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D E C I S I O N
of 2 March 2005

Case Number: W 0028/04 - 3.3.3

Application Number: PCT/EP 3/05787

Publication Number: WO 03/106514 A2

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Title of invention:

Process for the preparation of ethylene copolymers

Applicant:

BASELL POLIOLEFINE ITALIA S.p.A.

Opponent:

-

Headword:

-

Relevant legal provisions:

PCT Art. 17(3) (a)

PCT R. 13.1, 13.2, 40.2 (c) (d) (e)

Keyword:

"Unity of invention - yes"

Decisions cited:

G 0001/89, T 0572/88, T 0677/91

Catchword:

-



Case Number: W 0028/04 - 3.3.3

International Application No. PCT/EPO 3/05787

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 2 March 2005

Applicant: BASELL POLIOLEFINE ITALIA S.p.A.
Via Pergolesi 25
I-20124 Milano (IT)

Representative: Colucci, Giuseppe
Basell Poliolefine Italia S.p.A.
Intellectual Property
P. le G. Donegani 12
I-44100 Ferrara (IT)

Decision under appeal: Protest according to Rule 40.2(c) of the Patent
Cooperation Treaty made by the applicants
against the invitation (payment of additional
fees) of the European Patent Office
(International Searching Authority) dated
3 November 2003.

Composition of the Board:

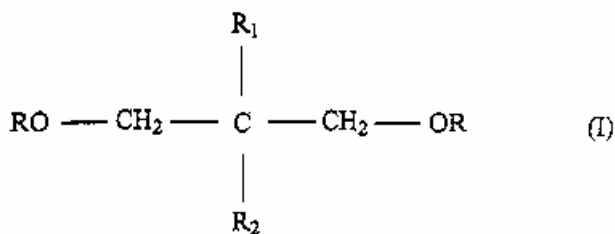
Chairman: R. Young
Members: C. Idez
B. Günzel

Summary of Facts and Submissions

I. International application PCT/EP03/05787 entitled "Process for the preparation of ethylene copolymers" comprising 22 claims, numbered as 1 to 10, and 12 to 23 was filed on 30 May 2003.

II. Independent Claims 1, 7, 10 and 20 of the application as filed read as follows:

"1. A process for the preparation of ethylene copolymers comprising the copolymerization of ethylene with olefins $\text{CH}_2=\text{CHR}$, in which R is a hydrocarbyl radical with 1-12 carbon atoms carried out in the presence of a catalyst comprising the product obtained by contacting (i) a solid catalyst component comprising Mg, Ti, halogen and a 1,3-diether of formula (I)



in which R is a $\text{C}_1\text{-C}_{10}$ hydrocarbon group, R_1 is methyl or ethyl, optionally containing a heteroatom, and R_2 is a $\text{C}_4\text{-C}_{12}$ linear alkyl group optionally containing a heteroatom, and (ii) an organo-Al compound.

7. A solid catalyst component comprising Mg, Ti, halogen and a 1,3-diether of formula (I) above in which R is a $\text{C}_1\text{-C}_{10}$ alkyl group, R_1 is methyl or ethyl, optionally containing a heteroatom, and R_2 is a $\text{C}_4\text{-C}_{12}$ linear alkyl group optionally containing a heteroatom

with the proviso that when R₁ is ethyl R₂ is higher than C₄.

10. Ethylene copolymers containing from 35 to 70% weight of ethylene, from 30 to 65% weight of an olefin CH₂=CHR, in which R a hydrocarbyl radical with 1-12 carbon atoms, and from 0 to 10% of a polyene characterized by (i) a Molecular Weight Distribution expressed by Mw/Mn of higher than 3, (ii) a content of 2-1 regioinversions of the α-olefin units of lower than 5% and (iii) a value of the Shore A measured according to ASTM D2240 and content by weight of ethylenic units, calculated on the basis of the whole polymer, such that the point defined by such values falls below the curve defined by the following equation:

$$Y = 0.0438X^2 - 4.1332X + A$$

where Y is the value of the Shore A measured according to ASTM D2240, X is the weight percentage of ethylene units in the polymer calculated by NMR and A is 153.

