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Bezeichnung der Erfindung: Process for extruding liquid crystal polymer
Title of invention:
Titre de l'invention :

Klassifikation / Classification / Classement : D01D4/00

ENTSCHEIDUNG / DECISION

vom / of / du 13 April 1989

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

CELANESE CORPORATION

Einsprechender / Opponent / Opposant :

01 BASF AG, Ludwigshafen
02 AKZO N.V.

Stichwort / Headword / Référence :

EPÜ / EPC / CBE Article 56, Article 100(b), Article 114.2

Schlagwort / Keyword / Mot clé :

"Inventive step (yes)"
"Sufficient disclosure (yes)"

Leitsatz / Headnote / Sommaire

Summary of Facts and Submissions

- I. European patent No. 045 575 was granted on 3 August 1983 with 23 claims in response to the European patent application No. 83 303 160.6 filed on 10 July 1981 claiming the priority of the earlier application of 15 July 1980.
- II. Admissible notices of opposition were filed against the European patent respectively on 9 March 1984 by Opponent I and on 30 May 1984 by Opponent II both requesting that it be revoked on the ground of non-patentability. The oppositions were, inter alia, supported by the following documents:
- (3) US-A-4 054 468
 - (5) EP-A-0 001 340
 - (7) EP-A-0 001 185
 - (9) DD-B-77 273
- III. In an interlocutory decision within the meaning of Article 106(3) EPC of 30 June 1987 the Opposition Division decided to maintain the patent in an amended form. Claim 1 as granted had read as follows:
- "A process for extruding liquid crystal polymer to form shaped articles comprising the successive steps of:
- (a) providing a fluid stream of liquid crystal polymer wherein said stream has a flow pattern comprising substantial shear flow;

- (b) converting the flow of said fluid stream of liquid crystal polymer to a substantially elongational flow in the substantial absence of shear flow; and
- (c) extruding said fluid stream of liquid crystal polymer to form a shaped article having the polymer molecules oriented substantially parallel to the flow direction and exhibiting enhanced mechanical properties."

In the amended form of Claim 1, the phrase under point (c) "extruding said fluid stream of liquid crystal polymer" was replaced by "transferring the fluid stream of liquid crystal polymer to an extrusion die".

Opponent I requests reimbursement of the appeal fee because he considers that there has been a procedural violation.

- IV. The Opposition Division contended that Claim 1 as amended was novel and inventive in the light of the prior art.

During the opposition proceedings the Opposition Division also expressed the opinion that the subject-matter of Claim 5 as granted was allowable as well.

- V. Opponent II filed an appeal against the decision on 22 August 1987 with payment of the fee, and submitted a Statement of Grounds on 21 October 1987.

Opponent I filed an appeal against the decision on 26 August 1987 with payment of the fee, and a Statement of Grounds was attached.

The two Appellants requested that the decision be set aside and the patent revoked on the following grounds:

- lack of support for the amendment to Claim 1 in the application as filed (Article 123(2) EPC)
- broadening of the protection conferred by the granted patent during the opposition proceedings (Article 123(3) EPC)
- lack of novelty (or of inventive step) of the subject-matter of Claim 1 and of the sub-claims dependent on it: Opponent I on the basis of document (9), Opponent II on the basis of documents (3), (5) and (7).

VI. By telefax dated 28 March 1988, confirmed in a letter received on 31 March 1988, and by a further letter received on 17 November 1988, the Respondent challenged the arguments of the two other parties and requested oral proceedings should either of the appeals be allowed.

VII. Having received a reply from Opponent I on 29 December 1988 the Board of Appeal invited the parties on 3 February 1989 to oral proceedings on 13 April 1989. A communication pursuant to Article 11(2) of the Rules of Procedure of the Boards of Appeal was attached to the summons for oral proceedings. In said communication the Board gave its provisional opinion on the essential points raised.

VIII. In subsequent letters the parties filed further submissions and on 18 March 1989 the patentee filed new requests by telefax, confirmed by letter on 14 April 1989. The main request is that the patent be maintained with the claims as granted and the fifth auxiliary request is that

Claim 1 as granted be restricted by adding the features of Claim 5 of the patent as granted, a claim which had been considered allowable by the Opposition Division.

