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(54) Bottle closure means.

(57) The subject of the invention is a bottle closure means comprising a left-handed thread (1) on the neck (2) of the bottle, and an aluminium cap (3), whose skirt (4) engages by means of a left-handed thread (101) with the thread (1) on the neck (2) of the bottle and possesses a lid (5) having an internal leaktight seal and being separated from the skirt (4) by means of a line of predetermined tearing (7, 8). According to the invention, the line of predetermined tearing (7, 8) is situated as close as possible to the horizontal plane of the rim (102) of the mouth of the bottle, while the leaktight seal (6) is secured to the lid (5) by means of the bottom edge (105) of the lid, which edge is bent in and engages with the peripheral edge of the leaktight seal (6), securing it to the lid (5). Close to the horizontal plane of the rim (102) of the mouth of the bottle, the neck (2) of the bottle has an external annular stop ridge (13) that prevents any excessive descent of the skirt (4) of the cap (3) once it has been detached from the lid (5), by engaging with the bent-in top edge (104) of the skirt (4).

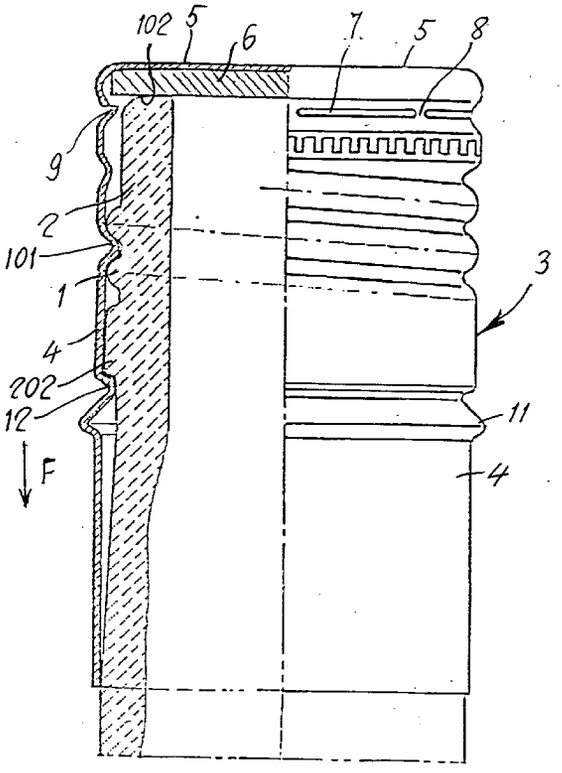

Fig. 5

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The invention relates to a bottle closure means consisting of an external left-handed thread on the neck of the bottle, and a cap which is made in particular of aluminium and comprises a skirt extending around the neck of the bottle and having an internal left-handed thread engaging with the external thread of the neck of the bottle, and a lid that has an internal seal able to seal the mouth of the bottle and that is connected to the skirt by means of a circumferential line of predetermined tearing, consisting of an alternating series of incisions and bridges of connecting material between the lid and the skirt, all of this being such that, by turning the cap in order to open the bottle, towards the left in the normal way (anticlockwise), with the intention of unscrewing it from the neck of the bottle, the connection created by the left-handed thread between the neck of the bottle and the skirt of the cap of the cap exerts a downward axial pull on the skirt of the cap sufficient to tear at least some of the connecting bridges of the line of predetermined tearing and hence wholly or partly to detach the skirt from the lid.

A device of this sort is known from document US-A-2,151,826. In this known device, the circumferential line of predetermined tearing of the cap, situated between the lid and the skirt of the cap, is shifted a certain distance downwards from the horizontal plane of the rim of the bottle mouth, which means that after the lid has been wholly or partly detached from the skirt, a rather large amount of the top of the bottle neck is left exposed between the top edge of the skirt and the rim of the bottle mouth.

The object of the invention is to eliminate this effect of the known closure device and to provide a closure device of the type described at the outset, improving it however in such a way that after the bottle has been opened, that is after the lid has been wholly or partly detached from the skirt, the top edge of the skirt reaches virtually all the way to the horizontal plane of the rim of the bottle mouth, reducing to a minimum the amount of the neck of the bottle left exposed at the top. In this way the skirt of the cap of the closure device according to the invention should replace or simulate the skirt of heatshrink plastic or the like which covers the neck of bottles known hitherto almost as far as the rim of their mouths and maintains this position even after the bottles have been opened.

At the same time, the closure device according to the invention must guarantee that closure will be perfectly leaktight, even if the bottle is under internal pressure, and yet must allow the bottle to be opened easily by simply removing the lid or hinging it up together with the leaktight seal once the lid has been wholly or partly detached from the skirt. Moreover, all these objects must be achieved by a constructionally simple and easily manufactured embodiment of the closure means.

This problem is solved by the invention in the form of a closure means of the type described at the outset and characterized in that

a) the circumferential line of predetermined tearing between the lid and the skirt of the cap is situated as close as possible to the horizontal plane of the rim of the mouth of the bottle, and

b) the bottom edge of the lid projects inwards and engages with a peripheral part of the leaktight seal from beneath so as to secure this seal to the lid.

In this embodiment according to the invention, once the lid and skirt of the cap have been wholly or partly detached from each other around the line of predetermined tearing by twisting the cap to the left with respect to the bottle, the lid can be immediately removed or hinged up together with the seal secured to it, by which means the bottle is easily and immediately opened, while the skirt of the cap, whose top edge is more or less in the horizontal plane of the rim of the mouth of the bottle, moves down, initially only as far as is necessary to break the bridges along the line of predetermined tearing, and then as far as permitted by the play between the thread on the skirt of the cap and the thread on the neck-of the bottle, exposing only a correspondingly small amount of the bottle at the top of the neck, i.e. basically maintaining its position in terms of height and simulating the skirt of heatshrink plastic or similar material covering the neck of hitherto known bottles.

In order that the downward axial movement of the skirt of the cap when the bottle is opened can be better controlled and reduced still further, that is in order to keep the skirt more securely and precisely in as close a position as possible to its initial position when the bottle is closed, in which the top edge of the skirt is more or less in the horizontal plane of the rim of the mouth of the bottle, or a little below it, the invention provides a closure means of the above sort, in which

c) the neck of the bottle has an external annular stop ridge close to the horizontal plane of the rim (102) of the mouth of the bottle,

d) the top edge of the skirt projects inwards in order to be able to engage from above with said stop ridge on the neck of the bottle, and

e) with the bottle in the closed condition, said stop ridge on the neck of the bottle is below the circumferential line of predetermined tearing of the cap, at such a distance from this line as to allow a downward axial movement of the skirt of the cap by an amount which is basically just sufficient to tear the connecting bridges of the line of predetermined tearing, after which said inwardly-projecting top edge of the skirt rests on the annular stop ridge on the neck of the bottle, and pre-

vents any further axial descent of the skirt.

