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File Number: T 441/90 - 3.3.3

Application No.: 80 303 989.0

Publication No.: 0 030 417

Title of invention: Compositions of melt-processable polymers having improved processibility, and method of processing

Classification: B29F 3/00

D E C I S I O N
of 15 September 1992

Proprietor of the patent: IMPERIAL CHEMICAL INDUSTRIES PLC

Opponent:
01) Bayer AG
02) BASF AG
03) Akzo N.V.
04) Hoechst AG

Headword:

EPC Article 54

Keyword: "Novelty affirmed" - "Burden of proving an inevitable result"



Case Number : T 441/90 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 15 September 1992

Appellant :
(Proprietor of the patent)

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Decision under appeal :

Decision of the Opposition Division of the
European Patent Office dated 5 April 1990
revoking European patent No. 0 030 417 pursuant
to Article 102(1) EPC.

Composition of the Board :

Chairman : F. Antony
Members : R.A. Lunzer
M.K.S. Aúz Castro

Summary of Facts and Submissions

I. European patent No. 30 417 was granted with 10 claims on 7 December 1983 on the basis of application No. 80 303 989.0 filed on 7 November 1980, having a priority date of 30 November 1979 derived from British applications Nos. 7 941 364 and 7 941 365.

II. Within the prescribed nine month time limit, oppositions were filed by four Opponents, the Respondents to the present appeal, on the ground of Article 100(a) EPC, alleging lack of novelty (Article 54 EPC), and lack of inventive step (Article 56 EPC). The Respondents cited in all some 15 prior published documents, out of which particular attention was concentrated upon documents

- (1) GB-A-2 008 598 and
- (2) DE-A-2 348 698,

while the Appellant (Patentee) drew attention to the later published article

- (3) Polyblends containing a liquid crystalline polymer, by Siegmann et al., Polymer, 1985, Vol. 26, pp. 1325 to 1330,

and by a letter of 15 February 1985 it filed a new set of claims, of which Claims 1, 6, and 7 read as follows:

"1. A melt-processable polymer composition comprising from 0.5 to 20% of the composition of at least one polymer capable of forming an anisotropic melt and at least one other melt-processable polymer characterised in that the temperature range over which the polymer can form an anisotropic melt and the temperature range over which the melt-processable polymer may be melt processed overlap.

6. A molten polymer composition characterised in that there coexist in the melt at least two polymers in melt form at least one of which is present as an anisotropic melt and is present at a concentration of from 0.5 to 20% by weight of the composition.

7. A method of improving the processability of a melt-processable polymer comprising forming a blend of the melt processable polymer with a second polymer characterised in that the melt of the second polymer is an anisotropic melt and is present in the blend at a concentration of from 0.5 to 20% by weight of the blend."

III. The proceedings before the Opposition Division were unusually protracted, involving 14 written submissions by the Respondents, including a number of experimental reports, and a further 6 written submissions by the Appellant. Oral proceedings were held on 17 March 1988, but they were inconclusive.

In the course of those oral proceedings, the Opposition Division found that Claim 1 was lacking in novelty in the light of the experimental evidence already filed by the Respondents. In response to that finding, the Appellant put forward an amendment to Claim 1 which limited the size of the particles of the anisotropic polymer to 5 to 10 microns. The Respondents consequently sought, and were granted, an opportunity to demonstrate by further experimental evidence to be filed later that Claim 1, even if so amended, would still lack novelty over Example 4 of document (1).

The order of the Opposition Division at the conclusion of the oral proceedings set time limits for the parties to file further evidence, and directed that, "The proceedings will be continued in writing."

IV. By its written decision given on 5 April 1990, the Opposition Division revoked the patent on the ground of lack of novelty of Claim 1 having regard to the further experimental evidence of the First and Second Respondents directed to showing that Example 4 of document (1) deprived Claim 1 of novelty, even taking into account the further amendment directed to particle size.

V. The decision of the Opposition Division (page 5, paragraph 4) contrasted the wording of Claim 1 with that of Claims 6 and 7. Whereas Claim 6 related to a molten polymer composition, and defined the polymers which are actually present in the melt, Claim 1 required no more than that a polymer capable of forming an anisotropic melt being present in a composition together with at least one other melt processable polymer. It explained further at page 6, paragraph 6 that it considered all the integers of Claim 1 were satisfied because polyethylene terephthalate was undoubtedly capable of forming an anisotropic melt, and likewise the copolyester composition identified was undoubtedly a melt-processable polymer (the designations of the respective polymers as anisotropic and melt-processable were accidentally reversed) and that the temperature range over which the two polymers could be melt processed overlapped.

