

(19)



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(11)

EP 0 909 717 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

26.02.2003 Bulletin 2003/09

(51) Int Cl.7: **B65D 47/08**, B65D 41/16

(21) Application number: **98308499.7**

(22) Date of filing: **16.10.1998**

(54) **Closure assembly**

Verschlussanordnung

Système de fermeture

(84) Designated Contracting States:
AT DE ES FR IT SE

(30) Priority: **17.10.1997 GB 9722018**

(43) Date of publication of application:
21.04.1999 Bulletin 1999/16

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Description

[0001] This invention relates to closure assemblies for containers. In particular (but not necessarily exclusively), it relates to closure assemblies in which the closure may be accurately and securely attached to the container in a specified orientation.

[0002] A problem with containers having closure assemblies comprising hinged closures, is the proper alignment of the hinge relative to the container body, so that, for example, an indentation for facilitating opening of the lid aligns with a label on the front of the container, and is secured in position once aligned.

[0003] One method of overcoming the above problem is disclosed in WO 87/00512, which discloses a snap-on closure having an axial rib which engages an axial rib or pair of axial ribs on the container. With such a container, any labelling printed on the container needs to be oriented with respect to the alignment rib on the container; the rib on the closure serves to orientate the closure with respect to the container.

[0004] Orientation devices have also been developed for use with screw-on closures. One such device is disclosed in GB 2,163,732-A.

[0005] Capping machines, which are used for capping containers, in particular flexible containers which are filled at the opposite end of the container after capping, operate at very fast speeds, and typically utilise optical sensors. It is convenient in some operations if the sensors can be triggered by a mark which is printed onto the container with any labelling and/or instructions.

[0006] The present invention provides a way of allowing for the alignment of a closure relative to a container body, but which does not require that the labelling be indexed relative to the container.

[0007] Accordingly, the invention provides, in one aspect, a method of assembling a closure to the mouth of a container, the closure being provided with splines on a surface thereof, the method including the step of pushing the closure axially onto the container so that the splines cut into co-operating surfaces on the container, thus locating the closure thereon.

[0008] Because the closure can be swaged into the container in any orientation relative to the container, it is only necessary to orientate the closure with respect to any labelling or printing on the container. This can be accomplished using machinery with optical sensors so that the labelling on the container is always aligned in a particular manner relative to a capping station, the caps or closures being fed to the capping station by mechanical means which ensures that the closures are also fed to the capping stations in a particular orientation.

[0009] Preferably, the closure is provided with resilient detent means to permit a snap-fit engagement with the container.

[0010] The interference between the splines on the closure and the co-operating surfaces on the container (conveniently an annular rib), is preferably at least 0.15

mm and more preferably in the range 0.2-0.4 mm.

[0011] The closure may be moulded from polypropylene and the container may be moulded from a relatively softer material for example a low density polyethylene compound, which may contain a small percentage, (for example up to 25% by weight), of high density polyethylene.

[0012] In an alternative aspect, the invention provides a closure for the mouth of a container, the closure having a plurality of circumferentially spaced axially extending splines, adapted to cut into a co-operating surface on a container. Preferably, the free ends of the splines are pointed, to facilitate cutting into the cooperating surface.

[0013] The closure is preferably substantially cylindrical, having an end wall with a cylindrical side wall which engages a nozzle on the container. The splines are preferably disposed on the surface of the side wall adjacent the nozzle.

[0014] Preferably, the closure has a cylindrical resilient skirt radially spaced from the side wall, which is resiliently biased against the container in use.

[0015] The invention also provides a closure and container assembly having a closure as defined above.

[0016] The invention further provides a closure and container assembly in which the closure is swaged onto the container, preferably onto an outlet nozzle on the container.

[0017] The invention will hereinafter be described by way of example only, and with reference to the accompanying drawings in which:-

Fig 1 is a cross-section through a closure according to the present invention;

Fig 2 is a cross-section through a top portion of a container for use in co-operation with the closure of Fig 1;

Fig 3 is an isometric view of the top portion as shown in Fig 2; and

Fig 4 is a cross-section through the closure of Fig 1 when assembled to the container of Fig 2 to form a closure/container assembly according to the present invention.

[0018] With reference to Figs 2 and 3, there is shown a container 11 having a flexible cylindrical body 12 having at one end thereof a frusto-conical shoulder 13 with an outlet nozzle 14. The opposite end of the cylindrical body 12 (not shown) is open, and after filling with the contents to be stored therein the open end is closed, typically by a welded seam.

