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D E C I S I O N
of 8 January 2002

Case Number: T 0369/99 - 3.2.5

Application Number: 88120929.0

Publication Number: 0322651

IPC: B29C 49/00

Language of the proceedings: EN

Title of invention:
Preform for, and method of forming hot fill container

Patentee:
CONTINENTAL PET TECHNOLOGIES, INC.

Opponent:
PLM AB

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56

Keyword:
"Novelty (yes)"
"Inventive step (yes)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0369/99 - 3.2.5

D E C I S I O N
of the Technical Board of Appeal 3.2.5
of 8 January 2002

Appellant: (Opponent)
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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted 4 February 1999 concerning maintenance of European patent No. 0 322 651 in amended form.**

Composition of the Board:

Chairman: W. Moser
Members: A. Burkhart
P. Michel

Summary of Facts and Submissions

I. The appellant (opponent) lodged an appeal against the interlocutory decision of the Opposition Division maintaining the patent No. 0 322 651 in amended form.

Opposition was filed against the patent as a whole and based on Article 100(a) EPC (lack of inventive step) and 100(c) EPC (lack of original disclosure).

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 amended.

II. The independent claims 1 and 13 underlying the decision of the Opposition Division read as follows:

"1. A preform (10) for forming a blow moulded hot fill container, the preform (10) being formed of a polyester resin and including a neck finish portion (16), a neck to body transition (18), a body portion (14) and a base portion (12), the neck finish portion (16) including a flange (24) immediately adjacent to the neck to body transition (18), the neck to body transition (18) including a first portion (30) adjacent to the flange (24) and terminating in a second portion (32), the first portion (30) flaring in increasing thickness from the second portion (32) to the flange (24), the second portion (32) defining a minimum cross-section region of the neck to body transition (18), which minimum cross-section has a thickness less than that of the body portion (14) and being spaced from the flange (24), and a third

portion (34) between the second portion (32) and the body portion (14), the third portion (34) flaring in increasing thickness to the body portion (14)."

"13. A method of forming a blow moulded hot fill container (54), the method comprising the steps of:

(a) providing a preform (10) including a neck finish portion (16), a neck to body transition (18), the neck finish portion (16) including a flange (24) immediately adjacent to the neck to body transition (18), a body portion (14) and a base portion (12), the neck to body transition (18) having a portion (32) thereof of minimum cross-section, the said portion (32) having a thickness less than that of the body portion (14), and the neck to body transition (18) flaring in thickness from said portion (32) to said body portion (14);

(b) heating the neck to body transition (18), the body portion (14) and the base portion (12) to a blow moulding temperature;

(c) placing the heated preform (10) in a blow mould (42);

(d) axially elongating the preform (10) thereby causing preferential thinning of the minimum cross-section portion (32) of the preform (10), which is spaced from the flange (24), relative to the remainder of the neck to body transition (18), wherein during axial elongation the said portion (32) is caused to neck down and assume a radially inwardly directed bowed configuration so as to undergo a greater stretching in the hoop direction

during subsequent blow moulding; and
(e) blow moulding the elongated preform (10) to form the container (54)."

III. The appellant referred to the following prior art documents:

D1: JP-A-57-8123, an English translation thereof, filed by the appellant on 6 October 1997,

D2: English translation of section 4 of the Article "Designing and moulding of PET bottles" by Samuel L. Belcher, Plastic Age, vol. 28, No. 12, 1982, pages 92-95, filed by the appellant on 6 October 1997,

D3: US-A-4406854,

D4: FR-A-2531001,

D5: Patent abstracts of Japan, vol. ll, No. 210, referring to JP-A-62-28211 and

D6: "Packaging", October 1987, 3 pages, filed by the appellant on 29 July 1997.

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

The respondent (patent proprietor) requested that the appeal be dismissed, and, as an auxiliary measure, that oral proceedings be appointed in the event that the appeal was not dismissed.

V. The appellant argued essentially as follows:

Document D1 disclosed a preform having all the features of claim 1 of the patent in suit, besides the only seemingly missing feature "the first portion flares in increasing thickness from the second portion to the flange". However, the preform according to Figure 2 of document D1 had a step portion with the thickness tl immediately below the flange, and since, in practice, the corners of such a step were never sharp but were always chamfered, bevelled or rounded off, the aforementioned feature was inherently present in the preform of document D1. Therefore, the subject-matter of claim 1 was not novel.

In case that this view of the appellant would not be accepted by the Board, the appellant alleged that the subject-matter of claim 1 did not involve an inventive step.

The problem to be solved by the aforementioned feature might be seen in avoiding stress concentrations and temperature unevenness in the step portion (tl) during blowing the container. This problem, however, belonged to the general knowledge of the person skilled in the art and was also addressed in document D2, which taught as a solution to this problem that in the shoulder of a parison a profile with acute angles should be avoided, in order to realise uniform heating during the blow moulding process.