20. A polyolefin composition, comprising:

(A) from 5 to 95 parts by weight of a crystalline propylene polymer having an isotactic index greater than 80, selected from polypropylene homopolymer and propylene copolymers containing 0.5 to 15 mol% of ethylene and/or an α-olefin having 4 to 10 carbon atoms, and

(B) from 5 to 95 parts by weight of an ethylene/α-olefin copolymer defined according to claim 10."

Claims 2 to 6 are dependent on Claim 1 and Claims 8 to 9 are dependent on Claim 7.

Claims 12 to 19 are directly or indirectly dependent on Claim 10.

Claim 22 is dependent on Claim 20.

Claims 21 and 23, although presented as dependent on Claim 19, should be considered as being dependent on Claim 20.

III. On 3 November 2003 the European Patent Office (EPO), acting as International Searching Authority (ISA), in compliance with Article 17(3)a) PCT issued an "Invitation to pay Additional Fees" (hereinafter "Invitation") stating that the application contravened the requirements of unity of invention according to Rule 13 PCT and inviting the Applicant to pay, within a time limit of 30 days, 2 additional search fees.

IV. This "Invitation" resulted from the EPO/ISA's conclusion that the general concept underlying the claimed subject-matter, i.e. the production and use of ethylene copolymers was known from the document EP-A2-0 434 082 (hereinafter referred to as D1). According to the "Invitation" the problem relating to the production of these copolymers could be solved in various ways, which were linked by the ethylene copolymer mentioned above as same or corresponding feature. In the light of D1, there was, however, no single general inventive concept (Rule 13.1 PCT) and no demonstrated same or corresponding special technical feature (Rule 13.2 PCT) linking the following groups of claims:

Group I: The subject-matter of Claims 1-9;

Group II: the subject-matter of Claims 10-19; and

Group III: the subject-mater of Claims 20-23.

V. On 2 December 2003 the Applicant paid under protest these two additional search fees and simultaneously requested reimbursement of these fees.

In its letter dated 1 December 2003 announcing the afore-mentioned payment the Applicant argued essentially as follows:

(a) Annex B of the Administrative Instructions under the Patent Cooperation Treaty (as in force from July 1998) set out that unity of invention was met for the case that there is "in addition to an independent claim for a given product, an independent claim for a process specially adapted for the manufacture of said product and an independent claim for a use of the said product" (cf. page 42, point (e), item (i)).

(b) The present invention concerned a specific ethylene polymer (Claims 10 to 19); a process for its preparation (Claims 1 to 9) and polyolefin composition based on that copolymer (Claims 20 to 23).

(c) The ISA had considered that the application lacked unity *a posteriori* in view of D1.

(d) According to the decision G 1/89 (OJ EPO, 1991, 155), while the ISA might consider the request of additional fees, this should be done only in clear cases.

(e) D1 did not anticipate or render obvious the present invention. The specific copolymers according to Claims 10 to 19 and the compositions according to Claims 20 to 23 were not disclosed in D1. The catalyst

used in the process of D1 did not fall within the definition given in Claim 1.

(f) The technical problem underlying the present application was to provide specific ethylene copolymers with an homogeneous comonomer distribution and not the preparation of a generic ethylene copolymer.

VI. On 22 March 2004 the Review Panel of EPO/ISA issued a "Notification regarding Review of Justification for Invitation to pay Additional Search Fees" (hereinafter "Review Notification"), in which the Applicant was invited to pay a protest fee within a time limit of one month.

In paragraph 1 of the "Review Notification", the Applicant was told that after review of the protest the two additional search fees should not be reimbursed.

The position of the Review Board (cf. paragraph 2.3.3 of the Review Notification) can be summarized as follows:

(i) Example 4 of D1 used a catalyst falling under the definition given in Claim 1 of the application in suit.

(ii) Example 20 of D1 disclosed the preparation of copolymer of 60% ethylene with 40% propylene, using a catalyst which only differed from the catalyst according to Claim 1 of the present application in that the diether compound exhibited an isopropyl group instead of an ethyl or a methyl group.

(iii) Claim 4 of D1 read in conjunction with Claim 7 instructed the skilled person to use a diether according to the Markush formula of Claim 4.

(iv) Thus, the skilled person would seriously contemplate working over the whole range of the formula of Claim 4, and in particular to use the catalyst disclosed in Example 4 of D1.

(v) Thus, D1 anticipated the subject-matter of Claims 1 to 9.

