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D E C I S I O N
of 25 February 1994

Case Number: T 0614/90 - 3.3.3

Application Number: 83302765.9

Publication Number: 0096968

IPC: C08F 10/06

Language of the proceedings: EN

Title of invention:
High melt-viscoelastic polypropylene for post-processed sheets and for blow moulding

Patentee:
Chisso Corporation

Opponent:
Hoechst Aktiengesellschaft
Solvay & Cie. S.A.

Headword:
-

Relevant legal norms:
EPC Art. 56, 111(1), 116(1), 123(2)

Keyword:
"Request for further oral proceedings - rejected"
"Request for prosecution in writing - rejected"
"Generalisation of a specific compositional feature (main request) - not allowable"
"Inventive step (first auxiliary request: no) - obvious alternative"
"Second auxiliary request rejected as submitted late and not clearly allowable"

Decisions cited:
T 0153/85

Headnote/Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0614/90 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 25 February 1994

Appellant: (Opponent 02)
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Decision under appeal:
Decision of the Opposition Division of the European Patent Office dated 30 May 1990 rejecting the oppositions filed against European patent No. 0 096 968 pursuant to Article 102(2) EPC.

Composition of the Board:

Chairman: F. Antony
Members: C. Gérardin
M. Aúz Castro

Summary of Facts and Submissions

I. The mention of the grant of European patent No. 0 096 968 in respect of European patent application No. 83 302 765.9 filed on 16 May 1983 and claiming the priority of 19 May 1982 from an earlier application in Japan, was published on 2 March 1988 on the basis of two claims, Claim 1 reading as follows:

"A polypropylene for post-processed sheets and for blow moulding, the polypropylene being obtained by polymerizing propylene, or propylene and ethylene, at multiple stages by the use of a catalyst comprising a titanium trichloride composition and an organoaluminium compound and a molecular weight modifier, characterized in that the resulting final polymer comprising a higher molecular weight portion and a lower molecular weight portion has a melt flow index (MI) of 0.03 to 2.0 g/10 minutes; between this melt flow index and the melt flow index (HMI) (10.2 kg/10 minutes, 230°C) as measured under 5 times the load applied in the measurement of the former melt flow index, there is the relationship

$$\log HMI \geq 0.922 \log MI + 1.44; \qquad (1)$$

the intrinsic viscosity (as measured in tetralin solution at 135°C) of the higher molecular weight portion, $[\eta]_L$, satisfy the relationship

$$3.0 \leq [\eta]_H - [\eta]_L \leq 6.5; \qquad (2)$$

and said final polymer consists of 35 to 65% by weight of a polymer portion corresponding to said higher molecular weight portion and 65 to 35% by weight of a polymer portion corresponding to said lower molecular weight portion."

For the sake of easier reference hereinbelow the two relationships have been numbered (1) and (2), as in the application as originally filed (page 5, line 2 and page 7, line 17).

Claim 2 was a dependent product claim directed to a particular embodiment of the product according to Claim 1.

II. On 25 November 1988 and 30 November 1988 respectively, two Notices of Opposition were filed against the grant of the patent, and revocation thereof in its entirety was requested for non-compliance with the requirements of Article 100(a) and (b) EPC. These objections were based essentially on the following document

(3) JP-A-56 070 014 (Application No. 146 054), considered in the form of its abstracts:

(3A) Central Patent Index, Basic Abstract Journal, Section A, Plasdoc, Week 31/1981, Derwent Publications, London; and

(3B) Chemical Abstracts, Volume 95, No. 20, 16 November 1981, Abstract 170 047z.

III. By decision of 30 May 1990 the Opposition Division rejected the oppositions. It was first stated in this decision that the objection raised under Article 100(b) EPC was not well founded, since all the information necessary for the preparation of the catalyst was provided in the description and the examples of the patent in suit. Further, document (3) did not explicitly disclose the full combination of features required in Claim 1 of the patent in suit. In particular, that citation did not suggest the importance of the relationship between the melt flow index (MI) and the

melt flow index (HMI), nor the importance of the difference of intrinsic viscosity between the higher molecular weight portion and the lower molecular weight portion.

