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(54) **CLOSURE CAP**

VERSCHLUSSKAPPE

BOUCHON DE FERMETURE

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(56) References cited:  
**WO-A-97/33799 US-A- 4 565 295**

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## Description

**[0001]** The present invention concerns a closure cap, which is suitable for use with returnable containers. Such containers are returned by the consumer when empty and are then washed and refilled. The invention particularly concerns a closure cap having the features of the preamble of claim 1. Such a closure is known from US 4 565 295 A.

**[0002]** Closure caps often include a mechanical guarantee band, which is used to indicate the intactness of containers closed with the closure. These guarantee bands are mounted on the lower edge of a closure cap by means of frangible bridges and co-operate with retaining means on the outside of a container. When the closure is unscrewed from the container for the first time, the frangible bridges tear and the guarantee band is at least partly separated from the closure cap. A detached guarantee band indicates that the container has already been opened. In the case of single use containers, most closure caps have a guarantee band, which is completely separated from the cap after opening and remains on the container neck when the closure is removed. The use of such guarantee bands with refillable returnable bottles is not possible. With such containers care must be taken that the guarantee band is removed with the closure cap when it is removed from the container. For this reason, the guarantee bands of closure caps, which are used with returnable containers, are preferably firmly joined to the closure cap at a root place. An axial breaking line is provided adjacent to the root place so that upon first opening of the container, the axial breaking line breaks at the same time as the frangible bridges, forming a pigtail which remains attached to the closure cap at the root place.

**[0003]** A disadvantage of such known arrangements is that when the guarantee band is no longer completely joined to the closure cap, the pigtail no longer lies flat against the bottle neck, but juts outwards. Such projecting pigtails are detrimental, above all during the washing and refilling processes inherent with returnable containers.

**[0004]** More often than not, returnable containers are returned in beverage cases and are removed from these cases (so-called decasing) by a gripper (decaser). During this process, there is the problem of the decaser, gripping the closure cap from above in the axial direction, and getting hooked up with the tamper-indicating band, which can lead to breakdowns. Guarantee bands are formed with a relatively high strength, so that they are torn reliably and do not stretch in the radial direction upon first removal of the closure cap from a container. Due to this strength, the guarantee band cannot move out of the way during the lowering of the decaser.

**[0005]** From WO97/33799 it is known to provide a guarantee band with hinges which operate in a radial direction, in order to avoid containers standing side by side from getting mutually hooked by the outwardly pro-

jecting pigtails. This increase in flexibility of the guarantee bands in the radial direction does indeed prevent problems in processing plants, where containers are often arranged side by side. However, the problem described above, which occurs with grippers for decasing, is not solved sufficiently by this arrangement.

**[0006]** Therefore, one aim of the invention is to avoid the disadvantages of the known closure caps described above. Thus, in particular, one aim of the invention is to produce a closure cap for closing a refillable container, which allows largely problem-free automatic removal of the containers from beverage cases even in the event of the containers having closures with guarantee bands jutting out sideways.

**[0007]** According to the invention, this aim is solved by a closure cap having the features of the characterising portion of Claim 1.

**[0008]** The closure cap according to the invention essentially consists of a crown, with a roughly cylindrical skirt depending from the outer edge of the crown. A guarantee band is connected to the lower edge of the skirt via frangible bridges. The closure is formed as a so-called pigtail closure. This means that the guarantee band is firmly joined to the lower edge of the skirt in at least one root place and that, viewed in the peripheral direction, is provided with an axial breaking line next to the root place. This arrangement of a root place and an axial breaking line results in the guarantee band not being completely separated from the closure cap upon first opening, but remaining firmly joined to the latter, forming a pigtail. Such pigtail closures are therefore particularly suitable for use on refillable containers.

**[0009]** According to the present invention, the guarantee band is provided with at least one hinge means. Looking at the closure cap in the peripheral direction, the hinge means is located on the opposite side of the root place to the axial breaking line and is arranged to allow the pigtail to be bent in an axial direction.

**[0010]** Thus, should the pigtails from adjacent bottles become hooked together, one bottle can be lifted by a gripper, from a case or from a conveyor belt for example, without pulling over the other hooked up bottle or bottles. The flexibility of the pigtails in an axial direction ensures that at least one of the pigtails can move out of the way as the bottle is lifted.

**[0011]** Advantageously, the hinge means may be arranged to allow the projecting part of the guarantee band to be folded downward, away from the closure cap, when a decaser for the removal of the container from the beverage case is moved over the closure cap and hits the projecting guarantee band.

**[0012]** The hinge means may be provided by a weakened zone, which acts as a hinge allowing the pigtail to be folded in the axial direction.

