

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. 39

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* GIULIANO CECCHIN,  
ANTEO PELLICONI, ANTONIO CIARROCCHI  
and PAOLO FERRARI

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Appeal No. 1998-3209  
Application 08/338,284

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ON BRIEF

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Before WARREN, LIEBERMAN and KRATZ, *Administrative Patent Judges*.

WARREN, *Administrative Patent Judge*.

*Decision on Appeal*

This is an appeal under 35 U.S.C. § 134 from the decision of the examiner finally rejecting claims 1, 2 and 8, which are all of the claims in the application. Claim 8, as it stands of record, is illustrative of the claims on appeal:

1. Crystalline homopolymers of propylene or copolymers of propylene with from 0.5 to 6%, by weight with respect to the copolymer, of ethylene, a C<sub>4-8</sub> alpha-olefin or both, prepared by sequential polymerization in at least two stages in the presence of a catalyst comprising a magnesium halide supported solid catalyst component, an Al-alkyl compound and an external electron donor compound consisting of a silane compound having bonded to the silicon atom at least one cyclopentyl group and one or more -OR group wherein R is C<sub>1-18</sub> alkyl, C<sub>3-18</sub> cycloalkyl, C<sub>6-18</sub> aryl or C<sub>7-18</sub> aralkyl radical and having a MIL > 2g/10 minutes, an intrinsic viscosity [η] in tetrahydronaphthalene at 135°C ≤ 2.8 dl/g, a M<sub>w</sub>/M<sub>n</sub> > 20, a content of fraction insoluble in xylene at 25° ≥ 94, flexural modulus from 1600 to 2700 MPa, notched Izod at 23°C

from 15 to 100 J/m, and stress at yield from 35 to 45 MPa, and from 10 to 60% by weight of a fraction (A) prepared in a first stage having  $[\eta] \geq 2.5$  dl/g.

The appealed claims, as represented by claim 1, are drawn to a crystalline homopolymer of propylene or a copolymer thereof with a specified amount of another alpha-olefin specified in terms of the catalyst system used in a sequential polymerization of at least two stages and of the properties which it must possess. According to appellants, the claimed polymer and copolymer has good mechanical properties and processability in the molten state (specification, page 6).

The reference relied on by the examiner is:

Cohen et al. (Cohen)	5,218,052	Jun. 8, 1993
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The examiner has rejected appealed claims 1, 2 and 8 under 35 U.S.C. § 103(a) as being unpatentable over Cohen.<sup>1</sup>

Appellants state in their brief (page 3) that the appealed “claims stand or fall together.” Thus, we decide this appeal based on appealed claim 1. 37 CFR § 1.192(c)(7) (1995).

We affirm.

Rather than reiterate the respective positions advanced by the examiner and appellants, we refer to the examiner’s answer and to appellants’ brief and reply brief for a complete exposition thereof.

### *Opinion*

In order to consider the examiner’s application of Cohen to appealed claim 1, we must first interpret this claim in light of the written description in appellants’ specification as it would be interpreted by one of ordinary skill in this art. *See generally, In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re Zletz*, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989). It is clear that claim 1 is drawn in product-by-process format wherein the process limitations “sequential polymerization in at least two stages” and the “presence of a catalyst comprising” at least the stated components, must be considered in determining the scope of the claimed crystalline homopolymers of propylene and copolymers propylene and another alpha-olefin, *see In re Thorpe*, 777 F.2d 695, 697, 227 USPQ 964, 966 (Fed. Cir. 1985); *In re Wertheim*, 541 F.2d 257, 271, 191 USPQ 90, 103-04 (CCPA 1976); *In re*

*Brown*, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972), along with the physical properties which the claimed homo- and copolymers so produced are specified to possess. We interpret the plain, generic language of the process limitations to permit the use of any process conditions in the sequential polymerization process as long as two stages are employed along with the specified catalyst. Through the use of the open-ended term “comprising,” the catalyst is not limited to the stated catalyst, co-catalyst and silane components or any amounts thereof, but can contain other ingredients or components, including other polymerization catalysts, co-catalysts, internal electron donors and external electron donors, bearing in mind that the specified physical properties must be obtained. *See In re Baxter*, 656 F.2d 679, 686-87, 210 USPQ 795, 802-03 (CCPA 1981) (“As long as one of the monomers in the reaction is propylene, any other monomer may be present, because the term ‘comprises’ permits the *inclusion* of other steps, elements, or materials.”). With respect to the specified physical properties, the ratio of weight average molecular weight to number average molecular weight,  $M_w/M_n$ , that is molecular weight distribution, must be greater than 20, and the melt index value, MIL, must be greater than 2g/10 minutes.