In an advantageous embodiment of the invention, the inwardly-projecting bottom edge of the lid that engages with the leaktight seal, and/or the inwardly-projecting top edge of the skirt that engages with the stop ridge on the neck of the bottle, are formed by means of an external annular groove impressed into the wall of the cap around the circumferential line of predetermined tearing. Instead of said external annular groove or in combination with it, the bent-in parts of the bottom edge of the lid and/or of the top edge of the skirt may take the form of corresponding deformations, for example lips, on the respective top and/or bottom edges of the slits or incisions of the circumferential line of predetermined tearing. These deformations can easily be produced in a manner known to those skilled in the art when cutting the slits of the line of predetermined tearing.

Other advantageous improvements of the bottle closure means according to the invention are covered by the other dependent claims.

Certain examples of embodiments of the bottle closure means according to the invention will now be described in greater detail below with reference to the enclosed schematic drawings, in which:

Fig. 1 is a side elevation, half in an external view and half in axial section, of the cap of a closure means according to the invention, prior to the application of this cap to the neck of the bottle.

Fig. 2 is a schematic cross section through the cap of Fig. 1 on the line A-A shown in Fig. 1.

Fig. 3 is a schematic cross section through the cap, similar to Fig. 2, but of a modified embodiment.

Fig. 4 is an elevation, half in external view and half in axial section, of the neck of a bottle designed to be closed by the cap shown in Figs. 1 and 3.

Fig. 5 is an elevation, half in external view and half in axial section, of the neck of the bottle in Fig. 4, closed by the cap shown in Figs. 1 to 3.

Fig. 6 is an elevation, half in external view and half in axial section, of the closure means shown in Fig. 5, after the bottle has been opened.

Figs. 7 and 8 are elevations, half in external view and half in axial section, of another embodiment of the means according to the invention, showing the bottle closed (Fig. 7) and reclosed after being opened for the first time (Fig. 8).

Figs. 9 and 10 are elevations, half in external view and half in axial section, of another embodiment of the means according to the invention, with the bottle seen closed (Fig. 9) and open (Fig. 10).

In all the embodiments illustrated, the bottle closure means according to the invention consists of an external left-handed thread 1 on the neck 2 of the bottle, and of an aluminium cap (3) comprising a generally cylindrical or slightly conical skirt 4 and a cap 5 that has an internal leaktight seal. In the embodiment shown in Figs. 1 to 6, 9 and 10, the leaktight seal consists of a flat disc 6 designed to rest on the rim 102 of the mouth of the bottle. In the embodiment shown in Figs. 7 and 8, however, the leaktight seal consists of a stopper part 106 designed to pass into the mouth of the bottle and having a peripheral flange 206 designed to rest on the rim 102 of the mouth of the bottle.

Between the skirt 4 and the lid 5 of the cap 3 is a circumferential line of predetermined tearing, consisting of an alternating series of slits or incisions 7 and bridges of connecting material 8 between the lid 5 and the skirt 4 of the cap 3. All the connecting bridges 8 of the line of predetermined tearing may be of the same length in the circumferential direction, in which case they will all tear when the bottle is opened so that the lid 5 comes away completely from the skirt 4 of the cap 3.

In one particular embodiment, one bridge 108 (Fig. 2) or two or more adjacent bridges 208 (Fig. 3) can be longer in the circumferential direction than the other bridges 8, as a result of which they remain intact, that is they do not tear, when the bottle is opened and provide a local hinged joint between the lid 5 and the skirt 4.

The line of predetermined tearing, consisting of the incisions 7 and bridges 8, 108, 208, is situated in the innermost part of an external annular groove 9 formed by an inward impression in the wall of the cap 3. Accordingly the lid 5, defined with respect to the skirt 4 by said line of predetermined tearing, has a bent-in bottom edge 105. This inwardly-projecting bottom edge 105 of the lid 5 engages from below with the peripheral edge of the disc 6 forming the leaktight seal in the embodiment shown in Figs. 1 to 6 and Figs. 9 and 10; and by this means secures this sealing disc 6 to the lid 5. Similarly, in the embodiment shown in Figs. 7 and 8, the inwardly-projecting bottom edge 105 of the lid 5 engages from below with the peripheral flange 206 on the stopper 102 and thus secures this stopper 102 to the lid 5.

Because of the external annular groove 9 provided along the line of predetermined tearing, the skirt 4 defined with respect to the lid 5 by said line of predetermined tearing also has a bent-in top edge 104 that can be exploited in a preferred embodiment of the invention described later with reference to Figs. 9 and 10.

Prior to its being fitted to the neck 2 of the bottle, the generally cylindrical skirt 4 of the aluminium cap 3 has an external annular groove 10 formed by an impression in the wall of the skirt 4 and situated below the circumferential line of predetermined tearing at the point where the external thread 1 on the neck 2 of the bottle commences. Further down, below the thread 1 on the neck 2 of the bottle, the skirt 4 of the cap 3 has an external annular rib 11 which is also formed by a corresponding deformation of the wall of the skirt 4.

In all the illustrated embodiments of the closure means according to the invention, the aluminium cap 3, prior to its being fitted to the neck 2 of the bottle, is in the form illustrated in Fig. 1 and is fitted with the leaktight seal (disc 6 or flanged stopper 106, 206), which is accommodated inside the lid 5 and is secured to the latter by means of its inwardly-projecting bottom edge 105 in the manner described above. This cap 3 is fitted to the neck 2 of the bottle and the seal is compressed such that the peripheral edge of the disc 6 (Figs. 5 and 9) or the peripheral flange 206 of the stopper 6 (Fig. 7) is pressed leaktightly over the rim 102 of the mouth of the bottle, while the skirt 4 of the cap 3 is deformed from the outside in some conventional manner, for example by rolling, to produce its internal left-handed thread 101 which is complementary with the external left-handed thread 1 on the neck of the bottle, the two engaging with each other as illustrated in Figs. 5, 7 and 9. Furthermore the skirt 4 of the cap 3 is provided - below the thread 101 - with an internal annular ridge 12 which is likewise produced by a corresponding impression from the outside into the wall of the skirt 4, for example by rolling, and engages with an external annular undercut 202 on the neck of the bottle. The external annular ridge 11 of the skirt 4 of the cap 3 is situated preferably partly below said internal annular ridge 12 on the skirt 4 and its function is to absorb any wrinkles or other undesirable unaesthetic deformations that may appear in the skirt 4 during the abovementioned operations of forming the thread 101 and internal annular ridge 12. Consequently, because of said external annular ridge 11, the skirt 4 also has, once the cap 3 has been fitted to the neck 2 of the bottle, a regular and attractive appearance. The external annular groove 10 situated at the top of the skirt 4 of the cap 3 (at the point where the thread 1 of the neck 2 of the bottle begins) serves to facilitate and improve the purchase of the shaping roll as it begins the operation of rolling the thread 101 on the cap 3.