**[0013]** Advantageously, the weakened zone is arranged on the upper side of the guarantee band, facing the cap skirt. This arrangement allows a particularly simple construction. Due the zone of weakening, the guar-

antee band can expand particularly easily in the region of its upper edge, while the unweakened, lower part of the guarantee band acts as a hinge.

**[0014]** In a preferred embodiment of the invention, the weakened zone is formed as a recess on the side of the tamper indicating band facing the cap skirt. The recess preferably extends over a height, which corresponds to about one third to one half of the height of the guarantee band.

**[0015]** It is sufficient to form the weakened zone as a slit in the guarantee band running more or less axially. However, it has turned out that a roughly U-shaped recess is particularly advantageous for technical production reasons. It is also possible to form the weakened zone by locally reducing the wall thickness of the guarantee band.

**[0016]** In an alternative embodiment of the invention, rather than providing a weakened zone in the guarantee band, the band is locally thickened around the root place. This makes the band stiffer and more rigid around its firm connection with the cap. The edge of the thickened zone, on the opposite side of the root place to the axial breaking line, is slanted (i.e. the thickened zone tapers). This slanted edge forms a preferential folding line for the pigtail due to the transition between the stiff thickened zone and the thinner adjacent portion of the guarantee band, thereby providing the hinge means.

**[0017]** This arrangement has the advantage that formation of the hinge means does not require a cutting operation and the provision of a thickened zone around the root place is relatively easy to mould.

**[0018]** Preferably, the slanted edge of the thickened zone is arranged at about 45° to the axis of the cap, as this allows the pigtail to be bent perpendicular to the closure in the axial direction. The thickened zone may taper towards the upper edge or lower edge of the guarantee band, depending upon whether it is desired for the pigtail to fold axially towards or away from the remainder of the closure cap respectively.

**[0019]** Of course, as is well-known, several root places and axial breaking lines may also be provided. Moreover, a single or even several hinge means may be provided corresponding to each root place.

**[0020]** The hinge means according to the invention is particularly advantageous in combination with retaining elements on the inside of the guarantee band, which are formed as tongues projecting inwards and upwards and hinged on the guarantee band. Guarantee bands with such retaining elements are known, for example, from WO94/14673, from WO96/24532 or WO98/22361. Such arrangements give the guarantee band a particularly high rigidity in the radial direction. This is desirable, in order to avoid the guarantee band inadvertently slipping over the retaining bead on the container neck on opening the closure for the first time. With such guarantee bands the improved flexibility in the axial direction achieved with the hinge means according to the invention is particularly advantageous.

**[0021]** Where the guarantee band is provided with such retaining tongues and the hinge means is provided by a weakened zone, it will be appreciated that for geometrical reasons, it is preferable to arrange the weakened zone on the side of the guarantee band, facing the cap skirt, thereby allowing the guarantee band to be bent axially away from the closure cap. Conversely, where the hinge means is provided by a thicker zone around the root portion of the guarantee band, it is preferable for the thickened zone to taper towards the side of the guarantee band facing the cap skirt, thereby allowing the guarantee band to bend axially towards the closure cap.

**[0022]** The hinge means is preferably arranged between the root place and the first frangible bridge (looking at the closure cap in the peripheral direction). This ensures that the whole of the projecting part of the guarantee band can be turned in an axial direction. Additional hinge means may also be arranged in between two adjoining frangible bridges. As long as the frangible bridge is not broken (i.e. particularly in the lowering process), the effect of the hinge means is hardly discernible. The frangible bridges hold the guarantee band in the desired position. However, as soon as the frangible bridges are torn, the guarantee band can be easily bend in an axial direction on account of the hinge means.

**[0023]** The invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 shows a side view of a closure cap according to the invention, having a v-shaped weakened zone,

Figure 2 shows the closure cap of Figure 1 with the guarantee band partly torn off,

Figure 3 shows a perspective view of a closure cap of Figures 1 and 2, with the guarantee band sticking out sideways,

Figures 4a to 4d show different embodiments of the weakened zone according to the invention,

Figure 5 shows a cross section through a guarantee band having a retaining tongue.

Figure 6 shows a side view of a closure cap according to an alternative embodiment of the invention, having a thickened area around the firm connection of the guarantee band to the closure,

Figure 7 shows the closure cap of Figure 6 with the guarantee band partly torn off,

**[0024]** Referring to Figure 1, a closure cap 1, consists essentially of a crown 2 and a roughly cylindrical skirt 4 depending from the outer edge 3 of the crown 2. A guarantee band 5 is fixed on the lower edge 7 of the skirt 4 via frangible bridges 6 and a firm root place 8. On the opening of the closure cap 1 for the first time, the guarantee band 5 is separated from the skirt 4 in the region of the frangible bridges 6 and remains joined to the skirt

4 at the root place 8. An axial breaking line 9 is provided on one side of the root place 8, which likewise breaks upon removal of the closure for the first time.