We have carefully reviewed the teachings of Cohen and find that the reference would have disclosed to one of ordinary skill in this art the preparation of a crystalline propylene homopolymer or copolymer of propylene and another alpha-olefin by sequential polymerization using a catalyst system under polymerization conditions as taught in the reference (e.g., cols. 5-8 and 10-13, and Example 14). Indeed, Cohen clearly provides for the preparation of highly crystalline homopolymers and copolymers of propylene which have, *inter alia*, a molecular weight distribution of 6 to about 50 and “a useful melt flow rate of at least about 0.1 up to about 200 grams per 10 minutes,” by sequential polymerization in at least two stages, wherein each of the stages can be conducted in batch in the same reactor and the conditions for polymerization include “the use of a molecular weight control agent or other techniques to control the molecular weights of the homopolymer or copolymer produced in each stage,” such as hydrogen (e.g., col. 5, lines 29-55, col. 6, line 27, to col. 8, line 37, and col. 10, line 20, to col. 11, line 3). The

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<sup>1</sup> The examiner withdrew the grounds of rejection under 35 U.S.C. § 112, second paragraph, and 35 U.S.C. § 102(e) over Cohen (answer, page 3).

reference provides that the polymerization is conducted in the presence of a highly active catalyst system and a silane compound, wherein the catalyst system can be, *inter alia*, a titanium containing component on a magnesium halide support, a co-catalyst that can be an aluminum-alkyl compound, and can contain other ingredients and components; wherein the silane compound can be an organo silane having, *inter alia*, a cycloalkyl substituent that is “cyclopentyl” (e.g., col. 5, line 55, to col. 2, line 10, and col. 11, line 4, to col. 15, line 22).

Based on this evidence in Cohen, we agree with the examiner that, *prima facie*, one of ordinary skill in this art routinely following the teachings of the reference with respect to the preparation of crystalline homo- and copolymers of propylene by sequential polymerization in at least two stages, would have routinely used a catalyst comprising a magnesium halide supported solid catalyst, an aluminum-alkyl cocatalyst and a silane compound that is substituted with a cyclopentyl group, in the reasonable expectation of successfully obtaining a homo- and copolymer having a molecular weight distribution of between 6 and 50 and “a useful melt flow rate” of between 0.1 and 200 grams per 10 minute as taught by the reference, and thus would have reasonably arrived at homo- and copolymers of propylene falling within appealed claim 1. *See Merck & Co., Inc. v. Biocraft Labs., Inc.*, 874 F.2d 804, 807, 10 USPQ2d 1843, 1845-46 (Fed. Cir. 1989); *In re Lemin*, 332 F.2d 839, 841, 141 USPQ 814, 815-16 (CCPA 1964). Indeed, the claimed molecular weight distribution of greater than 20 and the claimed melt index value of greater than 2g/10 minutes for the claimed crystalline homo- and copolymers of propylene clearly overlap with the ranges for these values taught by Cohen, thus shifting the burden to appellants to establish the criticality of the claimed ranges. *See generally, In re Geisler*, 116 F.3d 1465, 1470, 43 USPQ2d 1362, 1365 (Fed. Cir. 1997); *In re Boesch*, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980); *Lemin, supra*.

Furthermore, as pointed out by the examiner, while the crystalline propylene homopolymer of Cohen Example 14 differs from the claimed crystalline propylene homopolymer in the melt index value, one of ordinary skill in the art routinely following the teachings of Cohen would have adjusted the molecular weight distribution by using hydrogen in the reasonable expectation of obtaining any desired melt index (answer, pages 5-6). Thus, *prima facie*, one of ordinary skill in this art routinely following the teachings of Cohen would have arrived at a

crystalline propylene homopolymer even though the silane compound used in the preparation of the homopolymer of Example 14 is not a specified silane of appealed claim 1. Accordingly, the burden falls upon appellants to establish by effective argument and/or objective evidence that the claimed invention patentably distinguishes over Cohen Example 14 even though the rejection here is under § 103(a). *See Thorpe, supra; In re Best*, 562 F.2d 1252, 1255-56, 195 USPQ 430, 433-34 (CCPA 1977); *Wertheim, supra; In re Fessmann*, 489 F.2d 742, 744, 180 USPQ 324, 325-26 (CCPA 1974); *Brown, supra*.

