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D E C I S I O N
of 26 May 1999

Case Number: T 0036/96 - 3.3.3

Application Number: 83301087.9

Publication Number: 0092898

IPC: C08G 69/46

Language of the proceedings: EN

Title of invention:

Process for remelting polyamides

Patentee:

E.I. du Pont de Nemours and Company

Opponent:

Rhône-Poulenc Viscosuisse SA Patentabteilung
BASF Aktiengesellschaft, Ludwigshafen

Headword:

-

Relevant legal provisions:

EPC Art. 54, 56, 83, 84, 113
EPC R. 2(1), 67

Keyword:

"Disclosure - sufficiency (yes) - claims allegedly unclear not amounting to undue burden"

"Novelty (yes) - no reason to construe a document by incorporating the disclosure of another"

"Inventive step (yes) - non-obvious alternative concept"

Decisions cited:

T 0219/83, T 0153/85, T 0219/85

Catchword:

-



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Boards of Appeal

Chambres de recours

Case Number: T 0036/96 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 26 May 1999

Appellant: Rhône-Poulenc Viscosuisse SA
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Representative: -

Other party: BASF Aktiengesellschaft, Ludwigshafen
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Representative: -

Respondent: E.I Du Pont De Nemours and Company
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Decision under appeal: Interlocutory decision of the Opposition Division
of the European Patent Office posted 10 November
1995 concerning maintenance of European patent
No. 0 092 898 in amended form.

Composition of the Board:

Chairman: C. Gérardin

Members: B. ter Laan

A. Lindqvist

Summary of Facts and Submissions

- I. Mention of the grant of European patent No. 0 092 898 in respect of European patent application No. 83 301 087.9, filed on 1 March 1983, claiming priority from an earlier application in Great Britain (8212238), was published on 19 May 1993 on the basis of five claims, Claim 1 reading:

"A process for the production of a shaped article from a thermoplastic polyamide, but excluding polycaprolactam which has been prepared in the presence of an alkaline catalyst and which has not been washed to remove "monomer", by remelting the thermoplastic polyamide to form the shaped article from molten polyamide of set melt viscosity without the need to precondition the polyamide with water for prolonged times, comprising adding a controlled amount of water to the polyamide during and/or immediately prior to remelting and within a time less than that required to reach equilibrium conditions, the controlled amount of water added being that required to produce in the molten polymer the set melt viscosity."

Claims 2 to 5 referred to preferred embodiments of the process according to Claim 1.

- II. On 11 February 1994 and on 16 February 1994 two Notices of Opposition against the granted patent were filed, in which the revocation of the patent in its entirety was requested on the grounds set out in Article 100(a) and 100(b) EPC.

III. The opposition was, *inter alia*, supported by the following documents:

D1: US-A-2 943 350 and

D2: US-A-2 571 975.

IV. By a decision issued in writing on 10 November 1995, the Opposition Division held that the grounds for opposition did not prejudice the maintenance of the patent in amended form, the amendment consisting in the incorporation into Claim 1 of the subject-matter of Claim 4 as granted. The Opposition Division held that following that amendment the patentability requirements of the EPC were fulfilled. In particular, it was held that

(a) several objections made by the Opponents concerned Article 84 EPC, which was not a ground for opposition;

(b) the exact amount of water to be used in the claimed process could not be indicated in Claim 1 as it depended too much on the circumstances. Therefore, the requirements of Article 83 EPC were not contravened;

(c) regarding novelty, none of the cited documents disclosed the combination of both pre-treating polymer granules in order to increase the molecular weight as well as the exposure to water shortly before or during melting in such a way that no equilibrium was reached. Therefore, novelty was present;

(d) regarding inventive step, the problem to be solved was to find a simplified process for producing molten thermoplastic polyamides having a melt viscosity suitable for forming a desired shaped article. The problem was solved in that no equilibrium had to be reached between the polymer and the water. As none of the documents relied upon by the Opponent taught the exposure to water in a non-equilibrium way, no documents taken separately or in combination could render the claimed subject-matter obvious. The other documents on file did not refer to the kind of process now being claimed. Hence, the claimed subject-matter was inventive.