IV. The Appellant (Opponent 2) thereafter filed a Notice of Appeal against this decision on 23 July 1990 and paid the prescribed fee at the same time. Together with the Statement of Grounds of appeal filed on 28 September 1990 the Appellant submitted an English translation (3C) of the experimental section of the original document (3), i.e. Examples 1 and 2, Comparative Examples 1 to 5 and a summary in the form of two Tables of the important parameters and properties of the block polymers. It referred in particular to the propylene-ethylene block copolymer according to Example 2, which had a melt flow index (MI) of 0.2 g/10 min and in which the difference between the intrinsic viscosities of the two portions was 5.74, thus within the terms of relationship (2). In view of the close correspondence between relationship (1) and relationship (2) mentioned in the patent in suit (page 3, lines 33 to 41), relationship (1) was implicitly satisfied. Although the relative amounts of the two portions were admittedly outside the ranges required in the patent in suit, documents (3A) and (3B) mentioned ranges falling within the scope of Claim 1. It followed that the whole combination of features required in Claim 1 could be derived from document (3C).

V. Since oral proceedings had been requested as an auxiliary request by both the Appellant and the Respondent (Patentee), a hearing was scheduled for 27 October 1993.

As a party as of right to the proceedings, Opponent 1 was duly summoned, but informed the EPO on 28 July 1993 that it would not attend the hearing.

By telefax of 27 September 1993 the Appellant informed the EPO that it would not attend the oral proceedings and requested that a decision be made on the basis of the arguments presented in writing.

On 30 September 1993 the Board issued a communication specifying that, in view of its doubts regarding patentability, the oral proceedings were maintained as scheduled.

VI. In his introductory statement during oral proceedings, the Chairman indicated that the Board regarded the teaching of document (3C) as an implicit disclosure of the subject-matter claimed at that stage.

(i) Thereafter the Respondent filed an amended version of Claim 1 to be considered as the basis of the main request, the amendment consisting in the addition of the following feature at the end of the claim: "the ethylene content of neither portion exceeding 6.4% by weight, when ethylene is copolymerized with propylene in at least one of said multiple stages".

After discussion whether the figure of 6.4 disclosed in one example could be generalized, followed by intermediate deliberation, the Board announced that the above additional wording contravened Article 123(2) EPC and that, therefore, the main request would have to be rejected.

(ii) This led the Respondent to file, as the basis of an auxiliary request, a new single claim in line 2 of which the alternative "or propylene and ethylene" had been deleted, i.e. according to which polypropylene was obtained by

polymerising propylene as the only monomer at multiple stages. Although the so amended claim was held admissible under Article 123(2) EPC and to overcome the previous objection of lack of novelty, the Board expressed serious doubts as to the issue of inventive step.

(iii) However, since the latter objection had been raised for the first time, the Board regarded it as more appropriate to continue the procedure in writing.

VII. In a communication issued on 25 November 1993 the Board confirmed its previous objections. In particular, in the case of the auxiliary request, the use of propylene as single monomer in the various polymerisation stages could not be regarded as inventive, since (i), as conceded by the Respondent, document (3C) implicitly disclosed the same combination of features as required in Claim 1, but in the framework of propylene copolymers; (ii) FR-A-1 354 585 (document (5)), cited in the search report and introduced by the Board into the proceedings, specified that in the preparation of propylene polymers by a multiple stage process the differences between process parameters of two consecutive stages were more important for the properties of the final product than the optional presence of a comonomer, such as ethylene; and (iii) the properties of the propylene polymers mentioned in this latter citation would be clearly related to sheet-mouldability by the skilled person.

As far as the subsequent procedure was concerned, the Respondent was informed that any request for further oral proceedings would probably be rejected pursuant to Article 116(1) EPC, second sentence.

VIII. In the reply of 4 February 1994 the Respondent argued that (i) propylene homopolymers and propylene copolymers as described in document (5) were not necessarily equivalent; (ii) nothing in document (3C) suggested that propylene homopolymers could be used in place of the ethylene copolymers thereof; and (iii) even though it could not be denied that document (3C) disclosed compositions meeting the numerical requirements as specified in the auxiliary request, the combination of parameters according to that request had to be regarded as a selection.

Together with a further statement on 7 February 1994 the Respondent filed a full translation (3D) of document (3) as well as a further auxiliary request, whose only claim was directed to the alternative "propylene and ethylene", i.e. to polypropylene obtained by polymerising propylene and ethylene at multiple stages, and in which it was additionally specified at the end that "the ethylene content in said final polymer is in the range of 1 to 15% by weight".

