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D E C I S I O N
of 15 February 2001

Case Number: T 0809/97 - 3.3.7

Application Number: 94901418.7

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Language of the proceedings: EN

Title of invention:
FIBERS OF POLYOLEFIN POLYMERS

Applicant:
EXXON CHEMICAL PATENTS INC.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 54(2)

Keyword:
"Novelty (yes)"

Decisions cited:
T 0206/83

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0809/97 - 3.3.7

D E C I S I O N
of the Technical Board of Appeal 3.3.7
of 15 February 2001

Appellant: EXXON CHEMICAL PATENTS INC.
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Decision under appeal: **Decision of the Examining Division of the European Patent Office dated and issued in writing on 25 March 1997 refusing European patent application No. 94 901 418.7 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: R. E. Teschemacher
Members: R. Young
G. Santavicca

Summary of Facts and Submissions

I. European patent application 94 901 418.7, filed as International Application No. PCT/US 93/10913 on 10 November 1993, claiming a US priority of 24 November 1992 (US 07/981,029) and published on 9 June 1994 with the International Publication No. WO 94/12699, was refused, for lack of novelty, by a decision of the Examining Division dated and issued in writing on 25 March 1997. The decision was based on a set of Claims 1 to 17, Claims 1 to 7 having been filed on 26 June 1995, Claims 8 to 13 on 28 February 1997 and Claims 14 to 17 on 19 March 1996. The decision was, however, subject to the proviso that, since there were certain doubts concerning amendments, proposed, by the Applicant, in a letter dated 26 February 1997, to the wording of Claims 14 to 17, the decision did not concern Claims 14 to 17.

Claim 1 was worded as follows:

"Fibers comprising at least one copolymer of ethylene and at least one comonomer, the polymer having a density in the range of 0.86 to 0.93 g/cm^3, a molecular weight distribution (M_w/M_n) in the range of 1.8 to 3.5, a melt index (ASTM-D1238(E)) in the range of 4 to 1000, and a Solubility Distribution Breadth Index less than 25°C."

Claims 2 to 9 were dependent claims directed to elaborations of the "fibers" according to Claim 1.

Claims 10, 11 and 12 were respective independent claims directed, in the case of Claim 10, to fabrics comprising "fiber" according to Claim 1, and further

characterised, according to Claims 11 and 12, by additional features of the fabric and copolymer, respectively.

Claim 13 was an independent claim directed to a method of forming "fibers" according to Claim 1.

II. According to the decision, *inter alia* the following documents were considered to be relevant:

D1: Database WPI, Section Ch, Week 9120, Derwent Publications, Ltd., London (GB); Class A, AN 91-145614; abstract of: JP-A-3 082 816;

D2: JP-A-3 082 816;

D3: Translation into English of D2, provided by the Applicant;

D7: B.A. Krentsel' & L.A. Nekhaeva; Russian Chemical Reviews 59(12), pages 1193 to 1207 (1990); and

D9: WO-A-92/00333.

D1 was an English abstract, and D3 an English translation, of D2. Consequently, both D1 and D3 reflected the disclosure of D2.

D9, although referred to for the first time in the decision, was not a new document, since it was a published application belonging to the same Applicant, and furthermore was referred to in the application in suit, the description of which thus incorporated the relevant disclosure explicitly by reference.

The only feature of Claims 1, 2, 3, 5, 7, 10 and 13 that had not been disclosed explicitly in D2 (considered in the form of its English translation D3) was a value of the Solubility Distribution Breadth Index (SDBI) of less than 25°C. Since, however, no value for this parameter had been determined in the prior art and the description of the application in suit furthermore acknowledged that it was a new test method, the absence of a particular SDBI-value in D2 did not necessarily mean that there was a difference between the disclosure of the latter and the subject-matter of subject-matter claimed.