V. On 9 January 1996 the Appellant (Opponent I) lodged an appeal against the above decision and paid the prescribed fee simultaneously. The Statement of Grounds of Appeal was filed at the same time.

VI. Oral proceedings before the Board were held on 26 May 1999. Opponent II, as a party to the proceedings as of right (Article 117 EPC), had been duly summoned to the hearing but informed the EPO by letter of 21 January 1999 that it would not attend the oral proceedings and awaited a decision on the merits of the case.

VII. The Appellant, in its written and oral submissions, argued essentially as follows:

(a) The Opposition Division had contravened Article 113(1) EPC since it had disregarded (i) a request for oral proceedings by Opponent II and (ii) arguments presented in time by Opponent I

(Appellant).

(b) According to Decision T 219/85, if claims contained unclear expressions, that contravened not only Article 84 EPC, which admittedly was not an opposition ground, but also Article 83 EPC. Claim 1 was not clear because it contained 2 disclaimers and the term "equilibrium conditions" was not defined. The scope of the claims was too broad since they included all possible situations except the one in which equilibrium was reached, so that also future polymers were encompassed. Furthermore, the examples were not in conformity with the claimed subject-matter. Therefore, the skilled person could not carry out the claimed process over its full range.

(c) D1 (US-A-2 943 350) referred to D2 (US-A-2 571 975) so that, in view of Decision T 153/85, both documents were to be regarded as one single teaching for the purpose of novelty assessment.

D1, incorporating the teaching of D2, described the exposure to water of the polymer flakes as well as the post-condensation step of Claim 4 of the patent as granted. Post-condensation was an indispensable feature for melt-spinning, which was also disclosed by D2 and further illustrated by D3 (Kunststoff-Handbuch, Vol VI, page 235). The equilibrium to which the patent in suit referred was a different kind of equilibrium than mentioned in D2; the non-equilibrium conditions according to the patent in suit were also present in D2.

Furthermore, the equilibrium situation according to D2 was only a preferred feature, so that the non-equilibrium situation was also encompassed. Hence the claimed subject-matter was not novel.

- (d) Regarding inventive step, the problem to be solved was the control of the melt viscosity and humidity in the polymer in order to obtain a constant end product. The solution of the patent in suit was to contact the polymer with water for a short time after a post-condensation treatment. The same problem was addressed in D1 and D2, which both proposed to solve it by the addition of a certain amount of water after post-condensation of the polymer. As those documents described the effect of water addition, there was no technical difference between the patent in suit and that prior art. Any advantages claimed by the Proprietor, like a shorter contact time and a simplification of the process, could not be deduced from the patent in suit. Therefore, no inventive step was present.

VIII. The Respondent (Proprietor), in its written and oral submissions, argued essentially as follows:

- (a) No request for oral proceedings had been made so that there could be no question of a substantial procedural violation. Also, the Opposition Division explicitly indicated to have disregarded a letter filed by the Proprietor. However, there was no indication that any of the Opponent's arguments were disregarded. All parties had had the opportunity to comment, so that no offence

against Article 113 EPC had occurred.

- (b) Decision T 219/85 was an *ex parte* case so that it did not apply to the present opposition case. Most of the Appellant's arguments pertained not to actual disclosure, but to clarity which was not a ground for opposition. The examples, which showed two different kinds of polyamides, were in conformity with Claim 1. The argument that the invention could not be carried out over its full claimed range had not been submitted before and was not supported by any evidence. Since the various polymers had a greatly different equilibrium behaviour towards water, the conditions under which equilibrium was attained could not be defined more precisely.
- (c) Documents D1 and D2 were to be taken isolated for novelty purposes since D2 was mentioned as one of many prior art documents and hence could not be regarded as part of the disclosure of D1.

The process as claimed showed the following differences with the prior art :

- (i) The drying step disclosed in D2 was not necessarily the same as post-condensation, since it was possible to remove water by other means as well. Post-condensation was not indispensable for melt-spinning. Moreover, there were also other post-condensation methods than now required by the patent in suit. D1 did not disclose post-condensation or drying at all.

