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(54) Title : SCREW CAP CLOSURE

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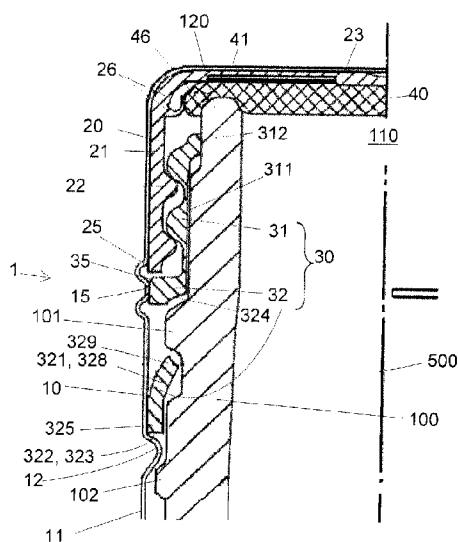


Figure 1

(57) Abstract : Composite cap (1) intended to be clipped onto the glassware rim (100) of a bottle then act as a closure that can be screwed on and unscrewed at will, the glassware rim being provided with at least one annular flange (101), it comprises: - a shell (10) with a skirt (11) provided with an internal annular flange (12); - a first insert (20), arranged on the inside of said shell, provided with an internal screw thread (22) a second insert (30) having two portions (31 and 32) that are cylindrical overall; - the first portion (31) being provided with a screw thread (311) that complements that of said first insert, - the second portion (32) being provided with means (321) of axial immobilization which are intended to collaborate with said annular flange (101) and with means (322) of axial abutment, collaborating with said internal annular flange (12), so that once the inserts have been screwed together they are trapped inside said shell.

(57) Abrégé : Capsule composite (1) destinée à être encliquetée sur la bague de verrerie (100) d'une bouteille puis à servir de bouchon vissable et dévissable à volonté, la bague de verrerie étant munie d'au moins un bourrelet annulaire (101). Elle comprend: - une coque (10) avec une jupe (11) munie d'un bourrelet annulaire interne (12); - un premier insert (20), disposé à l'intérieur de ladite coque, muni d'un file de vissage intérieur (22) un deuxième insert (30) présentant deux portions globalement cylindriques (31 et 32); - la première portion (31) étant munie d'un file de vissage (311) complémentaire de celui dudit premier insert, - la deuxième portion (32) étant munie de moyens d'immobilisation axiale (321) destinés à coopérer avec ledit bourrelet annulaire (101) et de moyens de butée axiale (322), coopérant avec ledit bourrelet annulaire interne (12), de telle sorte que les inserts solidarisés par vissage se trouvent piégés à l'intérieur de ladite coque.

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SCREW CAP

[0001] The invention concerns the field of caps and more especially screw caps intended to close receptacles, in particular glass bottles. The bottles concerned
5 contain in particular drinks, typically alcoholic drinks, such as wines, aperitifs, liqueurs or alcohols, the consumption of which is typically staged, which requires being able to close and open said bottles, possible a large number of times.

[0001a] A reference herein to a patent document or other matter which is given as
10 prior art is not to be taken as an admission that that document or matter was known or that the information it contains was part of the common general knowledge as at the priority date of any of the claims.

[0002] A large number of caps are already known. Some of these caps are made from
15 plastics material, as described in European patent EP 0 107 680. They are typically intended for closing plastic water bottles. Others, intended in particular for closing alcohol, aperitif and spirits bottles, such as the one described in the French patent application FR 2 763 046, comprise an insert made from plastics material, comprising an internal screw thread suited to the standard screw thread of collars of glass bottles
20 and fixed to the inside of a metal shell, the cylindrical skirt of which reveals no visible screw thread.

[0003] The patent EP 1 254 059 describes a cap suitable for closing wine bottles, also without any visible thread. It comprises a cap blank, typically a metal shell provided
25 with a head and a skirt, and an insert made from plastics material fixed to said blank and having a particularly thin skirt also comprising an internal screw thread suited to the standard screw thread of collars of glass bottles. This composite cap is supplied to the bottlers who, after filling the bottle, have to screw the assembly onto the glass collar of the bottle and then crimp the metal shell by effecting a restraint below the
30 bead.