**[0025]** A large number of weakened zones 11 are arranged on the top 10 of the guarantee band 5. A first weakened zone 11 - looking at the closure in the peripheral direction - is arranged on the opposite side 12 of the root place 8 to the axial breaking line 9. Further weakened zones 11 are distributed uniformly around the circumference of the guarantee band 5. Multiple weakened zones 11 improve the flexibility of the guarantee band 5, but are optional.

**[0026]** The weakened zones shown in Figure 1 are formed as roughly U-shaped recesses 20. The recess 20 extends over a height h, which corresponds to about one third to one half of the height H of the guarantee band 5.

**[0027]** Figure 2 shows the closure cap of Figure 1 with guarantee band 5 torn off. Like components have been indicated using the same reference numerals as those used in Figure 1.

**[0028]** At a force F acting from above in the axial direction (for example through the gripper of a decaser), the guarantee band 5 is bent downwards around the weakened zone 11, which acts as hinge. Thus, the gripper of the decaser can easily reach over the closure on to a bottle and seize the bottle.

**[0029]** Moreover, the weakened zones 11 also improve the flexibility of the guarantee band in a plane perpendicular to the axial direction of the closure cap 1. Therefore, hooking up of outwardly projecting, partially torn off guarantee bands (for example, in the case of bottles standing side by side on a conveyor belt) is likewise avoided.

**[0030]** Figure 3 shows a perspective representation a closure cap 1 according to the invention. The torn-off guarantee band 5 remains firmly joined to the skirt 4 via the root place 8, when the closure cap 1 is opened for the first time. The strength of the root place 8 is such that, in normal use, the guarantee band is not torn off. Of course, it is possible to remove the guarantee band 5 by applying increased force.

**[0031]** The torn-off part of the guarantee band 5 sticks out sideways like a pigtail 14. Thanks to the zones of weakness 11, the pigtail 14 can be pressed downwards into the position 14', as represented by dashed lines.

**[0032]** Figures 4a to 4d show different configurations of the weakened zone 11 of the invention.

**[0033]** In Figure 4a, the weakened zone is formed as a U-shaped recess 20.

**[0034]** In Figure 4b, the weakened zone is formed as a material thinning in a region 21. The material thinning can be arranged on the inside or the outside surface of the guarantee band 5.

**[0035]** According to Figure 4c, the weakened zone is formed as a slit 22, which extends downwards from the upper edge of the guarantee band 5.

**[0036]** In Figure 4d, a zone of weakness is shown in

the form of a recess 23, which is arranged on the lower edge of the guarantee band 5. The recess 23 widens towards the free edge of the guarantee band 5 and creates sufficient room in the guarantee band, for the pigtail 14 (see Figure 3) to be folded axially away from the closure cap. Alternately, the recess 23 may operate in a similar way to that shown in Figure 2 allowing the guarantee band to bend axially towards the closure cap.

**[0037]** Figure 5 is a schematic representation of a guarantee band with a hinged retaining tongue 13 projecting inwards and upwards. The tongue 13 serves for gripping under a bead on a container neck (not shown).

**[0038]** Figures 6 and 7 show an alternative embodiment of the invention to that shown in Figures 1 and 2, but again like components have been given the same reference numerals.

**[0039]** As previously described, the closure cap 1 comprises a crown 2 with a depending skirt 4 and guarantee band 5. The guarantee band 5 is connected to the skirt 5 via frangible bridges 6 and a firmly connected root place 8. An axial breaking line 9 is formed in the guarantee band 5 on one side of the root place 8. The region of the guarantee band directly around the root place 8 is thicker than the remainder of the guarantee band 5 and this thickened zone 15 has a slanted edge 16 on the opposite side of the root place 8 to the axial breaking line 9 (looking in a peripheral direction). The thickened zone 15 tapers towards the edge of the guarantee band 5 facing the closure skirt 4. Due to the transition in stiffness between the thickened zone 15 and the remainder of the guarantee band 5, the slanted edge of the thickened zone 15 acts as a preferential folding line 16, providing a hinge which allows the guarantee band 5 to fold axially towards the closure cap 1, once it has been partially detached from the cap, on first opening.

