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D E C I S I O N
of 11 July 2000

Case Number: T 0186/96 - 3.2.5

Application Number: 90100576.9

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IPC: B29C 47/90

Language of the proceedings: EN

Title of invention:

Cooling plugs in thermoplastic pip forming apparatus

Patentee:

Lupke, Manfred Arno Alfred

Opponent:

HEGLER PLASTIK GMBH

Headword:

-

Relevant legal provisions:

EPC Art. 123(2), 123(3), 56

Keyword:

"Added subject-matter (no)"

"Extension of the scope of protection (no)"

"Inventive step (no)"

Decisions cited:

-

Catchword:

-



Case Number: T 0186/96 - 3.2.5

D E C I S I O N
of the Technical Board of Appeal 3.2.5
of 11 July 2000

Appellant: HEGLER PLASTIK GMBH
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 7 February 1996
rejecting the opposition filed against European
patent No. 0 381 938 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: A. Burkhart
Members: C. G. F. Biggio
M. K. S. Aúz Castro

Summary of Facts and Submissions

I. The appellant (opponent) lodged an appeal against the decision of the Opposition Division dated 7 February 1996 rejecting the opposition filed against European Patent No. 0 381 938.

Opposition was filed against the patent as a whole and based on Article 100(a) EPC, in conjunction with Article 56 EPC (lack of an inventive step).

During the opposition procedure the appellant further submitted that the patent contravened Article 100(c) EPC, in conjunction with Article 123(2) EPC.

The Opposition Division held that the grounds for opposition mentioned in Article 100(a) and (c) EPC did not prejudice the maintenance of the patent as granted.

For evaluation of inventive step, the following prior art documents were considered:

D1: DE-C-23 62 444, and

D2: DE-A-23 57 993.

II. Oral proceedings before the Board were held on 11 July 2000.

The appellant requested that the decision under appeal be set aside and the European patent be revoked.

The respondent (patentee) requested that the appeal be dismissed, and by way of auxiliary request, with the proviso that the patent be maintained on the basis:

- of claims 1 to 3 filed in the oral proceedings as auxiliary request I, or
- of claims 1 and 2 also filed in the oral proceedings as auxiliary request II.

III. Claim 1 as granted reads as follows:

"1. An apparatus for forming seamless ribbed thermoplastic tubes, comprising a travelling mold tunnel, means for extruding molten thermoplastic into the travelling mold tunnel, a sizing plug (46) with a surface for forming the inner wall of the tube, and means for introducing a parison of molten thermoplastic onto the surface of said plug (46), characterized in that means for cooling the surface of said plug (46) and means to distribute suction over the surface of said plug (46) are provided and that said suction distribution means are arranged such that suction is applied downstream at the point at which cooling is started so that there is a diminution in the vacuum pressure in the upstream direction."

Claim 1 according to auxiliary request I essentially differs from claim 1 as granted in that the feature of claim 2 as granted:

"that at least one suction distribution channel (28) adapted to distribute suction is provided on the surface of the plug (46) longitudinally open"

has been added.

Claim 1 according to auxiliary request II essentially differs from claim 1 according to auxiliary request I

in that the feature

"said plug (46) comprising a core (45) including a channel (25) in its outer surface for cooling liquid and being covered by a sleeve (47) having generally smooth outer surface to size the inner wall of the tube"

has been added.

IV. The appellant argued essentially as follows:

Formal requirements (Article 123(2) and (3) EPC):

In respect of claim 1 as granted the appellant submitted that the last feature of said claim, i.e.:

"...said suction distribution means are arranged such that suction is applied downstream at the point at which cooling is started so that there is a diminution in the vacuum pressure in the upstream direction"

was not supported in this general form by the originally filed disclosure, and that, therefore, claim 1 as granted contravened Article 123(2) EPC.