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5 [0004] Such a solution does not appear to be completely satisfactory since the composite cap, as supplied to the bottlers, requires, after the filling of the content of the bottle and the placing of the cap on the glass ring, additional operations, such as screwing and crimping, which require the use of rotary tools which are not easy to move on a continuous-kinematics line, and which consequently reduce throughputs and make the bottling process more expensive.

10 [0005] The applicant has therefore attempted to find a satisfactory solution for supplying to bottlers a capping product that is at least as effective with regard to reversible stoppering and able to offer controlled sealing conditions and that does not require as many operations after filling of the bottle.

15 [0006] A first subject matter according to the invention is a composite cap which is to be fixed to the glass ring of a bottle and then to serve as a stopper which can be screwed and unscrewed as desired in order to close or open the distribution orifice of said bottle, said glass ring being provided with at least one annular protuberance, said composite cap comprising:

- a shell, typically made of metal, having a substantially cylindrical skirt, provided with an inner annular protuberance;
- 20 - a first insert, arranged inside said shell, rigidly connected to said shell, comprising a skirt provided with an inner screw thread,
- a second insert, in the general shape of a sleeve having at least two generally cylindrical portions;
- the first portion being provided on its external wall thereof with a screw thread
- 25 which is complementary to that of said first insert, so that said first insert and said second insert are in the form of an assembly rigidly connected by screwing, located inside said shell;
- the second portion being provided with axial immobilisation means which are to cooperate with said annular protuberance of said ring, and with axial stop
- 30 means, typically the lower end of said second portion, which cooperate with said inner annular protuberance so that said assembly which is rigidly connected by screwing is trapped inside said shell.

wherein said first portion of the second insert has a height such that, when said composite cap is rigidly connected in an irreversible manner to said glass ring, the upper end thereof is located beneath the level of the rim of the ring, and said first insert comprises a head which extends transversely with respect to said skirt, said cap
5 also comprising a seal places inside the first insert and having a diameter such that it remains trapped between said head of the first insert and the upper end of said first portion of the second insert.

[0007] The cap according to invention comprises two inserts:

- 10 - a first insert fulfilling the role described for example in EP 1 254 059: it makes the cap screwable and unscrewable after first opening while not revealing any external screw thread;
- a second insert, which is assembled on the first insert by screwing, so that the assembly thus formed can be introduced into the shell and trapped therein, by
15 virtue of the internal annular bead on said shell. Said internal annular bead corresponds typically, when the shell is metal, to the internal part of an annular groove produced by external application of a knurling tool on the cylindrical skirt.

[0008] Thus formed, the composite cap, provided with means of immobilisation with respect to the glass ring, can be simply pressed onto the neck of the bottle until said immobilisation means irreversibly secure the cap on the neck.

5

[0009] These immobilisation means comprise axial immobilisation means that act so that, when said composite cap is pressed by simple translation on said neck, a bead on the glass ring is trapped at the middle of said immobilisation means. Advantageously, these immobilisation means also comprise circumferential
10 immobilisation means (immobilisation with respect to rotation) so that, after first opening, said second insert, completely secured to the glass ring, serves as an attached screw thread. The circumferential immobilisation means are for example longitudinal ribs that extend on the internal wall of the first portion and/or the second portion of the second insert and cooperate with reliefs provided on the external
15 surface of the glass ring placed so that they serve as a stop for said ribs in rotation in both directions.

[0010] By convention, we describe the various parts of the cap by assuming that it is placed (or ready to be placed) on the glass ring of an upright bottle. Thus the terms
20 "upper", "above", etc. mean simply that the objects thus designated are closer to the dispensing orifice whereas the terms "lower", "below", etc. means simply that the objects thus designated are further away from the dispensing orifice of the bottle. Following this convention, the first insert is "above" the second insert, the first portion of which is an "upper" portion screwed into the first insert.

25

[0011] Advantageously, the cylindrical skirt of the shell has a circumferential easy-rupture line, situated below the first insert, close to the lower end of the skirt thereof, and preferably above the second portion of the second insert, so that the immobilisation means and the annular bead on the glass ring remain concealed even
30 after the first opening. At the time of the first opening, the top of the shell, which is secured to the first insert, is driven in rotation whereas the second insert remains locked with respect to rotation and is held axially while remaining secured to the bottom of the shell. By accentuating the rotation in the direction of unscrewing, the shell tears at the easy-rupture line and the composite capsule is transformed into two

separable parts: an upper part serving as a screwable and unscrewable cap and a lower part serving as a screw thread attached to the neck of the bottle.