Accordingly, since a *prima facie* case of obviousness has been established over Cohen, we have again evaluated all of the evidence of obviousness and nonobviousness based on the record as a whole, giving due consideration to the weight of appellants' arguments. *In re Johnson*, 747 F.2d 1456, 1460, 223 USPQ 1260, 1263 (Fed. Cir. 1984); *In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984).

We have carefully considered appellants' arguments. Appellants' argument that Cohen would not have taught or suggested the "cyclopentyl" substituted silanes of appealed claim 1 to one of ordinary skill in this art even though the "cyclopentyl" is taught as a suitable substituent for the silane compound (col. 5, lines 55-68, and col. 11, line 44, to col. 12, line 2), because a "cyclopentyl" substituted silane is not disclosed to be a preferred embodiment and is not an exemplified embodiment (brief, pages 12-13; reply brief, pages 3-4) is clearly contrary to applicable authority. *See generally, See Merck v. Biocraft*, 874 F.2d at 807, 10 USPQ2d at 1846, quoting *In re Lamberti*, 545 F.2d 747, 750, 192 USPQ 278, 280 (CCPA 1976) ("But in a section 103 inquiry, 'the fact that a specific [embodiment] is taught to be preferred is not controlling, since all disclosures of the prior art, including unpreferred embodiments, must be considered.'"). Indeed, it would have been readily apparent to one of ordinary skill in this art that a "cyclopentyl" substituted silane would function in the same or similar manner as the other silanes falling within the specified formula for the purposes for which it is used by Cohen. As the examiner points out, "the cyclopentyl group is one of only thirteen species" encompassed by the formula (answer, page 8). *See Merck v. Biocraft, supra; Lemin, supra; cf. In re Sivaramakrishnan*, 673 F.2d 1383, 213 USPQ 441 (CCPA 1982) ("[T]he fact remains that one of ordinary skill informed by the teachings of [the reference] would not have had to choose

judiciously from a genus of possible combinations of resin and salt to obtain the very subject matter to which appellant's composition per se claims are directed."). Thus, the facts here are not those of *In re Baird*, cited by appellants (brief, page 13; reply brief, page 4), wherein our reviewing court found that the cited reference disclosed an estimated "100 million different diphenols, only one of which is bisphenol A." 16 F.3d 380, 382, 29 USPQ2d 1550, 1552 (Fed. Cir. 1994).

We further do not agree with appellants that Cohen fails to disclose the claimed crystalline homo- and copolymers of propylene because the values specified in appealed claim 1 for the molecular weight distribution and for the melt index value are not shown in the reference Examples (brief, pages 13-14). *See Lamberti, supra*. As we pointed out above, the claimed ranges for these values overlap with the ranges taught by Cohen, and the burden is on appellants to establish the criticality of the claimed ranges. While appellants point out that Example 14 of Cohen applies an additional electron donor (brief, page 14), it is clear that such a catalyst ingredient is not excluded by the claim in view of the phrase "a catalyst comprising" as we have construed it above. In similar manner, appellants' arguments with respect to the "batch" operations taught by Cohen (reply brief, page 3 n.1) are not convincing because the broad limitation "sequential polymerization" includes "batch" operations, and in any event, the contentions advanced are not supported. *See In re Lindner*, 457 F.2d 506, 508, 173 USPQ 356, 358 (CCPA 1972) ("This court has said . . . that mere lawyers' arguments unsupported by factual evidence are insufficient to establish unexpected results. [Citations omitted.]").

We reiterate here that the appealed claims are product-by-process claims and thus encompass products made by other processes even though the process limitations specified in the claims is given weight with respect to defining the product (see reply brief, page 2). Thus, the teachings of Cohen *as a whole* clearly would have led one of ordinary skill in this art to the claimed crystalline homo- and copolymers of propylene such that it is not necessary to modify the teachings of Cohen by any other reference or knowledge in the art, as was the case in *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991), or to rely on aspects of the claimed invention to support the ground of rejection, as was the case in *In re Ochiai*, 71 F.3d 1565, 37 USPQ2d 1127 (Fed. Cir. 1995), upon which appellants rely (brief, page 14; reply brief, page 2).

Accordingly, based on our consideration of the totality of the record before us, we have weighed the evidence of obviousness found in Cohen with appellants' countervailing evidence of and argument for nonobviousness and conclude that the claimed invention encompassed by appealed claims 1, 2 and 8 would have been obvious as a matter of law under 35 U.S.C. § 103(a).

The examiner's decision 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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	)	
	)	
PAUL LIEBERMAN	)	BOARD OF PATENT
Administrative Patent Judge	)	APPEALS AND
	)	INTERFERENCES
	)	
	)	
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