[0019] The nozzle 14 is coaxial with the cylindrical body 12 and has at its mouth 16 a radially inwardly projecting flange 15. The external cylindrical surface of the nozzle has a pair of axially spaced annular ribs 17 and 18 thereon. The rib 17 projects radially outwardly a less-

er distance than the rib 18, the latter being nearer to the shoulder 13.

[0020] The container may be formed from low density polyethylene (LDPE) or a compound containing mostly LDPE together with another polyolefin such as high density polyethylene in amounts of up to 25% by weight.

[0021] A closure 20 for the container 11 is shown in Fig 1. The closure comprises a cylindrical sidewall 21, which engages the outer surface of the nozzle 14, and has an end wall 22 with an aperture 23 therein for expulsion of the contents of the container.

[0022] The end wall 22 extends radially outwardly of the side wall 21 and has an axially downwardly projecting cylindrical outer skirt 24 extending therefrom.

[0023] A cylindrical inner wall 25 also extends axially downwardly of the end wall 22, and surrounds the aperture 23. The inner cylindrical wall 25 can be a tight sliding fit or an interference fit in the mouth 16 of the container. The side wall 21, on its side which in use is adjacent nozzle 14, has a plurality of axially extending splines 26 thereon. There are preferably six equiangularly spaced splines 26, each with a pointed free end 27.

[0024] The splines 26 are arranged so that there is a radial interference between the splines 26 and the annular rib 17 adjacent to the mouth 16 of the container nozzle 14. The radial interference should be at least 0.15mm and preferably in the range 0.2-0.4mm.

[0025] Snap fit detent means 28 is arranged on the inner surface of the side wall. The detent means 28 comprises four circumferentially spaced chordal bosses each of which can pass over the second annular rib 18 on the nozzle 14 and then resiliently snap back to lock the closure on the container.

[0026] The closure 20 is a moulded one piece closure which is formed from polypropylene and has a cover 29 hinged to the end wall 22 by an integral hinge 31. The closure may have a recessed thumb pad 32 diametrically opposite the hinge 31 to assist in opening cover 29. Ideally, the closure 20 is assembled to the container 11 so that the thumb pad 32 is aligned with a label 33 on the container.

[0027] With reference to Fig 4, the closure 20 is shown assembled with the container 11. The outer skirt 24 is radially aligned with the outer surface of the cylindrical body 12.

[0028] During assembly, a plurality of containers 11 may be mounted on a turntable (not shown) having a plurality of stations, each comprising a mandrel on which a respective container is mounted. Each mandrel is rotatable relative to the turntable. The closures 20, in a closed condition, are mechanically fed to a capping station on the turntable in which they are held in a particular orientation. When the turntable has indexed to the station the mandrel will rotate, and as it rotates a sensor may detect a mark printed on the container. The mandrel is then stopped and indexed to a position so that the mark is located at a particular orientation relative to the closure orientation.

[0029] At that point the closure 21 will be pushed axially onto the container neck. The detent means 28 will pass over the first rib 17 and contact the second rib 18 and start to ride up the top inclined face 19 of the rib 18 just prior to the pointed ends 27 of the splines 26 cutting into the first rib 17. Further axial movement cause the splines 26 to cut through the rib 17 and the detent means rides over the rib 18 and resiliently contracts on passing over the annular rib 18 to form a snap-fit connection preventing removal of the closure from the nozzle 14. Since the splines are swaged into the rib 17, the closure 20 is rotationally fixed relative to the container and can only be rotated by damaging the container or closure.

[0030] The skirt 24 is a resilient skirt which contacts the container shoulder 13 and exerts an upwards bias on the closure to hold the detent means 28 against the annular rib 18 and prevent axial movement of the closure on the nozzle.