- IX. In their letters and during the oral proceedings the Appellants raised a number of objections including the following:
- (a) during an appeal against a decision of an Opposition Division the patentee should not be allowed to revert to the main claim of the patent as granted if he has restricted the scope of said claim during the opposition proceedings.
 - (b) auxiliary requests filed a few days before the oral proceedings should not be taken into account on the basis of Article 114(2) EPC.
 - (c) a skilled person knew how to perform a pre-orientation before extruding a crystal polymer and the process of the invention was therefore obvious. (This assertion was based mainly on document (9) combined with the teaching of an extract from a technical book "WARD" in document (3).)
- X. The Appellants maintain the only request that the decision under appeal be set aside and the patent revoked.

At the end of the oral proceedings the Respondent requests that the appeal be dismissed and the patent maintained on the basis of Claim 1 according to the last auxiliary request filed on 13 March 1989, which reads as follows:

"A process for extruding liquid crystal polymer to form shaped articles comprising:

- (a) providing a fluid stream of liquid crystal polymer wherein said stream has a flow pattern comprising substantial shear flow;
- (b) passing said fluid stream of liquid crystal polymer through at least one grid having a plurality of converging passages located upstream of an extrusion die to convert the flow of said fluid stream of liquid crystal polymer to a substantially elongational flow in the substantial absence of shear flow; and
- (c) extruding said fluid stream of liquid crystal polymer to form a shaped article having the polymer molecules oriented substantially parallel to the flow direction and exhibiting enhanced mechanical properties."

Reasons for the Decision

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

As stated in the Board's communication, Claim 1 as granted, having been amended by adding the idea of "transferring", which restricts its scope, satisfies the requirements of Article 123(3) EPC. But, likewise as stated in said communication, the term "transferring" implies a voluntary action to forward the flow to another part - here the die - and said notion of transfer covers embodiments which are different from an action covered by the "successive step" as stated in Claim 1 as granted by the Examining Division.

As said step of transferring - though not excluded - was not explicitly contained in any claim, nor in the description, as filed and as it cannot be derived from the figures, it cannot be introduced into the claims without violating Article 123(2) EPC.

The patentee's reasoning according to which the verb "transfer" can be transitive or intransitive has been carefully considered. In the example given of a person who can either transfer himself from one point to another or who can be involuntarily and passively transferred from one point to another by public transport means, it is agreed that both meanings are possible. But in said example there is a public transport means and in the application as filed there is nothing which could be construed as a transport means, but only a duct; going back to the above example we are thus not in the position of a person using transport means but in that of someone going through a corridor which may lead him from one point to another but cannot "transfer" him there.

Claim 1 as modified and proposed by the Opposition Division for maintaining the patent in an amended form is therefore not allowable as contrary to Article 123(2) EPC.

3. As Claim 1 as granted by the Opposition Division is not allowable, it has to be considered whether Claim 1 as granted by the Examining Division satisfied the requirements of the EPC.

It has been asserted that it is not allowable for a patentee to revert to the set of claims of his patent as granted after he has agreed to restrict the scope of said claims during the opposition proceedings, has not replied

to the interlocutory decision pursuant to Article 106(3) EPC and has not filed an appeal.

The Board gave its opinion on this point during the oral proceedings and does not consider it necessary to discuss the matter here since it is not decisive in the present case for the reasons set out below. Furthermore, it has been held by a Board of Appeal in decision T 23/85 (to be published), see particularly paragraph 3.1.2 thereof, that the Patentee may be allowed in certain cases to abandon a limited request and revert to a request to maintain his patent as granted.

The same applies in the case of an appeal against a decision of an Opposition Division. Consequently the patentee is allowed to modify, if necessary, the scope of his claims as long as Article 123(2) and (3) EPC are not violated.

Since the patentee has filed a request asking the Board to consider the set of claims in the patent as granted by the Examining Division, it has to be decided whether the main claim was allowable.

As stated during the oral proceedings, it is possible to deduce Claim 1 of the granted patent from document (3) US-A-4 054 468 which deals with spinneret for spinning liquid crystal polymers and a process for making it which shows the same successive process steps for obtaining filaments with high tenacity if said spinneret is used.

Said Claim 1 is therefore not novel and the patent cannot be maintained in the form as granted.

