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Bezeichnung der Erfindung: Low pressure preparation of ethylene copolymers in fluid bed reactor
Title of invention:
Titre de l'invention :

Klassifikation / Classification / Classement : C08F 210/16

ENTSCHEIDUNG / DECISION

vom / of / du 21 August 1990

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent / Titulaire du brevet : Union Carbide Corporation

Einsprechender / Opponent / Opposant : 01) BASF Aktiengesellschaft
02) BP Chemicals Limited

Stichwort / Headword / Référence :

EPÜ / EPC / CBE Article 123(2)

Schlagwort / Keyword / Mot clé : "Lack of original disclosure (yes) - arbitrary combination of values to an undisclosed range"

Leitsatz / Headnote / Sommaire

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Case Number : T 38/89 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 21 August 1990

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Decision under appeal :
Decision of Opposition Division of the European Patent Office dated 24 November 1988 concerning maintenance of European Patent No. 0 004 645 in amended form.

Composition of the Board :
Chairman : F. Antony
Members : C. Gérardin
J. Stephens-Ofner

Summary of Facts and Submissions

I. The mention of the grant of the patent n° 4 645 in respect of European patent application n° 79 100 953.3 filed on 30 March 1979 and claiming priorities of 31 March 1978 and 27 February 1979 from two earlier applications in the United States of America, was published on 19 December 1984 on the basis of 4 claims.

Whereas Claims 1 and 2 were directed to a process for copolymerising ethylene, Claim 3 concerned an ethylene copolymer and Claim 4 a film made from that copolymer. Claim 3 read as follows:

" Ethylene copolymer as recovered directly from a polymerization reactor containing _ 90 mol percent of ethylene and _ 10 mol percent of a least one C_3 to C_8 α-olefin, said α-olefin not containing any branching on any carbon atom closer than the fourth carbon atom, in granular form having an average particle size of 0.125 to 1.78 mm (0.005 to 0.07 inches) with a Ti content of 0 to _ 10 ppm and a content of one or more of Cl, Br or I of 0 to _ 70 ppm, and having a melt index of _ 0.0 to about 100 g/10 min, a high load melt index of about 11 to about 2000 g/10 min, a melt flow ratio of _ 22 to _ 32, an unsaturated group content of _ 1C=C/1000 carbon atoms, a density of 0.91 to 0.925 g/cm^3, a bulk density of 0.24 to 0.50 g/cm^3, and a n-hexane extractable content of less than about 3 weight percent, said copolymer being obtainable by the process of claim 1."

II. On 27 August 1985 and 17 September 1985 Respondents 1 and 2 (Opponents 1 and 2) filed respective Notices of Opposition requesting the revocation of the whole patent

in suit on the grounds that its the subject-matter was not novel and did not involve an inventive step with regard to the teaching of several documents; in addition, they alleged that the wording of Claim 3 contravened the requirements of Article 123(2) EPC.

III. By an interlocutory decision of 24 November 1988, the Opposition Division held that there were no valid grounds for opposition to maintenance of the patent in suit in amended form on the basis of Claims 1 and 2 as originally granted because the subject-matter of these two claims was both novel and inventive, whereas the subject-matter of Claim 3 (slightly amended during oral proceedings) and of Claim 4 as granted did not involve an inventive step.

IV. While neither of the Opponents (Respondents) appealed the said decision, the Patentee (Appellant) lodged a Notice of Appeal on 12 January 1989 and paid the prescribed fee at the same time. In the Statement of Grounds of Appeal filed on 4 April 1989, the Appellant argued in favour of an inventive step of Claims 3 and 4 on the basis of the results of a comparative test. Together with the above submission, the Appellant filed a new Claim 3, which differed from Claim 3 as granted mainly by the density range, which was now given as 0.91 to 0.923 g/cm^3.

Once more, on 13 July 1990, a new Claim 3 (two alternative versions) was filed in which, in addition to other amendments, the word "about" before the upper limit of the n-hexane extractable content was deleted.