- (ii) In both D1 and D2 the polymer melt was allowed to stand until equilibrium was reached, which was not the case in the process according to the patent in suit.
- (iii) In D2 no water was actually added. In both D1 and D2 the molecular weight was controlled by atmospheric conditions, whereas the patent in suit required the active addition of a controlled amount of water.

Therefore, the claimed subject-matter was novel.

- (d) As regards inventive step, D1 was the closest document since in D2 no water was added to the polymer. The problem to be solved was to provide an easy process for the preparation of shaped articles of high molecular weight polyamides. The problem was solved by a three step process: (i) increasing the molecular weight, (ii) decreasing the molecular weight by adding water under controlled non-equilibrium conditions, (iii) remelting and shaping of the polymer. As pointed out when arguing novelty, both D1 and D2 taught away from that specific combination of features, in particular the controlled addition of water without establishing equilibrium conditions before remelting and without dependence on atmospheric circumstances, in combination with a pretreatment to increase the molecular weight of the polymer. Therefore, the claimed subject-matter was not obvious.

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

The Respondent requested that the appeal be dismissed and that the patent be maintained as amended in opposition proceedings, alternatively that the patent be maintained on the basis of auxiliary requests 1 or 2, both filed on 21 May 1999.

Reasons for the Decision

Admissibility of the appeal

1. The appeal is admissible.

Language during oral proceedings

2. After the opening of the oral proceedings, the Appellant informed the Board and the Respondent of its intention to speak German instead of English, the language of the proceedings.

2.1 According to Rule 2(1) EPC, any party to oral proceedings may, in lieu of the language of the proceedings, use one of the other official languages, on condition that such party gives notice at least one month before the date laid down for the oral proceedings or makes provision for interpretation into the language of the proceedings (see also the communication from the Vice-President, Directorate-General 3 of the European Patent Office, dated 19 May

1995, OJ EPO 1995, 489).

2.2 The Appellant informed the Respondent and the Board of its intention as late as during the oral proceedings and had made no provisions for translation from German into English, so that the conditions as set out in Rule 2(1) EPC were not fulfilled. Therefore, the Appellant had no right to use any other language than that of the proceedings and the Board did not allow an exception from the above provisions.

Substantial procedural violation

3. The Appellant stated that the other opponent had filed a request for oral proceedings before the first instance. However, the other opponent only requested the issue of a communication in order to be able to decide whether or not to request oral proceedings (Notice of Opposition, page 1, paragraph 6: "Weiterhin bitten wir die Einspruchsabteilung um einen Zwischenbescheid, wenn die Stellungnahme des Patentinhabers zu diesem Einspruch vorliegt, damit besser entschieden werden kann, ob die diesseitige Interessenlage einen Antrag auf mündliche Verhandlung gemäß Artikel 116 EPÜ ratsam erscheinen läßt."). In a later letter (13 July 1995), which followed the Respondent's detailed counterstatement of 10 January 1995, a decision on the merits of the file was requested ("Wir bitten um Entscheidung nach Aktenlage."). Therefore, the Board cannot follow the Appellant's view that the other Opponent had in fact filed a request for oral proceedings, so that taking a decision without oral proceedings did not imply a substantial procedural violation.

4. The Appellant pointed out that the Opposition Division had not taken into account all its arguments presented during the opposition proceedings.

Although the decision refers explicitly to the Notices of Opposition and to the Respondent's counterstatement, but not to the Appellant's statement filed on 24 May 1995, there is ample evidence that the letter was properly considered.

First, the list of documents identified in point 3 of the Summary of Facts and Submissions includes in particular D3, which was cited for the first time in that statement (cf. Point 1).

Secondly, in point 6 of the Reasons for the Decision, it is stated that "It does not seem possible to combine D1 with D3, as Opponent I has suggested, since D3 is concerned with the water content of polyamides at equilibrium and is therefore equally irrelevant."

Furthermore, in the Board's view, the arguments put forward in that letter in connection with the issue of clarity, novelty and inventive step have been properly dealt with in the impugned decision.

It follows that the Appellant's objection is not supported by the reality of the case and that, consequently, no substantial procedural violation occurred within the meaning of Article 113(1) EPC which might justify the reimbursement of appeal fees pursuant to Rule 67 EPC.

