

**THIS OPINION WAS NOT WRITTEN FOR PUBLICATION**

The opinion in support of the decision being entered today  
(1) was not written for publication in a law journal and  
(2) is not binding precedent of the Board.

Paper No. 14

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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**Ex parte** RUEGER SCHLUND and BERNHARD RIEGER

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Appeal No. 95-1959  
Application 07/894,128<sup>1</sup>

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ON BRIEF

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Before KIMLIN, METZ and WEIFFENBACH, **Administrative Patent Judges**.

METZ, **Administrative Patent Judge**.

**DECISION ON APPEAL**

This is an appeal under 35 U.S.C. § 134 from the  
examiner's refusal to allow claims 1 through 3 and 6 through  
8, all the claims remaining in this application.

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Application for patent filed June 4, 1992.

**THE INVENTION**

Appellants' claimed invention is directed to catalyst systems (claims 1 through 3, 6 and 7) and to a process for preparing a catalyst system (claim 8). The catalyst system comprises a Group IV or Group V metal complex and an oligomeric alumoxane compound applied to a finely divided polypropylene support. Useful metals include titanium, zirconium, hafnium, vanadium, niobium and tantalum. The method of preparing the catalyst system comprises mixing the metal complex and the alumoxan oligomer to form a mixture and thereafter applying the resulting mixture to finely divided polypropylene. The catalyst system is useful for the polymerization of C<sub>2</sub>-C<sub>10</sub> 1-alkenes.

Claim 1 is adequately representative of the appealed subject matter and is reproduced below for a more facile understanding of appellants' invention.

1. A catalyst system suitable for the polymerization of C<sub>2</sub>-C<sub>10</sub>-alk-1-enes comprising, as active ingredients, a complex compound of metals in Sub-groups IV and V of the Periodic Table and an oligomeric alumoxan (sic) compound and obtained by a procedure in which metals in Sub-groups IV and V of the Periodic table are mixed with the oligomeric alumoxan (sic) compound and the resulting mixture is then applied to finely divided polypropylene.

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The references of record which are being relied on by the examiner as evidence of nonobviousness are:

Maemoto et al. (Maemoto)	4,098,979	July 4, 1978
Welborn, Jr. (Welborn)	4,897,455	January 30, 1990
Winter et al. (Winter)	5,081,322	January 14, 1992

Takahashi, Japanese Kokai No. 63-92621, published April 23, 1988<sup>2</sup>

The appealed claims stand rejected as being unpatentable under 35 U.S.C. § 103 from the disclosure of Welborn, considered with Takahashi, Maemoto and Winter. We affirm.

#### **THE REFERENCES**

Maemoto discloses a method for the preparation of easily pourable polyolefin granules by polymerizing an olefin in the presence of a catalyst system having a main catalyst component supported on a spheroidal particle of a high molecular weight used as a carrier and an organometallic compound (column 1, lines 7 through 14). The high molecular weight compounds used as a carrier include polyethylene, polypropylene and polybutylene (column 2, lines 28 through

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<sup>2</sup> All reference to Takahashi in this opinion is a reference to the complete English language translation of the Japanese document, a copy of which was furnished to appellants by the examiner in his first Office action.

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36). The main requirement for the substance used as a carrier is that it is insoluble or sparingly soluble in the polymerization medium and will not strongly inactivate the catalyst component (column 2, lines 36 through 41). Particle size for the carrier ranges from 1 to 1,000 microns (column 2, lines 41 through 43). The main catalyst component to be supported must remain insoluble in the polymerization medium during polymerization and may comprise the well known catalyst system for polymerizing olefins comprising a compound of Groups IV through VI of the Periodic Table and an organometallic compound of a metal of Groups I to III (column 2, lines 54 through 64). The proportion of main catalyst component supported on the carrier is 50% by weight or less, preferably 0.5 to 30 % by weight or less (column 3, lines 26 through 30). The particle size of the polyolefin formed in the polymerization reaction may be controlled by controlling the particle size of the carrier (column 3, lines 65 through 68). Olefins which may be prepared by polymerization with the catalyst system include polypropylene (column 4, lines 20 through 23). Useful organometallic compounds include aluminum compounds represented by the formula  $R_nAlX_{3-n}$  wherein "R" is a hydrocarbon of from 1 to 8 carbon atoms, "X" is halogen,

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alkoxy or hydrogen and "**n**" is a positive number of 3 or less (column 4, lines 25 through 35).