V. In the Chairman's introductory statements in the oral proceedings held on 21 August 1990, a warning was given to the effect that, whilst the Board was willing to consider the two versions of Claim 3 filed on 13 July 1990, it might refuse to accept any further versions of this claim

that might be presented during said oral proceedings, unless such could be seen as being clearly allowable. Despite this warning, the Appellant submitted four new versions of Claim 3, of which the one according to his Main Request reads as follows:

" Ethylene copolymer as recovered directly from a polymerization reactor containing $\geq$ 90 mol percent of ethylene and $\leq$ 10 mol percent of at least one C_3 to C_8 α-olefin, said α-olefin not containing any branching on any carbon atom closer than the fourth carbon atom, in granular and fluidizable form having an average particle size of 0.125 to 1.78 mm (0.005 to 0.07 inches) with a Ti content of $>$ 0 to $\leq$ 10 ppm and a content of one or more of Cl, Br or I of $>$ 0 to $\leq$ 70 ppm, and having a melt index of $\geq$ 0.5 to$\leq$5.0 g/10 min, a high load melt index of 11 to 150 g/10 min, a molecular weight distribution Mw/Mn of $\geq$ 2.7 to $\leq$ 3.6, a melt flow ratio of $\geq$ 22 to $\leq$30, an unsaturated group content of $\geq$ 0.1 to $\leq$ 0.3 C=C/1000 carbon atoms, a density of 0.91 to 0.92 g/cm^3, a bulk density of 0.24 to 0.50 g/cm^3, and an n-hexane extractable content of less than 3 weight percent, said copolymer being obtainable by the process of claim 1."

Claim 3 according to the first Auxiliary Request differed from the above by the density range being 0.91 to 0.928 g/cm^3.

Claim 3 according to the second Auxiliary Request differed from Claim 3 according to the first Auxiliary Request by the fact that it was specified at the end of the claim that the copolymer was obtainable by the process of Claim 1 "employing an inorganic carrier as the only

carrier material and a fluidized bed of particulate copolymer particles having the same composition as the copolymer being formed".

Claim 3 according to the third Auxiliary Request differed from the one according to the second Auxiliary Request by the density range being 0.91 to 0.92 g/cm^3.

The Appellant submitted that these various density limits were supported by the description (page 10, line 49), in which a range of from 0.91 to 0.92 g/cm^3 was explicitly disclosed, as well as by Example 26 (page 16, Table IV), in which a density of 0.928 g/cm^3 was mentioned; furthermore, this value was even quoted as being the preferred upper limit of density in the description (page 6, line 24).

VI. In their various written statements as well as during oral proceedings the Respondents strongly objected that, although the limits of the above ranges were individually disclosed in the patent specification, they were not to be found as such in the description in connection with the film forming properties of the copolymers repeatedly put forward by the Appellant. This resulted in an arbitrary definition of the product claimed.

VII. The Appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of any one of the four requests submitted in the course of oral proceedings.

The Respondents requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.

2. The Opposition Division having held that there were no valid grounds of opposition under Article 100 EPC to maintenance of the patent in suit on the basis of Claims 1 and 2 as granted, and there being no appeal by either of the two Opponents, all that needs to be decided by the Board is the allowability of Claim 3 in any one of the four versions submitted during oral proceedings, together with appendant Claim 4 as granted.

3. With specific reference to the express warning mentioned in paragraph V above, the Board has considered whether it should accept for or exclude from consideration any of four versions of Claim 3 before it, bearing in mind that late submittal not only of facts or evidence (e.g. new citations), but also of other matter (e.g. new requests, new claims) is objectionable, because the public's as well as the parties interests require that opposition proceedings and appeals should be speedily concluded. This requirement is reflected in Article 99(1) EPC as well as Rule 55c) EPC read in the light of Rule 66(1) EPC, which seek to ensure a speedy end to oppositions and appeals by requiring the full presentation in the Notice of Opposition of the case that the Patentee needs to meet in order to keep his patent in force.

