

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TIM J. COFFY and STEVEN D. GRAY

Appeal 2008-1347
Application 11/016,103
Technology Center 1700

Decided: February 28, 2008

Before EDWARD C. KIMLIN, ROMULO H. DELMENDO, and
JEFFREY T. SMITH, *Administrative Patent Judges*.

DELMENDO, *Administrative Patent Judge*.

DECISION ON APPEAL

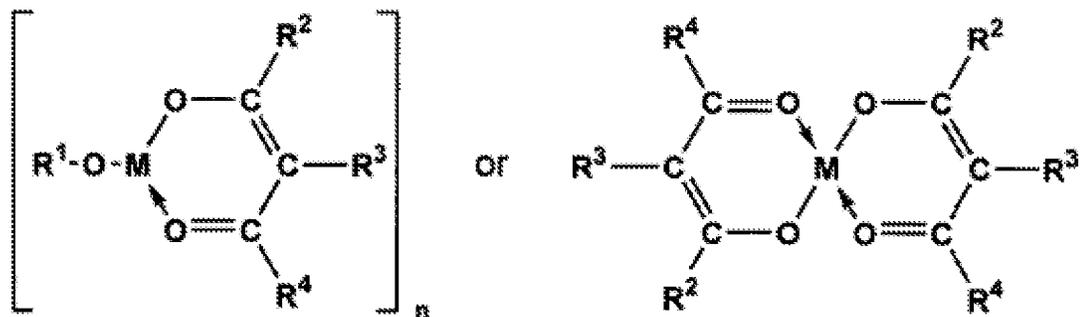
STATEMENT OF CASE

Appellants appeal under 35 U.S.C. § 134 (2002) from a final rejection of claims 1-3 and 5-13.¹ We have jurisdiction under 35 U.S.C. § 6(b) (2002).

Appellants state they invented a process for making a catalyst precursor, the process comprising contacting a specified oxygen-containing metal compound with a diketone to form a specified bis(diketonate). (Spec. 2.) According to Appellants, the precursor is useful for making an olefin polymerization catalyst. (Spec. 2-3.)

Claim 1 on appeal reads as follows:

1. A process for making a catalyst precursor, the process comprising contacting a metal compound of the formula $M(OR^1)_2$ with a diketone to form a bis(diketonate) having the general formula:



wherein M is a Group IIA metal; O is oxygen; $n = 1$ or 2 ; R^1 , R^2 , R^3 , and R^4 are the same or different; and are a hydrogen or a substituted or unsubstituted alkyl or aryl moiety having from about 1 to about 20 carbon atoms; and

¹ In an Amendment filed and entered after Final Rejection, the limitations of claim 4, now canceled, were incorporated into claim 1. (App. Br. 2; Ans. 2.) Also, claims 14-40 have been withdrawn pursuant to a restriction requirement. (App. Br. 2.)

contacting the bis(diketonate) with an organometallic agent.

The Examiner rejected claims 1-3 and 5-13 under 35 U.S.C. § 103(a) (2007).²

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Gray	6,790,804 B2	Sep. 14, 2004
Luinstra	2005/0255990 A1	Nov. 17, 2005

The Examiner states that “Gray teaches a process for the preparation of Ziegler catalyst encompassing all of the limitations of the instant claims except Gray’s diketonate complex is prepared from the reaction between a diketone and MR_2 rather than $M(OR)_2$...” (Ans. 3.) The Examiner further contends that “Luinstra teaches preparation of sodium diketonate from sodium ethoxide and diketone” and that “both sodium (Na^+) and magnesium (Mg^{2+}) belong to Groups 1A and 2A metals respectively and their analogous compounds are expected to have similar chemical properties.” (Ans. 3-4.) From these findings, the Examiner concluded that “it would have been obvious to a skilled artisan... to employ Luinstra’s teaching to Gray’s catalyst preparation process by reacting a diketone with $M(OR)_2$ to provide the diketonate complex since $M(OR)_2$ is less expensive and much easier to

² In the Final Office Action of October 6, 2006, the Examiner also rejected claims 1-3 under 35 U.S.C. § 112, ¶2. In the Answer, however, the Examiner did not repeat this rejection. Therefore, we presume that the Examiner has withdrawn this rejection. *Ex parte Emm*, 118 USPQ 180, 181 (BPAI 1957).

handle compared to MR_2 and in the absence of any showing criticality [sic] and unexpected results.” (Ans. 4.)

On the other hand, Appellants argue, *inter alia*, that the Examiner did not establish that a person of ordinary skill in the art would have had a reasonable expectation in combining the references as proposed by the Examiner. (App. Br. 4.) Furthermore, Appellants urge that “even if combined, Luinstra is utilizing $M(OR)_2$, wherein M is a Group I metal, not a Group IIA metal.” (*Id.*)

We reverse.

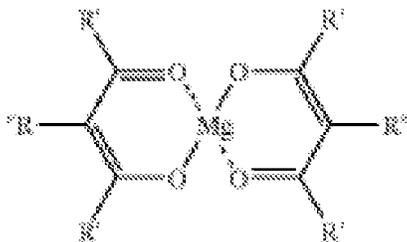
ISSUES

Has the Examiner identified some reason that would have prompted a person of ordinary skill in the art to combine the teachings of Gray and Luinsa in order to arrive at Appellants’ claimed subject matter?