Sufficiency of disclosure

5. The Appellant's arguments regarding the meaning of the disclaimers and the term "equilibrium conditions" in Claim 1 amount to an objection of lack of clarity of the claim, which is not open to opposition (Article 100 EPC). The Appellant, however, relied on Decision T 219/85 (OJ EPO 1986, 376), according to which unclear claims would imply that Article 83 EPC was not complied with. The Board cannot agree with that line of argument.

5.1 First, T 219/85 concerns an *ex parte* case, in which Article 84 EPC as well as Article 83 EPC may be considered. Secondly, in that decision it was found that "the essential difference between the claimed and the prior art processes, which gives rise to the different results, is enshrined in the vague term "under conditions such", which can be accepted only if it can be shown that it was sufficiently clear to enable a person skilled in the art to carry out the invention disclosed in the application (Article 83 EPC). Either, therefore, the purport of these words must emerge clearly from a reading of the original text of the patent application or the conditions that give rise to this different result must be so apparent to the skilled person as to require no further explanation." Thus, in decision T 219/85 the link laid between Article 84 EPC and Article 83 EPC resulted from the need to interpret a vague expression in the claim by means of the information disclosed in the application as a whole, which information was found to be insufficient both for the purpose of carrying out the invention and for the interpretation of the claim. In other words, because in that particular case Article 83 EPC was not complied with, the requirements of Article 84 EPC were also not fulfilled. The Appellant's general statement that non-compliance with Article 84 EPC would also mean that the requirements of Article 83 EPC would not be met, can therefore not be deduced from that decision.

5.2 The present case differs from the situation in T 219/85 since it concerns an opposition, so that Article 84 EPC cannot play any role. Therefore, the only question to be answered is whether the requirement of Article 83

EPC, that the invention should be disclosed in a manner sufficiently clear and complete for it to be carried out by the skilled person, is complied with.

5.3 Contrary to Article 84 EPC, which concerns the claims, Article 83 EPC pertains to the patent as a whole. Therefore, if the patent as a whole contains sufficient information for a skilled person to carry out the invention, the requirements of Article 83 EPC are satisfied.

5.4 In the patent in suit, there is a clear definition of what is meant by "equilibrium conditions" in column 3, lines 46 to 52 of the patent in suit: the polymer is exposed to water during "... a short period of time, sufficient to ensure that the water is uniformly distributed throughout the bulk of the granules, but insufficient to allow the water to become uniformly diffused through each granule, ie equilibrium conditions are not achieved." Further information as regards the "short period of time" can be found in column 1, line 47 to column 2, line 1. Regarding the amount of water to be added, instructions are given in column 2, lines 42 to 54. A list of processable polymers as well as general considerations about the suitability of the claimed process are mentioned in column 2, line 55 to column 3, line 7.

Furthermore, in the three examples two different systems of carrying out the claimed process are described. In Example 1, in a continuous process, polyamide chips are dried and fed to an extruder in the feed zone of which water is injected. The amount of water is controlled by a viscosity measuring device via

an electric signalling system. In Examples 2 and 3 batch processes are described in which water is added to the dried polymer.

In view of all that information, the Board comes to the conclusion that the skilled person would have had no difficulty in carrying out the claimed process. The Appellant's argument that the claims were "too broad" since all kinds of polymers, also future ones, were encompassed, holds no water. It has been made sufficiently plausible that the process can be carried out over the full scope of Claim 1 and the Appellant, which, as an opponent, has the onus of proof (cf. T 219/83, OJ EPO 1986, 211 corr. 328) has brought no evidence of any polymer which could not be treated according to the process as defined in the patent in suit. The requirements of Article 83 EPC therefore are met.

Combining documents

6. Generally, for purposes of novelty assessment, the combination of documents is not permitted. In certain exceptional cases, like described in Decision T 153/85 (OJ EPO 1988, 1), where there was a specific reference in one prior document to a second prior document as well as an identity of the processes described in those documents, the disclosure of the second document may be considered to be part of the disclosure of the first document.

