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Bezeichnung der Erfindung: Thermoplastic film extruding T-die
Title of invention:
Titre de l'invention :

Klassifikation / Classification / Classement : B29C 47/16

ENTSCHEIDUNG / DECISION
vom / of / du 20 July 1990

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent /
Titulaire du brevet : Tetra Pak International AB

Einsprechender / Opponent / Opposant : Hermann Berstorff Maschinenbau GmbH

Stichwort / Headword / Référence :

EPÜ / EPC / CBE Art. 56

Schlagwort / Keyword / Mot clé : "Inventive step (yes)"

Leitsatz / Headnote / Sommaire

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Case Number : T 328/88 - 3.2.2

D E C I S I O N
of the Technical Board of Appeal 3.2.2
of 20 July 1990

Appellant : (Opponent)
Hermann Berstorff
Maschinenbau GmbH
An der Breiten Wiese 3/5
D-3000 Hannover 61 (DE)

Representative :

Respondent : (Proprietor of the patent)
Tetra Pak International AB

Representative :
Williams, Trevor John
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14th South Square
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London WC1R 5EU (GB)

Decision under appeal :
Decision of Opposition Division of the European Patent Office dated 27 May 1988 rejecting the opposition filed against European patent No. 0 084 450 pursuant to Article 102(2) EPC.

Composition of the Board :

Chairman : G. Szabo
Members : K. Stamm
O. Bossung

Summary of Facts and Submissions

I. European patent No. 84 450 was granted on 28 May 1986 with three claims in response to the European patent application No. 83 300 219.9, filed on 17 January 1983.

II. A Notice of Opposition was filed against the European patent on 22 November 1986 requesting revocation of the patent since its subject-matter was neither novel nor inventive with respect to documents

(1) US-A-3 018 815,
(2) DE-U-1 979 334.

III. In its decision, dated 27 May 1988, the Opposition Division Division rejected the opposition since the subject-matter of Claims 1 and 2 was novel and based on an inventive step.

IV. The Appeal of the Opponent, filed on 5 July 1988 together with payment of the Appeal fee and the Statement of Grounds, is directed against this decision. The Appellant argued that the subject-matter of Claim 5 lacked an inventive step with respect to document (2). He is of the opinion that the slight distinction of the claimed subject-matter compared with (2), i.e. providing a straight inclined guiding surface, cannot form a sufficient basis for patentability.

V. In his observations, filed on 25 October 1989, in response to a Communication issued by the Board, the Respondent submitted a main and an auxiliary request with amended claims and gave reasons as to why the subject-matter of Claim 1 was, in his view, no obvious derivation from document (2).

VI. Amended Claim 1 of the main request filed on 25 October 1989 reads as follows: (amendments emphasised):

"A T-die for extruding a thermoplastic film, said die comprising: main body (3); a manifold (2) defined in said body and extending in the widthwise direction of said film to be extruded; a die slit (also extending in the widthwise direction of said film and communicating with said manifold (2) so that molten resin fed to said manifold is discharged through said die slit (5); and deckle plugs (6) each fitted in the respective end portions of said manifold and having at the inner end thereof a guide surface (7) for guiding said molten resin so that the latter has a component of flow outwardly in the widthwise direction as it flows in the manifold to said die slit, characterised in that
each said deckle plug (6) extends into said die slit (5) with a cross-sectional shape substantially corresponding with that of the manifold (2) and the slit (5) so as to fit into said manifold and die slit for blocking said molten resin from flowing along such end portions of the manifold, each deckle plug being provided on its outer face with a deckle packing (8) to prevent molten resins from flowing between the deckle plug and the manifold wall and having its guide surface straight and and inclined outwardly in the widthwise direction in the die slit as well as in the manifold at an angle of not less than 25° to the direction of extrusion, the guide surface extending to the point of exit or resin from the slit".

Claim 1 according to the auxiliary request filed on 25 October 1989 is identical to the one of the main request except that the passage at the end "of not less than 25°" is replaced by "of 25° to 37°".

Claim 3 according to the auxiliary request filed on 25 October 1989 and the letter of the Respondent of 10 April 1989 is to be deleted.

The Appellant requests the revocation of the patent. The Respondent asks for the maintenance of the patent according to the main or auxiliary request as filed on 25 October 1989 with consequential amendments also indicated in the letter.

Reasons for the Decision

1. The appeal is admissible.

2. **Amendments**

2.1 The first amendment replacing in granted Claim 1 "said deckle plug (6) extends into said die slit (5) and has a cross sectional shape ..." as follows: "said deckle plug (6) extends into said die slit (5) with a cross sectional shape .." is a clarification based on the description and drawing of the original application and restricts the properties of the die plug defined in the claim as granted.