Welborn discloses a new, improved catalyst useful for polymerization of olefins. The catalyst is a heterogeneous transition metal containing supported catalysts which may be used without the use of a cocatalyst (column 1, lines 8 through 20). Specifically, a new metallocene/alumoxane catalyst is provided for olefin polymerization useful for the polymerization of polyethylenes and copolymers of alphaolefins having from 3 up to 18 or more carbon atoms (column 2, lines 32 through 38). In one embodiment, the catalyst comprises the reaction product of at least one metallocene and an alumoxane in the presence of a support material thereby providing a supported metallocene/ alumoxane reaction product as the catalyst (column 2, lines 39 through 44). The metallocenes are organometallic coordination compounds which are cyclopentadienyl derivatives of a Group 4b, 5b or 6b metal of the Periodic Table and include metallocenes of titanium, zirconium, hafnium and vanadium. The alumoxanes are the reaction products of aluminum trialkyl with water. Useful supports include any of the solid, particularly porous supports such as talc, inorganic oxides and resinous supports

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such as polyolefins (column 3, lines 41 through 45). Finely divided polyethylene makes a useful support (column 3, lines 52 through 55). The supported catalyst is prepared by simply mixing the reactants in a suitable solvent to the support material slurry (column 5, lines 8 through 11). The amount of catalyst used may vary over a wide range and the ratios suitable for use are significantly less than that which is necessary in a homogeneous system (column 5, lines 41 through 56). The particle size of the support effects the particle size of the product obtained. A particle size of from 30 to 600 microns is suitable (column 8, lines 25 through 40).

Winter discloses a catalyst for copolymerizing propylene with other olefins (column 1, lines 56 through 58). The catalyst comprises a metallocene and an alumoxane (column 2, line 23 through column 3, line 40). The metallocene may be preactivated by reaction with an alumoxane before the polymerization (column 7, lines 33 through 52).

Takahashi discloses a method for the preparation of an ethylene copolymer by the gas phase copolymerization of ethylene and an alpha-olefin of from 3 to 10 carbon atoms in the presence of a catalyst comprising a transition metal complex of cyclopentadiene and alumoxane supported on a

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granular polyethylene support having a density of from 0.80 to 0.935 g/cm<sup>3</sup> Page 4, lines 1 through 13).

**OPINION**

There is no dispute between the examiner and appellants concerning what the prior art relied on to reject the claims discloses. Thus, the only issue before us concerns the meaning which would have been given to the respective disclosures by the hypothetical person of ordinary skill in the art at the time appellants' invention was made. Thus, appellants urge that no *prima facie* case of obviousness is engendered by the prior art on which the examiner relies. Alternatively, appellants urge that assuming a *prima facie* case of obviousness is made out then appellants have overcome the *prima facie* case by the presentation of objective evidence of nonobviousness in the nature of the two declarations filed pursuant to 37 C.F.R. § 1.132 by Reuger Schlund, one of the herein named inventors.

After a careful consideration of the entire record before us, including all the evidence of record and the stated positions of both the appellants and the examiner, we agree with the examiner's conclusion that the claimed subject matter

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would have been *prima facie* obvious to a person of ordinary skill in the art at the time appellants' invention was made. Moreover, upon reconsidering the *prima facie* case anew in light of all the evidence, including appellants' rebuttal evidence, we also agree with the examiner that the rebuttal evidence is inadequate to overcome the *prima facie* case of obviousness.

As we stated above, appellants have not argued that the prior art of record fails to disclose the active catalyst ingredients of the claims. That is, we find the combination of a "complex compound of metals in Sub-groups IV and V of the Periodic Table and an oligomeric alumoxan (sic) compound" to be notoriously well-known catalysts for the polymerization and copolymerization of olefins. Indeed, appellants have conceded as much at page 3 of their main brief in their discussion of what Welborn does and does not disclose and, again, at pages 6 and 7 in discussing the metal complexes applied to the substrate. Thus, the narrow question before us is whether or not it can be fairly said that the prior art relied on teaches or suggests using the well-known prior art catalysts on a support comprising "finely divided polypropylene". We find

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that the art relied on strongly suggests the use of polyolefins in general and polypropylene in particular.