**[0040]** Although the thickened zone 15 is depicted tapering towards the edge of the guarantee band 5 facing the closure skirt 6, it will be obvious that the slanted edge 16 could be reversed, so that the thickened zone 15 tapers towards the free edge of the guarantee band 5. In this arrangement, the preferential folding line 16 will allow the guarantee band 5 to fold axially away from the closure cap 1. Where the closure cap 1 is provided with a hinged retaining tongue 13 (as shown in Figure 5), the thickened zone 15 preferably tapers towards the side of the guarantee band 5 facing the closure skirt 4 (as shown in Figures 6 and 7), because this arrangement is simpler to manufacture due to geometrical considerations.

**[0041]** The closure cap may be produced from a plastics material e.g. polyethylene, by normal injection moulding processes, well-known to the man skilled in the art. Moreover, the closure cap is also provided with conventional elements, such as threads or snap beads, for fixing the closure on a container neck, sealing means (using an inserted liner or sealing lips) and retaining elements (tongues or beads) on the guarantee band. The frangible bridges 6, the root place 8 and the axial break-

ing line 9 can be produced by cutting or in the plastics moulding process. The same applies to the recesses 20, 23 and the cut 22, which can likewise be produced in the plastics moulding process or in a secondary cutting process

### Claims

1. A closure cap (1) comprising  
a crown (2), with a substantially cylindrical skirt (4) depending from the periphery (3) of the crown (2), and  
a guarantee band (5), joined to the lower edge (7) of the skirt (4) via frangible bridges (6) and firmly connected to the lower edge (7) of the skirt (4) in at least one root place (8),  
the guarantee band having at least one axial breaking line (9) located adjacent only one side of the root place (8), **characterised in that**  
the guarantee band (5) has at least one feature (11, 16) located on the opposite side of the root place (8) to the axial breaking line (9), the feature (11, 16) is formed in such a way that it allows the guarantee band (5) to be bent in an axial direction.
2. A closure cap according to claim 1, wherein the feature (11, 16) is provided by a weakened zone (11).
3. A closure cap according to claim 2, wherein the weakened zone (11) is formed by a recess (20, 23) on the upper edge (10) or lower edge (5) of the guarantee band (5).
4. A closure cap according to claim 3, wherein the recess (20, 23) extends over a height (h), which corresponds to about one third to one half of the height (H) of the guarantee band.
5. A closure cap according to claim 3 or claim 4, wherein the recess (20, 23) is substantially U or V shaped.
6. A closure cap according to claim 2, wherein the weakened zone (11) is formed by an area of material thinning (21).
7. A closure cap according to claim 1, wherein the portion of the guarantee band adjacent to the root place (8) is locally thicker than the remainder of the guarantee band (5) and this thickened portion (15) has a slanted edge on the opposite side of the root place (8) to the axial breaking line (9), the slanted edge defining a preferential fold line (16) which acts as the feature (11, 16).
8. A closure cap according to claim 7, wherein the preferential fold line (16) is slanted at about 45° to

the axial direction of the closure.

9. A closure cap according to any one of the preceding claims, wherein the feature (11, 16) is arranged between the root place (8) and the first adjacent frangible bridge (6).
10. A closure cap according to claim 8, comprising a plurality of features (11, 16), the first feature (11, 16) arranged between the root place (8) and the first adjacent frangible bridge (6) and subsequent features (11, 16) arranged between every two adjacent frangible bridges (6).

### Patentansprüche

1. Verschlusskappe (1) mit einer Krone (2), von deren Umfang (3) sich ein im wesentlichen zylindrischer Mantel (4) abwärts erstreckt, und mit einem Garantiestreifen (5), der über zerbrechbare Brückenabschnitte (6) und über wenigstens einen Wurzelabschnitt (8) fest mit der unteren Kante (7) des Mantels (4) in Verbindung steht, wobei der Garantiestreifen wenigstens eine axiale Bruchlinie (9) aufweist, die in der Nähe zu lediglich einer Seite des Wurzelabschnitts (8) angeordnet ist, **dadurch gekennzeichnet, dass** der Garantiestreifen (5) wenigstens ein Merkmal (11, 16) aufweist, welches sich auf der der axialen Bruchlinie (9) gegenüberliegenden Seite des Wurzelabschnitts (8) befindet und welches dahingehend ausgestaltet ist, der Garantiestreifen (5) in axialer Richtung gebogen werden kann.
2. Verschlusskappe nach Anspruch 1, wobei das Merkmal durch eine geschwächte Zone (11) gebildet ist.
3. Verschlusskappe nach Anspruch 2, wobei die geschwächte Zone (11) durch eine Ausnehmung (20, 23) an der oberen Kante (10) oder der unteren Kante (5) des Garantiestreifens (5) gebildet ist.
4. Verschlusskappe nach Anspruch 3, wobei sich die Ausnehmung (20, 23) über eine Höhe (h) erstreckt, welche ungefähr einem Drittel bis einer Hälfte der Höhe (H) des Garantiestreifens entspricht.
5. Verschlusskappe nach Anspruch 3 oder 4 wobei die Ausnehmung (20, 23) im wesentlichen U-förmig oder V-förmig gestaltet ist.
6. Verschlusskappe nach Anspruch 2, wobei die geschwächte Zone (11) durch einen werkstofflich ausgedünnten Bereich (21) gebildet ist.
7. Verschlusskappe nach Anspruch 1, wobei der Teil