6.1 In the present case, D1, column 1, lines 22 to 38, refers to D2, not for the purpose of incorporating by reference the whole disclosure of this document, but as

a reference to one of several prior art methods which made it possible to control the uniformity of physical properties of yarns by conducting the spinning under a positive and predetermined water vapour pressure. D1 mentions the advantage (improved uniformity of melt) as well as the disadvantage (low polymerisation degree) of the process of D2 and endeavours to overcome that shortcoming. D1 proposes to conduct the spinning of the melted polymer in contact with steam, while a constant atmosphere of water vapour, unsaturated at the temperature of the melt, is maintained in the melting chamber (column 1, lines 47 to 51). From the descriptions and illustrations of D1 and D2 the processes they describe would not appear to be identical, nor does the process of D1 incorporate all the features of the process of D2. On the contrary, in D2 saturated steam is brought into contact with polymer flakes (column 2, lines 11 to 17), whereas in D1 the polymer in melted form is exposed to an atmosphere of unsaturated water vapour (column 1, lines 47 to 54).

Therefore, the circumstances in the present case differ in essential points from the circumstances of decision T 153/85 (supra).

6.2 For those reasons, the Board sees no ground to combine D1 with D2 when assessing novelty.

Novelty

7. D1 describes in a process of spinning a synthetic linear polyamide wherein the polymer flake is melted in a melt chamber and the melt is exposed to water vapour for a time sufficient to establish equilibrium between

the melt and the water vapour before the melt is spun, the improved method of controlling the equilibrium between polymerization and depolymerization which comprises maintaining the partial pressure of the steam in the melt chamber constant throughout the melting and spinning operations by maintaining said melt chamber in open communication with an air-conditioning chamber, circulating through the latter chamber an inert gas which is saturated with steam at a lower temperature than the temperature of the melt chamber, but at the same pressure as that in the melt chamber, so that the atmosphere of the melt chamber differs only in temperature from that of said air-conditioning chamber, whereby the ratio of the partial pressures of the water vapour and the said inert gas are maintained constant at the temperature of the melt, and producing from said spinning process polyamide filaments having improved physical properties (Claim 1). Care is taken that no condensation of the steam occurs (column 2, lines 37 to 41). The air-conditioning chamber makes it possible to maintain the melt chamber conditions which only differ in temperature and so to produce any desired water content and hence a constant degree of polymerization of the melt; this provides a certain flexibility regarding the water content of the shreds which are melted (column 2, lines 45 to 53) and ensures more uniform physical properties of the yarn.

- 7.1 The process of D1 can thus be summarized to include the following steps: melting the polymer, exposing it to water vapour for sufficiently long to establish equilibrium between the water vapour and the polymer melt, and then spinning the melted polymer. Hence it differs from that of the patent in suit in that the

polymer is melted before it is exposed to unsaturated steam, whereas in the present process the polymer in granular form is first exposed to elevated temperatures under conditions allowing the removal of volatile products and only then water is added during and/or immediately before melting.

Although two different passages in D1 mention the necessity of reaching an "equilibrium", they do not relate to the same kind of equilibrium; moreover, none of them can be equated with the equilibrium conditions required in the patent in suit. In D1 the first reference concerns the polymerization-depolymerization equilibrium which has to be kept so as to result in a polymerization degree which is as high as possible (column 1, lines 42 to 45) and also represents the improvement over prior art processes, such as D2, when that parameter was too low (column 1, lines 22 to 38); the second reference is in Claim 1, where it concerns the equilibrium between the melted polymer and the water vapour. By contrast, according to the present process, this term relates to the polymer during and/or immediately prior to melting. Therefore, the disclosure of D1 gives no reason to assume that its equilibrium conditions would imply the same conditions as the non-equilibrium conditions of the patent in suit and the Appellant has not provided any evidence in support of its allegation.

7.2 In the light of the above, the Board comes to the conclusion that D1 does not prejudice the novelty of the claimed subject-matter.