IX. The Appellant requested that the decision under appeal be set aside and the patent be revoked.

The Respondent requested that the appeal be dismissed and that the patent be maintained on the basis of Claims 1 and 2 filed as main request on 27 October 1993 (main request), or on the basis of the single claim filed on 27 October 1993 as auxiliary request (first auxiliary request), or on the basis of the single claim filed on 7 February 1994 as further auxiliary request (second auxiliary request). As a still further auxiliary request, the Respondent requested further oral proceedings or, alternatively, to be given a further opportunity to comment in writing on the Appeal Board's reasons for such a refusal.

Reasons for the Decision

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

Procedural matters

2. As appears from point III above, the issues raised by the main, first auxiliary and second auxiliary requests have not been discussed in the decision under appeal, since these three requests were only submitted during the appeal procedure (see points VI and VIII above). The first point to be decided is thus whether pursuant to Article 111(1) EPC the Board should exercise any power within the competence of the Opposition Division, i.e. examine and decide the case itself, or remit the case to that department for further prosecution.

Having regard to the fact that (i) the Respondent has been informed of the objections raised by the Board and has been given several opportunities to comment on them, namely oral proceedings before the Board on 27 October 1993 and submission of two written statements on 4 and 7 February 1994, so that the requirements of Article 113(1) EPC are clearly met, (ii) the patent application was filed nearly eleven years ago, (iii) an explicit request for remittal of the case to the first instance has not been made by any of the parties, and (iv) given the relevance of newly submitted document (3C), in the Board's view, further prosecution before the Opposition Division would not lead to any different ultimate outcome, the Board exercising its discretion has chosen to examine and decide the case itself.

3. This conclusion, however, raises the issue of the conditional request presented by the Respondent for further oral proceedings (see point IX above), since, as will appear hereinafter, the main, the first auxiliary and the second auxiliary requests have to be rejected.

According to Article 116(1) EPC, "oral proceedings shall take place ... at the request of any party to the proceedings. However, the European Patent Office may reject a request for further oral proceedings before the same department where the parties and the subject of the proceedings are the same." These restrictive conditions are met in the present case. In the first place, there is no doubt that the department and the parties are the same. In the second place, the main and the first auxiliary requests were the subject of the proceedings before the Board on 27 October 1993; as to the second auxiliary request, as will appear hereinafter, it is not clearly allowable and, therefore, not admitted into consideration.

For these reasons, the Board does not consider further oral proceedings to be expedient.

4. As to the opportunity requested by the Respondent to comment in writing on the Board's reasons to refuse further oral proceedings, there is no basis for such a request in the EPC. The reasons for such refusal were given to the Respondent in the Board's communication of 25 November 1993. In that communication explicit reference was made to Article 116(1) EPC, second sentence, and emphasis was laid on the fact that the Board's substantive objections had been communicated to the Respondent during oral proceedings held on 27 October 1993. The Respondent was thus fully informed

of the Board's position which since then has not changed. The substantive issues having been fully discussed, the matter is now ready for decision.

For these reasons, the Respondent's request to be given a further opportunity to comment in writing on the Board's reasons to refuse further oral proceedings is rejected.

5. As appears from points II, IV and VIII above, document (3) has been considered successively as abstract documents (3A) and (3B) during opposition procedure, then in the form of the English translation of the experimental section (3C) submitted by the Appellant, and now in the form of the English translation of the description (3D) submitted by the Respondent. These various citations, which relate to the same original document (3), can thus be regarded as complementary to each other and will accordingly be considered as one single disclosure. This means as well that document (3D), in spite of having been submitted late, is admitted into the procedure.

Main request

6. As indicated in point VI(i) above, the present version of Claim 1 according to the main request differs from Claim 1 as granted by the proviso that the amount of ethylene should not exceed 6.4% by weight in any portion of the copolymer.

This figure corresponds to the amount of ethylene in the second stage portion of the copolymer according to Example 10 (see page 8, Table 3). It has thus been disclosed in the specific context of the copolymer according to this example only, i.e. in the framework of the combination of parameters characterizing one

particular polymer and as the result of the process features of one single example. In particular, the possibility that the limit of 6.4% by weight of ethylene could apply to the first stage portion as well as to the second stage portion of the copolymer has no support in the patent in suit, for such an embodiment is neither illustrated in the examples concerned with the preparation of a copolymer (see Examples 8 and 10 wherein there is no ethylene in the first stage polymerisation), nor even vaguely envisaged in the description (see page 3, lines 48 to 55). It follows that the upper limit of 6.4% by weight of ethylene must be regarded as a generalisation offending against Article 123(2) EPC, so that the main request has to be rejected.