In respect of claim 1 according to the auxiliary request II, the appellant submitted that said claim contravened Article 123(3) EPC, because it claimed the cooling means as a part of the invention, although in the granted patent (column 4, lines 48 to 50) it was stated:

"The cooling arrangements for plug 46 form no part of the present invention...".

Inventive step:

The appellant submitted that the subject-matter of claim 1, either according to the main or to the auxiliary requests I and II lacked an inventive step in view of the teaching of document D1 - representing the closest prior art on file - when the latter was combined with the teaching of document D2, which disclosed the distribution of the suction as generally defined by the characterising clauses of said claims.

In the patent in suit it was indicated that the problem underlying the invention was to improve the smoothness of the inner wall of molded thermoplastic profiled tubes, especially when the outer surface thereof was ribbed (see column 2, lines 55 to 58). However, the whole disclosure of the patent in suit did not make any further reference to any peculiarity of the manufacturing of the outer surface of said ribbed tubes. Therefore, the problem underlying the invention of the patent in suit was not concerned with the sizing of the outer tube surface but only with the sizing of the inner wall of molded thermoplastic profiled tubes.

Said problem was dealt with by document D2, which (see Claim 1 thereof) taught that an improved smoothness of the inner wall of molded thermoplastic profiled tubes could be obtained by providing the outer surface of the sizing plug with means for distributing suction over the surface of said plug. The person skilled in the art would have arranged such suction distributing means so that suction was applied downstream of the point at which cooling was started, in order to prevent still molten plastic from being drawn into said suction distributing means. Such an arrangement would result in

a diminution in the vacuum pressure in the upstream direction. In doing so, the person skilled in the art arrived, without any inventive activity, at the apparatus according to claim 1 of the patent in suit.

In respect of claim 1 according to both auxiliary requests I and II, reference was made to prior art documents US-A- 036 930 and US-A-4 663 107, which showed on the surface on the tube sizing means suction distribution means in the form of channels.

In view of this prior art the subject-matter of claim 1 according to both auxiliary requests I and II also lacked an inventive step.

V. The respondent argued essentially as follows:

Formal requirements (Article 123(2) and (3) EPC):

The last feature of claim 1 as granted was directly and unambiguously derivable for the person skilled in the art from column 5, lines 48 to 54 in connection with Figure 1 of the published A1-application.

Claim 1 as granted was, accordingly, not open to objection pursuant to Article 123(2) EPC.

The statement "The cooling arrangements for the plug 46 form no part of the present invention...", in column 4, lines 48 to 50, of the granted patent referred to the previous passage in column 4, lines 38 to 47, of the granted patent concerned specific cooling arrangements and could not be construed as excluding any features of the cooling system of the plug 46 other than those referred to in the previous passage from the scope of

the claimed invention. In fact, claim 4 as granted, referring to a cooling liquid channel (25) as a feature of a preferred embodiment of the invention, showed that such a cooling arrangement was indeed a part of the invention of the patent.

Claim 1 according to the auxiliary request II was, accordingly, not open to objection pursuant to Article 123(3) EPC.

Inventive step:

The problem underlying the invention of the patent in suit was strongly related to the manufacturing of ribbed tubes and was to avoid shrink marks which could appear during the cooling process because of the different wall thicknesses of the areas carrying the ribs and the areas between the ribs.

The person skilled in the art would not consider document D2 when looking for a suggestion to solve the problem of the patent in suit, since document D2 did not deal with the manufacture of tubes having ribs but with the manufacture of tubes having a smooth outer surface, where the problem of the patent in suit did not arise. Moreover, the person skilled in the art would consider the arrangement of the suction and cooling means according to D2 as being incompatible with the structure of the sizing plug according to D1.

Therefore, the subject-matter of claim 1 as granted was not rendered obvious by the combined teachings of documents D1 and D2.

In any case, documents D1 and D2 did not disclose or

suggest the provision of suction distribution channels as claimed in claim 1 according to both the auxiliary requests I and II.