(vi) Since the catalyst used in Example 20 was virtually identical to that of the present application, the copolymers produced would have the same properties as those of Claims 10 to 18 of the present application. Thus, Claims 10 to 18 were anticipated by D1.

(vii) Contrary to the arguments of the Applicant, there was no evidence that the copolymers of D1 did not fall under the definition of the copolymers according to the present claims.

VII. On 14 April 2004 the Applicant paid the protest fee requested in the "Review Notification". In its letter dated 6 April 2004 announcing the afore-mentioned payment the Applicant submitted the following additional comments:

(i) The diether used in the catalyst of Example 20 of D1 did not fall under the definition of Claim 1 of the present application.

(ii) The virtual similarity of the catalyst of Example 20 of D1 with the catalyst according to the present application could not amount to proof of identical polymers.

(iii) On the contrary D1 clearly showed that any change in the donors might lead to dramatic structural changes (cf. Examples 11 and 13 of D1).

(iv) The Examiner was wrong in maintaining that the combination of Claim 4 and 7 of D1 taught the present invention and that the skilled person would have been encouraged to work within the scope of present Claim 1.

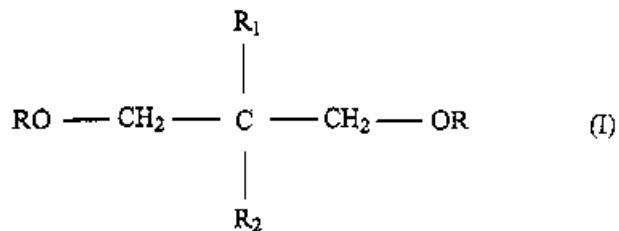
(v) D1 did not disclose the use of the specific electron donors of Claim 1 in the preparation of a catalyst for ethylene copolymerization.

VIII. The Applicant requested the reimbursement of the additional search fees and of the protest fee which had been paid.

Reasons for the Decision

1. The protest is admissible.
2. As can be deduced from the description, the aim of the present application is the preparation of ethylene copolymers with olefins of the formula $\text{CH}_2=\text{CHR}$, in which R is a hydrocarbyl radical with 1-12 carbon atoms having an homogeneous comonomer distribution. This problem is solved, according to the application, by using a catalyst composition comprising specific 1,3-

diether electron-donors as defined by the following formula (I)



in which R is a C₁-C₁₀ hydrocarbon group, R₁ is methyl or ethyl, optionally containing a heteroatom, and R₂ is a C₄-C₁₂ linear alkyl group optionally containing a heteroatom, (cf. page 2, lines 7 to 15; page 5, line 32 to page 6, line 19).

3. As indicated above in Section II, the present application comprises 4 independent claims. Thus, in contrast to the submissions made in the "Invitation" (cf. Section IV above), the claims of the present application should be grouped in the following manner:

Group I: Claims 1 to 6 which refer to the process for copolymerizing ethylene of ethylene with olefins CH₂=CHR, in presence of this specific catalyst component;

Group II: Claims 7 to 9 which relate to the catalyst component *per se*;

Group III: Claims 10, and 12 to 19 which refer to the ethylene copolymers; and

Group IV: Claims 20 to 23 which refer to compositions comprising such copolymers.

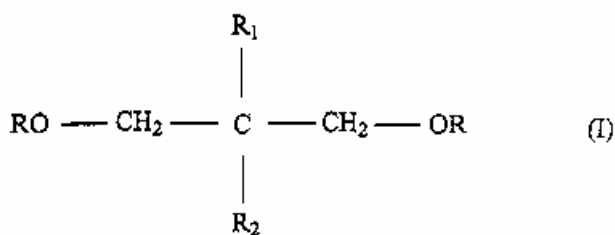
4. In the Board's view the subject-matter of the Group I is conceptually linked by the catalyst system specified in Claim 1, directly, with that of Group II, and indirectly, due to the responsibility of the catalyst system for the desired homogeneous distribution of the comonomer in the copolymers structure with the subject-matter of the Groups III and IV. Thus, this catalyst system would qualify as common unifying "special technical feature" within the meaning of Rule 13.2. PCT, provided this common concept is novel and has an inventive character.

5. In this connection, it has, however, been considered in the "Review Notification" (Section VI above) that document D1 anticipated the subject-matter of Claims 1 to 9.