We agree with the examiner's conclusion that Welborn's teaching that "finely divided olefins such as finely divided polyethylene" as a support for a complex of a metallocene and alumoxane is a strong suggestion that polyolefins, in general, and lower polyolefins, specifically, would have been expected to be useful supports for catalysts as claimed. Considered with the fact that Maemoto discloses that high molecular weight polypropylene is one of many useful solid materials which serve as a useful support for catalysts for polymerization of olefins, including polypropylene, we find that a *prima facie* case of obviousness is raised by the references on which the examiner relies. Appellants' brief is totally silent with respect to the disclosure of Maemoto except for the terse recognition by appellants at page 3 of their main brief that Maemoto teaches both polyethylene and polypropylene have been used as supports for Ziegler-type catalysts useful in polymerizing olefins.

We find ample motivation to use a supported catalyst solely from the well-known benefits that a heterogeneous catalyst is known to engender. Specifically, these benefits

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would at least include ease of separation from the reaction mixture, simplicity of catalyst recovery and easier regeneration. Moreover, Welborn and Maemoto's respective disclosures that the particle size of the product obtained may be controlled by selection of the particle size of the support for the catalyst serves as additional motivation to use "finely divided" polyolefin supports and, specifically, the polypropylene support disclosed by Maemoto.

In our view, appellants have failed to consider what the prior art relied on by the examiner would have fairly suggested to the routineer in the art at the time their invention was made. Rather, appellants have chosen to focus on the individual references separately for what the references disclose individually. Such analysis is improper where, as here, the rejection is founded on a combination of references.

We have not overlooked appellants' reliance on In re Baird, 16 F.3d 380, 29 USPQ2d 1550 (Fed. Cir. 1994) for the proposition that the broad disclosure of polyolefins as supports in Welborn without exemplification of polypropylene as a support does not suggest the claimed invention or support a *prima facie* case of obviousness. We simply consider Baird

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to lack relevance to the facts in this case. That is, while Welborn does not specifically disclose polypropylene, Maemoto does and appellants have simply failed to address the relevance of the combination of references on which the examiner has relied to reject the claims. To extend Baird beyond the specific facts of that case and apply the rule of that case here is simply unwarranted.

Having concluded that the examiner has made out a prima facie case of obviousness with respect to the appealed subject matter, it is necessary for us to consider appellants' rebuttal evidence, if any, and to reconsider the prima facie case in light of all the evidence. In re Piasecki, 745 F.2d 1468, 223 USPQ 785 (Fed. Cir. 1984). Appellants' rebuttal evidence constitutes the declarations of one the named inventors, Rueger Schlund. For reasons set forth below, we find appellants' evidence to be inadequate to rebut the *prima facie* case of obviousness.

In his first declaration, Schlund states at page 1, that he is addressing the examiner's conclusion that the claims are "either anticipated by Takahashi (6392631-4/88) or obvious over Takahashi in view of Welborn." Nonetheless, the

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rejection with which declarant was faced under 35 U.S.C. § 103 was over Welborn in view of Takahashi, Sinn et al. Maemoto and Winter. Inexplicably, declarant fails to address the rejection made by the examiner or acknowledge that Maemoto fairly suggests "finely divided" polypropylene as a carrier for catalysts as claimed. At page 2, declarant states that he has:

carried out a Comparative Experiment, in which, under otherwise identical conditions, Example 3 of the instant application has been repeated with the exception that I replaced polypropylene grit by polyethylene grit.

The examiner objected to the declaration on various grounds, including the failure to adequately identify the nature of the "polyethylene grit." Accordingly, a second declaration was proffered in which the declarant specifically attempted to address the examiner's objections to the first declaration.

In the second declaration, after restating the rejections and issues to which his second declaration is addressed, Dr. Schlund states that the polyethylene grit used in the previous declaration had a particular particle size and a particular average particle size distribution. In the paragraph bridging page 1 and 2 of the second declaration, declarant states:

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The average particle size distribution of the polyethylene grit used corresponds to the average particle size distribution of the polypropylene grit used in Example 3 of the instant application.

No density or molecular weight for the polyethylene grit is set forth in either declaration.

