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D E C I S I O N
of 7 November 2000

Case Number: T 0552/98 - 3.3.3

Application Number: 90630150.2

Publication Number: 0419400

IPC: C08G 63/88

Language of the proceedings: EN

Title of invention:
Process for crystallization of polyethylene naphthalate

Patentee:
SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

Opponent:
E. I. Du Pont De Nemours and Company
Hoechst Trevira GMBH & Co KG Patente und Lizenzen

Headword:
-

Relevant legal provisions:
EPC Art. 84, 123(2), 123(3)

Keyword:
"Claims - formulation - clarity (no)"
"Amendments - added subject-matter (yes) - broadening of claim (yes) - opposition proceedings"

Decisions cited:
T 0430/89, T 0097/94, T 0438/98

Catchword:
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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0552/98 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 7 November 2000

Appellant: (Proprietor of the patent)
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 17 March 1998 revoking European patent No. 0 419 400 pursuant to Article 102(1) EPC.**

Composition of the Board:

Chairman: C. Gérardin
Members: C. Idez
A. Lindqvist

Summary of Facts and Submissions

I. The mention of the grant of European Patent 0 419 400 in respect of European patent application No. 90 630 150.2, filed on 5 September 1990 and claiming priority of the earlier US patent application 408354 of 18 September 1989, was announced on 28 February 1996 (Bulletin 1996/09) on the basis of 9 claims.

Claim 1 read as follows:

"A process for crystallising amorphous polyethylene naphthalate prepolymer at a temperature within the range of 150°C to 250°C while providing agitation characterised by heating the amorphous polyethylene naphthalate prepolymer, prior to crystallisation, to a temperature in the range of 80°C to 140°C in the presence of a stream of an inert gas or under a vacuum for a period of time to devolatilise the amorphous polyethylene naphthalate prepolymer".

Dependent Claims 2 to 7 referred to specific embodiments of the process according to Claim 1.

Independent Claim 8 related to a process for producing high molecular weight polyethylene naphthalate resin by solid state polymerisation of the crystallised prepolymer prepared by the process according to any of Claims 1 to 7.

Dependent Claim 9 dealt with preferred features of the polymerisation reactor in which the process according to Claim 8 was carried out.

II. Notices of Opposition were filed by ICI (Opponent I) and by Hoechst Trevira on 28 November 1996.

Both Opponents requested revocation of the patent in its entirety on the grounds set out in Article 100(a) (lack of novelty and lack of inventive step), (b) and (c) EPC.

The objections of lack of novelty and lack of inventive step were supported inter alia by:

D1: GB-A-1 361 080 and

D2: US-A-3 746 688.

III. By decision announced orally on 21 January 1998 and issued in writing on 17 March 1998, the Opposition Division revoked the patent on the ground that Claim 1 did not meet the requirements of Article 56 EPC. More specifically the decision held successively (i) that the replacement of the upper limit of 250°C of the crystallisation temperature by 260°C was the result of the correction of an obvious error which occurred in examination proceedings, (ii) that the invention was disclosed in a manner sufficiently complete to be carried out by a person skilled in the art, and (iii) that the claimed subject-matter was novel over the cited prior art, in particular over D1. However, the claimed process represented nothing more than a mere adaptation of the processing conditions tailored for polyethylene terephthalate taught in D1 in order to take account of the known thermal properties of polyethylene naphthalate (PEN hereinafter).

IV. On 13 May 1998 an appeal was lodged by the Appellant (Patent Proprietor) against this decision with simultaneous payment of the prescribed fees.

(i) The Statement of Grounds of Appeal was filed on 20 July 1998. An experimental report and a new main request based on an amended set of claims were annexed to this statement.

(iii) With its letter of 5 October 2000 the Appellant filed a new set of Claims 1 to 9 as main request as well as an auxiliary request and submitted a further experimental report.

Claim 1 of the main request reads as follows:

"A process for crystallising pellets of amorphous polyethylene naphthalate prepolymer at a temperature within the range of 150°C to 260°C while providing agitation, said pellets being subject to sudden and rapid expansion upon exposure to temperatures of 180 to 220°C, characterised in that, prior to crystallisation, the amorphous polyethylene naphthalate pellets are heated to a temperature in the range of 80°C to 140°C in the presence of a stream of an inert gas or under a vacuum for a period of time sufficient to devolatilise the amorphous polyethylene napthalate pellets to an extent that said sudden and rapid expansion is avoided."