des Garantiestreifens, der dem Wurzelabschnitt (8) benachbart ist, örtlich dicker als der Rest des Garantiestreifens (5) ausgestaltet ist und dass dieser verdickte Abschnitt (15) auf der der axialen Bruchlinie gegenüberliegenden Seite des Wurzelabschnitts (8) eine schräge Kante aufweist, wobei diese schräge Kante eine bevorzugte Faltungslinie (16) bildet, welche im Sinne des Merkmals (11,16) wirkt.

8. Verschlusskappe nach Anspruch 7, wobei die bevorzugte Faltungslinie (16) unter einem Winkel von ungefähr 45° schräg zu der Axialrichtung des Verschlusses verläuft.
9. Verschlusskappe nach einem der vorangegangenen Ansprüche, wobei das Merkmal (11,16) zwischen dem Wurzelabschnitt (8) und dem ersten benachbarten zerbrechbaren Brückenabschnitt (8) angeordnet ist.
10. Verschlusskappe nach Anspruch 8, welche eine Vielzahl von Merkmalen (11,16) umfasst, wobei das erste Merkmal (11,16) zwischen dem Wurzelabschnitt (8) und dem ersten benachbarten zerbrechbaren Brückenabschnitt (6) angeordnet ist und wobei nachfolgende Merkmale (11,16) zwischen jeweils einander benachbarten zerbrechbaren Brückenabschnitten (6) angeordnet sind.

## Revendications

1. Bouchon (1) de fermeture comportant  
une couronne (2), avec une jupe sensiblement cylindrique (4) s'étendant vers le bas depuis la périphérie (3) de la couronne (2), et  
une bande (5) de garantie, reliée au bord inférieur (7) de la jupe (4) par des ponts fragiles (6) et reliée fermement au bord inférieur (7) de la jupe (4) en au moins un emplacement de racine (8),  
la bande de garantie ayant au moins une ligne axiale (9) de rupture située de façon à être adjacente uniquement à un côté de l'emplacement (8) de racine, **caractérisé en ce que**  
la bande (5) de garantie comporte au moins une configuration (11, 16) placée sur le côté opposé de l'emplacement de racine (8) par rapport à la ligne axiale (9) de rupture, la configuration (11, 16) étant formée d'une manière telle qu'elle permet à la bande (5) de garantie d'être courbée dans une direction axiale.
2. Bouchon de fermeture selon la revendication 1, dans lequel la configuration (11, 16) est procurée par une zone affaiblie (11).
3. Bouchon de fermeture selon la revendication 2,

dans lequel la zone affaiblie (11) est formée par un évidement (20, 23) sur le bord supérieur (10) ou le bord inférieur (5) de la bande (5) de garantie.

4. Bouchon de fermeture selon la revendication 3, dans lequel l'évidement (20, 23) s'étend sur une hauteur (h) qui correspond à environ un tiers à une moitié de la hauteur (H) de la bande de garantie.
5. Bouchon de fermeture selon la revendication 3 ou la revendication 4, dans lequel l'évidement (20, 23) est sensiblement en forme de "U" ou de "V".
6. Bouchon de fermeture selon la revendication 2, dans lequel la zone affaiblie (11) est formée par une étendue de matière amincie (21).
7. Bouchon de fermeture selon la revendication 1, dans lequel la partie de la bande de garantie adjacente à l'emplacement de racine (8) est localement plus épaisse que la partie restante de la bande (5) de garantie et cette partie épaissie (15) comporte un bord incliné sur le côté opposé de l'emplacement (8) de racine par rapport à la ligne axiale (9) de rupture, le bord incliné définissant une ligne de pliage préférentiel (16) qui agit en tant que configuration (11, 16).
8. Bouchon de fermeture selon la revendication 7, dans lequel la ligne de pliage préférentiel (16) est inclinée d'environ 45° par rapport à la direction axiale de la fermeture.
9. Bouchon de fermeture selon l'une quelconque des revendications précédentes, dans lequel la configuration (11, 16) est agencée entre l'emplacement de racine (8) et le premier pont fragile adjacent (6).
10. Bouchon de fermeture selon la revendication 8, comportant plusieurs configurations (11, 16), la première configuration (11, 16) agencée entre l'emplacement de racine (8) et le premier pont fragile adjacent (6) et les configurations suivantes (11, 16) agencées tous les 2 ponts fragiles adjacents (6).