In all the illustrated embodiments of the closure means according to the invention, the circumferential line of predetermined tearing, consisting of the incisions 7 and bridges 8, 108, 208 between the skirt 4 and the lid 5, is situated - once the cap 3 has been fitted in the manner described above to the neck 2 of the bottle - close to the horizontal plane of the rim 102 of the mouth of the bottle, or else only slightly below this plane, as can be seen in Figs. 5, 7 and 9. In order to open the bottle, the cap 3 is twisted to the left, as would normally be done to unscrew any ordinary screw cap. In the embodiment according to the invention, however, the screw connection 1, 101 between the neck 2 of the bottle and the skirt 4 of the cap 3 is left-handed, which means that twisting to the left, far from unscrewing the cap, tends to screw the skirt 4 of the cap 3 further down the neck 2 of the bottle with a downward pull on this skirt 4. Since the lid 5 is resting, via the leaktight seal (disc 6 or flange 206 of the stopper 106), on the rim 102 of the mouth and cannot therefore move downwards, this downward axial pull on the skirt 4 of the cap 3 tears the connecting bridges 8 of the line of predetermined tearing, leaving only the optional bridge 108 (Fig. 2) or two optional adjacent bridges 208 (Fig. 3) untorn. The result of the first case is complete detachment of the lid 5 from the skirt 4 of the cap, the bottle being opened by completely removing the lid 5 together with the leaktight seal (disc 6 or flanged stopper 106, 206), as illustrated for example in Fig. 10. In the second case, the bottle is opened by pivoting back the lid 5 together with the leaktight seal (disc 6) on its bridge 108 or pair of bridges 208 left untorn and acting as a hinged joint with the skirt 4 of the cap 3, as illustrated in Fig. 6. This embodiment as shown in Figs. 5 and 6 enables the bottle to be closed again a small number of times, purely to prevent the entrance of dust or the like, by pivoting the raised lid 5 back down again over the mouth of the bottle. The embodiment shown in Figs. 7 and 8, in contrast, allows the bottle to be reclosed any number of times with perfect sealing, since the seal secured to the lid 5 is a flanged stopper 106, 206 that sits inside the mouth.

Once the lid 5 has been wholly or partly detached from the skirt 4 of the cap 3 around the line of predetermined tearing 7, 8, the skirt 4 descends axially around the neck 2 of the bottle by only a small amount approximately equal to the axial descent of the skirt 4 when being driven around the thread to tear the bridges 8 and hence detach it from the lid 5. To this necessary axial descent there is also added, in the embodiments shown in Figs. 1 to 8, a small additional descent due to the various axial plays, in particular the play between the thread 101 on the skirt 4 and the thread 1 on the neck 2 of the bottle. In all cases, the axial descent of the skirt 4 after- the bottle has been opened is very limited and exposes only a small and not very conspicuous part at the very top of the neck 2 of the bottle, as can be clearly seen in Figs. 6 and 8.

In the embodiment shown in Figs. 9 and 10, the neck 2 of the bottle has an external annular stop ridge 13 situated as close as possible to the horizontal plane of the rim 102 of the mouth, below the circumferential line of predetermined tearing formed by the incisions 7 and bridges 8. This external annular ridge 13 is intended to engage with the top edge 104 of the skirt 4 of the cap 3, which top edge 104 is bent in because of the fact that the line of predetermined tearing 7, 8 is situated in the innermost part of an external annular groove 9 impressed into the wall of the cap 3, as described earlier. The external annular stop ridge 13 on the neck 2 of the bottle is situated in such a position that, when the bottle is in a closed condition (Fig. 9), the distance between said annular stop ridge 13 and the superjacent inwardly-projecting top edge 104

of the skirt allows this skirt 4, when the bottle is being opened, that is during the twisting of the skirt 4 to the left, to move axially downwards by an amount which is basically just sufficient to tear the bridges 8 of the line of predetermined tearing and thus detach the lid 5. Immediately after this, however, the bent-in top edge 104 of the skirt 4 comes to rest on the annular stop ridge 13 on the neck 2 of the bottle and therefore prevents the skirt 4 of the cap 3 from descending axially any further, as illustrated in Fig. 10. In this way the axial descent of the skirt 4 of the cap 3 after the bottle has been opened is better controlled and in fact further reduced, since the influence of the various axial plays, for example, is eliminated, thereby further reducing the top part of the neck 2 of the bottle exposed after the opening of the bottle.

In the example of an embodiment illustrated in Figs. 9 and 10, the leaktight seal secured to the lid 5 by its inwardly-projecting bottom edge 105 is formed by a flat disc 6, but-it can of course also take the form of a flanged stopper 106, 206, as illustrated in Figs. 7 and 8.

Claims

1. Bottle closure means consisting of an external left-handed thread (1) on the neck (2) of the bottle, and a cap (3) made in particular of aluminium with a skirt (4) extending around the neck of the bottle and having an internal left-handed thread (101) engaging with the external left-handed thread (1) on the neck (2) of the bottle, and also with a lid (5) that has an internal seal (6, 106, 206) able to seal the mouth of the bottle and that is connected to the skirt (4) by means of a circumferential line of predetermined tearing consisting of an alternating series of incisions or slits (7) and bridges of connecting material (8, 108, 208) between the lid (5) and the skirt (4), all of this being such that, by turning the cap (3) in order to open the bottle, towards the left in the usual way, with the intention of unscrewing it from the neck (2) of the bottle, the connection created by the left-handed threads (1, 101) between the neck (2) of the bottle and the skirt (4) of the cap (3) exerts a downward axial pull on the skirt (4) sufficient to tear at least some of the connecting bridges (8) of the line of predetermined tearing and hence wholly or partly to detach the skirt (4) from the lid (5), characterized in that

   a) the circumferential line of predetermined tearing between the lid (5) and the skirt (4) of the cap (3) is situated as close as possible to the horizontal plane of the rim (102) of the mouth of the bottle, and

   b) the bottom edge (105) of the lid (5) projects inwards and engages with the peripheral part of the leaktight seal (6; 106, 206) from beneath so as to secure this seal to the lid (5).