8. D2 describes a process for spinning a synthetic linear

polyamide which comprises melting the said polyamide in a chamber; introducing water vapour into said chamber at a substantially atmospheric pressure; exposing the resultant melted polyamide to the said water vapour until water is uniformly distributed in the melt; and feeding the resultant molten composition to a means for extruding it from said chamber, the melting and the feeding being carried out at substantially atmospheric pressure and in the presence of water vapour at substantially constant pressure (Claim 1). Although according to Claim 1 the melted polymer is exposed to water vapour, according to Figure 1, polymer flakes are brought into contact with steam and only after mixing with the steam the flake passes to a grid melter where it becomes thoroughly melted (column 2, line 22 to column 3, line 4). In column 1, lines 18 to 21, it is stated that to avoid excessive degradation by water, steps are usually taken to dry the polymer flake to a low and controlled moisture content prior to the melt spinning step.

8.1 Regarding the drying step, the parties held contrary positions.

The Appellant maintained that this was paramount to the post-condensation required in the patent in suit, since post-condensation was essential for the melt-spinning process. No supportive evidence for those arguments was however given.

The Respondent pointed out that there were other means of drying the polymer without post-condensation and, in support, referred to D7 (DE-A-2 702 605). Also, post-condensation was not essential for melt-spinning.

In fact, the drying step mentioned in D2 in column 1, lines 18 to 21, forms part of a passage (column 1, lines 7 to 47) which reviews the prior art at the time of filing of D2. The description of the invention according to D2 starts at line 48, so that the Board cannot follow the Appellant's argument that D2 discloses the drying of the polymer in combination with the other process steps described in that document. On the contrary, the aim of D2 is to avoid the disadvantages of existing techniques. Thus, it cannot be concluded that D2 discloses the combination of drying and spinning of the polymer in a clear and unambiguous way.

- 8.2 Moreover, D2 differs from the patent in suit in further points than the post-condensation. First, regarding the equilibrium conditions, the same considerations are valid as for D1 (see point 8.1 above): According to D2, column 2, lines 46 to 54, the polymer melt is in equilibrium with steam and the steam serves to blanket the polymer flake. Those conditions would appear to differ from the non-equilibrium conditions of the present process. A further reference to "equilibrium" can be found in D2, column 2, line 55, to column 3, line 14, where it is described how the polymer, in a steam atmosphere, is passed to a heated grid, where it becomes thoroughly melted to form a melt pool and is then metered out to a spinneret. The contents of that melt pool are kept as small as possible, but large enough to be exposed to the steam for sufficiently long to establish an equilibrium (see also column 2, lines 13 to 15). According to column 6, lines 5 to 8, it is preferred to use flake which has reached equilibrium with ordinary atmospheric conditions. This

equilibrium state would appear to refer to the condition of the flakes before they are used in the process of D2. The passages of D2 which refer to "equilibrium" would therefore not appear to concern the same stage of the process and hence to different kinds of equilibrium. Anyway, like in D1, the same kind of equilibrium would not appear to be meant as in the patent in suit. Therefore, the disclosure of D2 also gives no reason to assume that its equilibrium conditions would imply the same conditions as the non-equilibrium conditions of the patent in suit.

9. Therefore, the Board comes to the conclusion that D2 does not prejudice the novelty of the claimed subject-matter.
10. None of the other documents mentioned during the proceedings before the first instance were cited against novelty and the Board agrees with that view.
11. Therefore, the Board decides that the claimed subject-matter of the patent in suit is novel.

Inventive step

12. The patent in suit concerns a process for remelting polyamides.

Such processes were known from D1 as well as D2. The problem described in both D1 and D2 is that polyamide polymers tend to change their properties when melted by reacting with water which may be present in the polymer itself or in the surrounding atmosphere. That reaction leads to a change in the degree of polymerization of

the polyamide, indicated by a change in viscosity, and hence to a change in properties of the product obtained from the melted polymer. The object of both D1 and D2 is to obtain a product that is uniform in physical properties by controlling the polymerization/depolymerization equilibrium of the polymer melt, which is achieved by adjusting the moisture content of the polymer (D1: column 1, lines 22 to 45; D2: column 1, line 6 to column 2, line 3). As can be seen from the patent specification, column 1, lines 14 to 48, the patent in suit addresses the same problem and pursues the same object. Therefore, both D1 and D2 are considered appropriate starting points for the assessment of inventive step.