6. According to the decision T 677/91 of 3 November 1992 (not published in OJ EPO) it is not sufficient for finding a lack of novelty that the claimed features could have been derived from a prior document, there must be a clear and unmistakable teaching of the claimed features and according to the decision T 572/88 of 27 February 1991 (not published in OJ EPO) assessment of novelty should be strictly distinguished from that of inventive step.

7. Thus, the question boils down as to whether D1 discloses clearly and unambiguously the use of the catalyst according to Claim 1 of the present application for the copolymerization of ethylene with olefins of the formula $\text{CH}_2=\text{CHR}$, in which R is a hydrocarbyl radical with 1-12 carbon atoms.

8. Document D1 relates to a catalyst component for the polymerization of olefins comprising a porous metal oxide, on which a magnesium dihalide and a titanium halide or titanium halogen alcoholate, and an electron-donor compound containing two or more ether groups are supported, said electron-donor compound being capable of complexing with anhydrous magnesium dichloride in a quantity not greater than 60 mmoles per 100 g of $MgCl_2$ and being unreactive with $TiCl_4$ to give substitution reactions, or being capable of reacting in this manner for less than 50% in moles. The compound containing ether groups is selected from compounds having the general formula:



where R, R_1 and R_2 , are the same or different from each other and are C_1 - C_{18} alkyl, C_3 - C_{18} cycloalkyl, C_6 - C_{18} aryl, C_7 - C_{18} aralkyl or alkylaryl radicals, and R_1 and R_2 can also be hydrogen atoms (Claims 1 and 4).

In a preferred embodiment R is methyl, and R_1 and R_2 , are the same or different from each other and are selected among methyl, ethyl, propyl, isopropyl, butyl, isobutyl, t-butyl, isopentyl, 2-ethylhexyl, cyclohexyl, methylcyclohexyl, phenyl, and benzyl, and when R_1 is hydrogen, R_2 is ethyl, butyl, sec.butyl, tert-butyl, 2-ethylhexyl, cyclohexyl, diphenylmethyl, p-chlorophenyl, 1-naphthyl, 1-decahydronaphthyl (Claim 5). D1 further relates to a catalyst for the polymerization of olefins

comprising the reaction product of this catalyst component and an Al-alkyl compound (Claims 7 and 9).

9. In particular, Example 4 of D1 discloses a catalyst falling within the definition given in Claim 1 of the present application, but this example only relates to the polymerization of propylene, and in Example 20, which is the only example of D1 dealing with the copolymerization of ethylene (i.e. with propylene), the catalyst used in that example comprises a diether component according to the formula mentioned above in paragraph 8 in which R_1 is isopropyl, R_2 isopentyl, and R methyl.
10. It is thus evident from paragraphs 8 and 9 above that D1 does not clearly and unambiguously disclose the use of a catalyst comprising a diether donor of formula I in which the radical R_1 is a methyl or an ethyl group and R_2 is a group having 4 or more carbon atoms in the copolymerization of ethylene with olefins of formula $CH_2=CHR$, in which R is a hydrocarbyl radical with 1-12 carbon atoms.
11. It is further evident that Example 4 of D1 does not destroy the novelty of the subject-matter Claim 7 of the present application, since this specific catalyst disclosed in this example is clearly excluded by the proviso incorporated in that claim.
12. Consequently, D1 does not anticipate the subject-matter of Claims 1 to 9 of the present application.
13. It thus follows that the common concept as defined in paragraph 4 above is novel over D1.

14. In the Board's view, this common concept cannot be rendered obvious by the disclosure of D1, since this document does not contain any hint that the use of catalyst comprising the specific diether electron-donators of formula (I) as defined in Claim 1 of the present application would lead to an homogeneous distribution of the comonomer in the ethylene copolymer.

15. Consequently, the subject-matter of Claims 1 to 9, of Claims 10, 12 to 19, and of Claims 20 to 23 must be considered as so linked as to form a single general inventive concept within the meaning of Rule 13.1 PCT.

16. It thus follows from the above that the reasons given in the "Invitation" do not warrant the proposed lack of unity objection and the Applicant's protest against the payment of two additional search fees is therefore justified.

Order

For these reasons it is decided that:

The refund of the additional search fees and the protest fee is ordered.

The Registrar:

The Chairman:

C. Eickhoff

R. Young