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D E C I S I O N
of 8 March 1995

Case Number: T 1035/93 - 3.2.1

Application Number: 88308005.3

Publication Number: 0306259

IPC: B65D 41/34

Language of the proceedings: EN

Title of invention:
Closures for containers

Applicant:
METAL CLOSURES LIMITED

Opponent:
-

Headword:
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Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (after amendment - yes)"

Decisions cited:
-

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-

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Case Number: T 1035/93 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 8 March 1995

Appellant: METAL CLOSURES LIMITED
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Decision under appeal: **Decision of the Examining Division of the European Patent Office dated 2 July 1993 refusing European patent application No. 88 308 005.3 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: F. A. Gumbel
Members: P. Alting van Geusau
J. C. Saisset

Summary of Facts and Submissions

I. European patent application No. 88 308 005.3 (publication No. 0 306 259), filed on 30 August 1988, was rejected by the Examining Division with decision dated 2 July 1993.

The Examining Division was of the opinion that the subject-matter of the independent Claims 1 and 12, filed with letters dated 25 and 22 November 1991 respectively, did not involve an inventive step having regard to the prior art disclosed in

D1: US-A-4 526 282.

II. An appeal was lodged against this decision on 31 August 1993. Payment of the appeal fee was received on the same day.

With the Statement of Grounds of Appeal, received on 30 October 1993, new Claims 1 and 12 were filed.

III. With a communication dated 23 November 1994 the Board expressed the provisional opinion that the claimed subject-matter in principle appeared to involve an inventive step but that the Claims and application documents exhibited some formal deficiencies.

VI. With responses dated 30 December 1994, 21 February 1995 and 23 February 1995 the Appellant filed new Claims 1 to 12 (partly) and a new description (pages 1A, 2 and 4 to 8), Claim 12 (partly) and new description pages 1 and 3A and a new description page 3, respectively.

By implication the Appellant requested grant of a patent on the basis of these new documents together with the drawings (Figures 1 to 17) as originally filed.

The independent Claims 1 and 12, read as follows:

"1. A container closure moulded from plastics material and comprising a top (10), an annular skirt (11) depending from the top and formed with a screw-thread (12) on its internal surface, and a tape-evident ring (13) connected to the end of the skirt remote from the top by frangible bridges (15) extending across an axial gap (14) or by a circumferentially extending line of weakening between the ring and the skirt, said ring having on its inner surface radially inwardly projecting protrusions (16) each having an end surface (17) generally facing the top but inclined radially inwardly, and said ring (13) having an annular groove (20) formed in a radially facing surface thereof at a location axially between the protrusions (16) and the bridges (15) or line of weakening, characterised in that each protrusion (16) has a downwardly and radially outwardly, conically or partly or wholly concavely inclined cam surface extending from said end surface (17) towards the free end of the ring (13); in that the ring (13) is circumferentially continuous over its full axial height, and in that the annular groove (20) forms an annular hinge for each protrusion such that application of pressure on the inclined cam surfaces (18) allows the protrusions (16) to hinge outwardly, assisted by the weakening effect of the annular groove (20) on the wall of the ring (13)".

"12. A method of moulding from plastics material a container closure comprising a top (10), an annular skirt (11) depending from the top and formed with a screw-thread (12) on its internal surface, and a tamper-

evident ring (13) connected to the end of the skirt remote from the top by frangible bridges (15) extending across an axial gap or by a circumferentially extending line of weakening between the ring and the skirt, said ring having on its inner surface radially inwardly projecting protrusions (16) each having an end surface (17) generally facing the top but inclined radially inwardly, and said ring having an annular groove (20) formed in a radially facing surface thereof at a location axially between the protrusions and the bridges or line of weakening, which method comprises forming the radially inner profile of the closure on a mould core (30), forming the outer surfaces of the top and the skirt in a mould sleeve (31) for disposition about the upper portions of the mould core member, forming the bridges and the portions of the external surface of the ring from the bridges to the groove, including the groove, in a third mould part (32), and forming the remainder of the radially outer surface of the ring in a fourth mould part (33), wherein after moulding of the closure in the assembled mould, the mould sleeve (31) and the fourth mould part (33) are removed in axially opposite directions, then the mould core (30) is removed axially while the closure is held against axial movement by the engagement of the third mould part (32) in said axial gap, and then the third mould part (32) from about the closure, characterised in that each protrusion (16) is formed to have a downwardly and radially outwardly conically or partially or wholly concavely inclined cam surface (18) extending from said end surface (17) towards the free end of the ring (13); in that the mould core (30) and the fourth mould part (33) jointly form both the protrusions (16) and intermediate wall portions of the ring (13) extending between the protrusions (16) to form a circumferentially continuous wall over its full axial height at the location of the protrusions (16) and in that when removing the mould core (30) from

the container closure, under the pressure of the mould core (30) against the end surfaces (17) of the protrusions (16), the protrusions (16) hinge outwards about the location of the annular groove (20) to enable the protrusions to be extracted from the mould core."