On the contrary, since D2 referred *inter alia* to the use of catalysts of "Kaminski type", which were known to lead to polymers having a low MWD-value lying within the scope of Claim 1, the SDBI-value for the polymers from which the fibres in the relevant disclosure of D2 had been made would inevitably be within the range defined in Claim 1.

The counterargument of the Applicant, that the disclosure of D2 was not enabling in the sense of the relevant case law (T 206/83, OJ EPO 1987, 005) was dismissed. That Kaminsky-type catalysts were capable of making the relevant polymers with low MWD was known from an earlier document D7. The catalysts according to D7 were, furthermore, among those identified in D9, a document referred to in the application in suit itself, as being suitable for preparing polymers of relevant MWD and SDBI. Finally, the process conditions specified in D2 were also to be found in D9, which indicated that polymers having the relevant low MWD could be obtained.

In summary, D2 provided an enabling disclosure of the

relevant polymers and their use to form fibres according to Claims 1, 2, 3, 5, 7, 10 and 13 of the application in suit. Consequently, the subject-matter of the latter claims lacked novelty. The subject-matter of the remaining claims was, however, considered to be novel and inventive.

III. A Notice of Appeal against the above decision was filed on 14 May 1997, the prescribed fee being paid on the same day.

In the Statement of Grounds of Appeal, filed on 8 July 1997, the Appellant (Applicant) argued, in substance, as follows:

(a) The single sentence forming the totality of the relevant disclosure in D2 of how the polymers in question could be made was not such as to enable the relevant polymers to be reproduced and characterised because (i) the conditions given were not applicable to the gas phase fluidised bed process referred to, and (ii) the minimum temperature proposed, being above the melting point of the ethylene polymers, would result in the fluidised bed used becoming fouled with molten polymer.

(b) The reference, in the decision under appeal, to the catalyst system disclosed in D9, which mentioned temperatures and pressures corresponding to those in the relevant passage of D2, was a disclosure of the broadest conditions under which the catalyst might be used and did not mean that such conditions were applicable regardless of the specific process applied, and in particular would

not be taken by the skilled person to apply to gas phase fluidised beds.

(c) In view of the above, the disclosure of D2 was not novelty destroying for the relevant claims of the application in suit.

The Appellant furthermore wished Claims 14 to 17 to be considered in the appeal.

The Statement of Grounds of Appeal was thus accompanied by a set of Claims 14 to 17, of which Claims 14 and 15 were dependent claims directed to elaborations of the method of Claim 13, Claim 16 was an independent claim directed to "drapeable fabrics", comprising fibres formed from copolymer(s) of ethylene and one or more comonomer(s), having the parameters defined in Claim 1, and Claim 17, an independent claim, was directed to a garment of drape" comprising fabric of Claim 16.

In relation to the latter claims, the Appellant argued that their subject-matter was novel for the same reasons as given under points (a) and (b), above. Furthermore, the subject-matter of Claims 16 and 17 was in any case novel, because the fabrics disclosed in D2 were not drapeable fabrics.

IV. The Appellant requested that the decision under appeal be set aside, and a patent granted on the basis of Claims 1 to 13 underlying the decision under appeal, and Claims 14 to 17 accompanying the Statement of Grounds of Appeal.

Reasons for the Decision

1. The appeal is admissible.

2. *Admissibility of amendments*

Claims 14 to 17 filed with the Statement of Grounds of Appeal correspond to Claims 12 to 15, respectively, as originally filed. They do not, therefore, contravene Article 123(2) EPC and are thus admissible.

No objection under Article 123(2) EPC was raised against Claims 1 to 13 in the decision under appeal and the Board sees no reason to raise an objection of its own. Hence, the Claims 1 to 17 underlying the present decision are held to meet the requirements of Article 123(2) EPC.

3. *The application in suit; novelty*

In its broadest aspect, the application in suit is concerned with fibres comprising at least one copolymer of ethylene and at least one comonomer, the copolymer being characterised by four parameters:

(i) a density in the range of 0.86 to 0.93 g/cm^3;

(ii) a molecular weight distribution (M_w/M_n) in the range of 1.8 to 3.5;

(iii) a melt index in the range of 4 to 1000; and

(iv) a Solubility Distribution Breadth Index (SDBI) less than 25°C

(Claim 1).