2. Means according to Claim 1, characterized in that

   c) the neck (2) of the bottle has an external annular stop ridge (13) close to the horizontal plane of the rim (102) of the mouth of the bottle,

   d) the top edge (104) of the skirt (4) projects inwards in order to be able to engage from above with said stop ridge (13) on the neck (2) of the bottle, and

   e) with the bottle in the closed condition, said stop ridge (13) on the neck (2) of the bottle is below the circumferential line of predetermined tearing (7, 8) of the cap (3), at such a distance from this line as to allow a downward axial movement of the skirt (4) of the cap (3) by an amount which is basically just sufficient to tear at least some of the connecting bridges (8) of the line of predetermined tearing, after which the inwardly-projecting top edge (104) of the skirt (4) rests on the stop ridge (13) on the neck (2) of the bottle, thereby preventing any further descent of the skirt (4).

3. Means according to Claim 1 or 2, characterized in that in order to form the inwardly-projecting bottom edge (105) of the lid (5) that engages with the leaktight seal (6; 106, 206), and/or in order to form the inwardly-projecting top edge (104) of the skirt (4) that engages with the stop ridge (13) on the neck (2) of the bottle, the circumferential line of predetermined tearing (7, 8) is situated in the innermost part of an external annular groove (9) impressed into the wall of the cap (3).

4. Means according to one or more of the previous claims, characterized in that the inwardly-projecting bottom edge (105) of the lid (5) that engages with the leaktight seal (6; 106, 206), and/or the inwardly-projecting top edge (104) of the skirt (4) that engages with the top ridge (13) on the neck (2) of the bottle, consist of lips bent in from the top and/or bottom edges of the slits or incisions (7) of the circumferential line of predetermined tearing.

5. Means according to one or more of the previous claims, in which the internal thread (101) of the skirt (4) of the cap (3) is formed by rolling it around the external thread (1) on the neck (2) of the bottle, the cap (3) with its threadless skirt (4) having first been placed on the neck (2), characterized in that at the top of the skirt (4) of the cap (3), at the point where the thread (1) of the neck (2) of the bottle begins, is an external annular groove (10) impressed into the wall of the cap (3) to give

a purchase to the skirt (4) thread (101) shaping roll.

6. Means according to one or more of the previous claims, characterized in that the neck (2) of the bottle has, below the thread (1), an undercut (202) with which there engages an internal annular ridge (12) on the skirt (4) of the cap (3), impressed into the wall of said skirt (4).

7. Means according to one or more of the previous claims, characterized in that below the thread (1) of the neck (2) of the bottle or below the undercut (202) of the neck (2) of the bottle, the skirt (4) of the cap (3) has an external annular ridge (11) produced by deforming the wall of said skirt (4) and intended to absorb wrinkles or other unaesthetic deformations in said skirt during the rolling of its thread (101).

8. Means according to one or more of the previous claims, characterized in that one bridge (108) or two adjacent bridges (208) in the line of predetermined tearing are longer in the circumferential direction than the other bridges (8), and thus remain untorn after the other bridges (8) have been torn, and form a local hinged joint between the lid (5) and the skirt (4) of the cap (3).

9. Means according to one or more of the previous claims, characterized in that the leaktight seal secured to the lid (5) consists of a flat disc (6) that rests on the rim (102) of the mouth of the bottle and beneath whose periphery the inwardly-projecting bottom edge (105) of the lid (5) engages.

10. Means according to one or more of Claims 1 to 9, characterized in that the leaktight seal consists of a stopper (106) that can be inserted in the mouth of the bottle and has a peripheral flange (206) that rests on the rim (102) of the mouth of the bottle and with which the inwardly-projecting bottom edge (105) of the lid (5) engages.