Dependent Claims 2 to 7 correspond to Claims 2 to 7 as granted.

Dependent Claim 8 is drafted as follows:

"The process as specified in any one of claims 1-7 wherein the crystallised polyethylene naphthalate pellets are solid state polymerised at a temperature within 50° C to 1°C below its sticking temperature".

Dependent Claim 9 refers to the specific embodiments of the process of Claim 8.

(iii) To support the wording of these claims the Appellant argued

(iii.1) regarding Article 123 EPC, that the new feature "said pellets being subject to sudden and rapid expansion upon exposure to temperatures of 180 to 220°C" was adequately supported by the description of the patent as granted (Article 123(2) EPC) and that this resulted in a definition of the starting material which was narrower than in Claim 1 as granted (Article 123(3) EPC), and

(iii.2) regarding Article 84 EPC, that the starting material was clearly defined, since the process explicitly concerned amorphous PEN prepolymer pellets which underwent sudden and rapid expansion under specified conditions.

(iv) In addition the Appellant provided detailed arguments concerning the issues of novelty and inventive step in the Statement of Grounds of Appeal and in its letter of 5 October 2000.

V. By letter of 7 January 1999 Respondent I (Opponent I) indicated that it had sold the "Melinex" Polyester Films business to E. I. Du Pont de Nemours and that the identity of Respondent (I) should be changed accordingly. An original assignment dated 6 April 1999 transferring the opposition from ICI to E. I. Du Pont De Nemours was sent with letter of 7 April 1999.

VI. During oral proceedings held on 7 November 2000, following the preliminary discussion of the procedural issue arising from the late submission of a voluminous experimental report by the Appellant on 6 October 2000, the discussion concentrated on the question of the wording of the claims.

(i) Concerning the main request the Appellant explained that Claim 1 should properly be construed as comprising a kind of preliminary test in order to determine whether the amorphous PEN pellets were indeed subject to sudden and rapid expansion upon exposure to temperatures of 180 to 220°C, the actual crystallisation process concerning only these pellets.

That interpretation of Claim 1 was objected to by the Respondents, since it meant that only some PEN pellets exhibited that effect, which amounted to a new teaching offending against Article 123(2) EPC.

The Respondents raised also objections under Article 123(3) against Claims 1 and 8. They essentially argued that the incorporation into Claim 1 of the functional feature " to devolatilise the amorphous polyethylene naphthalate pellets to an extent that said sudden and rapid expansion is avoided" and the deletion of the wording " high molecular weight

polyethylene naphthalate resin" in Claim 8 represented unallowable extensions over the subject-matter of Claims 1 and 8 as granted. Furthermore, the definition of the process was unclear (Article 84 EPC), since a crystallisation step carried out between 150 and 179°C was not related to sudden and rapid expansion and as such could not represent the solution to a technical problem.

(ii) Thereafter the Appellant offered numerous amendments to the claims to be considered by the Board and also submitted several amended versions of Claim 1. Finally, a set of 7 claims was filed as unique auxiliary request, of which Claim 1 reads as follows:

"A process for crystallising pellets of amorphous polyethylene naphthalate prepolymer at a temperature within the range of 150°C to 260°C while providing agitation, said pellets being subject to sudden expansion upon exposure to temperatures of 180°C to 220°C, characterised in that, prior to crystallisation, the amorphous polyethylene naphthalate pellets are heated to a temperature in the range of 80°C to 140°C in the presence of a stream of an inert gas or under a vacuum for a period of time to devolatilise the amorphous polyethylene naphthalate pellets".

Claims 2 to 7 are the same as Claims 2 to 7 as granted.

(iii) In the Respondents' view the wording of new Claim 1 did not overcome any of the objections raised against Claim 1 of the main request which, therefore, were maintained.

VII. The Appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of Claims 1 to 9 of the main request submitted on 6 October 2000 or alternatively on the basis of Claim 1 submitted during oral proceedings and Claims 2 to 7 as granted as auxiliary request.

