

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.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

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MITSUHISA TAMURA, KENSHI UCHIDA,
KIYOSHI IWANAGA AND YOSHIAKI ITO

Appeal No. 2000-0998
Application 08/521,432

HEARD: July 11, 2002

Before OWENS, LIEBERMAN and PAWLIKOWSKI, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL

This appeal is from the refusal to allow claims 1-8 as amended after final rejection. These are all of the claims in the application.

THE INVENTION

The appellants claim a process for producing 1-hexene comprising preparing a specified catalyst system in 1-hexene solvent, charging the catalyst system in a reaction vessel without removing the 1-hexene solvent from the catalyst system, adding ethylene and a solvent consisting essentially of 1-hexene

to the reaction vessel, and trimerizing the ethylene to form 1-hexene. Claim 1 is illustrative:

1. A process for producing 1-hexene comprising the steps of:

(1) preparing a catalyst system by contacting in a 1-hexene solvent the following components (A), (B), (C) and (D):

(A) a chromium-containing compound represented by the general formula:



wherein X is a residue of a carboxylic acid, a residue of a 1,3-diketone, a halogen atom or an alkoxyl group, k is an integer of 2 to 4, Y in Y_m is an amine compound, a phosphine compound, a phosphine oxide compound, a nitrosyl group or an ether compound and m is an integer of 0 to 6, with the proviso that any two Y's may be same or different;

(B) trialkylaluminum or dialkylaluminum hydride;

(C) a pyrrole compound or a derivative thereof;

(D) a Group 13 (IIIB)-halogen compound represented by the general formula: MTtU_{3-t} or a Group 14 (IVB)-halogen compound represented by the general formula: M'Tt'U_{4-t'} wherein M is a Group 13 (IIIB) atom, M' is a Group 14 (IVB) atom, T is an alkyl group, an aryl group, an allyl group or a hydrogen atom, U is a halogen atom, t is a real number of 0 or more and less than 3 and t' is a real number of 0 or more and less than 4;

(2) charging the catalyst system in a reaction vessel without removing the 1-hexene solvent from the catalyst system;

(3) adding ethylene and a solvent to the reaction vessel;
and

(4) trimerizing said ethylene to form 1-hexene;

wherein said solvent added to the reaction vessel consists essentially of 1-hexene and wherein said solvent added to the reaction vessel is not removed from the 1-hexene formed by trimerization.

THE REFERENCE

Reagen et al. (Reagen) 5,523,507 Jun. 4, 1996
(effective filing date on or before Dec. 13, 1991)

THE REJECTION

Claims 1-8 stand rejected under 35 U.S.C. § 103 as obvious over Reagen.

OPINION

We reverse the aforementioned rejection. We need to address only claim 1, which is the sole independent claim.

There is no dispute as to whether Reagen discloses a catalyst made by contacting components (A) to (D) in the appellants' claim 1. The dispute pertains to the 1-hexene solvent.

Reagen discloses that stable and active catalyst systems can be formed in the presence of an unsaturated hydrocarbon (col. 12, lines 65-66). The disclosed unsaturated hydrocarbons include 1-hexene (col. 13, lines 22-23).¹ Reagen teaches that the

¹ In tests in which the catalyst is prepared in 1-hexene (runs 7010-7013), 1-hexene is separated from the catalyst and the solvent added to the trimerization reactor is cyclohexane.

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unsaturated hydrocarbon, which can be one or more of the olefin reactants trimerized, oligomerized and/or polymerized in the presence of the catalyst, preferably is present during the catalyst system preparation, but can be introduced directly into the trimerization, oligomerization and/or polymerization reactor (col. 9, lines 36-48; col. 12, line 66 - col. 13, line 6).

Reagen discloses that ethylene can be trimerized to 1-hexene and that ethylene and hexene can be co-trimerized to 1-decene and/or 1-tetradecene (col. 17, line 66 - col. 17, line 4).

The examiner argues that Reagen discloses (col. 17, lines 17-32) that mixtures of ethylene and 1-hexene can be used as trimerizable olefin compounds, and argues that the 1-hexene can be considered to be both a reactant and a solvent (answer, page 3). The examiner argues that one of ordinary skill in the art who used 1-hexene as the solvent in the catalyst preparation would have charged to the trimerization reaction vessel that 1-hexene still mixed with the catalyst system rather than incurring the added expense of separating the 1-hexene from the catalyst system and then recombining 1-hexene with the catalyst system in the trimerization reaction vessel (answer, page 4).

The appellants' claim 1 requires that ethylene is trimerized to form 1-hexene. The examiner relies upon Reagen's teaching

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that ethylene and hexene can be co-trimerized, but does not point out where Reagen teaches that this co-trimerization produces some 1-hexene. Also, the examiner provides no technical explanation as to why this co-trimerization necessarily produces some 1-hexene. Hence, the examiner has not established that, even if Reagen's 1-hexene used in preparing the catalyst system were not separated from the catalyst system but, instead, were used in the co-trimerization of ethylene and 1-hexene as proposed by the examiner, the process would be that claimed by the appellants. See *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 1052, 5 USPQ2d 1434, 1439 (Fed. Cir.), *cert. denied*, 488 U.S. 825 (1988).

The examiner, therefore, has not carried the burden of establishing a *prima facie* case of obviousness of the appellants' claimed process. Accordingly, we reverse the examiner's rejection.

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DECISION

The rejection of claims 1-8 under 35 U.S.C. § 103 over
Reagen is reversed.

REVERSED

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| TERRY J. OWENS |) | |
| Administrative Patent Judge |) | |
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| |) | BOARD OF PATENT |
| PAUL LIEBERMAN |) | |
| Administrative Patent Judge |) | APPEALS AND |
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| |) | INTERFERENCES |
| |) | |
| BEVERLY A. PAWLIKOWSKI |) | |
| Administrative Patent Judge |) | |

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