropriate amendment of the claims so rejected or a showing of facts relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the application will be remanded to the examiner...

(2) Request that the application be reheard under 37 CFR § 1.197(b) by the Board of Patent Appeals and Interferences upon the same record...

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

Appeal No. 2001-0968
Application No. 08/894,423

REVERSED
37 CFR § 1.196(b)

Edward C. Kimlin)	
Administrative Patent Judge)	
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Romulo H. Delmendo)	
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¹ The examiner also refers to U.S. Patent 5,244,854 to Noristi et al. (Noristi) issued on Sep. 14, 1993. (Examiner's answer, p. 5.) However, we will not consider Noristi as part of the evidence relied upon in the examiner's rejection, because this reference was not positively included in the examiner's statement of the rejection. In re Hoch, 428 F.2d 1341, 1342 n.3, 166 USPQ 406, 407 n.3 (CCPA 1970)("Where a reference is relied on to support a rejection, whether or not in a 'minor capacity,' there would appear to be no excuse for not positively including the reference in the statement of rejection.").

² We wish to commend the appellants' counsel for his candor in this regard.