   Insofar as new evidence is concerned, the Opposition Division or Appeal Board may disregard such pursuant to Article 114(2) EPC, which sets the legal limit upon the inquisitorial duties of the EPO under Article 114(1) EPC. It can and will, of course, be admitted if its evidential weight ("relevance") warrants this.

Although Article 114(2) EPC does not mention requests, it is quite clear that the discretion to refuse all late filed amendments, including requests, that the Examining Division has under Rule 86(3) EPC, is also possessed by the Opposition Division and therefore, by virtue of Rule 66(1) EPC, by the Boards of Appeal. It was this general discretion that was exercised in Decision T 153/85 "Alternative Claims"/AMOCO (OJ EPO 1988, 1) in the manner set out in that decision. It goes without saying that in the absence of an abuse of proceedings, the Boards will normally admit into consideration requests submitted no later than together with the Statement of Grounds of Appeal, while thereafter, depending upon the degree of lateness and other factors, they may become increasingly reluctant to do so.

In the present case, there being no versions other than the four versions submitted during oral proceedings, which represent bona fide attempts to overcome the objections raised under Article 123(2) EPC, the Board has exercised its discretion so as to admit all four versions into consideration.

4. According to the wording of Claim 3 in each of the four versions before the Board, the claimed copolymers are essentially characterized by the following parameters:

(a) average particle size
(b) titanium content
(c) halogen content
(d) melt index
(e) high load melt index
(f) molecular weight distribution
(g) melt flow ratio
(h) unsaturated group content

(i) density
(j) bulk density
(k) n-hexane extractable content.

It is essential to appreciate the definition of these ranges in connection with the properties of the copolymers, especially with their suitability for film making purposes, as claimed in Claim 4.

5. The part of Claim 3 preceding these parameters differs from the corresponding part of Claim 3 as granted only by providing that the ethylene copolymer, as recovered directly from the polymerisation reactor, is to be in "fluidizable" form. This property must be regarded as implicitly disclosed in the description of the patent specification as well as that of the original application, wherein it is referred to a gas phase fluid bed process for the production of the copolymer (page 8, line 57 to page 10, line 23, respectively page 20, line 16 to page 25, line 15). Moreover, both descriptions specify that the particle size of the granular copolymer materials is important for the purpose of readily fluidizing the polymer particles in the fluid bed ractor (page 6, lines 16 to 19, respectively page 10, lines 19 to 24). There is thus adequate support for the concept of fluidizable form.

As to the passage following the reference to Claim 1 in Claim 3 according to the second and third Auxiliary Requests, it is supported by the description on page 7, lines 25 to 27 and page 9, lines 40 to 42, respectively page 13, lines 18 to 22 and page 22, lines 20 to 25.

6. The ranges given for parameters (a), (b), (c) and (j) are the same as in Claim 3 as granted, which in turn is supported by the following passages of the application as originally filed: page 10, lines 21, 3, 14/15 and 25.

The ranges of parameters (d) and (f) are disclosed on page 6, lines 22 to 26, respectively page 10a, lines 1 to 6, as essential for film making purposes.

Regarding parameter (g), which is another means of indicating the molecular weight distribution of a polymer, it is specified on page 5, lines 31 to 35, respectively page 8, lines 5 to 11 that a melt flow ratio (MFR) range of from 22 to 32 corresponds to a Mw/Mn value range of 2.7 to 4.1 and that a MFR range of from 25 to 30 corresponds to a Mw/Mn value range of 2.8 to 3.6. The range of from 22 to 30 corresponds thus to a Mw/Mn value range of 2.7 to 3.6, which is consistent with the range of parameter (f).

The description (page 11, lines 54 to 60, respectively page 30, line 30 to page 31, line 1) indicates that the high load melt index or flow rate, i.e. parameter (e), is obtained by multiplying the melt index, i.e. parameter (d), by the melt flow ratio, i.e. parameter (g). The range of parameter (e) is thus formed by multiplying the lower limits of the two ranges of parameters (d) and (g), i.e. 0.5 and 22, and correspondingly the upper limits of these two ranges, i.e. 5 and 30; the resulting range of from 11 to 150 g/10 min is therefore acceptable for the same reasons as the former ranges. Although the Respondents regarded the presence of this additional parameter as a superfluous characterization of the copolymers, the limits of the range of high load melt index are clearly consistent with those of parameters (d) and (g).