VII. In support of his request the Appellant essentially relied upon the following submissions:

In the prior art in accordance with D1 the purpose of the slots in the security ring of the closure cap is firstly to allow radial expansion of the lower part of the ring to enable the bead segments to be extracted from the part of the mould which forms them, and secondly to facilitate passage of the bead segments over the security band on a bottle on which the closure is secured. This radial expansion is achieved by bending of the segments, formed between the slots, at their upper ends. In view of these disclosures it does not only involve a complete and untaught addition to the disclosure of D1 but also a complete shift in the way the stresses produced by radial expansion are accommodated, to modify the ring to be circumferentially continuous in accordance with the characterising features of Claim 1 of present application.
Moreover, it is clear that the groove formed in the lower part of the cap just above the plane "C" shown in Figure 1 of D1 does not form a hinge. On the contrary, as follows from the disclosures in column 6, lines 23 to 45 of D1, it is actively prevented to form a hinge during extraction of the closure from the mould.

In the closure formed in accordance with the present application the hoop forces created by the outward deflection of the lower portions of the ring present considerably greater resistance than the slotted arrangement of D1 and the inclined cam surfaces assist

greatly in enabling the closure to be applied smoothly to the neck of container. This combination of features ensure at the same time easy application of the cap to the bottle neck and high resistance to pulling the tamper ring back over the bottle neck.

Reasons for the Decision

1. The appeal complies with the requirements of Articles 106 to 108 and Rules 1(1) and 64 EPC. It is admissible.

2. *Amendments*

2.1 New Claim 1 contains all the features of the originally filed Claim 1 in its pre-characterising portion. The pre-characterising part is related to the prior art container closure cap disclosed in US-A-4 526 282 (D1).

Although D1 does not explicitly disclose the alternative for the bridges in the form of "a circumferentially extending line of weakening between the ring and the skirt" in the embodiments of the invention claimed there, such measure of weakening is referred to in the discussion of the prior art (column 1, lines 62 to 65) and would therefore be seen by the skilled person as a disclosed alternative for a weakened region.

Claim 1 is thus correctly related to the closest prior art as required by Rule 29(1) EPC.

2.2 The characterising features of Claim 1 are:

(i) each protrusion has a downwardly and radially outwardly, conically or partly or wholly concave inclined cam surface extending from said end surface towards the free end of the ring,
(ii) the ring is circumferentially continuous over its full axial height and
(iii) the annular groove forms an annular hinge for each protrusion such that the application of pressure on the inclined cam surfaces allows the protrusions to hinge outwardly assisted by the weakening effect of the annular groove on the wall of the ring.

Feature (i) is supported by the disclosure on page 4, lines 13 to 22 of the originally filed description.

Feature (ii) follows from the description of the preferred embodiments in relation to the Figures according to which ring 13 is circumferentially closed.

Feature (iii) follows from the disclosure on page 5, lines 20 to 30 of the originally filed description. This passage elucidates that there is no real expansion of the ring but rather a local deformation at the position of the protrusions to allow the protrusions to move outwardly by swivelling about the hinge formed by the groove 20.

2.3 The independent method Claim 12 is based on the originally filed method Claim 13 and is now satisfactorily related in its pre-characterising part to the prior art method of moulding a closure cap disclosed in D1.

2.4 The dependent Claims 2 to 11 are essentially repetitions of the originally filed Claims 2 and 4 to 12.

2.5 The originally filed description was amended to take account of the closest prior art disclosed in D1 and the scope of the new set of claims.

2.6 In view of the above assessments no objections in respect of Article 123 (2) EPC arise against the amended documents.

3. *Novelty*

3.1 Novelty of the subject-matter of the independent Claims 1 and 12 follows from the combination of the features relating to a continuous ring (13), an annular groove (20) and cam surfaces (17 and 18) causing the ring, when under pressure either when screwing the cap on a bottle (Claim 1) or when extracting the cap from the mould (Claim 12), to expand locally and allow the protrusions (16) to hinge outwardly assisted by the weakening effect of the annular groove (20) on the wall of the ring.