Fig.1.

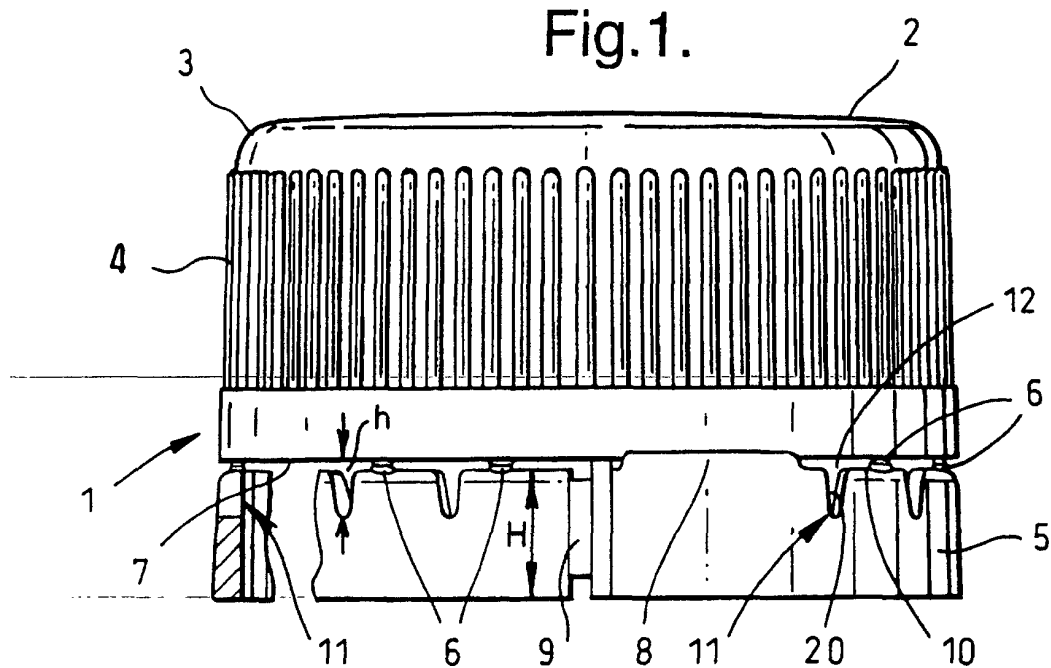
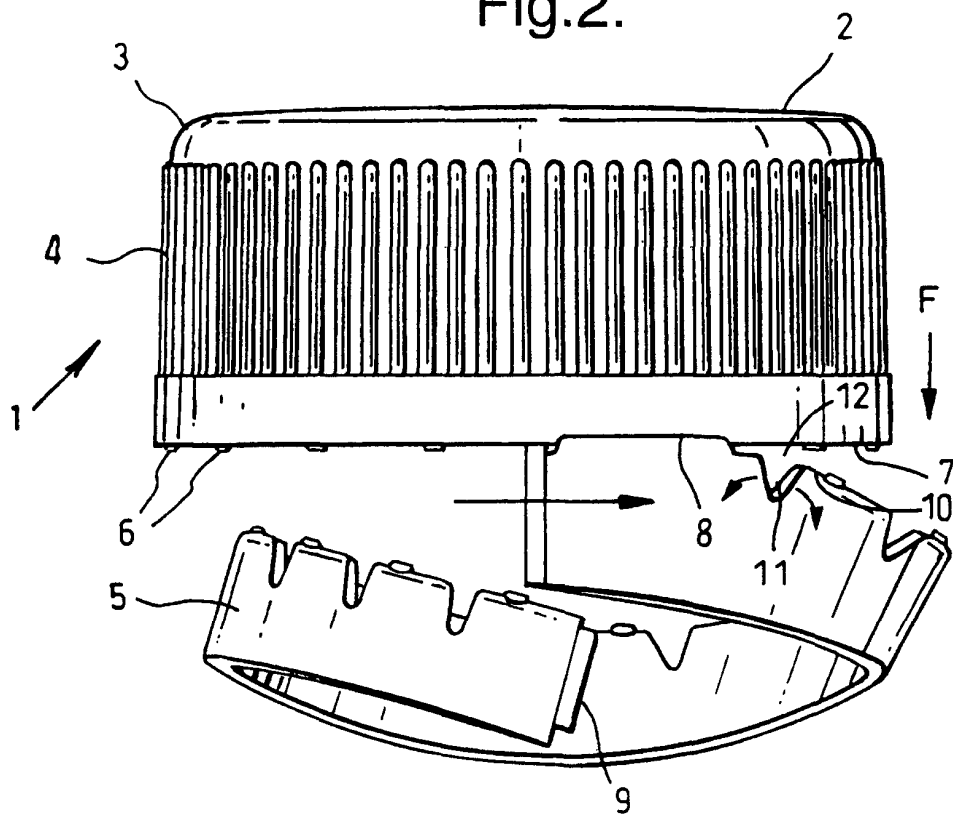