Having this teaching of document D2 in mind, the person skilled in the art would modify the preform according to document D1 in the sense that the step portion was replaced by a portion flaring in increasing thickness towards the flange.

The process according to claim 13 of the patent in suit, which contained the same features as claim 1 and additional blow moulding features, also did not involve an inventive step, since these additional blow moulding features were conventional measures, as could be seen from documents D3 and D4.

The subject-matter of the dependent claims of the patent in suit was suggested by documents D1, D2, D3, D5 and D6.

VI. The respondent argued essentially as follows:

The preform as defined in claim 1 of the patent in suit comprised a neck to body transition which included three specifically structured portions, namely a first portion flaring in increasing thickness from a second portion to the flange, the second portion defining a minimum cross-section region, and a third portion flaring in increasing thickness from the second portion to the body portion.

Such a neck to body transition was not present in the preform of document D1. The step portion (tl) referred to by the appellant was, according to the definition given in document D1, the "thickness of the preform at a portion corresponding to the lower end of the mouth of the container and not to be oriented". Therefore, the step portion (tl) was not part of any neck to body transition of the preform of document D1 for forming the shoulder of the container, but rather constituted a part of the neck finish or mouth portion of both the preform and the resultant container.

The teaching of document D2 was concerned with the

designing of a shoulder of a parison to be transformed and oriented by blow moulding into the shoulder portion of the finished container, wherein particular profiles should be avoided for effective resin utilisation and for realising uniform heating. However, since the step portion (tl) shown in Figures 1 and 2 of document D1 was a portion of the neck finish, and was not intended to be oriented and transformed into the shoulder of the finished container, any teaching in document D2 concerning the designing of the shoulder of a parison had no bearing whatsoever on the structure of the step portion (tl) disclosed in document D1. Moreover, document D2 taught away from this specific structural configuration of the three-portion neck to body transition defined in claim 1 of the patent in suit, since the teaching of document D2 was against the provision of faces or angles as defined in claim 1.

The objective technical problem present in the prior art according to document D1 was how to achieve increased biaxial orientation of the shoulder of the resultant container. The technical solution arrived at by the present inventors was to provide a preform structure in the neck to body transition which permitted inward bowing of the neck to body transition on axial stretching so that on blow moulding thereafter an increased hoop stretch was introduced into the shoulder. Accordingly, the preform structure was chosen not only for increased axial stretch in the shoulder, but also to increase the hoop stretch in the shoulder. The technical solution, as recited in claim 1 of the patent in suit, was to provide an additional downwardly facing flaring first portion above the minimum cross-section portion which was then spaced from the unstretched and unoriented flange of the neck finish.

This provided three parts in the neck to body transition. The provision of such three parts assisted the achievement of smooth inward bowing of the preform remote from the flange leading to continuous changes in the shape and orientation of the bowed structure so that, on blow moulding, there was increased hoop stretching for increasing the biaxial orientation in the shoulder.

Such a solution was not suggested by the teachings of documents D1 and D2. Therefore, both the preform according to claim 1 and the process according to claim 13, referring to the blow moulding of the perform defined in claim 1, were novel and involved an inventive step having regard to the prior art documents cited by the appellant.

VII. On 27 April 2001 the Board issued a communication pursuant to Article 110(2) EPC, wherein it expressed its provisional opinion in detail that the subject-matter of claims 1 and 13 of the patent in suit was novel with respect to the disclosure of document D1 and involved an inventive step with respect to the prior art disclosed in documents D1 to D6, and that, therefore, the appeal was likely to be dismissed.

VIII. In its reply to the communication of the Board of 6 November 2001 the appellant made the following statement:

"With respect, the Opponent does not share your view. As sharp corners should be avoided, all corners (inner and outer) of the part with the thickness t2 in D1 are smooth/bevelled. That results in the portion with thickness t2 flaring in increasing thickness from the

second portion (that with the minimum thickness) to the flange."

Reasons for the Decision

1. *Novelty*

The closest prior art under consideration is represented by document D1. Document D1 (cf. Figures 1 and 2 and corresponding parts of the description) discloses a preform for forming a blow moulded container, the preform being formed of a polyester resin including a neck finish portion, a neck to body transition, a body portion and a base portion, the neck finish portion including a flange immediately adjacent to the neck to body transition.

Below this flange there is provided a step portion having a thickness tl. In the sole claim of document D1 this thickness is said to be the "thickness (mm) of the preform at a portion corresponding to the lower end of the mouth of the container and not to be oriented". From this indication and also from Figures 1 and 2 of document D1 it follows that the step portion having the thickness tl is part of the flange of the neck finish portion which is not intended to be stretched or oriented during the blow moulding operation and, accordingly, cannot be part of the neck to body transition of the preform which is required to be stretched and oriented during the blow moulding operation. Figure 1 of document D1 further shows below the step portion having the thickness tl a portion having a constant thickness t2, smaller than the thickness tl. In the sole claim of document D1 this

thickness t2 is said to be the "average thickness (mm) of the preform at a portion corresponding to the shoulder of the container (the intermediate area between the lower end of the mouth which had not been oriented and the body which has been fully oriented)". Below this portion having a constant thickness t2 a further portion is provided, which portion flares in increasing thickness towards the body portion (see Figures 1 and 2).