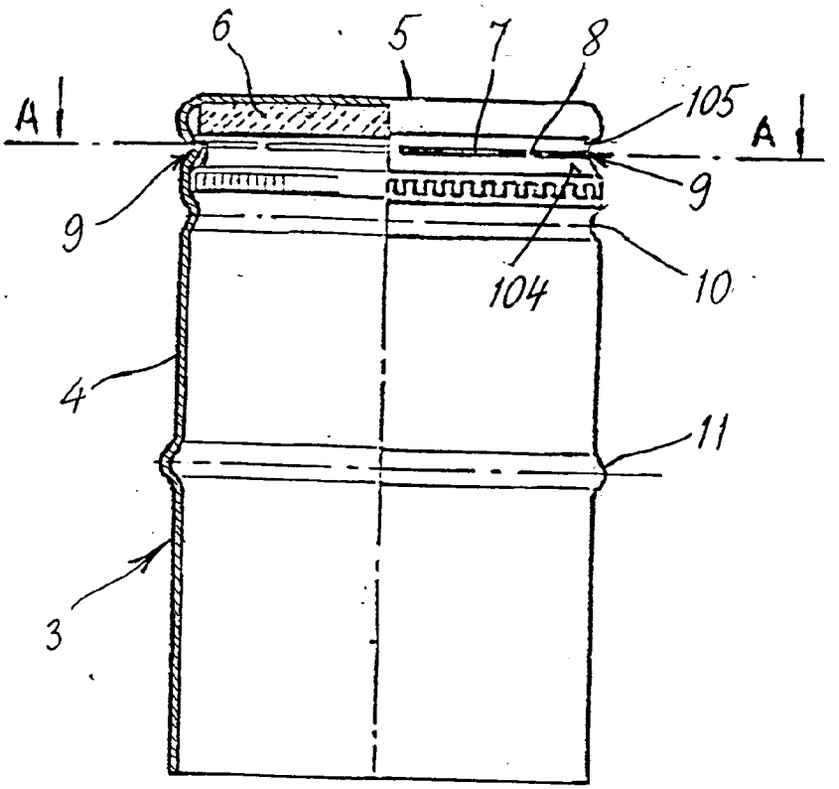

Fig. 1

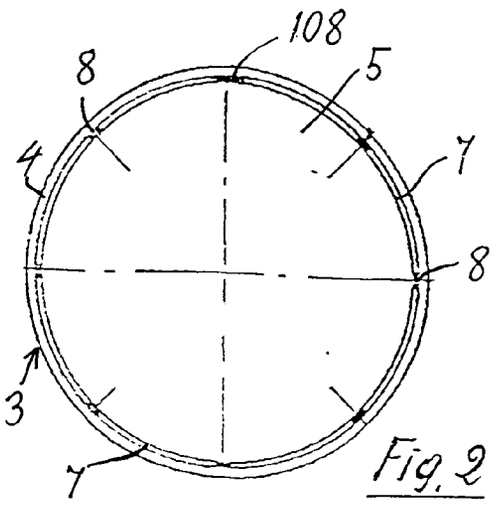

Fig. 2

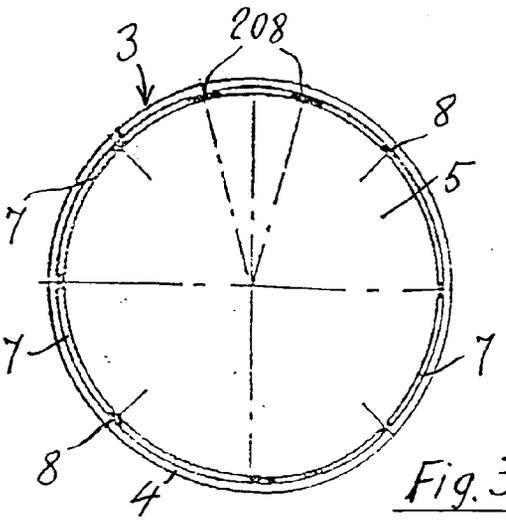

Fig. 3

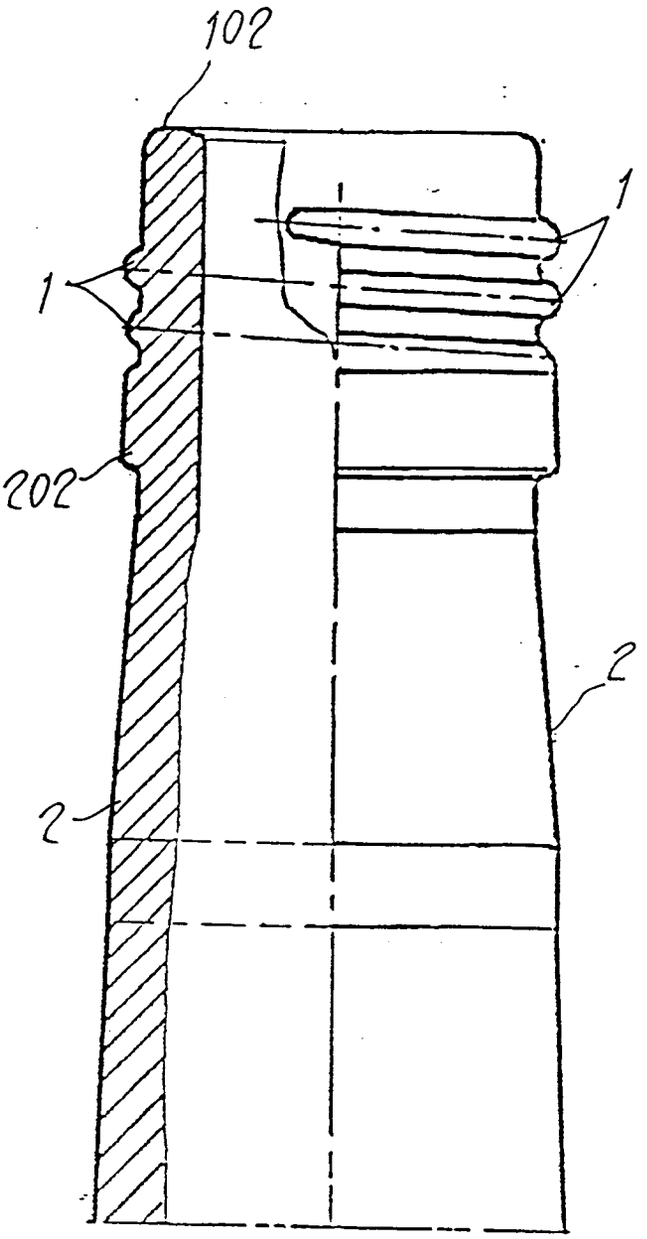

Fig. 4

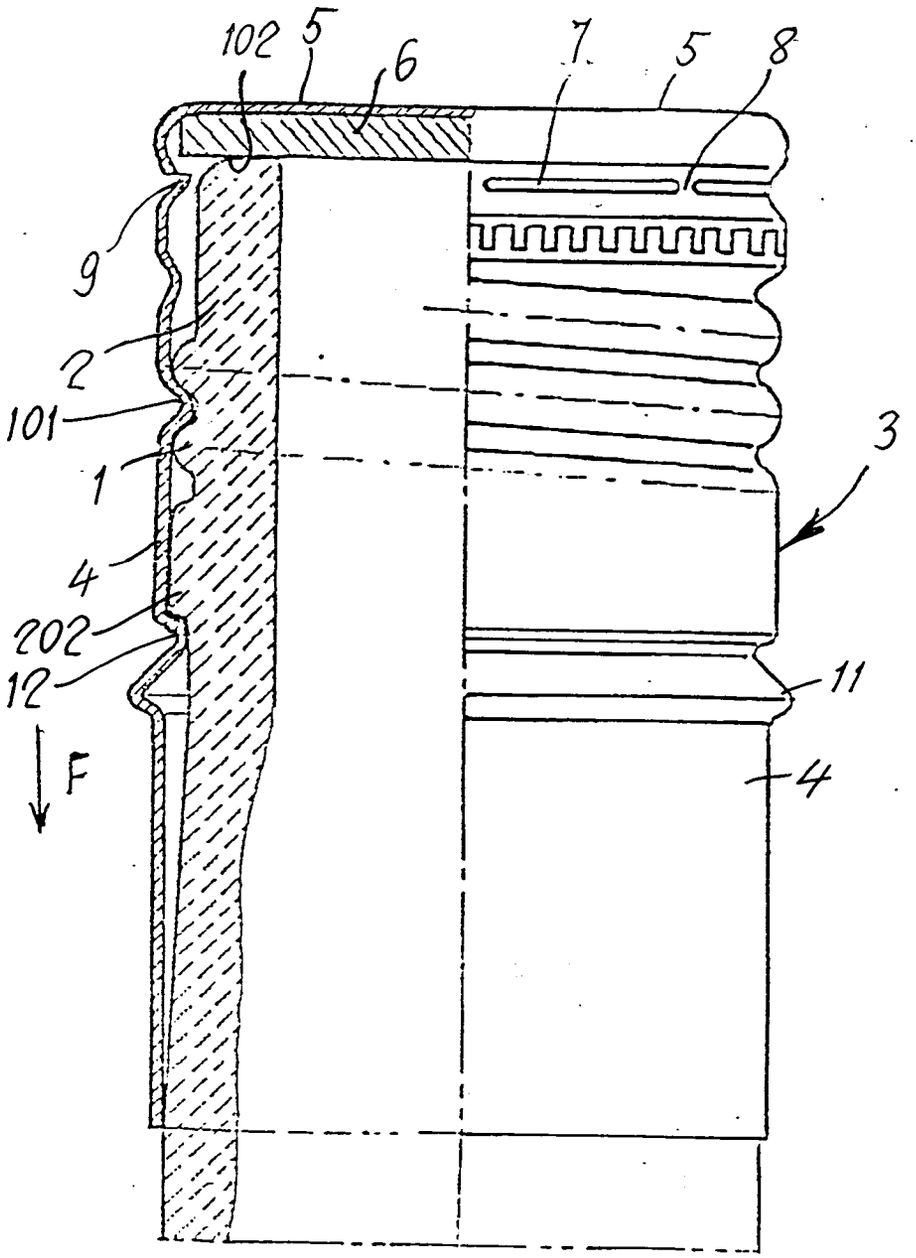

Fig. 5

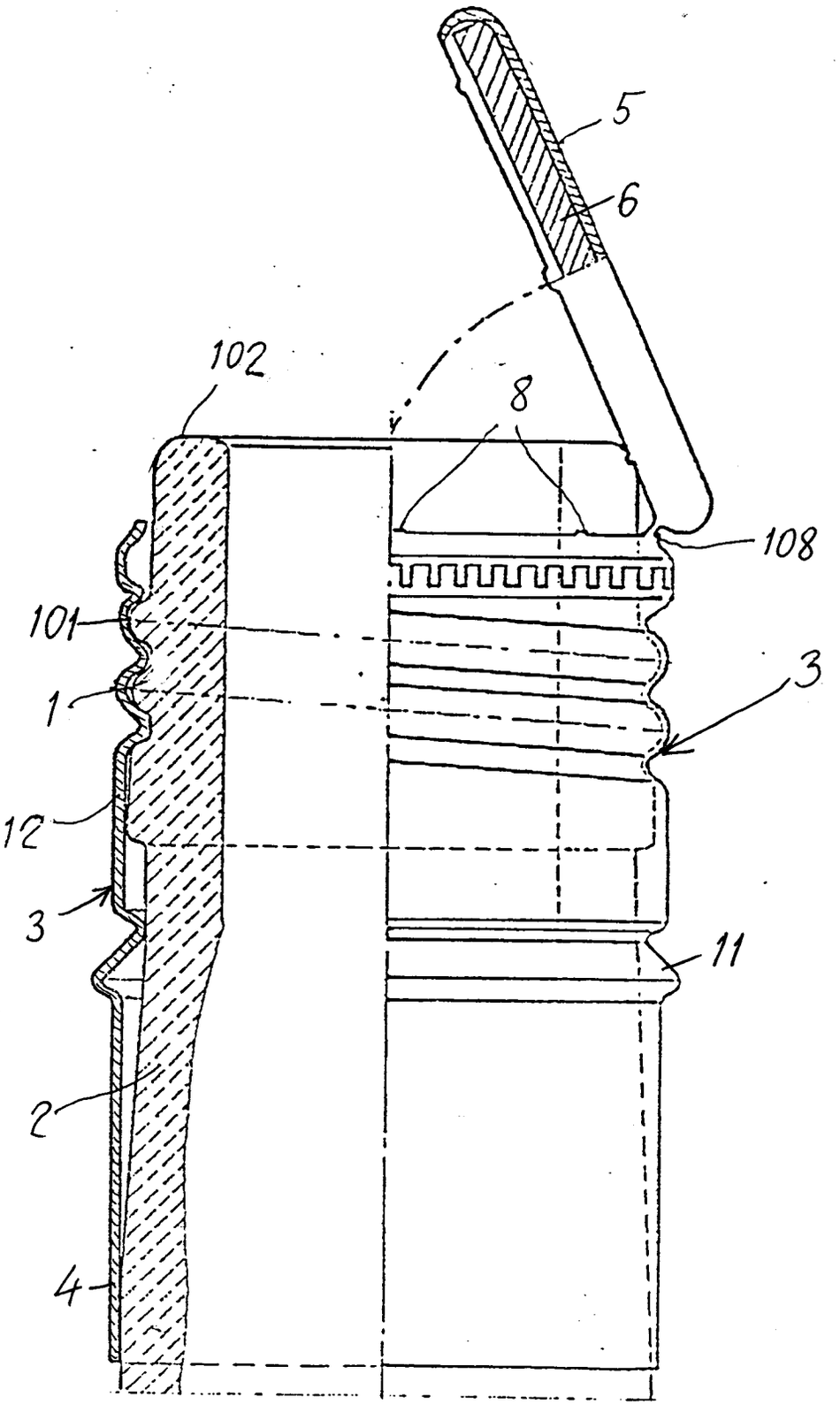

Fig. 6