The comonomer may be one or more of propylene, butene-1, hexene-1, octene-1 and 4-methyl-1-pentene (Claim 2). The fibres may be melt-spun, melt-blown or spunbonded to form non-woven fabrics including drapeable fabrics, for instance a garment or drape (Claims 7 and 12 to 17).

The SDBI is explained in the application in suit as being "a reasonable and accurate method by which distribution of comonomers throughout the polymer chain can be characterized". It may be measured by temperature rising elution fractionation (page 9, line 10 to page 11, line 15), the calculation of the resulting index being analogous to the standard deviation of the solubility curve but involving the fourth, rather than the second power of the temperature deviation (page 11, line 15 to page 12, line 7).

3.1 According to D2, considered in the form of its English translation (D3), a binder fibre for unwoven fabrics is formed by melt-spinning a linear low-density polyethylene which is a copolymer of ethylene and a C_{3-12} á-olefin, the density being 0.85 to 0.91 g/cm^3, the melt flow rate from 3 up to 100 g/10 min, and the ratio of M_w/M_n being no greater than 4 (Claim).

The linear low-density polyethylene is obtained by ionic polymerization under conditions which include the use of catalyst such as the Ziegler type or Kaminski type, gas phase fluidized bed, pressure of at least 200 kg/cm^2 and temperature of at least 150°C (page 1, final paragraph).

Materials of density below 0.85 g/cm^3 are not readily available, but when the density exceeds 0.91 g/cm^3, heat

fusion is not good. When the melt flow rate is under 3 g/10 min, spinning behaviour is poor and when the melt flow rate is over 100 g/10 min the strength of the fibres themselves is diminished. When M_w/M_n is above 4, gelation and oxidative deterioration tend to occur at melt-spinning, and not only spinnability but fusion as a binder fibre is also poor (page 2, second complete paragraph).

According to a typical example, a linear low-density polyethylene prepared from ethylene and butene-1 had a density of 0.900 g/cm^3, a melt index of 20 g/10 min and a value of M_w/M_n of 3.5 (Example 1). It was melt-spun through a spinneret with a hole size of at least 1 mm at a temperature of 200°C to obtain a 10-denier undrawn tow. This was heat-drawn and machine-crimped at 10 crimps/inch. The fibres were then cut at 51 mm to obtain staple type binder fibres (page 2, penultimate paragraph; page 3, Table).

3.2 It is evident from the above, that whilst a fibre fulfilling the parametric requirements (i), (ii) and (iii) according to the application in suit is referred to in D2, there is no mention of the fourth parameter, SDBI, let alone any indication that a particular value for this latter parameter must be fulfilled.

3.3 The finding, according to the decision under appeal, that the SDBI-value for the polymers of the fibres according to D2 would inevitably be within the range defined in Claim 1 of the application in suit was dependent upon a number of assumptions.

3.3.1 Firstly, it was assumed that, of the two types of catalyst mentioned in D3, viz. Ziegler and Kaminsky,

only the latter type must have been used. This was based on the evidence of the value given for M_w/M_n in the examples, which was lower than would have been expected, had a Ziegler type catalyst been used (Reasons for the Decision; page 8, first, second and third paragraphs).

Whilst it is certainly true that one characteristic of Ziegler catalysts is their tendency to produce higher values of M_w/M_n, in the kind of copolymerisation reaction under consideration, the complete absence of any detail concerning the precise nature of the catalyst used or the manner of its application, except for indications of temperature and pressure which, according to the unrefuted submission of the Appellant, would have been inapplicable in practice, means that the assumption is not directly and unambiguously supported by the disclosure relied upon.