[0012] Advantageously, the first insert and the second insert have external walls the
5 diameter of which are substantially similar so that the assembly secured by screwing has a cylindrical appearance overall, with an outside diameter preferably substantially equal to the inside diameter of the shell skirt. Advantageously, the transition between the first portion and the second portion of the second insert comprises a shoulder that extends typically as far as said outside diameter and serves as a stop for the screwing
10 of the second insert in the first insert.

[0013] Advantageously, the glass ring comprises a second annular bead intended to serve as an axial stop for the internal annular bead on the shell not only when the composite cap is pressed on the neck of the bottle but also after tearing of the easy
15 rupture line: the bottom part of the shell can thus remain at its original location whatever the friction conditions at the interface of the bottom part of the shell and the external cylindrical wall of the second portion of the second insert. The risk that it may "fall" as far as the bottom of the neck of the bottle, revealing the means of immobilisation of the bead and the second insert, is thus prevented.

20

[0014] Advantageously, said composite cap also comprises an attached seal. For example, the first insert comprises a head that extends transversely to said skirt and said attached seal is placed inside the first insert, having a diameter such that it remains trapped between said head and the upper end of the first portion of the
25 second insert.

[0015] Preferably, said first portion of the second insert has a height such that, when said composite cap is irreversibly secured to said glass ring, its upper end is situated below the level of the rim of the ring, also referred to as the "ring top". In this way,
30 when said composite cap is placed on the glass ring, an annular bearing zone, close to the periphery of said seal, comes into contact with the top of the ring and, after irreversible securing of the composite cap on the neck, said annular bearing zone is compressed between the head of the insert and said ring top.

[0016] Advantageously, said seal comprises a resilient layer. It is typically a layer made from an expanded polymeric material such as expanded polyethylene, the thickness of which is greater than 1 mm. Preferably, this layer is thicker than the resilient layer of the seals used in conventional caps: under the normal geometric
5 conditions of the bottles concerned (dispensing orifice with a diameter typically between 18 and 25 mm), it is greater than 2 mm, or even greater than or equal to 2.5 mm. By virtue of this particular thickness, said resilient layer can, apart from its specific function in a seal, fulfil two other functions associated firstly with the spring effect that it can exert at the end of pressing on when the composite cap is fixed on
10 the glass ring (see [0020]) and secondly with its suitability for compensating for the axial plays due to the addition of the separations found between the actual dimensions of the manufactured parts and their nominal values. This thick resilient layer may in fact fulfil a beneficial role in the compensation for the total of the axial dimensional plays related to the conditions of manufacture of the glass ring and those related to
15 the manufacturing conditions of the various parts of the composite cap.

[0017] Advantageously, said first insert has radial compression means, as described in the patent EP 1 638 853, which, without the formation of a fold, presses the periphery of said seal on the periphery of the upper end of the glass ring, the latter including the
20 peripheral edge of the rim and a substantially cylindrical portion of the ring.

[0018] The applicant has also found that, when the first portion of the second insert has an upper end below the level of the top of the ring, and when it is provided with an attached seal as described above and coming into abutment directly on the top of the
25 ring, the composite cap according to the invention guarantees a seal superior to those of other systems clipped onto a glass ring, because the seal bears directly on the glass rim rather than on a plastic part, which confers on it better reliability over time.

[0019] The cap according to the invention is intended to be mounted on a specific
30 glass ring, with no screw thread but having at least one axial immobilisation means, such as an annular bead, continuous or not, intended to cooperate with the axial immobilisation means of the second insert, and circumferential immobilisation means intended to cooperate with those of the second insert in order to lock the latter with respect to rotation. The design of the various elements of the composite cap must be

adapted to a realistic geometry of the neck of the bottle. In particular, the dimensions of said second insert must be defined so that the dimensional tolerances in industrial manufacture of said second insert are compatible with the dimensional tolerances in industrial manufacture of said glass ring.

5

[0020] In a preferred embodiment, the second portion of the second insert comprises a lower end annulus and an upper end annulus connected together by longitudinal bridges. Between these longitudinal bridges there extend flexible annular blades attached to said lower end annulus, oriented upwards and, at rest, inclined towards
10 the longitudinal axis, so that the ends of said blades are situated on a circle the diameter of which is less than the outside diameter of the annular bead on the glass ring. When the composite cap is pressed on the neck, said flexible blades flex towards the outside when they come into contact with said annular bead on the glass ring and then return abruptly to their position at rest when they have gone beyond said
15 bead, which prevents any withdrawal movement, that is to say any movement in the direction opposite to the pressing on of the cap, the ends of said flexible blades being situated almost immediately in abutment against said annular bead.