The Respondents requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible

2. *Procedural matter*

2.1 In order to explain the lateness of the voluminous statement of 5 October 2000 which contained two new sets of claims and an experimental test report the Appellant's representative indicated that he had just taken over the representation of the case and it had been practically impossible for him to act sooner.

As set out in decision T 97/94 (OJ EPO 1998, 467), an important element to consider in such a situation is whether the change of representative was due to force majeure. In the present case the examination of the appeal file reveals that this change was simply the wish of the client, which means that the new representative was obliged to continue the proceedings from the stage they had reached when he took over from his predecessor (cf. Reasons for the Decision, point 3.5.3). The same principle was expounded in decision T 430/89 of 17 July 1991 (not published in OJ EPO).

2.2 Although self-evidently the Respondents had not enough time to carry out their own experiments in reply to the Appellant's late-filed experimental test report, both declared being able to provide some comments on the experimental conditions chosen and the results obtained by the Appellant. This led the Board, after intermediate deliberation, to allow the Appellant to refer to its experimental test report to the extent that the Respondents would be in the position to comment on the experimental conditions and results therein.

As will appear hereinafter, this point turned out not to be decisive, since the substantive issues were not considered for the outcome of the appeal.

2.3 As to the claims, no objection arises in connection with their submission on 6 October 2000, since that left the Respondents a whole month to consider the wording and merits of the claims of the main request. Moreover, all the alternative claims discussed during oral proceedings, whether in the form of amendments simply suggested by the Appellant or in the form of auxiliary requests properly formulated, derived directly from the main request, which was also advantageous for the Respondents.

3 *Main request*

3.1 With respect to Claim 1 as granted the wording of Claim 1 on file differs by (a) the incorporation of the wording "pellets" in order to qualify the physical state of the amorphous polyethylene naphthalate, (b) the change of the temperature range of the crystallisation from 150°C to 250°C to the range 150°C to 260°C, (c) the introduction of the feature that the pellets are "subject to sudden and rapid expansion upon exposure to temperatures of 180 to 220°C", and (d) the

use of the functional feature "for a period of time sufficient to devolatilise the amorphous polyethylene napthalate pellets to an extent that said sudden and rapid expansion is avoided."

3.1.1 The description of the patent specification, in particular column 2, line 19 to column 3, line 5 corresponding to page 3, line 13 to page 4, line 24 of the application as originally filed, contains several references to PEN pellets. This passage describes a particular phenomenon which PEN pellets, unlike pellets of more conventional polyesters, undergo as they are heated to near the crystallisation temperature. All the examples describe a specific sequence of heat treatment steps tailored for a continuous crystallisation of PEN pellets.

There is thus adequate support for this amendment (Article 123(2) EPC), which does not extend the scope of the claimed subject-matter (Article 123(3) EPC) and contributes to the clarity of the process in that it specifies the physical state of the starting material (Article 84 EPC).

3.1.2 Although amendment (b), e.g. the change of the upper limit of the range of crystallisation temperature (260°C instead of 250°C), had been objected to by the Respondents earlier in the proceedings as not complying with the requirements of Article 123(3) EPC, this objection was no longer maintained during the oral proceedings.

It is thus sufficient to state that, according to established case law, amending a claim to remove an inconsistency does not contravene Article 123(2) or (3) EPC if the claim as corrected has the same meaning as

the correct interpretation of the uncorrected claim in the light of the description (cf. T 438/98 of 12 October 2000, not published in OJ EPO, which refers to several decisions on the same issue).

3.1.3 The support for amendment (c) relied upon by the Appellant is to be found in the introductory sentence "This phenomenon explains the sudden expansion of PEN pellets as they are exposed to standard crystallisation temperatures of 180°C to 220°C" (cf. column 2, lines 38 to 41 of the patent specification).