FINDINGS OF FACT

Gray describes a process for making a metal-diketonate precursor complex useful as a polyolefin catalyst component, in which the process generally includes contacting a metal compound of the formula MR_2 with a diketone to form a metal bis(diketonate), wherein M is a Group IIA metal, and R is hydrocarbyl or substituted hydrocarbyl having from 1 to 20 carbon atoms. (Col. 2, ll. 5-23).

At column 3, lines 1-10, Gray further teaches that a suitable metal-diketonate has a structure as follows:

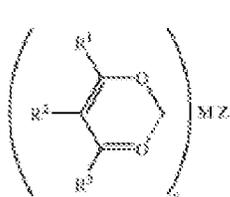


Gray does not define R” anywhere in the disclosure, but teaches that the diketonates can have the formula $Mg(RCOR'OCR)_2$ or $Mg(OCRCR'CRO)_2$, wherein R and R' are substituted or unsubstituted hydrocarbon radicals generally having about 1 to about 20 carbon atoms. (Col. 4, ll. 36-49.)

Thus, Gray differs from Appellants' claimed subject matter in that it teaches the use of MR_2 as a reactant instead of the here recited $M(OR_1)_2$.

Luinstra teaches a catalyst for polymerizing formaldehyde to form polyoxymethylene, which is not a polyolefin. (¶0011.)

Luinstra describes a structure for the catalyst as follows:



wherein M is TiO, ZrO, HfO, VO, CrO₂, MoO₂, WO₂, MnO₂, ReO₂, Fe, Ru, Co, Rh, Ir, Ni, Pd, Pt, Cu, Zn, Cd, Hg, Sn, SnO, or PbO; R¹, R², and R³ are each independently a radical which is selected from H, alkyl, aryl, and aralkyl, and the radical may be partly or fully halogenated; Z is an anion; and n is 1 or 2. (¶¶0012-0016.)

Luinstra describes a synthesis for $\text{MoO}_2(\text{diketonate})\text{Cl}$ ($\text{Z1}=\text{Cl}$) in which sodium diketonate is reacted with MoO_2Cl_2 in tetrahydrofuran. (¶0078.)

The sodium diketonate is prepared by reacting sodium diethoxide with a diketone in ethanol. (¶0078.)

Neither Gray nor Luinstra teaches the use of a compound having the formula $\text{M}(\text{OR}^1)_2$ as recited in the appealed claims.

The Examiner did not rely on any evidence demonstrating that a person having ordinary skill in the art would have reasonably expected that MgR_2 and $\text{Mg}(\text{OR}^1)_2$ are interchangeable for Gray's purpose, which is to synthesize a Ziegler-Natta olefin catalyst component.

PRINCIPLES OF LAW

While the Supreme Court of the United States has recently rejected a formalistic and rigid application of the teaching, suggestion, or motivation test as an exclusive test in the obviousness inquiry, it nevertheless made clear that an invention "composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (2007). The Supreme Court elucidated on this matter by stating that "it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine elements in the way the claimed new invention does." *Id.*

ANALYSIS

The Examiner appears to realize that neither reference describes the use of $M(OR^1)_2$ as a reactant. To make up for this deficiency, the Examiner speculates as to the structure of the reaction product of sodium ethoxide with diketone described in Luinstra at paragraph 0078. (Ans. 3.) The Examiner then alleges that “[b]oth sodium (Na^+) and magnesium (Mg^{2+}) belong to Groups 1A and 2A metals respectively and their analogous compounds are expected to have similar chemical properties.” (Ans. 3-4) In response to Appellants’ argument that there is no evidence to establish a reasonable expectation of success in combining Gray with Luinstra (App. Br. 4), the Examiner argues that “[i]t is text book knowledge that hydrocarbyl groups (R) such as alkyl groups are much stronger organic bases compared to hydrocarboxy groups such as alkoxides” and “[t]hus, one would have been motivated to replace the alkyl metal compound with the metal alkoxide since the metal alkoxide is easier and safer to handle and less expensive.” (Ans. 4-5.)

Even assuming that the Examiner’s “textbook knowledge” is correct, such knowledge, in and of itself, does not demonstrate that a person having ordinary skill in the art would have reasonably expected MR_2 and $M(OR^1)_2$ to be interchangeable in formulating Gray’s Ziegler-Natta olefin catalyst component. Because the Examiner has not adequately explained why the disclosure of a monovalent Na complex as an intermediate for forming a catalyst for polymerizing formaldehyde demonstrates that $M(OR^1)_2$, where M is a Group II divalent metal, is interchangeable with MR_2 in the synthesis

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of a divalent Group II metal complex for use as a Ziegler-Natta catalyst, we cannot affirm.

CONCLUSION

On this record, we cannot say that the Examiner has established a prima facie case of obviousness within the meaning of 35 U.S.C. § 103(a).

DECISION

The Examiner's rejection of claims is reversed.

REVERSED

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