[0021] Said upper end annulus is advantageously provided with a lower wall that forms
20 a shoulder while extending as far as a diameter less than that of the annular bead on the glass ring. This lower wall completes the trapping of said bead by preventing the continuation of the pressing of said cap on said ring.

[0022] The resilient layer of the seal can be used to effect a pressing on beyond the
25 theoretical dimension corresponding to the release of the ends of the flexible blades. This additional pressing on, typically of around 0.5 mm, makes it possible, because of the manufacturing dimensional tolerances of the glass ring and the various parts of the composite cap, to be sure that the flexible blades will indeed release at the end of pressing on, that is to say their ends are actually situated on a circle with a diameter
30 substantially less than that of the annular bead on the ring. When the pressing-on force is stopped, the spring effect of the resilient layer drives the whole of the composite cap upwards and the ends of the flexible blades arrive in abutment against said annular bead.

[0023] Advantageously, said glass ring comprises a second annular bead also serving as a stop for the pressing on when it cooperates with the internal annular bead on the shell.

5 [0024] The major advantage of the invention lies in the fact that, after filling of the bottle, it is no longer necessary to screw the composite cap on the ring and then crimp it: it suffices to press it onto the neck until it is trapped. The simplicity of this movement makes it possible to increase production rates with bottling machines functioning in simplified continuous kinematics.

10

[0025] Another subject matter of the invention is a glass ring occupying the top of the neck of a bottle and intended to accept a composite cap according to the invention, characterised in that it comprises an annular bead situated at a distance from the top rim but level with said first portion of said second insert as well as circumferential
15 immobilisation means cooperating with the circumferential immobilisation means of said second insert. It is a case for example of reliefs cooperating with longitudinal internal ribs attached to the internal wall of said second insert.

[0026] The glass ring according to the invention is associated with the composite cap
20 according to the invention. This is a novel glass ring, different from those used in the prior art (cf. FR 2 763 046 and EP 1 254 059 for example), since it is devoid of any screw thread but comprises a special annular bead and circumferential immobilisation means the position and dimensions of which are specifically adapted to said composite cap, so that said second insert, once fixed on said glass ring after snapping
25 on by simple pressing of said composite cap onto said glass ring, becomes an attached screw thread perfectly secured to said glass ring.

[0027] Advantageously said glass ring comprises a second annular bead serving as a stop for the pressing on of said composite cap.

30

[0028] Another subject matter of the invention is a bottle intended for the staged consumption of wines, aperitifs, liqueurs, alcohols or alcoholic drinks, characterised in that its neck is provided with a glass ring according to the invention and in that it is provided with a composite cap according to the invention.

[0029] Another subject matter of the invention is a method for capping a bottle intended for the staged consumption of wines, aperitifs, liqueurs, alcohols or alcoholic drinks, characterised in that

- 5 a) bottles provided with a glass ring according to the invention are obtained;
- b) they are filled with the liquid that said bottles are to contain;
- c) composite caps according to the invention are obtained and are fixed to the glass ring of said bottles by simple axial translation.

10 [0030] Figure 1 illustrates in diametral half-section the upper end of a bottle capped with a particular embodiment of the invention.

[0031] Figure 2 illustrates in perspective the second insert of the composite cap shown in figure 1.

15

PARTICULAR EMBODIMENTS OF THE INVENTION

EXAMPLE 1:

[0032] Figures 1 and 2 below illustrate a preferred embodiment of the invention,
20 dedicated to the stoppering of wine bottles.

[0033] The composite cap (1) comprises a metal shell (10) having a cylindrical skirt (11) provided with an internal annular bead (12). It also comprises two inserts (20 and 30) screwed together and introduced inside the shell (10).

25

[0034] The first insert (20) makes the cap screwable and unscrewable after first opening while not revealing any external screw thread. The second insert (30) is assembled on the first insert by screwing, so that the assembly thus formed can be introduced into the shell and then trapped therein by means of the internal annular
30 bead (12). The internal annular bead (12) corresponds to the internal part of an annular groove produced by external application of a knurling tool to the cylindrical skirt.