The structures disclosed by US-A-4 036 930 and US-A-4 663 107 could not lead the person skilled in the art to the form of channels as claimed in claim 1 according to both the auxiliary requests I and II, since these documents dealt with totally different molding processes and systems.

Reasons for the Decision

1. *Original disclosure - Article 123(2) EPC*

In column 5, lines 48 to 51 of the published application EP O 381 938 A1 it is mentioned that, preferably, each channel 28 is located to apply suction downstream of the point at which cooling is started so that plastic material will not be drawn into channels 28. Furthermore, in lines 51 to 54 it is stated that, when suction is applied at the downstream end of the plug 46 without branching of conduit 38, the diminution in strength is progressive towards the upstream end.

This last statement means that, in the embodiment discussed in the description referring in particular to Figure 1, either the upstream branch leading to the upstream suction port 39 or the downstream branch leading to the downstream suction port 39 is omitted. The required diminution of vacuum pressure then starts from the remaining suction port 39 towards the upstream end of the plug 46.

A person skilled in the art directly and unambiguously derives from this disclosure that also in the case where conduit 38 branches, as shown in Figure 1, there will be a diminution of vacuum pressure starting from the upstream suction port 39 towards the upstream end of the plug 46. According to the above-cited preferred arrangement of the channels 28, the upstream suction port 39 is located at a point downstream of the point on the plug 46 at which cooling is started. Therefore there is a diminution of vacuum pressure in the upstream direction between these two points. It is, hence, self-evident for a person skilled in the art that, when suction is applied downstream of the point at which cooling is started, a diminution in the vacuum pressure takes place in the upstream direction from the point where suction is applied downstream independent of the fact whether conduit 38 branches or not.

Therefore, claim 1 as granted is not open to objection pursuant to Article 123(2) EPC.

2. *Extension of the scope of protection - Article 123(3) EPC*

The statement "The cooling arrangements for plug 46 form no part of the present invention...", in column 4, lines 47 to 50, of the granted patent refers to the previous passage in column 4, lines 38 to 47, of the granted patent dealing with specific cooling arrangements. Said statement cannot be construed as excluding any features of the cooling system of the plug 46 other than those referred to in this passage from the scope of the claimed invention.

In fact, claim 4 as granted refers to a cooling liquid

channel (25) as a feature of the preferred embodiment of the cooling arrangement now claimed in claim 1 according to the auxiliary request II. This shows that such a cooling arrangement was indeed considered as being part of the invention of the granted patent.

Therefore, claim 1 according to the auxiliary request II is not open to objection pursuant to Article 123(3) EPC.

3. *Inventive step*

3.1 Claim 1 as granted (main request)

3.1.1 Closest prior art

Document D1, which is considered to represent the closest prior art, discloses an apparatus for forming seamless ribbed thermoplastic tubes, comprising a travelling mold tunnel, means for extruding molten thermoplastic into the travelling mold tunnel, a sizing plug with a surface for forming the inner wall of the tube, means for introducing a parison of molten thermoplastic onto the surface of said plug and means for cooling the surface of said plug.

3.1.2 Problem underlying the invention

In the process disclosed in document D1, the problem arises that shrink marks are formed on the inner wall of the tube during the cooling process, due to the different wall thicknesses of the areas carrying the ribs and the areas between the ribs.

Therefore, the problem underlying the invention is to

improve the smoothness of the inner wall of a molded thermoplastic tube, the outer surface of which is ribbed.

3.1.3 Solution

This problem is solved in that the apparatus known from document D1 is modified in the sense that means for distributing suction over the surface of the plug are provided and that said suction distribution means are arranged such that suction is applied downstream of the point at which cooling is started, so that there is a diminution in the vacuum pressure in the upstream direction.

3.1.4 This solution is obvious to the person skilled in the art, for the following reasons.

Document D2 (cf. claim 1 and page 8, paragraphs 1 and 2) teaches that the smoothness of the inner wall of molded thermoplastic tube can be improved by providing the outer surface of the sizing plug with means to distribute suction over the surface of the plug.