Fig.2.



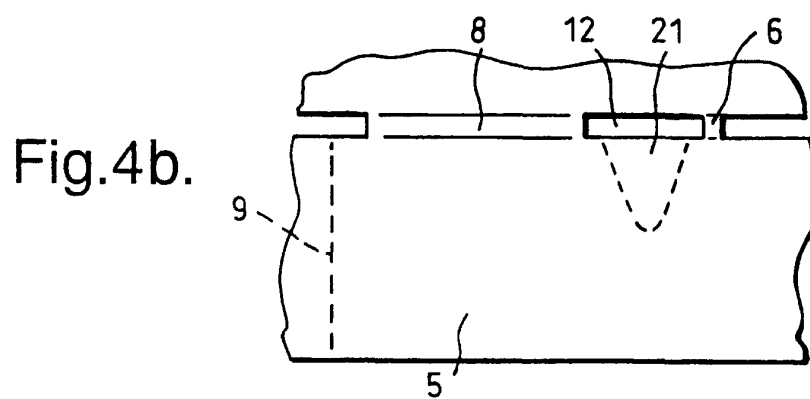
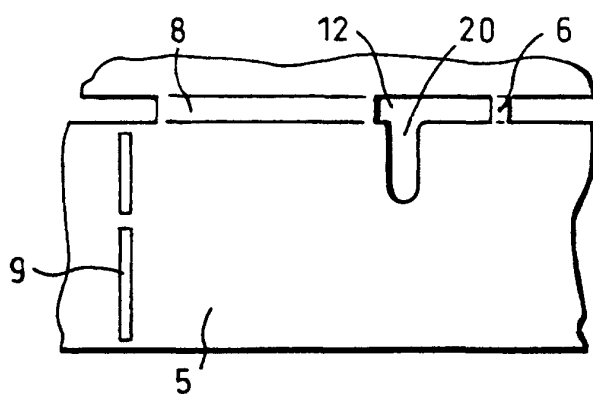
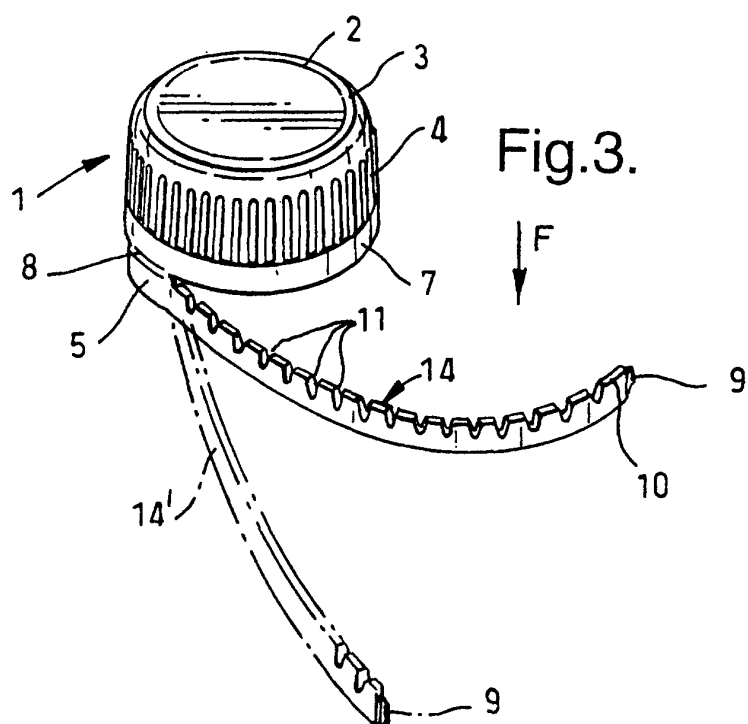




Fig.4c.