[0035] The second insert (30) has two roughly cylindrical portions: a first portion (31) provided on its external wall with a screw thread (311) complementary to that of said first insert, and a second portion (32) provided with axial immobilisation means (321) intended to cooperate with the annular bead (101) on the glass rim (100). The lower
5 end (323) of the second portion (32) cooperates with the internal annular bead (12) on the shell (10), so that the set of screwed inserts (20 + 30) is trapped inside the shell.

[0036] The second portion (32) of the second insert (30) comprises a lower end annulus (325) and an upper end annulus (326) connected together by longitudinal
10 bridges (327). Between these longitudinal bridges there extend flexible annular blades (328) attached to said lower end annulus, oriented upwards and, at rest, inclined towards the longitudinal axis (500), so that the ends (329) of said blades are situated on a circle the diameter of which is less than the outside diameter of the annular bead (101) of the glass ring (100).

15

[0037] When the composite capsule is pushed onto the neck, the flexible blades (328) flex outwards when they come into contact with the annular bead (101) on the glass ring and then return abruptly to their idle position when they have passed beyond said bead, which prevents any withdrawal movement.

20

[0038] The upper end annulus (326) is provide with a bottom wall (324) that forms a shoulder forming an axial stop for the annular bead (101) on the glass ring.

[0039] The second insert (30) also comprises longitudinal ribs (313) that extend on the
25 internal wall of the first portion (31) and cooperate with reliefs formed on the external surface of the glass ring.

[0040] The cylindrical skirt (11) of the shell (10) has a circumferential easy-rupture line (12), situated below the first insert (20), close to the bottom end (25) of the skirt (21)
30 thereof, and above the second portion (32) of the second insert (30), so that the flexible blades (328) and the annular bead (101) remain concealed even after the first opening.

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5 [0041] The first insert (20) and the second insert (30) have substantially cylindrical external walls the diameters of which are substantially equal to the inside diameter of the skirt (11) of the shell (10). The transition between the first portion (31) and the second portion (32) of the second insert (30) comprises a shoulder (35) that serves as a stop for the screwing of the second insert in the first insert.

10 [0042] The composite cap also comprises an attached seal (40) placed inside the first insert (20). Its diameter is such that it remains trapped between the head (23) of the first insert and the upper end (312) of the first portion (31) of the second insert (30). When the composite cap is placed on the glass ring, an angular abutment zone (41), close to the periphery (46) of the seal (40), comes into contact with the rim (120), also referred to as the "ring top", so that, when the composite cap is pressed onto the neck after bottling, the annular abutment zone (41) is compressed between the head of the insert (23) and the rim (120).

15 [0043] The seal comprises a resilient layer of expanded polyethylene. In the context of this example, the thickness of the resilient layer is 2.5 mm. The first insert (20) has radial compression means, here a double flexible tongue (26), which, without the formation of a fold, press the periphery (46) of the seal (40) on the periphery of the upper end of the glass ring, the latter including the peripheral edge of the rim and a substantially cylindrical portion of the ring.

25 [0044] The glass ring (100) associated with said composite cap (1) has no screw thread but has a continuous annular bead (101) intended to cooperate with the flexible annular blades (328) of the second insert (32), and reliefs (not shown) intended to cooperate with the longitudinal ribs (313) of the second insert (30) in order to lock the latter with respect to rotation. The glass ring also comprises a second annular bead (102) intended to serve as an axial slot for the internal annular bead (12) on the shell.

30 [0045] Throughout the description and claims of the specification, the word "comprise" and variations of the word, such as "comprising" and "comprises", is not intended to exclude other additives, components, integers or steps.

The claims defining the invention are as follows:

1. A composite cap which is to be fixed to the glass ring of a bottle and then to serve as a stopper which can be screwed and unscrewed as desired in order to close or open the distribution orifice of said bottle, said glass ring being provided with at least one annular protuberance, said composite cap comprising:
- a shell , typically made of metal, having a substantially cylindrical skirt, provided with an internal annular protuberance;
 - a first insert, arranged inside said shell, rigidly connected to said shell, comprising a skirt provided with an inner screw thread,
 - a second insert, in the general shape of a sleeve having at least two generally cylindrical portions;
 - the first portion being provided on its external wall thereof with a screw thread which is complementary to that of said first insert, so that said first insert and said second insert are in the form of an assembly rigidly connected by screwing, located inside said shell;
 - the second portion being provided with axial immobilisation means which are to cooperate with said annular protuberance of said ring and with axial stop means, typically the lower end of said second portion, which cooperate with said inner annular protuberance, so that said assembly which is rigidly connected by screwing is trapped inside said shell,
- wherein said first portion of the second insert has a height such that, when said composite cap is rigidly connected in an irreversible manner to said glass ring, the upper end thereof is located beneath the level of the rim of the ring, and said first insert comprises a head which extends transversely with respect to said skirt, said cap also comprising a seal places inside the first insert and having a diameter such that it remains trapped between said head of the first insert and the upper end of said first portion of the second insert.
2. A composite cap according to claim 1, wherein said second insert is also provided with circumferential immobilisation means cooperate with circumferential immobilisation means formed on said glass ring.

3. A composite cap according to claim 1 or 2, wherein the skirt of the shell has a circumferential break line located beneath said first insert, close to the lower end of the skirt thereof, and above the second portion of the second insert.
- 5 4. A composite cap according to any one of claims 1 to 3, wherein the first insert and the second insert have cylindrical external walls of which the diameters are substantially the same, so that the assembly which is rigidly connected by screwing has a generally cylindrical appearance, with an external diameter which is substantially equal to the internal diameter of the skirt of said shell.
- 10 5. A composite cap according to claim 4, wherein the transition between the first portion and the second portion of the second insert comprises a shoulder which serves as a stop for the screwing of said second insert in said first insert.
- 15 6. A composite cap according to any one of claims 1 to 5, wherein said first portion of the second insert has a height such that, when said composite cap is rigidly connected in an irreversible manner to said glass ring, the upper end thereof is located beneath the level of the top so that, when said composite cap is placed on the glass ring, an annular bearing region close to the periphery of said seal comes into contact with the ring top and, after the composite cap has been rigidly connected in an irreversible manner to the neck, said annular bearing region is compressed between the head of the insert and said ring top.
- 20 7. A composite cap according to claim 6, wherein said seal comprises a resilient layer, the thickness of which is greater than 2 mm.
- 25 8. A composite cap according to claim 7, wherein the thickness of the resilient layer is greater than or equal to 2.5 mm.
- 30 9. A composite cap according to claims 7 or 8 wherein the resilient layer is a layer of an expanded polymer material.

10. A composite cap according to any one of claims 6 to 9, wherein said first insert has radial compression means which allow the periphery of said seal to be flattened against the periphery of the upper end of the glass ring without a crease being formed.
5
11. A composite cap according to any one of claims 1 to 10, wherein said second portion comprises a lower end ring and an upper end ring which are inter by longitudinal bridges elements between which there extend flexible annular strips which are attached to said lower end ring, are oriented upwards and, at rest, are inclined towards the longitudinal axis so that the ends of said strips are located on a circle of which the diameter is smaller than the external diameter of the annular protuberance on the glass ring.
10
12. A composite cap according to claim 11, wherein said upper end ring is provided with a lower wall which forms a shoulder by extending to a diameter which is smaller than the diameter of the annular protuberance of the glass ring.
15
13. A glass ring located at the top of the neck of a bottle and associated with a composite cap according to any one of claims 1 to 12, comprising an annular protuberance located at a distance from the upper rim at a height of said first portion of said second insert, as well as circumferential immobilisation means cooperate with the circumferential immobilisation means of said second insert.
20
14. A glass ring according to claim 13, comprising a second annular protuberance which serves as a stop for the insertion of said composite cap.
25
15. A bottle for drinks, typically alcoholic drinks such as wines, aperitifs, liqueurs and spirits, which are consumed in stages, wherein the neck thereof is provided with a glass ring according to either claim 13 or claim 14 and wherein the bottle is provided with a composite cap according to any one of claims 1 to 12.
30

- 5
16. A method of capping a bottle for drinks, typically alcoholic drinks such as wines, aperitifs, liqueurs and spirits, which are consumed in stages, wherein
- a) bottles provided with a glass ring according to either claim 13 or claim 14 are obtained;
 - b) the bottles are filled with said drink;
 - c) composite caps according to any one of claims 1 to 12 are obtained and are fixed to the glass ring of said bottles by simple axial translation.