Claims

1. A method of assembling a closure to the mouth of a container, the closure being provided with splines on a cylindrical surface thereof and a resilient detent means whereby the closure makes a snap-fit engagement with the container, and the container having a nozzle onto which the closure is pushed, the splines locating the closure on the container, **characterised in that** the nozzle (14) is further provided with a first annular rib (17) near said mouth (16), and a second annular rib (18) spaced from the first rib (17) and which is further from said mouth, and when the closure (20) is pushed onto the nozzle (14) the splines (26) cut into the first rib (17) to locate the closure and the detent means (28) engage the second rib (18).
2. A method as claimed in Claim 1 **characterised in that** the closure (20) is provided with a resilient skirt (24) which during the mounting of the closure (20) onto the container (11) reacts against the container biasing the closure (20) away from the container (11) and which after assembly of the closure (20) to the container (11) continues to react so that the detent means (28) is held against the second rib (18) to prevent axial movement of the closure (20) relative to the container (11).
3. A closure and container assembly comprising a container having a nozzle with a mouth therein and a closure which is a push fit over the nozzle and has splines on a cylindrical surface thereof and a resilient detent means whereby the closure makes a snap-fit engagement with the container, the splines locating the closure on the container, **characterised in that** the nozzle (14) has a first annular rib (17) near said mouth (16), and a second annular rib

(18) spaced from the first rib (17) and which is further from said mouth, and the splines (26) being cut into the first rib (17) to locate the closure and the detent means (28) engaging the second rib (18).

4. An assembly as claimed in Claim 3 **characterised in that** the splines (26) and detent means (28) are both disposed on the inner surface of cylindrical sidewall (21) which surrounds the nozzle (14).
5. An assembly as claimed in Claim 3 or Claim 4, **characterised in that** the detent means (28) comprise circumferentially spaced annular bosses.
6. An assembly as claimed in any one of claims 3 to 5 **characterised in that** the closure is formed from a polypropylene compound and the container is formed from at least a majority of low density polyethylene.
7. An assembly as claimed in any one of Claims 3 to 6 **characterised in that** the closure (20) is provided with a resilient skirt (24) which reacts against the container (11) biasing the closure (20) away from the container (11) so that the detent means (28) is held against the second rib (18) to prevent axial movement of the closure (20) relative to the container (11).

Patentansprüche

1. Verfahren für die Anordnung eines Verschlusses auf der Öffnung eines Behälters, bei welchem der Verschluss ausgestattet ist mit Verzahnungen auf einer zylindrischen Oberfläche desselben und mit einer elastischen Feststellvorrichtung, wodurch der Verschluss einen Eingriff durch Einschnappeinpassung mit dem Behälter vornimmt, und bei welchem der Behälter einen Leitkranz aufweist, auf den der Verschluss gedrückt wird, wobei die Verzahnungen den Verschluss auf dem Behälter anordnen, **dadurch gekennzeichnet, dass** der Leitkranz (14) ferner ausgestattet ist mit einer ersten ringförmigen Rippe (17) in der Nähe der Öffnung (16) und mit einer zweiten ringförmigen Rippe (18), die räumlich entfernt von der ersten Rippe (17) angeordnet ist und die sich weiter weg von der Öffnung befindet, und dass, wenn der Verschluss (20) auf den Leitkranz (14) gedrückt wird, die Verzahnungen (26) in die erste Rippe (17) schneiden, um den Verschluss anzuordnen, und die Feststellvorrichtung (28) tritt mit der zweiten Rippe (18) in Eingriff.
2. Verfahren gemäss Anspruch 1, **dadurch gekennzeichnet, dass** der Verschluss (20) mit einer elastischen Schürze (24) versehen ist, welche im Verlaufe des Montierens des Verschlusses (20) auf den

Behälter (11) zurück auf den Behälter wirkt, wodurch der Verschluss (20) weg von dem Behälter (11) vorgespannt wird, und welche anschließend an die Anordnung des Verschlusses (20) auf dem Behälter (11) fort fährt rückzuwirken, so dass die Feststellvorrichtung (28) gegen die zweite Rippe (18) gehalten wird, um eine axiale Bewegung des Verschlusses (20) in Bezug auf den Behälter (11) zu verhindern.

3. Verschluss- und Behälteranordnung, die einen Behälter enthält, der einen Leitkranz mit einer Öffnung darauf aufweist, und einen Verschluss, der eine Schiebeeinpassung über dem Leitkranz darstellt und der Verzahnungen auf einer zylindrischen Oberfläche aufweist, und eine elastische Feststellvorrichtung, wodurch der Verschluss durch eine Einschnappeinpassung mit dem Behälter in Eingriff tritt und die Verzahnungen ordnen den Verschluss auf dem Behälter an, **dadurch gekennzeichnet, dass** der Leitkranz (14) eine erste ringförmige Rippe (17) in der Nähe der Öffnung (16) aufweist und eine zweite ringförmige Rippe (18), die räumlich entfernt von der ersten Rippe (17) angeordnet ist und die sich weiter weg von der Öffnung befindet, und dass die Verzahnungen (26) in die erste Rippe (17) einschneiden, um den Verschluss anzuordnen, und dass die Feststellvorrichtung (28) mit der zweiten Rippe (18) in Eingriff tritt.