It is true that in the apparatus according to D2 the sizing of the outer tube surface is carried out in a manner different from that in the apparatus according to D1: In the apparatus according to D1 the sizing of the outer tube surface is effected by means of a travelling mould tunnel, whereas in the apparatus according to D2 the sizing of the outer tube surface is effected by means of an annular extrusion die.

However, the problem underlying the invention of the patent in suit is not concerned with the sizing of the

outer tube surface but with the sizing of the inner tube wall.

Therefore, the person skilled in the art looking for a solution of the problem "improvement of the sizing of the inner tube wall during moulding of a thermoplastic tube" would consider the above mentioned teaching of document D2 relating to the sizing of the inner tube wall. Following this teaching of document D2, the person skilled in the art would provide in the apparatus known from D1 at the surface of the cooling and sizing plug additional means for distributing suction over the surface of the plug. He would also, of course, arrange such suction means on the surface of the plug at a location downstream of the point at which cooling is started, in order to prevent uncooled liquid plastic material from being drawn into the suction means and blocking the latter, and, as a consequence of such a downstream position of the suction means, there would inevitably be a diminution in the vacuum pressure in the upstream direction.

Thus, the person skilled in the art arrives, without any inventive activity, at the apparatus as claimed in claim 1 of the patent in suit.

3.1.5 Since, therefore, the subject-matter of claim 1 according to the main request does not involve an inventive step in the sense of Article 56 EPC, the respondent's main request can not be granted.

3.2 Claim 1 according to auxiliary request I

The apparatus according to claim 1 of auxiliary request I differs from the apparatus of claim 1 as

granted in that the means to distribute suction over the surface of the plug comprise at least one suction distribution channel which is longitudinally open.

The provision of this feature is obvious for the person skilled in the art, for the following reason:

Suction distribution means on the surface of sizing devices having the form of longitudinally open channels belong to the general knowledge of the person skilled in the art of manufacturing seamless thermoplastic tubes, as can be seen for example from US-A-4 663 107 or US-A-4 036 930.

Therefore, the person skilled in the art, when applying the general teaching of document D2 to the cooling of the sizing plug of the apparatus of document D1 would consider surface distribution channels as an appropriate alternative to the distribution holes and slots used in the embodiments of the apparatus according to D2. The person skilled in the art would readily recognise that the use of surface channels instead of holes or slots is particularly advantageous, if he wants to keep the general structure of the cooling and sizing plug of the apparatus of D1 comprising an internal cooling system in connection with a surface sleeve.

Consequently, the subject-matter of claim 1 according to auxiliary request I does not involve an inventive step in the sense of Article 56 EPC, and, hence, the respondent's auxiliary request I cannot be granted.

3.3 Claim 1 according to auxiliary request II

The apparatus according to claim 1 of auxiliary request II differs from the apparatus according to claim 1 of auxiliary request I in that the sizing and cooling plug (46) is further defined by the features "said plug (46) comprising a core (46) including a channel (25) in its outer surface for cooling liquid and being covered by a sleeve (47) having a generally smooth outer surface to size the inner wall of the tube".

Since the sizing and cooling plug in the apparatus of document D1 already comprises these features, it is obvious for the person skilled in the art to keep the general structure of the cooling and sizing plug including these features, as in the apparatus of D1, and only to modify the plug so as to provide suction means according to the characterising part of claim 1 of auxiliary request I, the provision of which suction means in the apparatus of D1 does not involve an inventive step as pointed out in points 3.1 and 3.2 above.

Therefore, also the subject-matter of claim 1 according to auxiliary request II does not involve an inventive step in the sense of Article 56 EPC, and, hence also the respondent's auxiliary request II cannot be granted.

4. Since none of the requests of the respondent can be granted, the patent in suit has to be revoked.

Order

For these reasons it is decided that:

1. The impugned decision is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:

A. Townend

A. Burkhart