4. As regards the last request which has been maintained and is based on the main claim filed on 11 April 1989 comprising a combination of Claims 1 and 5 as granted, the following observations are made:
- 4.1 As regards novelty, the process which is subject-matter of the main claim differs from the nearest state of the art represented by document (3) in that the stream of liquid crystal polymer is passed through at least one grid having a plurality of converging passages located upstream of an extrusion die.
- 4.2 The subject-matter of Claim 1 is therefore novel.
- 4.3 The purpose of the process according to the present invention is to produce shaped articles exhibiting enhanced mechanical properties.
- 4.4 This result is obtained by passing the liquid crystal polymer through a plurality of converging passages. The products obtained show improved tensile strength, a fact not challenged by the Appellants.
- 4.5 It has to be investigated whether the man skilled in the art faced with this problem would have found a lead to the present solution in the state of the art.

The only document mentioning such a grid before the die is document (9) DD-B-77 273, which describes a process for extruding filaments of another category (linear polymers) in a melt process, for the purpose of increasing the evenness of said filaments. There was no indication in said document which could have led the skilled person first to think that said device could be applied to liquid crystal polymers and then that using said device for this

category of polymers would lead to products showing enhanced properties.

The process according to Claim 1 was therefore not obvious in the light of the combination of documents (3) and (9).

- 4.6 It has been put forward by Opponent II that the pre-orientation of the flow of melt polymer was a usual measure belonging to the usual practice of the skilled person; the WARD document was produced as evidence of this fact.

Having considered said document which was submitted for the first time during the oral proceedings, the Board has decided that because of its content said late-filed document was of no interest for the present case and therefore should be disregarded on the basis of Article 114(2) EPC.

- 4.7 Opponent I has stated that a pre-orientation was already described in document (3) because the restricted conical part of the duct produces a pre-orientation of the flow before extruding through the die.

Careful consideration of said document (3) does not allow the Board to find that said document taught the skilled person that an elongational flow could lead to a pre-orientation of the crystal domains producing enhanced mechanical properties.

It cannot therefore be concluded that document (3) could have led the skilled person to the solution comprising the use of a grid such as those represented in Figures 2 and 3 of document (9).

4.8 Another objection has been that Claim 1 of the present last request was filed only a few days before the oral proceedings. As said claim consists of a combination of the features of Claims 1 and 5 of the patent as granted by the Examining Division, the parties were able to study its scope and prepare themselves should the patentee restrict the scope of Claim 1 by taking the features of Claim 5. As the Opposition Division considered maintaining the patent on the basis of the same claim as allowable, it is not necessary for the Board to refer the case back to the Opposition Division since the latter has already expressed its opinion on this matter.

4.9 It has also been stated that in the Board of Appeal's communication a negative opinion was expressed about this claim.

As the opinions expressed in the communication pursuant to Article 11(2) of the Rules of Procedure of the Boards of Appeal were clearly indicated as being provisional, the parties were aware that the matter had to be discussed during the oral proceedings and the communication could not therefore be interpreted as the Board of Appeal's final opinion.

4.10 Claim 1 of the last request is therefore acceptable and, since it is novel and shows the required inventive step, it satisfies the requirements of Articles 54 and 56 EPC.

5. An objection has been raised by the Appellants about the only figure of the patent which shows a grid followed by a die of smaller section so that the flow of polymer coming out of the converging passages located at the periphery of the grid is disturbed when passing the right angle of the

entrance of the die to leave the recess shown between the grid and the die.

There is no doubt that the form shown is not the best which could be chosen to perform the process of the patent but the Board has no reason to believe that it is impossible to perform said process with a die as shown. Furthermore, a skilled person who wants to carry out the invention has the whole specification at his disposal and since it is stated (page 7, lines 26 to 65) that the way the polymer flows through the different parts is critical, it belongs to his normal duty to adapt the form of the die in order to obtain the best result.

It is therefore considered that said sole figure can remain as it is and cannot stand in the way of maintaining the patent.

Order

For these reasons, it is decided that:

1. The decision of the Opposition Division is set aside.
2. The case is remitted to the first instance with the order to maintain the patent in the amended form based on
 - (a) Claim 1 as submitted and amended at the oral proceedings (originally "fifth auxiliary request");
 - (b) Claims 2 to 21 as submitted at the oral proceedings;

- (c) description pages 2 to 13 as submitted at the oral proceedings;
- (d) drawing sheet 1 of the patent as granted.

The Registrar

S. Fabiani

S. Fabiani

The Chairman

P. Delbecq

P. Delbecque

30.05.89

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