Therefore, the portion having a constant thickness t2 and the portion flaring in increasing thickness towards the body portion constitute the neck to body transition of the preform.

The preform disclosed in document D1 does not comprise in the neck to body transition a portion adjacent the flange flaring in increasing thickness towards the flange as required by claim 1 of the patent in suit.

The arguments put forward by the appellant that this feature was inherently present in the preform of document D1, since "corners of a preform were never sharp but always chamfered, bevelled or rounded off", cannot be accepted by the Board.

Even if it is admitted that corners of a preform, like the corner at the transition of the step portion (t1) to the portion (t2) in Figures 1 and 2 of document D1, are never sharp, there is no objective disclosure or teaching in document D1 of the feature required by claim 1 of the patent in suit that the first portion of the neck to body transition flares in increasing thickness towards the flange.

Since document D1 does not disclose such a flaring first portion of the neck to body transition, it also does not disclose a neck to body transition which includes three interrelated structured portions as required by claim 1 of the patent in suit, namely a first portion flaring in increasing thickness from a second portion to the flange, the second portion defining a minimum cross-section region, and a third portion flaring in increasing thickness from the second portion to the body portion, as required by claim 1 of the patent in suit.

Therefore, the preform according to claim 1 of the patent in suit is novel.

Since the method claim 13 comprises all the features of claim 1 and some further process features, the subject-matter of claim 13 is also novel.

2. *Inventive step*

2.1 Problem underlying the invention

The inventors of the patent in suit have found that the blow moulding of the preform according to document D1 does not produce a container, the shoulder portion of which has a sufficiently high biaxial orientation in order to be heat and shrinkage resistant.

Therefore, the problem underlying the invention consists in providing a blow moulding technique by which an increased biaxial orientation of the shoulder of the resultant container is achieved.

2.2 Solution

The invention of the patent in suit solves the aforementioned problem in that the preform known from document D1 is modified in the sense that the neck to body transition includes three interrelated structural portions, namely a first portion flaring in increasing thickness from a second portion to the flange, the second portion defining a minimum cross-section region, and a third portion flaring in increasing thickness from the second portion to the body portion.

The provision of three such portions assists the achievement of smooth inward bowing of the preform remote from the flange leading to continuous changes in the shape and orientation of the bowed structure so that, on blow moulding, there is increased hoop stretching for increasing the biaxial orientation in the shoulder.

2.3 This solution is not rendered obvious by the documents referred to by the appellant, for the following reasons:

The teaching of document D2 is concerned with the design of the shoulder portion of bottle preforms. As stated under point 1 above, the step portion of the preform of document D1 which has a thickness t1, is a portion corresponding to the lower end of the mouth of the container and not to be oriented. This portion therefore is not a part of the shoulder of the preform and, thus, any teaching in document D2 concerning the designing of the shoulder of a preform has no bearing whatsoever on the structure of the step portion of thickness t1 disclosed in document D1.

Document D2 is concerned with designing a shoulder of a preform wherein particular profiles should be avoided for effective resin utilisation and for realising uniform heating. Since in the preform the step portion of thickness t1 is part of the lower end of the mouth of the container which is not to be orientated, it does not need to be deliberately heated because it is not stretched. In fact, document D2 discloses that a rise in temperature in the neck finish must be suppressed. Thus, any teaching in document D2 concerning establishing a profile for realising uniform heating is irrelevant to the structure of the step portion having the thickness t1 in the preform according to document D1.

Document D2 gives the general teaching that a profile with acute angles should be avoided in the shoulder of a preform and that the thickness should be made more uniform and, at most, should gently be changed from the neck finish to the body. This leads away from any modification of the preform of document D1 by the introduction of an additional first portion which deliberately flares in thickness from the second portion of minimum cross-section to the flange, since the provision of such an additional flaring first portion would increase thickness variations in the shoulder which document D2 teaches against.

Thus the skilled person would not be led by the teaching of document D2 to the technical solution arrived at by the invention of the patent in suit.

As far as documents D3 to D6 disclose a preform, they disclose that the thinnest part of the neck to body transition is adjacent to the flange of the neck

portion. Therefore, these documents cannot suggest the specific neck to body transition including three interrelated structural portions as defined in claim 1 of the patent in suit.

2.4 Therefore, the preform according to claim 1 of the patent in suit involves an inventive step within the meaning of Article 56 EPC.

2.5 The same applies to the method according to claim 13, which defines a blow moulding technique using the preform as defined in claim 1.

2.6 The dependent claims 2 to 12 and 14 to 25, respectively, also involve an inventive step because they refer to further embodiments of the subject-matter of claims 1 and 13, respectively.

3. Thus, the patent can be maintained in amended form according to the decision under appeal.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

M. Dainese W. Moser