- 1 / 1 -

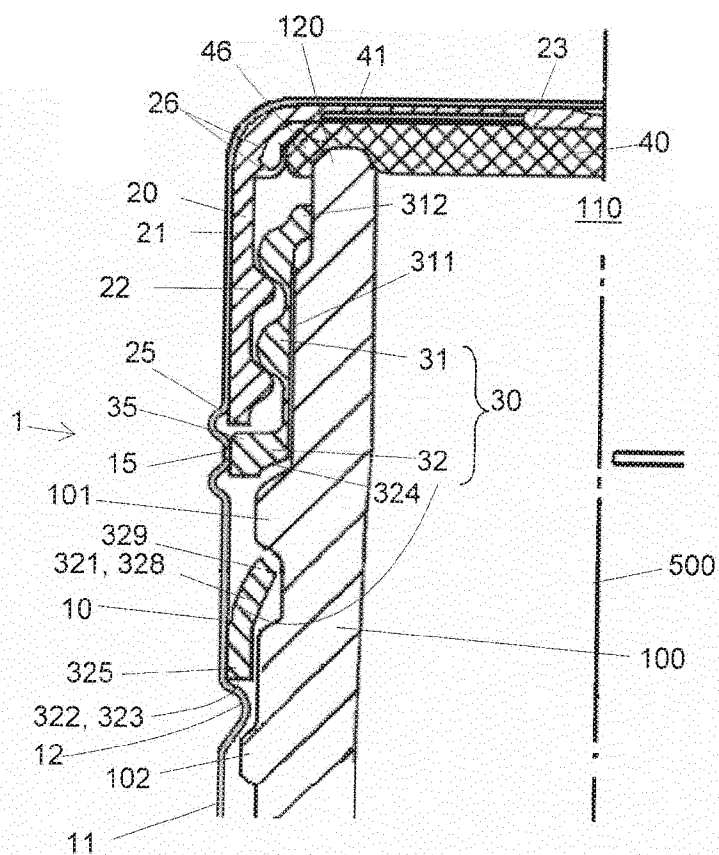


Figure 1

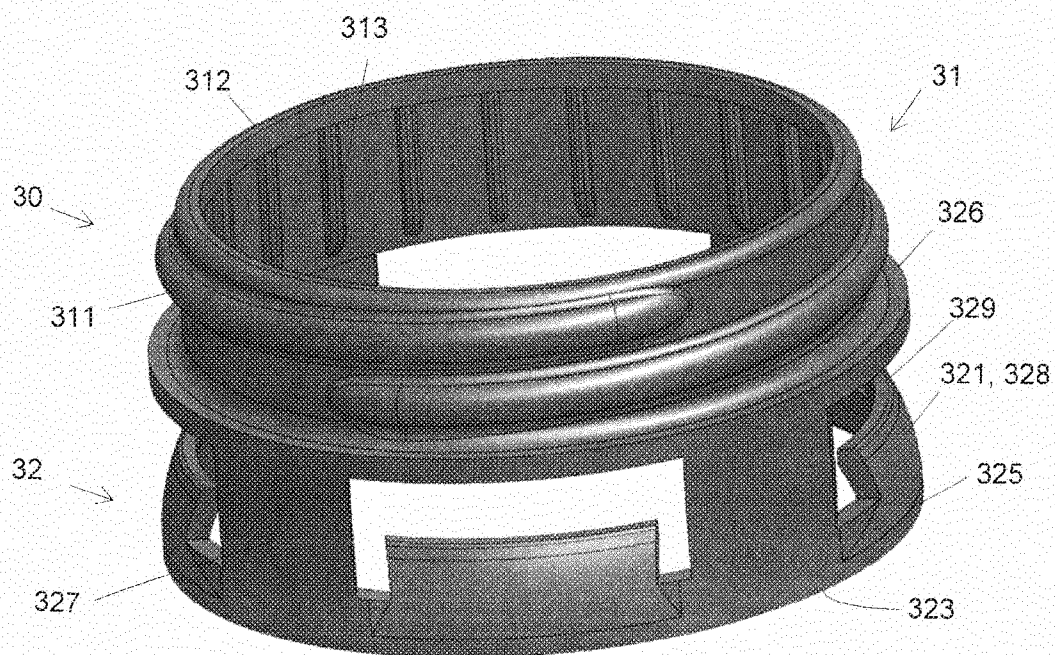


Figure 2