3.2 In D1 and the very similar US-A-4 552 328 (D2), the ring is not continuous. In the further document cited in the European search report, US-A-4 496 302 (D3), the protrusions bend sidewardly and there is no groove.

4. *Inventive step*

4.1 The tamper evident ring of the cap disclosed in D1 has a round shouldered inwardly projecting bead, split circumferentially into shorter lengths by a series of axial slots. These slots allow the bead portions to bend outwardly and move over the bottle neck during passage of the bead segments over the security band on the

bottle. However, such arrangement has the disadvantages that sudden resistance is encountered when forcing the bead portions to bend outwardly and further, when unscrewing the bottle cap, there is the risk that the bead segments slip back over the security band on the bottle, without that the wanted breakage of the frangible bridges or the weakening line is achieved.

4.2 The underlying problem of the present application can therefore be seen in the provision of a tamper proof closure cap avoiding these problems encountered in the prior art.

4.3 In accordance with,Claim 1 the tamper proof ring is a continuous ring so the force required to stretch the ring sufficiently for letting the cam surfaces pass back over the security band on the bottle top is considerable and thus removal of the cap without fracturing the bridges is prevented. In this respect the forces needed for the outward deflection of the portions of the ring present considerably greater resistance than the bending stresses occurring in the arrangement of D1.

On the other hand the form of the cam surfaces and the weakening effect of the annular groove on the wall of the ring both assist greatly in the local expansion in the region of the cam surfaces thereby enabling the closure to be applied smoothly to the neck of the bottle.

Such local deformation obviously has the effect that the ring is no longer circular but rather acquires a multi-angular form when the closure is screwed onto the bottle top or is taken out of the injection form.

4.4 The Examining Division considered the cap disclosed in D1 to function in a similar manner as the arrangement in accordance with the present application.

However, here the Appellant's arguments can be followed in that the tamper proof closure cap disclosed in D1 is not only constructionally different but does also not give any lead to the effects obtained by the subject-matter of the independent Claims 1 and 12.

The bending line of the bead portions disclosed in D1 is at plane "C" which is at the lower edge of the circumferential groove shown Figure 1 of the drawings. No disclosure or teaching is derivable that the groove assists in bending of the bead parts or functions as a hinge, as was alleged by the Examining Division. The references relied upon in the contested decision do not at all indicate that the known groove has any noticeable effect on the bending of the bead portions.

In this respect it is to be noted that the groove in D1 has a triangular form and accommodates and is supported by the stripper ring 56 during retraction of the core ring 52. Such combination clearly prevents bending in the area of the groove during extraction of the cap from the mould.

Furthermore, the vertical slits in the bead of D1 are essential for the bead portions to be able to bend outwardly and move over the security band on the bottle top. In view of this functioning of the prior art method of locking the cap to the bottle neck the skilled person would not be led to provide a continuous ring because such modification would interfere with and eliminate the working principle of the arrangement disclosed in D1.

4.5 Also the other cited documents of the European search report do not hint in the direction of the combination of a continuous ring and conical protrusions that hinge outwardly assisted by the weakening effect of an annular groove on the wall of the ring.

The arrangement disclosed in D2 is very similar to that of D1 and in the prior art construction shown in D3 the protrusions bend sidewardly during application of pressure and thus work according to a different principle.

4.6 Summarising, in the Board's judgment, the proposed solution defined in the independent Claim 1 to the technical problem underlying the patent in suit is based on an inventive step and therefore this claim as well as its dependent Claims 2 to 11, relating to particular embodiments of the invention in accordance with Rule 29(3) EPC, can form the basis for grant of a patent (Article 52(1) EPC).

4.7 The reasons set out under points 3 and 4.1 to 4.6 also apply to independent Claim 12 relating to a method specifically adapted to produce the closure according to Claim 1 and repeating the structural features of that product. Claim 12, therefore, is allowable too.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to grant a patent on the basis of the following documents:

   Claims 1 to 12 (partly) and the description pages 1A, 2 and 4 to 8, filed with letter dated 30 December 1994, Claim 12 (partly) and the description pages 1 and 3A filed with letter dated 21 February 1995, description page 3 filed with letter dated 23 February 1995 together with the drawings (Figures 1 to 17) as originally filed.

The Registrar:

S. Fabiani

S. Fabiani

The Chairman:

F. Gumbel