The decision then turned to Claim 1 as amended by the inclusion of the particle size feature of the dispersed anisotropic polymer, and held that the experimental evidence filed by the First and Second Respondents established that the particle size parameter was also satisfied by Example 4 of document (1) in accordance with the Respondents' repetitions of that Example. There was therefore a lack of novelty, the Appellant having filed no contradictory evidence.

Finally, as to Claims 6 and 7, it held that as there was no evidence that the composition of Example 4 of document (1) had ever been produced as a melt, it followed that those claims did not lack novelty, and that there was no adequate material for challenging the inventiveness of their subject matter.

VI. An appeal against that decision was lodged on 30 May 1990, the appeal fee was paid on 5 June, and the Grounds of Appeal were filed on 3 August 1990.

The Appellant complained of the failure of the Opposition Division to resume the "adjourned" oral proceedings, after receipt of the further submissions from the parties. As to the substantive issues, it drew attention to its earlier letters of 28 July 1988 and 4 August 1989, which included experimental reports which had not been challenged by any contradictory experiments. They showed that if the experimental details of Example 4 of document (1) were properly followed, a rigid intractable polymer would be produced which was incapable of forming a melt. In contrast, such experimental work as had been filed by the Respondents did not conform to the scant experimental information actually given in Example 4. It was therefore difficult to understand how the Opposition Division had reached its conclusion adverse to the Appellant. Furthermore, as the rigid polymer of Example 4 could only be introduced into the composition by solution blending, it would be molecularly dispersed, and thus could not possibly have had the particle size distribution which was a characteristic of the Claim 1 in the form finally considered by the Opposition Division.

VII. The Appellant requested that the decision of the Opposition Division should be set aside, that the oral proceedings before the Opposition Division should be continued, and the patent maintained on the basis of the 10 claims submitted in its letter of 15 February 1985 as its Main Request; alternatively on the basis of one of three Auxiliary Requests filed with the Grounds of Appeal. The Respondents requested that the appeal should be dismissed.

VIII. The First, Second, and Fourth Respondents filed only brief statements, indicating that they relied for the purposes of the appeal on their detailed submissions filed in the proceedings before the Opposition Division, the Fourth Respondent continuing to rely additionally on document (2) in challenging the novelty of the alleged invention. No statement was filed by the Third Respondent.

Reasons for the Decision

1. The appeal is admissible.
2. Procedural position

As was clearly stated in the Minutes of the oral proceedings, the Chairman of the Opposition Division closed, rather than "adjourned" the proceedings, and indicated that the proceedings would be continued in writing. Such an order in no way inhibits any of the parties from asking for further oral proceedings if it thinks fit. However, having made such an order, and in the absence of another formal request for oral proceedings, the Opposition Division is plainly absolved from appointing any further hearing, or even inquiring of the parties whether they wish to be heard further.

3. Admissibility of amendments

Into each of the independent Claims set out in II. above, the Appellant has introduced the limitation that the proportion of the anisotropic polymer should be limited to the range of 0.5 to 20% by weight. That limitation was disclosed in the application as filed at page 5, lines 20 to 31 in the application as filed, corresponding to page 3, lines 40 to 46 of the patent as granted. It also limits the scope of the claims as granted, and therefore it is a permissible amendment for the purposes of both Articles 123(2) and (3) EPC. The previously proposed limitation in Claim 1 to regions having a diameter of 5 to 10 microns is no longer requested.

4. Novelty

4.1 The substantial issue in the present appeal is whether the alleged invention, according to Claim 1 of the Main Request, is novel having regard to the disclosure of Example 4 of document (1). As was accepted by the Opposition Division, document (1) relates to an entirely different solution to a different problem from that with which the present invention is concerned. The present alleged invention is concerned with the problem of the processability of isotropic polymers, and it proposes the inclusion of a relatively small proportion of an anisotropic polymer, which has a marked effect on the viscosity of the combination of polymers especially at high shear rates.