13. According to D1 and D2, the polymer is exposed to water vapour during a time sufficient to reach equilibrium. The exact duration of that exposure depends on the material used. In D1 no time is given, but in D2, column 3, lines 9 to 14, an exposure time of as little as 15 minutes is given. According to the patent specification, the object of the invention is to provide a process for the conditioning of polyamide polymers which, while controlling the moisture content of the polymer, only requires a short time of contact with water (column 1, lines 23 to 25 and 45 to 47). In practice, however, periods of several hours are necessary (column 1, line 55 to column 2, line 1).

- 13.1 Therefore, the technical problem underlying the patent in suit as defined in column 1, lines 45 to 47, to provide "a process for the conditioning of polyamide polymer which only requires a short time of contact with water" is not solved so that it needs to be

reformulated in less ambitious terms. In the light of the disclosure of both D1 and D2 and the present patent specification, the Board sees the technical problem underlying the patent in suit as to define a further process for controlling the moisture content of a polyamide when it is remelted.

13.2 According to the patent in suit that problem is to be solved by first subjecting the polyamide in granular form to an elevated temperature under conditions for the removal of volatile products to increase its molecular weight and then adding a controlled amount of water to the polyamide during and/or immediately before melting and within a time less than that required to reach equilibrium conditions.

13.3 The examples in the patent specification provide evidence that the above-defined problem is effectively solved. In particular, it has been shown that by the process according to Claim 1 the moisture content of the polyamide products is effectively controlled, which is demonstrated by the slight decrease of the relative viscosity of the spun yarns as compared to the dry polyamide, whereas the viscosity increases when the dry polymer is spun without the addition of water (comparative example A).

14. It remains to be decided whether the claimed subject-matter is obvious having regard to the documents on file.

14.1 According to D1, the spinning of the polyamide is conducted in contact with steam, while a constant atmosphere of water vapour, unsaturated at the

temperature of the melt, is maintained in the melting chamber by connecting an additional air-conditioning chamber to it (column 1, lines 47 to 51; column 2, lines 27 to 38 and lines 45 to 50; Figures). In that manner, the melt chamber conditions are maintained, thus producing any desired water content and hence a constant degree of polymerization of the melt.

14.2 In D2 the atmosphere of the melt chamber is kept at desired conditions by directly introducing water vapour into it while keeping its pressure within very narrow limits (column 2, lines 42 to 46). The Respondent's remark that D2 teaches away from the addition of water because the polyamide in the melt in fact contains less moisture than in the stage before melting, cannot be followed. According to D2, column 6, lines 5 to 8, polyamide flake which has reached equilibrium with atmospheric conditions contains about 4% moisture. Column 3, lines 32 to 36, refers to the amount of water in the melt, which depends, among other factors, upon the polyamide being spun. The amount of 0.16% mentioned for polyhexamethylene adipamide can be higher or lower for other polyamides. There is no reason whatsoever to connect those two numbers with each other, let alone to conclude that the melted polyamide contains less moisture than in the stage before melting.

14.3 Therefore, the general teaching of both documents is to melt the polyamide under controlled atmospheric conditions by providing water vapour or steam to the melt chamber and allowing the melted polymer to establish an equilibrium between it and the water. Although D2 contains a reference to a usual drying step of the polymer, that refers to prior art processes and

is not necessarily the same as post-condensation (see point 9 above). Neither of D1 or D2 therefore teaches to post-condensate the polyamide, nor to expose the polymer to water during or immediately before melting during a time less than that required to allow the water to become uniformly diffused through each granule.

14.4 In the above light, even a combination of D1 and D2 would not lead to modify the processes there described so as to arrive at the specific process defined in present Claim 1.

15. For the above reasons, the Board comes to the conclusion that the subject-matter of Claim 1 involves an inventive step over D1 and D2. No other documents were mentioned which might render that subject matter obvious and the Board sees no reason to deviate from that view.

16. As Claim 1 of the main request is allowable, the same goes for dependent Claims 2 to 4, the patentability of which is supported by that of Claim 1.

17. Since the Respondent's main request is granted, there is no need to consider the auxiliary requests.

Order

For these reasons it is decided that:

1. The appeal is dismissed.
2. The Appellant's request for reimbursement of appeal fees is rejected.

The Registrar:

The Chairman:

E. Görgmaier

C. Gérardin