3.3.2 Even if it had been, it was furthermore assumed that the Kaminsky catalyst chosen would necessarily have been a single-site catalyst, and this on the basis of knowledge gained from D7, which referred to such catalysts as being able to be used to obtain polyethylene with a low M_w/M_n (Reasons for the Decision; page 9, final paragraph).

Whilst D7 was admittedly published in 1990 (probably in December of that year, judging from the issue number (12)), it is not referred to in D2. This is not surprising, since D7 was not available to the public at the filing date of D2 (21 August 1989). Consequently, the disclosure of D2 cannot be regarded as automatically incorporating any matter from D7.

Even allowing for the fact that D7 was published shortly before D2 (8 April 1991), the question arises as to what contribution, if any, it would have made to the ability of the skilled reader, at the publication date of D2, to reduce the latter teaching to practice, and in particular to fill any gap in its teaching, as to the precise nature of the catalyst. According to the relevant case law referred to in the decision under appeal, T 206/83 (OJ EPO 1987, 005), it is made clear that, "Basically, any cure of insufficiency lies with the addressee of the document, i.e. the person skilled in the art who has common general knowledge at his immediate disposal. It would be unfair to the public if more were to be expected of him, i.e. an awareness of the whole state of the art. It is normally accepted that common general knowledge is represented by basic handbooks and textbooks on the subject in question." (Reasons for the decision, point 5).

It is immediately evident in this connection, however, that D7 is Russian Chemical review, which is a specialist research publication and by no means a basic handbook or textbook. Consequently, the disclosure of D7 cannot be regarded as belonging to the general knowledge in the light of which the skilled person would have read D2. In other words, the disclosure of D2 does not make available to the skilled reader the details of particular Kaminsky catalysts referred to in D7.

Similar considerations apply *a fortiori* to D9, a patent application which has both an international filing date (21 June 1991) and publication date (9 January 1992) later than the publication date of D2.

In summary, the catalysts according to D7 and D9 are not directly and unambiguously derivable from the disclosure of D2.

3.3.3 This is not to say that the disclosure of D2 is necessarily insufficient to enable the skilled person provide polymers having the characteristics set out in that document. It only means that the the chain of considerations envisaged in the decision under appeal as leading from the brief reference to the use of Ziegler or Kaminsky type catalysts on the one hand, to polymers having not only the parameters (i) (ii) and (iii), but also the SDBI value (iv) required by Claim 1 of the application in suit on the other, is broken by at least two points of disjunction. Furthermore, the uncertainty implied by the first of these (section 3.3.1, above) combined with the incompleteness of relevant detail associated with the second (section 3.3.2, above) is such as to deprive the resulting finding concerning the product, of the quality of inevitability necessary to meet the relevant criterion of its being "directly and unambiguously derivable" from the disclosure of D2.

3.4 In summary, and without it being necessary for the Board finally to decide on the question of overall sufficiency, in the sense of Article 83 EPC, of the disclosure of D2, the latter document does not make available, either explicitly or implicitly, a fibre or fabric made from a polymer having all the parametric requirements (i) to (iv) according to Claim 1 of the application in suit.

3.5 Hence the subject-matter of Claim 1, and, by this same token, that of Claims 2 to 17, which are all dependent

upon, or require a fibre made from a polymer having the parametric features (i) to (iv) defined in Claim 1, is novel over the disclosure of D2.

4. In view of the above, the decision under appeal must be set aside and the appeal allowed. It is, however, evident from the file that no final assessment of the questions of sufficiency and inventive step in relation to the claims rejected as lacking novelty has been carried out by the Examining Division.

Whilst the Board has no particular reason of its own to raise objection under either or these headings, nevertheless it does not wish to bind the first instance in these respects, since such matters have not been raised in first instance proceedings. Consequently, it finds it appropriate to make use of its powers under Article 111(1) EPC to remit the case to the first instance for further prosecution.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the Examining Division for further prosecution.

The Registrar: The Chairman:

C. Eickhoff R. Teschemacher