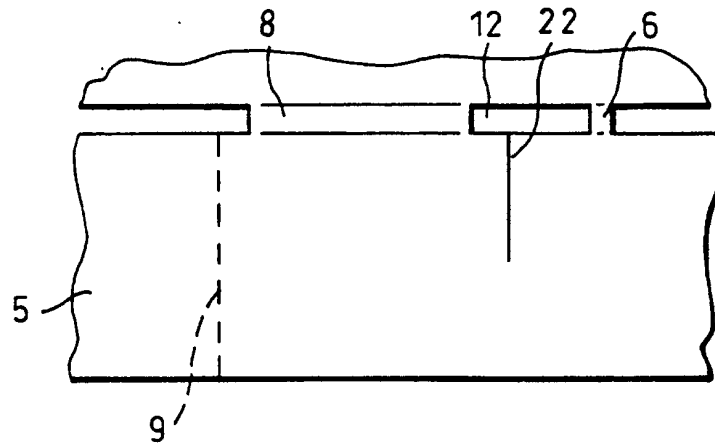


Fig.4d.

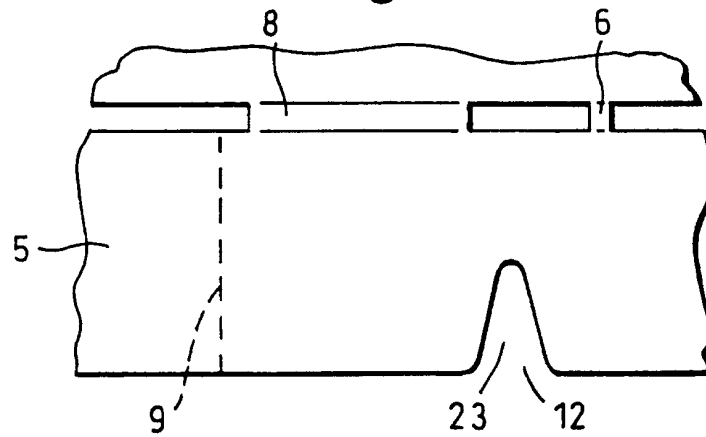


Fig.5.

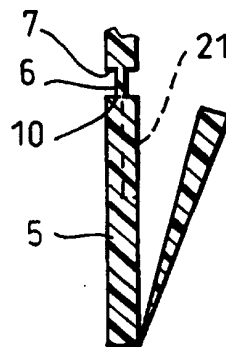


Fig.6.

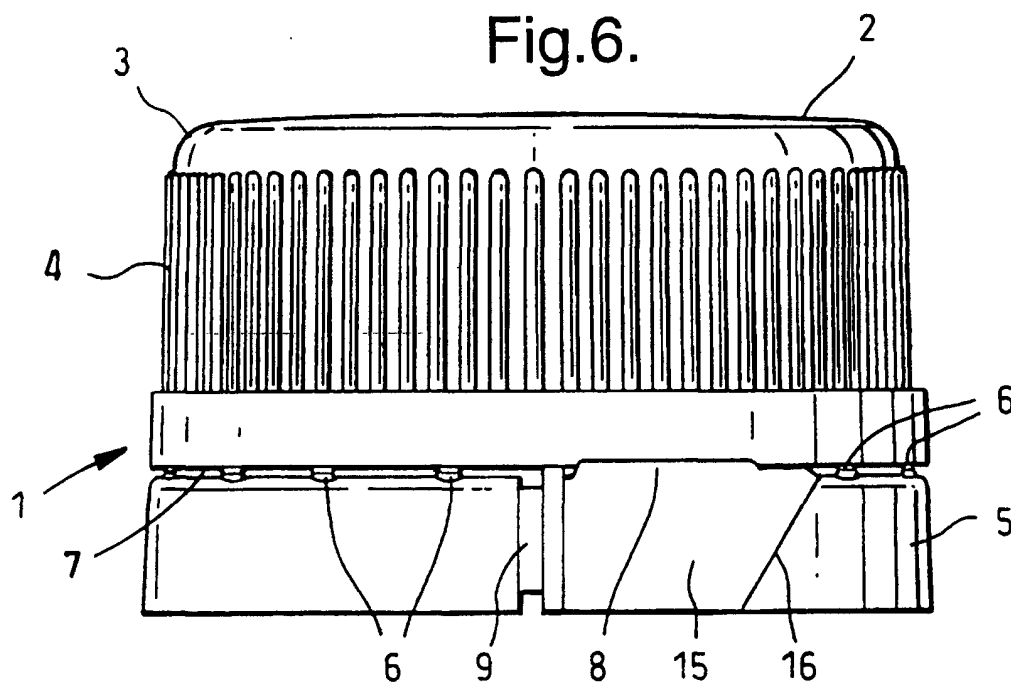


Fig.7.