4. Anordnung gemäss Anspruch 3, **dadurch gekennzeichnet, dass** die Verzahnungen (26) und die Feststellvorrichtung (28) beide auf der inneren Oberfläche einer zylindrischen Seitenwand (21) angeordnet sind, die den Leitkranz (14) umgibt.
5. Anordnung gemäss Anspruch 3 oder Anspruch 4, **dadurch gekennzeichnet, dass** die Feststellvorrichtung (28) am Umfang angeordnete ringförmige Vorsprünge umfasst.
6. Anordnung gemäss irgendeinem der Ansprüche 3 bis 5, **dadurch gekennzeichnet, dass** der Verschluss aus einer Polypropylenverbindung hergestellt wird und dass der Behälter aus mindestens einem mehrheitlichen Anteil aus Polyethylen mit geringer Dichte gebildet wird.
7. Anordnung gemäss irgendeinem der Ansprüche 3 bis 6, **dadurch gekennzeichnet, dass** der Verschluss (20) mit einer elastischen Schürze (24) versehen ist, welche gegen den Behälter (11) rückwirkt, wodurch der Verschluss (20) weg von dem Behälter (11) vorgespannt wird, so dass die Feststellvorrichtung (28) gegen die zweite Rippe (18) gehalten wird, um eine axiale Bewegung des Verschlusses (20) in Bezug auf den Behälter (11) zu verhindern.

Revendications

1. Procédé d'assemblage d'une fermeture sur l'embouchure d'un récipient, la fermeture comportant des cannelures sur une surface cylindrique correspondante et un moyen de cliquet élastique, la fermeture étant ainsi engagée par encliquetage dans le récipient, le récipient comportant une buse sur laquelle la fermeture est poussée, les nervures assurant le positionnement de la fermeture sur le récipient, **caractérisé en ce que** la buse (14) comporte en outre une première nervure annulaire (17) près de ladite embouchure (16) et une deuxième nervure annulaire (18) espacée de la première nervure (17) et plus éloignée de ladite embouchure, les cannelures (26) pénétrant dans la première nervure (17) lorsque la fermeture (20) est poussée sur la buse (14) pour positionner la fermeture et engager le moyen de cliquet (28) dans la deuxième nervure (19).

2. Procédé selon la revendication 1, **caractérisé en ce que** la fermeture (20) comporte une bordure élastique (24) réagissant, lors du montage de la fermeture (20) sur le récipient (11), contre la force exercée par le récipient pour pousser la fermeture (20) à l'écart du récipient (11) et continuant à réagir après l'assemblage de la fermeture (20) sur le récipient (11), de sorte que le moyen de cliquet (28) est retenu contre la deuxième nervure (18) pour empêcher un déplacement axial de la fermeture (20) par rapport au récipient (11).

3. Assemblage de fermeture et de récipient comprenant un récipient comportant une buse avec une embouchure, ainsi qu'une fermeture ajustée par poussée au-dessus de la buse et comportant des cannelures sur une surface cylindrique correspondante et un moyen de cliquet élastique, la fermeture étant ainsi engagée par encliquetage dans le récipient, les cannelures assurant le positionnement de la fermeture sur le récipient, **caractérisé en ce que** la buse (14) comporte une première nervure annulaire (17) près de ladite embouchure (16) et une deuxième nervure annulaire (18) espacée de la première nervure annulaire (17) et plus éloignée de ladite embouchure, les cannelures (26) pénétrant dans la première nervure (17) pour positionner la fermeture et engager le moyen de cliquet (28) dans la deuxième nervure (18).

4. Assemblage selon la revendication 3, **caractérisé en ce que** les cannelures (26) et le moyen de cliquet (28) sont agencés sur la surface interne de la paroi latérale cylindrique (21) entourant la buse (14).

5. Assemblage selon les revendications 3 ou 4, **carac-**

térisé en ce que le moyen de cliquet (28) comprend des bossages annulaires à espacement circonférentiel.

6. Assemblage selon l'une quelconque des revendications 3 à 5, **caractérisé en ce que** la fermeture est formée à partir d'un composé de polypropylène, le récipient étant composé au moins en majeure partie d'un polyéthylène de faible densité.