2.2 The further amendment according to the main request extends the originally disclosed content of the application. This amendment fixes a lower limit for the angle of inclination, leaving an upper limit fully open. If the absence of proper limits for the inclination of the guide surface cast doubt on the reliable operability of the invention in view of the criticality of this particular feature to the results. The same considerations should apply to both lower and upper limits. The suggested amendment is unsupported by the disclosure, and thereby contravenes Article 123(2) EPC.

2.3 The amendment according to the auxiliary request is disclosed in Claim 3 of the original application, accurately restricts granted Claim 1 and complies, therefore, with Articles 123(2) and (3) EPC. This claim is allowable in formal respects and is taken as a basis for the following statements.

3. **Novelty**

Document (2) does not comprise all the features of Claim 1, in particular the straight and inclined shape of the guide surface of the plugs. The other documents are less relevant. The subject-matter of Claim 1 is, therefore, novel in compliance with Article 54 EPC.

4. **Inventive step**

4.1 **Closest prior art**

Document (2) discloses a T-die especially designed for avoiding formation of the beads along the edges of the extruded film. To this end a combination of a movable deckle plug and a static flag is suggested with a curved surface to provide smooth flow characteristics and to avoid corners where the movement of the liquid material would stand still, as was formerly the case. However, the curved widening part is terminated by a constricted slit in order to reduce the thickness of the film at the line of discharge in the embodiment shown in the document.

4.2 **Problem and solution**

4.2.1 Based on document (2), the objective technical problem to be solved may be identified as aiming at further improvements of performance in relation to preventing formation of beads.

The Board accepts the arguments of the Respondent according to which the problem to be solved is not to be seen in a possible simplification of the curvature of the flags in the T-die according to (2), since the skilled man had no obvious reason to jeopardize what this document teaches, viz. to secure a perfect hydrodynamic flow for the extrusion.

4.2.2 The problem is, as the Board sees it, solved according to Claim 1 in the first place by the use of straight inclined guidance surfaces at the edges of the flow. The claimed T-die for extruding a thermoplastic film comprises as decisive feature two straight surfaces of the plugs, inclined at an angle of 25° to 37° to the direction of extrusion. These define a course of flow which achieves a certain balance between the shrinking effects of the hardening resin and a constant lateral component of movement directed outwardly without being upset by any sudden restriction before discharge. As further distinctions to (2), the whole plug carrying the inclined surface is adjustable and there is a packing behind to prevent leakage.

4.3 **Non-Obviousness**

4.3.1 Document (2) deals with the same technical situation as the contested invention, i.e. prevention of formation of beads. There the solution is seen before all in the curved form of the plugs, with a sudden acceleration at the restricted end. The first question is, whether the skilled man would learn from this document or other citation how to improve the disclosed T-die according to Claim 1 in question.

Document (2) recommends not to expose the resin too long a time within so-called dead angles ("sogenannte tote Winkel"). For that purpose two deckle plugs are provided having an inner surface formed along a curvature. In particular it is explicitly explained that this curvature is hydraulically shaped, however, without identifying more closely any determining elements of such a curve. It can at the best be recognized - in respect of Figures 1 and 2 - that evidently smooth transition between the inclined start at the upper end point and the lower end point is aimed at, and that the inclination at the lower end point has a tangent near the vertical, i.e. approaching a parallel, presumably laminar flow before the constriction, with no constant lateral component.

Since it is, as mentioned above, expressly explained in (2) that the curvature has to be hydraulically shaped, the skilled man who tries to improve the flow situation in order to avoid formation of beads, may be encouraged from this teaching to investigate the best course of the curvature, e.g. to look for an optimal empiric or mathematical definition of the curvature. He has, nevertheless, - in this given context - no motive to provide a constant inclination between the two mentioned ends since this would involve a constant horizontal component of movement and would, therefore, come in conflict with the primary idea of realizing a hydraulic shape. None of the other documents in the file suggest this critical feature of the solution. Other distinctions to the closest art are not relevant to the inventive step.

4.3.2 The patent specification discloses evidence showing that the T-die according to the invention is superior to the conventional die. There was no evidence submitted by the Appellant, as Opponent, in any stage of the opposition or appeal proceedings showing that the performance of the T-die according to the patent was no better than that of

the die in the cited document, refuting the Respondent's allegations as to advantages and improvements. The Board, therefore, accepts that these are provided and that they are unexpected.

The subject-matter of Claim 1 as amended in the auxiliary request is, therefore, not to be deduced in an obvious manner from the cited documents, even when combined, by the skilled man looking for a solution to the posed problem. The claim is, therefore, in compliance with Articles 52(1) and 56 EPC and thus allowable.

5. Claim 2, being dependent on Claim 1, is also allowable.

Order

For these reasons, it is decided that:

1. The contested decision of the Opposition Division is set aside.

2. The case is remitted to the Opposition Division with the order to maintain the patent as granted with Claim 1 being replaced and Claim 3 being deleted according to the auxiliary request mentioned under VI. above with an accordingly adapted description.

The Registrar: The Chairman:

N. Maslin G. Szabo

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