4.2 Document (1) is acknowledged in the patent as granted at page 2, lines 35 to 41, where it is indicated that although some of the rigid polymers there disclosed as being dispersed as particles of 1 micron or less would be

capable of forming an anisotropic melt, there was no disclosure of such a melt, nor of a composition in which both flexible polymer and rigid polymer were present simultaneously in melt form. Accordingly, in the view of the Board, the issue of novelty turns on whether an opponent is capable of demonstrating convincingly that, notwithstanding the general teaching of document (1), the inevitable result of carrying out Example 4 would be that a product falling within the scope of the present Claim 1 would result.

- 4.3 Example 4 is described so briefly that it is quoted in full below:

"3 parts of copolyester obtained from dimethylterephthalate and a 7:3 (molar ratio) mixture of o-chlorohydroquinone and 2,6-dihydroxynaphthalene as the rigid material (number average molecular weight 12,400, average chain length 560°, sigma 4.9) and 97 parts of poly(ethylene terephthalate) were mixed with p-chlorophenol as a solvent, and a film was produced by wet-casting."

The Example then deals with mechanical treatment and mechanical properties.

- 4.4 It is to be observed that this is an example of solvent polymerisation, and that the dispersion of the rigid polymer would be on a molecular scale.
- 4.5 Like the Appellant, the Board finds some difficulty in following the reasoning of the Opposition Division referred to in IV. above. It appears to be saying that as the copolyester, when made by a method which is not necessarily that used in Example 4 is anisotropic, while polyethylene terephthalate is isotropic, there is thus

disclosed a combination of two substances capable of forming a melt together having regard to their respective melting ranges. However, if that be the reasoning of the Opposition Division, in the view of the Board it would have been valid only if the opening words of Claim 1 had been directed to a "polymer composition", and not, as is the case, to a "melt-processable polymer composition".

- 4.6 The Opposition Division failed to give proper weight to the explicit functional limitation of Claim 1 to melt-processable compositions, which excludes such compositions as that of Example 4 of document (1), which, in accordance with such experimental evidence as is available, are not melt-processable.
- 4.7 The unchallenged evidence of the Appellant, filed with its letter of 28 July 1988, is that despite adopting four variants of experimental conditions, each of which falls within the scanty information disclosed by Example 4 of document (1), the product of every one of those experiments was intractable, and thus not melt-processable. In Experiment 5 it was demonstrated that by going outside the disclosure of Example 4, and adopting the reactants used in the experiment sought to be filed by the Respondents at the hearing before the Opposition Division, a liquid crystalline melt could be produced.
- 4.8 Although extensive experimental reports were filed by both the First and Second Respondents, the Board has been unable to find in them any credible refutation of the Appellant's experimental work. The argument on the part of the First Respondent at pages 2 to 3 of its written submission dated 29 December 1988, to the effect that the skilled worker is not to be expected to adhere "slavishly" to the details disclosed in reworking a prior published example, and that alternatives which are well known to the

skilled worker, or as in this case were actually suggested in document (1) at page 2, lines 51 onwards, may be used in re-working an example for the purposes of demonstrating an inevitable result is wrong in law. As was said in the decision T 396/89 (8 August 1991, Point 4.5 of the Reasons), insofar as a party seeks to establish an inevitable result of carrying into effect a prior published example, which does not itself publish the alleged invention, every detail of the prior art example must be duplicated, save for exceptional circumstances where it is not practicable, or not reasonable, to do so.

- 4.9 Accordingly, the Board is satisfied that Claim 1 in accordance with the Main Request is novel over document (1). Regarding the objection of lack of novelty over document (2), the Board agrees with the argument directed thereto by the Appellant in its letter of 15 February 1985, to the effect that that document relates to the known art of blending materials of different viscosity to achieve a lower viscosity, as contrasted with the alleged invention which relates to blending small quantities of anisotropic polymers with isotropic polymers. Thus, document (2) at page 7 comments on the low viscosity of the products in accordance with its disclosure, and at pages 20 to 21 it is proposed that this low viscosity can be exploited by including 60% of the polymer in accordance with its disclosure, so as to reduce the viscosity of the remaining 40% of a polyethylene terephthalate to one twentieth of its previous value. In the view of the Board, this disclosure is consistent with the commonly known methods of reducing viscosity, and does not disclose the proposal of the present invention, of making use of a relatively small proportion of an anisotropic polymer.