7. Assemblage selon l'une quelconque des revendications 3 à 6, **caractérisé en ce que** la fermeture (20) comporte une bordure élastique (24) réagissant contre la force exercée par le récipient (11) pour pousser la fermeture (20) à l'écart du récipient (11), de sorte que le moyen de cliquet (28) est retenu contre la deuxième nervure (18) pour empêcher un déplacement axial de la fermeture (20) par rapport au récipient (11).

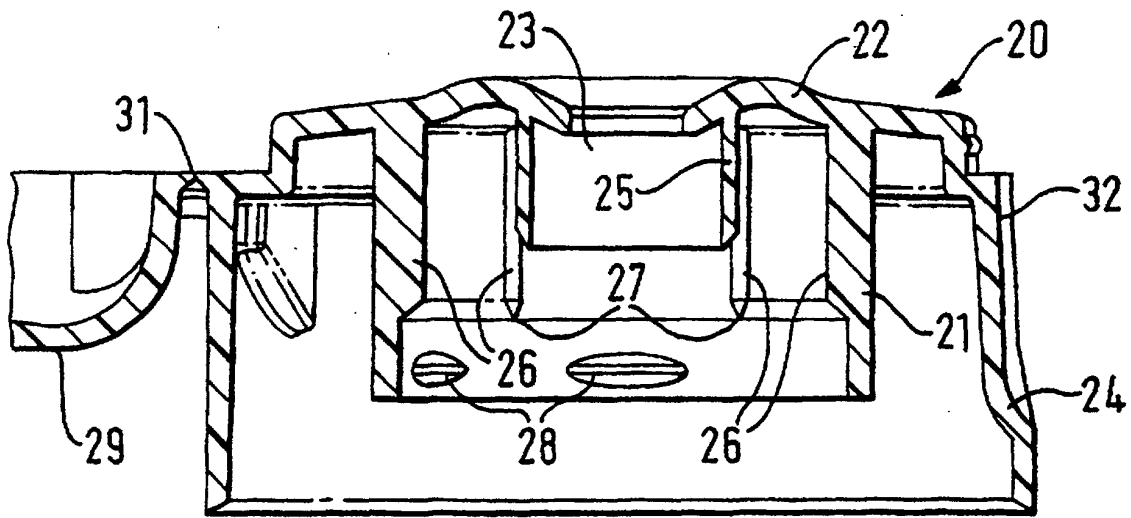


FIG. 1

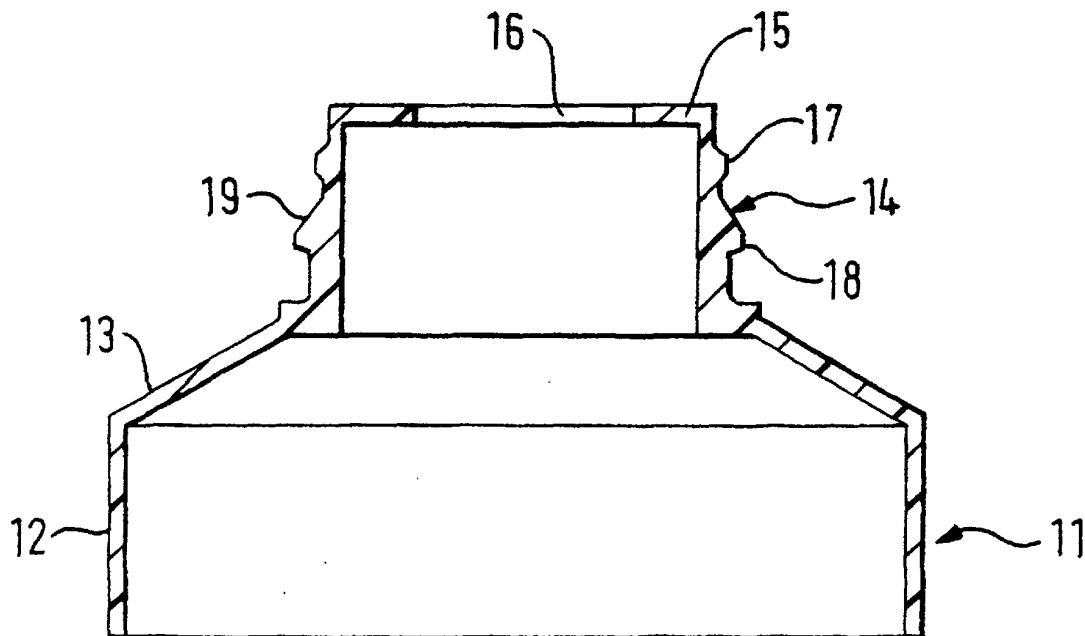


FIG. 2

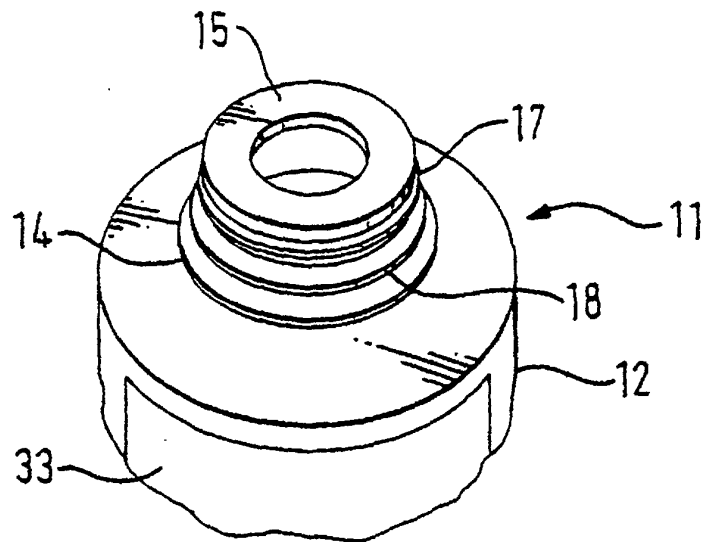


FIG. 3

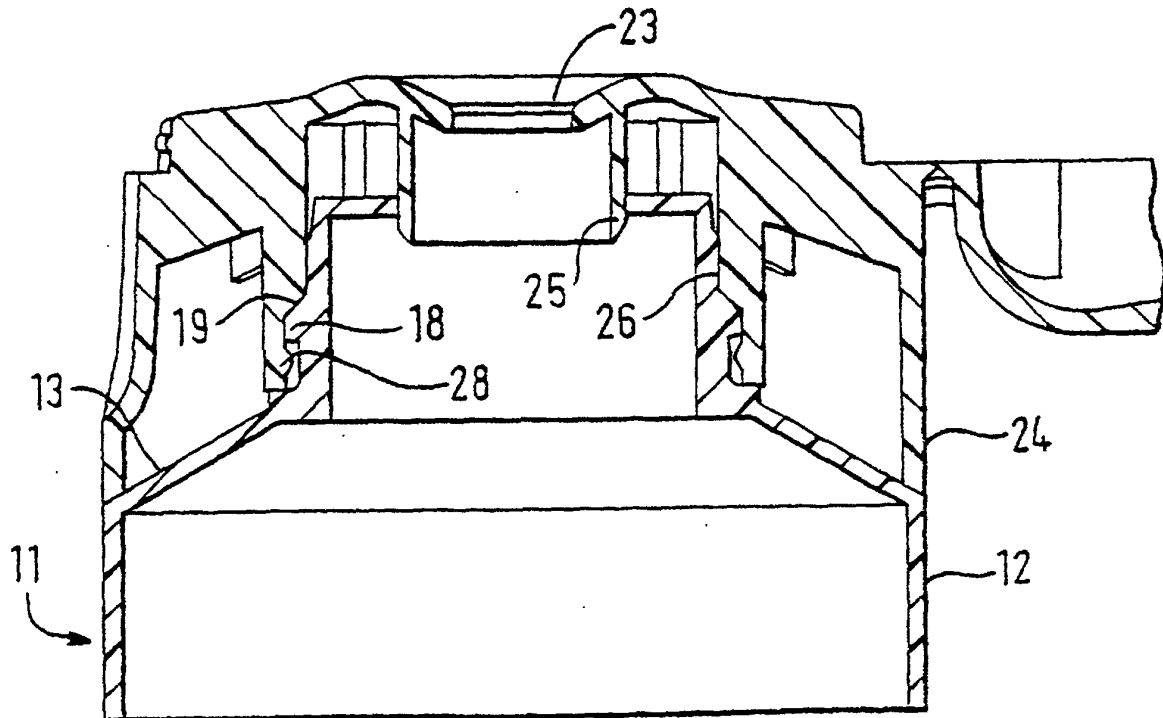


FIG. 4