The range of parameter (h) is mentioned on page 5, line 63, respectively page 9, lines 24/25 and can be regarded as a general property of the copolymers, thus compatible with the claimed application. As to parameter (k), it only differs from the previous

definition by the deletion of the word "about" before the upper limit of the range, which can only result in a more precise and restrictive definition of the parameter.

In conclusion, the definitions of the parameters (a) to (h) as well as (j) and (k) do not give rise to any objection having regard to Article 123(2) EPC.

7. However, there is no support for a density range of 0.91 to 0.92 for parameter (i) (Main Request and third Auxiliary Request) in connection with the fabrication of films.

First, it is specified in the description of the patent in suit that the copolymers which may be prepared by the process according to Claim 1 have a density of from 0.91 to 0.96 g/cm^3 (page 5, lines 36/37). Further, as far as the definition of copolymers suitable for making films is concerned, it is indicated that these copolymers should have a density of from $\geq$ 0.912 to $\leq$ 0.940 g/cm^3, preferably of from $\geq$ 0.916 to $\leq$ 0.928 g/cm^3 **together with** (emphasis added by the Board) a specific range of molecular weight distribution (parameter (f)) and standard melt index (parameter (d)) (page 6, lines 22 to 26). Apart from the objection that no combination of the last four density limits could result in the range as at present defined, the above passage makes it clear that this specific combination of parameters (d), (f) and (i) is essential to obtain copolymers having the desired properties and that consequently the claimed combination of parameters does not correspond to that teaching.

It is true that the range of 0.91 to 0.92 for parameter (i) is mentioned in the description (page 10, lines 48 to 51), on which the Appellant relied more specifically during oral proceedings. There it is said

that temperatures of from 75 to 90° C are used to prepare products having a density of from 0.91 to 0.92 g/cm^3, and that higher temperatures lead to densities up to 0.96 g/cm^3. This passage teaches thus to control or even adjust the density of the copolymer by means of an appropriate range of temperature of the fluid bed reactor; however, the Board cannot see in such statement any connection with a particular property of the copolymer, such as the suitability for making films.

8. Similar considerations apply to the range of from 0.91 to 0.928 g/cm^3 for parameter (i) according the first and second Auxiliary Request.

As was correctly stated by the Respondents, there is no such range mentioned anywhere in the description, either in connection with the fabrication of films, or in any other respect. In fact, this range results from the combination of two figures which have been diclosed in entirely different contexts. The figure of 0.91 corresponds to the lower limit of density of the copolymers obtainable by the process according to Claim 1, which for the new copolymers is given as from 0.91 to 0.925 g/cm^3 according to page 5, lines 25/26, and more generally as from 0.91 to 0.96 g/cm^3 according to page 5, lines 36/37; it is thus a figure disclosed in connection with the preparation of the copolymers. As to the figure 0.928, it corresponds to the upper limit of the preferred range of density of the copolymers suitable for making films (page 6, line 24) and to the value of this parameter for the copolymer according to Example 26 (page 16, Table IV); it is thus a figure disclosed in connection with the properties of the copolymers. For this reason, in the Board's view, the present range of density must be regarded as an arbitrary combination of figures which has no counterpart in the original description.

9. In view of the foregoing, thus, there is no adequate support for the two ranges of density as presently defined, so that the wording of each of the four versions of Claim 3 is objectionable under Article 123(2) EPC.

For this reason, it is not necessary to consider any contribution of the given density ranges in combination with the other parameters, in particular with the low hexane extractable content, to the inventiveness of the above copolymers in the light of the various submissions made by the Appellant.

10. Claim 3 being not formally admissible in any of its versions for the reasons given hereinabove, Claim 4 cannot be upheld either.

Order

For these reasons, it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

E. Görgmaier F. Antony