4.10 Having reached the above conclusion as to novelty, the Board need consider neither the novelty of the more limited claim which was the subject of the decision under appeal, nor the Appellant's Auxiliary Requests. The Board would have found difficulty in endorsing the finding by the Opposition Division that a claim, limited to particles with a particle size of 5 to 10 microns, lacked novelty over the disclosure of an example in a patent in which all the products in accordance with its claims had to have a particle size of less than 1 micron. Insofar as the Respondents purported to repeat Example 4, and generated products having a particle size for the rigid polymer of 5 to 10 microns, that fact alone suggests that they failed to adhere fully to the instructions contained in document (1). Their experimental results are consequently irrelevant to the matter in issue. In that regard the Board accepts the comment in the statement by Mr MacDonald accompanying the Appellant's letter of 4 August 1989, to the effect that the Respondents had not fairly repeated the instructions contained in Example 4.

5. Inventiveness

5.1 As the decision of the Opposition Division was based on its finding of lack of novelty of Claim 1, without having dealt fully with whether the subject matter of the claim did or did not involve any inventive step, the Board has a discretion under Article 111 EPC to decide the case itself, or to remit it for further consideration by the Opposition Division. In the exercise of its discretion not to remit the case, the Board has taken into account the facts that the case before it is substantially the same as that which was before the Opposition Division, that the Opposition Division itself found (decision pages 7 and 8) that there was inventiveness at least in the subject matter of Claims 6 and 7, and finally the considerable age of the present proceedings.

5.2 The Board endorses the Opposition Division's view of the inventiveness of Claims 6 and 7. Furthermore, as the Board has reversed the finding of lack of novelty of Claim 1, the invention is considered to be inventive for substantially the same reasons as were relied on by the Opposition Division in connection with Claims 6 and 7. None of the cited prior art comes close to the teaching of the present invention. Document (1) is directed to a wholly different solution to a wholly different problem, viz. to finding an alternative to fibres, such as glass fibres, which are commonly used to improve the strength and rigidity of normally soft plastics. To that end it proposes the inclusion of a minor proportion of microscopic particles (less than 1 micron) of a rigid polymeric material, composed substantially of rigid molecular chains, into relatively soft plastics. In contrast, the present invention is concerned with reducing the high shear melt viscosity of isotropic polymers by the inclusion of a minor proportion of an anisotropic polymer. In the view of the Board, the teaching of document (1) has no direct bearing on the present invention.

5.3 A considerable number of other documents were cited, directed mainly to the common knowledge in this art, that the admixture of a lower viscosity polymeric component to a higher viscosity component can have the effect of lowering the overall viscosity of the mixture. Such knowledge is exemplified in document (2), details of which have already been dealt with in 4.9 above. The well known fact that viscosity can be reduced by mixing as above stated is no pointer towards the altogether different proposal of selecting an anisotropic polymer to reduce the viscosity of an isotropic polymer. The significance of the present invention is highlighted by document (3), which was referred to by the Appellant as independent confirmation of the merit of the present invention. The

Board has no reason to doubt the independence of the work reported in it, and the finding that very significant reductions in viscosity were observed even when small proportions of liquid crystalline polymers (i.e. anisotropic polymers) were included in a melt consisting mainly of an isotropic polymer. This article, published in 1985, confirms the Board's view that the invention was unsuggested by any other work published before the relevant priority date of 1979.

6. Conclusion

The subject matter of Claim 1 of the patent in issue is thus novel, and involves an inventive step as required by Articles 54 and 56 EPC. The dependent Claims 2 to 5 relate to modifications of the polymer compositions falling wholly within the scope of Claim 1, and on that ground alone they are entitled to be upheld. Claims 6 and 7 were found to be valid by the Opposition Division, and their validity has not been challenged by the Respondents. The Board sees no objection to their validity, nor to Claims 8 to 10, each of which is dependent on Claims 1, 6, and/or 7.

Order

For these reasons, it is decided that:


1. The decision under appeal is set aside.
2. The case is remitted to the Opposition Division with the order that a patent be maintained on the basis of Claims 1 to 10 referred to in the Appellant's Main Request (corresponding to the claims filed on 15 February 1985), the description to be adapted.

The Registrar:



E. Gorgmajer

The Chairman:



F. Antony