As a starting point in our analysis of the declarations, we turn to Example 3 at page 9 of the instant application. In Part A. of Example 3, captioned "Preliminary Activation" it is recited that, "[i]n a manner similar to that described in Example 1" particular components were mixed to obtain a solution containing aluminum and zirconium in an atomic ratio of 400:1. In Part B. of Example 3, captioned "Application to Substrate", it is recited that "[i]n a manner similar to that described in Example 1" the same polypropylene grits from Example 1 were combined with the solution in the activation step. The polypropylene grits in Example 1 have an average particle size distribution of from 0.25mm to 0.5mm. No description of the density or the molecular weight for the polypropylene grit is set forth in either the declaration or in Example 3 of the instant specification. In part C. of Example 3 of the specification, captioned "Polymerization", it is recited that "[i]n a manner similar to that described in

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Example 2" the supported catalyst from step B., in a suspension of methylalumoxane and heptane, was used to polymerize propylene in the gas phase.

By describing the comparative example in the declaration in narrative terms rather than by explicitly describing what reactants were used, what amounts or proportions of reactants were used and what reaction conditions were used, declarant has rendered it difficult for us to ascertain exactly what the experiment entailed and what was being compared. Further, by referencing examples in the specification in the declaration, which examples themselves are described as "similar" to other examples which are also described as "similar" to other procedures, declarant has injected further uncertainty in determining exactly what was compared.

Additionally, as noted by the examiner, the scope of appellants' claim 1 is considerable. No particular metal complex or alumoxane is claimed nor is any particular polypropylene, other than it is "finely divided." We agree with the examiner's conclusion that, in light of the particular and admitted relevance of the prior art, and in light of the narrow issue before us, the welter of undefined

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variables in the proffered showing makes it impossible to attribute the results in the declaration to the nature of the carrier or support. Indeed, we question whether by reference to Example 3 in the specification in the declarations and the reference in Example 3 to procedures "similar" to procedures in other examples, the declaration adequately defines what was the nature of the experiment conducted by declarant.

It is also apparent that in making the above-noted declarations, the declarant either ignored or overlooked the rejections of record and the teachings of certain of the references relied on to reject the claims as in, for example, Maemoto where polypropylene of a particle size which would be considered "finely divided" is taught as a carrier for catalysts as claimed. Further, it is unclear whether declarant observed the caution in Maemoto that the carrier material must be insoluble or sparingly soluble in the polymerization medium. This is the very point we believe the examiner is attempting to make in the paragraph bridging pages 6 and 7 of his Answer and which appellants chose not to address in their reply brief. Thus, we are also unable to determine the basis for declarant's conclusion on page 2 of the first declaration that reactor fouling was due to

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replacement of polypropylene grit with polyethylene grit.

We have not overlooked appellants' entreaty that we separately consider the patentability of claim 6, said to be commensurate in scope with appellants' evidence of nonobviousness, in light of the declarations. Nevertheless, claim 6 does not further define the support or carrier recited in claim 1 but only limits the catalysts in Claim 1 to catalysts prepared from particular metals and unsaturated cyclic hydrocarbons. In light of the admission by appellants that it is the support or carrier which yields their unexpected or surprising results we do not understand appellants' naked conclusion at page 7 of their main brief that claim 6 "must stand as separately patentable." Suffice it to say appellants have not explained the basis for their conclusion.

Based on all the above, we agree with the examiner's explicit and implicit conclusions that the declarations set forth inadequate details for us determine if a truly comparable comparison has been made. Moreover, the examiner has made certain factual findings in his Answer at pages 5, 6 and 7 which findings appellants had an opportunity to rebut in their reply brief but which they chose not even to address.

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Specifically, the examiner found that in light of the art recognition that the support's characteristics affect the characteristics of the polymers it is necessary to know the exact nature of the support used in any comparative run. Additionally, the examiner found that the skilled routineer would have expected certain catalysts within the scope of Claim 6 to produce atactic polypropylenes while other catalysts also within the scope of Claim 6 would have been expected to yield crystalline polypropylene. Appellants have not rebutted or even challenged these findings by the examiner. We, therefore, accept them as true.

Accordingly, 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**

EDWARD C. KIMLIN )  
Administrative Patent Judge )  
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Administrative Patent Judge	)	APPEALS AND
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