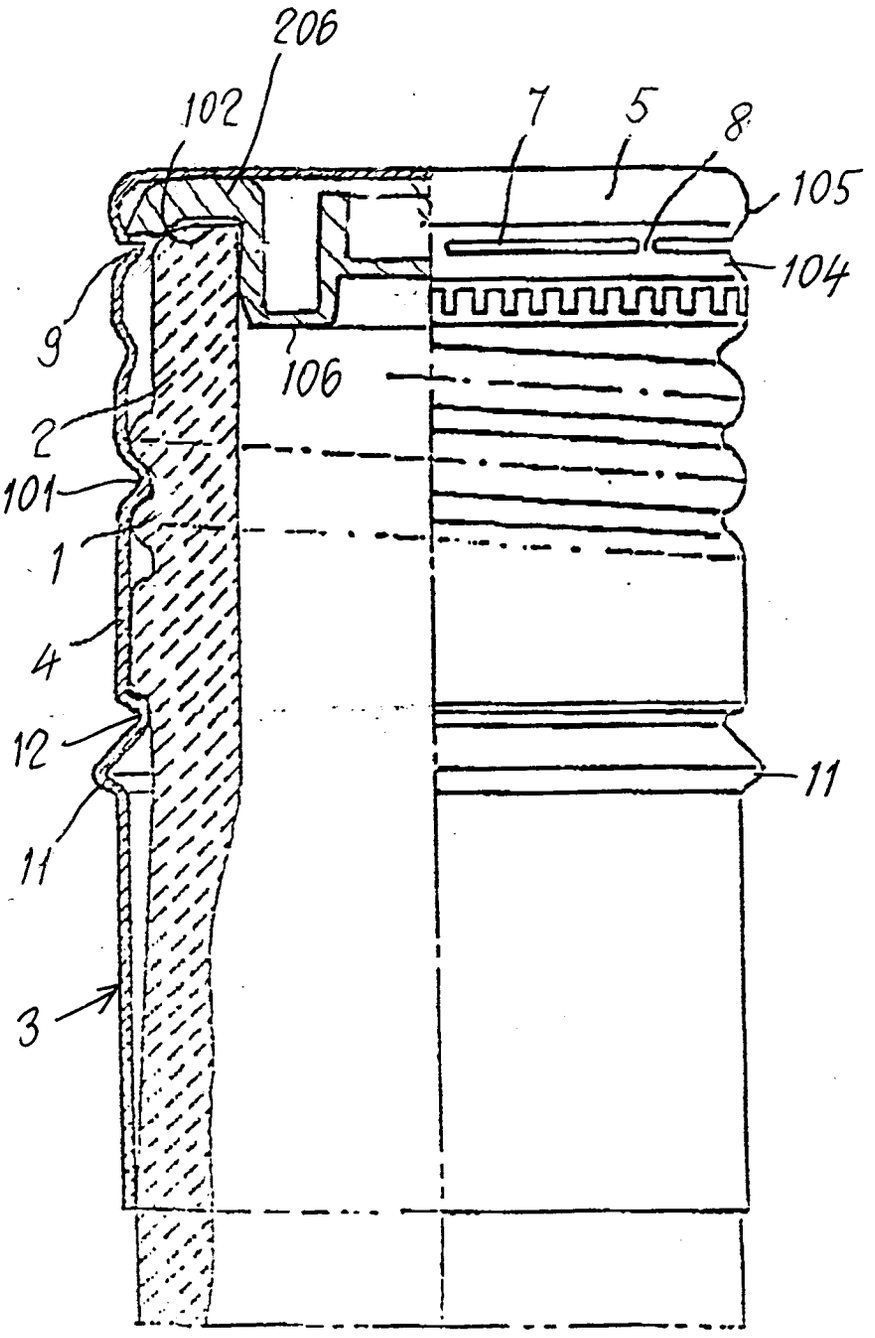

Fig 7

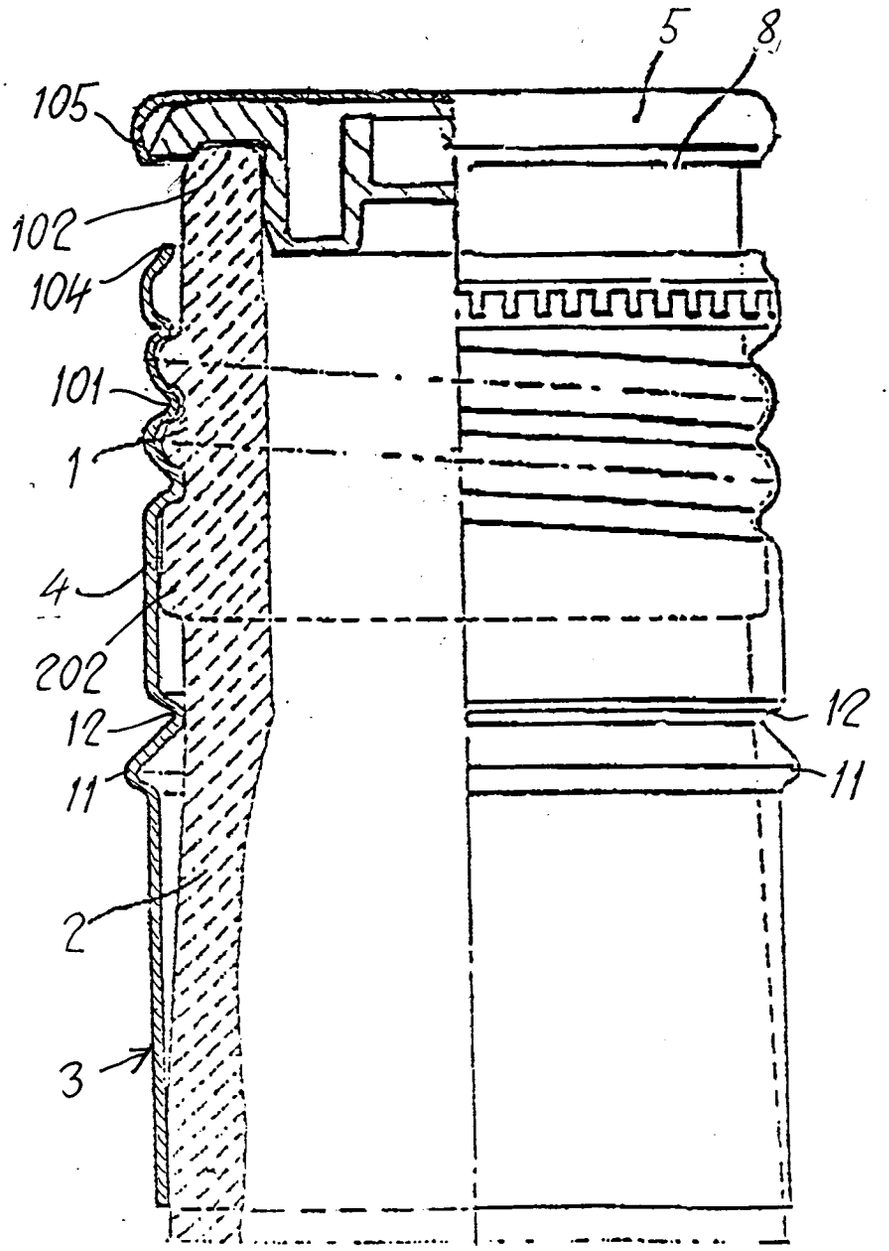

Fig. 8

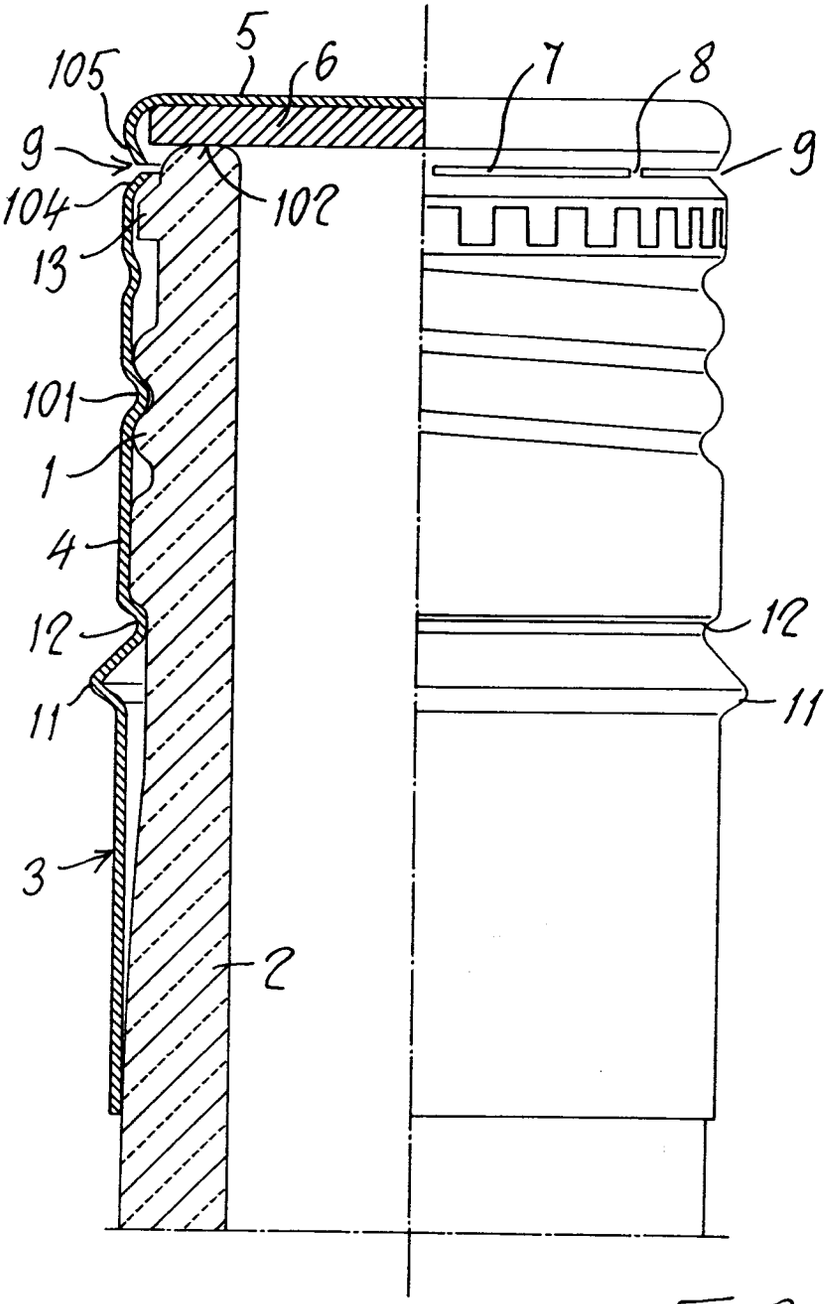

Fig. 9

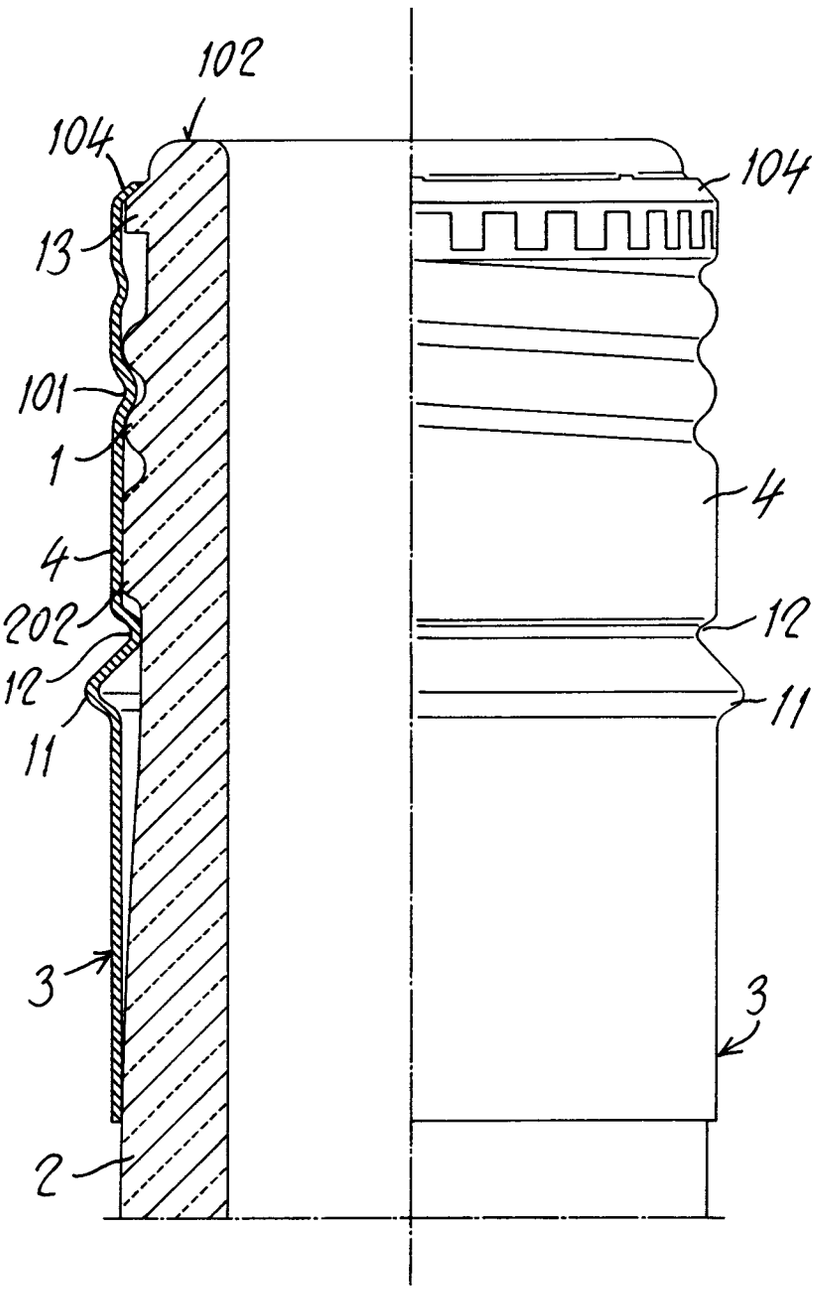

Fig. 10

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 10 4121

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A,D	US-A-2 151 826 (E.F.ANDERSEN) * column 1, line 50 - column 2, line 1; figures *	1	B65D41/62 B65D41/34
A	FR-A-2 358 330 (S.N.B.P.) * figures 2,4 *	1	
A	EP-A-0 493 301 (A.ARDUCA) * abstract; figures *	1	
A,P	EP-A-0 615 915 (D.MILHOMME) * figure 1 *	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	7 July 1995	Zanghi, A

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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O : non-written disclosure
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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

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