As pointed out by the Respondents, the additional feature in Claim 1 "said pellets are subject to sudden and rapid expansion upon exposure to temperatures of 180 to 220°C", is in fact objectionable in several aspects. The first is that the new wording introduces an implicit difference between pellets subject to that phenomenon and pellets which are not; this was conceded by the Appellant, with the consequence that the process according to Claim 1 has to be interpreted as comprising a preliminary step carried out in order to determine the characteristics of the PEN pellets. Such an interpretation is clearly not supported by the teaching of the application as originally filed (Article 123(2) EPC). The second is that the sudden and rapid expansion of PEN pellets is a phenomenon which is said to occur near the crystallisation temperature (cf. page 3, lines 13 to 17 of the application as originally filed) as the result of the vaporisation and/or release of volatiles trapped inside the pellet as the polymer is softened near its crystallisation temperature (cf. page 3, lines 25 to 32 of the application as originally filed); it is evident that the present formulation does not reflect that teaching (Article 123(2) EPC), since it merely states that the sudden and rapid expansion occurs in the temperature range of 180°C to 220°C but not necessarily near the crystallisation temperature.

Finally it is not clear how Claim 1 should be interpreted when following the devolatisation step the crystallisation step is carried out at a temperature between 150 and 179°C, thus in accordance with the general requirement concerning the crystallisation temperature, but below the temperature at which the PEN pellets are subject to sudden and rapid expansion (Article 84 EPC). As argued by the Respondents, in that range of temperature no distinction can be made between the two categories of PEN pellets, with the consequence that there is neither a technical problem, nor consequently a need for a solution.

3.1.4 Amendment (d) corresponds to another characterization of the devolatisation step:

- Claim 1 as granted: "...heating the amorphous polyethylene naphthalate prepolymer.....for a period of time to devolatilise the amorphous polyethylene naphthalate prepolymer".

- Claim 1 as amended: "...the amorphous polyethylene naphthalate pellets are heated.....for a period of time sufficient to devolatilise the amorphous polyethylene naphthalate pellets to an extent that said sudden and rapid expansion is avoided."

There can be no doubt that the wording of Claim 1 as granted implied a complete devolatilisation of the PEN pellets, which was also in line with the requirements arising from various passages of the description of the patent specification (cf. column 2, line 55 to column 3, line 1; column 8, lines 20 to 35). By contrast, the volatilisation step in the process as amended only requires a devolatilisation sufficient to

avoid the sudden and rapid expansion of the PEN pellets. Since there is no evidence that the latter degree of devolatilisation corresponds to a complete vaporization and/or release of the volatiles, it can only be concluded that a complete devolatilisation (absolute concept) has been replaced by an at least partial devolatilisation (relative concept), which extends the scope of protection (Article 123(3) EPC).

3.1.5 It follows from these considerations that Claim 1 of the main request does not meet the requirements of Articles 123(2), 123(3) and 84 EPC.

3.2 Concerning Claim 8, whilst the claim as granted concerned a "process for the production of high molecular weight polyethylene naphthalate resin", the claim as amended is directed to the preparation of PEN polymers without any reference to their molecular weight, which clearly represents an extension of the scope of protection within the meaning of Article 123(3) EPC. The argument of the Appellant that this wording was superfluous in view of the solid state polymerisation, which is carried out according to the process of Claim 8 and inevitably leads to polymers having a high molecular weight, cannot be accepted, since it appears from the description of the patent specification (cf. column 3, lines 51 to 57 and column 6, lines 41 to 42) that PEN prepolymers may have an intrinsic viscosity and thus a molecular weight higher than PEN polymers obtained after the solid state polymerisation.

3.3 In view of the above deficiencies in Claims 1 and 8 the main request must be rejected.

4. *Auxiliary request*

4.1 The wording of Claim 1 as amended differs from the version as granted by (a) the reference to pellets, (b) the upper limit of 260°C of the range of the crystallisation temperature, and (c) the additional feature that "said pellets are subject to sudden expansion upon exposure to temperatures of 180 to 220°C".

4.2 For the reasons given above (cf. points 3.1.1 and 3.1.2) amendments (a) and (b) are not objectionable.

Regarding amendment (c), the fact that the expansion of the PEN is said to be "sudden" instead of "sudden and rapid" as in Claim 1 of the main request does not modify the situation in substance, so that all the objections raised against that amendment in Claim 1 of the main request are also raised against it in Claim 1 of the auxiliary request.

4.3 It follows that Claim 1 of the auxiliary request does not comply with the requirements of Articles 123(2) and 84 EPC.

4.4 For these reasons the auxiliary request must also be rejected.

4.5 In the absence of any request complying with the requirements of Articles 123 and 84 EPC the substantive issues cannot be discussed and the appeal has to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

E. Görgmaier C. Gérardin