7. Although the main request must be rejected for formal reasons alone, the Board deems it appropriate to specify that the feature of 6.4% by weight could not have been regarded as inventive. Without anticipating the reasons which will be given in detail when dealing with the first auxiliary request, it is enough to state that nothing in the application as originally filed or in document (3C) suggests that any particular monomer ratio may be essential for the properties of the polypropylene sheets; moreover, an unexpected technical effect resulting from the presence of at most 6.4% by weight of ethylene in any portion of the polymer has not been demonstrated.

First auxiliary request

8. As mentioned in point VI(ii) above, the amended version of Claim 1 according to the first auxiliary request differs from Claim 1 as granted by the fact that copolymerization of ethylene is excluded at any stage, i.e. that propylene is polymerised alone in a multiple

stage process. This embodiment, to which Claim 1 as originally filed was directed, corresponds to the first alternative envisaged in Claim 1 as granted. It follows that no objection arises having regard to Article 123 EPC.

9. Document (3D) describes the preparation by a two-stage polymerisation process of propylene polymers having a good sheet mouldability. These polymers are defined as propylene-ethylene block copolymers, the blocks differing in particular in terms of their molecular weight (Claim 1 in conjunction with page 3, paragraph 3 and page 8, paragraph 3). According to Example 1 of document (3C), which discloses a typical embodiment of that process, block [A] is obtained by polymerising a propylene based gas mixture in the presence of hydrogen and a catalyst system comprising activated titanium trichloride and diethylaluminium chloride; block [B] is prepared subsequently from a different monomer composition and with a different hydrogen concentration in the gas phase.

The product which is prepared in Example 2 according to this general method has a melt flow index (MI) of 0.2 g/10 minutes and comprises 86% by weight of a polypropylene homopolymer block [A] having an intrinsic viscosity of 2.98 dl/g and 14% by weight of a polyethylene homopolymer block [B] having an intrinsic viscosity of 8.72 dl/g, whereby relationship (2) is satisfied. As pointed out by the Appellant in the Statement of Grounds of appeal (page 4, paragraph 1), even in the absence of any explicit reference to the melt flow index (HMI) in document (3C), it must be assumed that relationship (1) is satisfied as well, since the description of the patent in suit specifies that relationship (2) substantially corresponds to relationship (1) and that, when the former is satisfied,

then the latter is satisfied as well (page 3, lines 40 to 41). Although admittedly the weight ratio block [A]:block [B] in this example lies outside the ranges required in the patent in suit, the relative amounts may actually vary between 50:50 and 95:5 according to documents (3A), (3B) and (3D) (Claim 1), thus within limits which partially overlap the ranges required in the patent in suit. This means that Example 2 interpreted in the light of the general teaching of documents (3) implicitly discloses a block copolymer meeting, with the exception of the composition, all the requirements specified in Claim 1.

This approach, which was followed by the Board during oral proceedings to support the objection of lack of novelty of the subject-matter of Claim 1 as granted, has been accepted by the Respondent in both its oral and written submissions. The use of propylene alone in both stages of polymerisation according to the first auxiliary request thus overcomes that objection; consequently, novelty is acknowledged on the basis of that compositional feature.

10. The patent in suit concerns high melt-viscoelastic polypropylene for post-processed sheets and for blow moulding. As stated above, Example 2 of document (3C), which the Board, like the parties, regards as the closest state of the art, teaches the combination of requirements to be met by propylene-ethylene block copolymers in order to ensure a good sheet mouldability as well as good properties of these sheets.

In the light of this prior art teaching, the technical problem underlying the patent in suit may thus be seen in the provision of further propylene polymers suitable for the post-processability for forming sheets having the same advantageous properties.

According to Claim 1 of the first auxiliary request this problem is to be solved by polypropylene polymers obtained by polymerising propylene alone by a two-stage process.

In view of Examples 1 to 7 in the patent specification (see Tables 1 and 2), which show that sheets made from such polymers exhibit the same advantageous properties in terms of appearance and heating behaviour as sheets made from propylene-ethylene block copolymers (compare Examples 8 and 10, Table 3), the Board is satisfied that the above-defined technical problem is effectively solved.

11. It remains to be decided whether the claimed subject-matter involves an inventive step with regard to the teaching of documents (3) and (5).

11.1 Document (5) describes the preparation of polypropylene polymers by a two-stage polymerisation process in the presence of a catalyst system comprising a titanium trichloride component and an organoaluminium compound, the hydrogen concentration being different in the two stages (Résumé, points 1 and 2). This process can be carried out by polymerising propylene alone in both stages (Example 1, runs a and b), or by first polymerising propylene alone, then ethylene alone (Example 2), or by first polymerising propylene alone, then a mixture of propylene and ethylene (Example 3; Résumé, point 3).

The main conclusion to be drawn from this document is that the presence of a comonomer, such as ethylene, in the second polymerisation stage is less important for the general properties of the polypropylene polymers than a substantial difference in terms of molecular weight between the first and second stage products as

the result of different hydrogen concentrations being used in the two stages (page 1, right-hand column, paragraph 2 to page 2, left-hand column, paragraph 4). Although the copolymerization of up to 10% by weight of ethylene in the second stage may improve the low temperature behaviour and shock resistance of the polymer (page 2, left-hand column, paragraph 5 to right-hand column, paragraph 2), the essential feature of this process is that it aims at the provision of a product characterised by a broad molecular weight distribution, whereby the viscoelastic properties and processability of polypropylene are improved, without impairing the well-known advantageous properties thereof. Further, even in the absence in this citation of any specific field of application for such polypropylene polymers, there can be no doubt that the properties reported for polymer A in the Table of Example 2 would be interpreted by the skilled person as meeting the requirements for sheet mouldability; this argument, which was expressed in the Board's communication of 25 November 1993, has not been disputed by the Respondent.

For these reasons, the skilled person looking for polymers other than the known propylene-ethylene block copolymers would consider polypropylene homopolymers as an obvious alternative.

11.2 As correctly pointed out by the Respondent in the statement of 7 February 1994 (page 1, paragraph 2), an essential feature of the propylene-ethylene block copolymers according to document (3D) is that the ethylene content in the second stage copolymer is at least 20% by weight (page 8, paragraph 2). However, this compositional feature is not related to sheet mouldability, thus to the property more specifically contemplated in this citation, but rather to the necessity to confer additional shock resistance and to

reduce the sensitivity of the propylene polymers to temperature variations. In the absence of such requirements in the definition of the technical problem underlying the patent in suit, nothing speaks against omitting ethylene altogether and, thereby, considering polypropylene homopolymers, provided the latter satisfy the conditions found to be most suitable in the case of the block copolymers described in Example 2 of document (3C).

11.3 In conclusion, the use of polypropylene homopolymers being obvious for the reasons given in point 11.1 above, the subject-matter of Claim 1 does not involve an inventive step and, consequently, the first auxiliary request has to be rejected.

Second auxiliary request

12. As indicated in point VIII above, the amended version of Claim 1 according to the second auxiliary request differs from Claim 1 as granted by the fact that (i) only the alternative "propylene and ethylene" has been retained, and (ii) the ethylene content in the block copolymer should be within the range of 1 to 15% by weight. The first amendment being obviously unobjectionable and the second corresponding to the preferred embodiment according to Claim 2 as granted and originally filed, no objection arises having regard to Article 123 EPC.

13. The objections against the patentability of the alternative "propylene and ethylene" having been explained to the Respondent during oral proceedings and summarised in point 9 above, and nothing in document (3D) or in the Respondent's last submission supporting the contention that an amount of 1 to 15% by weight of ethylene in the final polymer could be regarded as an

inventive selection, the second auxiliary request is thus not "clearly allowable" within the meaning of the decision T 153/85 "Alternative claims" OJ EPO 1988, 1. For the reasons given in that decision in points 2.1 and 2.2 and in the absence of any proper justification for the late filing of that alternative claim, the second auxiliary request is not admitted into consideration.

14. In view of the conclusions reached about the three substantive requests in points 6, 11.3 and 13, it is clear that the patent must be revoked.

Order

For these reasons, it is decided that:

1. The request for further oral proceedings is rejected.

2. The request for further prosecution in writing is rejected.

3. The decision under appeal is set aside.

4. The patent is revoked.

The Registrar: The Chairman:

E. Görgmaier F. Antony