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(54) A tamper-evident closure

(57) Tamper-evident closures are known in which the tamper-evidence remains attached to the closures after initial opening. However, the tamper-evidence is not always that clear and therefore it is desirable to produce a closure which more clearly shows it has been initially opened. This may be achieved by having a tamper-evident closure (10,110,310,410,510) comprising a base (20,320,420,520), a lid (25,325,425,525), and a tamper-evident member (30,130) frangibly connected to a lid side skirt, and becoming at least partly hidden from view upon first opening of the closure.

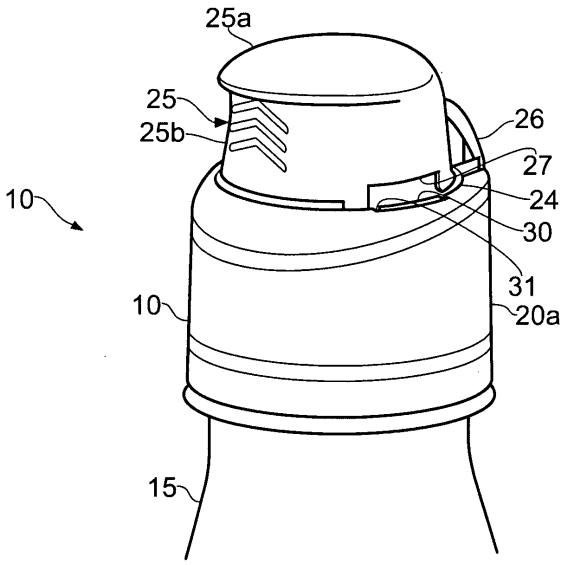


FIG. 3

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Description

[0001] The present invention relates generally to a closure for a container and particularly to a closure which can provide some indication that the closure has been opened at least once.

[0002] It is known to provide container closures with tamper-evident drop bands which are released from the open end of a closure side wall upon first opening. Although drop bands provide some indication that the closure has been opened, because they are physically separated there is no clear indication of opening on the remaining part of the closure. It is also known to provide tear-off bands which are removed from a closure body upon first opening. However, the tear-off bands present a litter problem and a potential choking hazard because they are generally small tabs which are separated from the closure body.

[0003] The present invention seeks to address the problems with known tamper-evident closures.

[0004] In a first aspect, the invention provides a tamper-evident closure comprising a base, a lid, a dispensing member, and a tamper-evident member which is visible prior to first opening of the closure in use, and upon first opening of the closure becomes at least partly hidden from view wherein prior to first opening of the closure in use, the tamper-evident member masks at least part of the dispensing member, and upon first opening of the closure reveals at least part of the dispensing member whereby to indicate the closure has been opened at least once.

[0005] In one embodiment the base may at least partly define a void and the tamper-evident member may move at least partly into the void upon first opening of the closure.

[0006] The base and lid may be integrally hinged to one another in that they are manufactured as one piece. For instance, the closure may be manufactured from plastics and the base and lid may be moulded in one, connected together via the hinge. The hinge may be a snap type hinge and may include at least one strap.

[0007] The dispensing member may be a separate member from the lid and/or base. For instance, it may be moulded separately, as opposed to being integral with the lid and/or base. The dispensing member may then be assembled with the lid and/or base. The dispensing member may be a spout for drinking from directly or for pouring from. Alternatively, the dispensing member may be integral with the lid or base.

[0008] The tamper-evident member may be movable from an unready position to a primed position. This movement may occur upon assembly of the dispensing member and base.

[0009] The tamper-evident member may be frangibly connected to either the base and/or the lid, and the frangible connection(s) may be breakable upon first opening of the closure. For instance, the tamper-evident member may, at one end, be frangibly connected to the lid. At the opposite end a projection may be provided. This projection may engage with the base and/or dispensing member such that when the closure is first opened the tamper-evident member cannot follow the relative movement of the lid such that the frangible connection(s) break. Alternatively, or additionally, the tamper-evident member may be frangibly connected at one end to the base and the projection may engage with the lid such that the action of opening the lid for the first time effects breakage of the frangible connection(s).

[0010] The tamper-evident member may be separate from the base, lid and dispensing member, and the closure and tamper-evident member may include corresponding means for limiting their relative movement upon first opening. For example, the tamper-evident member may be in the form of two rings connected together by frangible connection(s). This ring may fit between the lid and the base and surround the dispensing member. The lid and the spout or base may include projections which engage with corresponding projections on the tamper-evident member such that on first opening of the closure the tamper-evident band is pulled apart so that one ring is pulled by the lid and the other ring is pulled by the base or spout. The frangible connection(s) may then break such that the tamper-evident member splits into two parts. The lower ring of the tamper-evident member may fall into a pocket or void provided in the base so as to become at least partly hidden from view and to at least partly reveal the dispensing member.

[0011] The dispensing member may be of a different colour from the lid and/or base to be more clearly visible when the tamper-evident member has moved upon first opening.

[0012] There may be more than one tamper-evident member.

[0013] In a second aspect, the invention provides a tamper-evident closure comprising a closure body and a tamper-evident member which is visible prior to first opening of the closure in use, wherein upon first opening of the closure the tamper-evident member becomes at least partly hidden from view, whereby to indicate the closure has been opened at least once.

[0014] The tamper-evident member of the closure is therefore retained upon first opening but becomes at least partly hidden from view as an indicator that the closure has been opened at least once. In some embodiments the tamper-evident member may become completely hidden from view.

[0015] In a third aspect, the invention provides a tamper-evident closure comprising a closure body defining a void, and a tamper-evident member which is visible prior to first opening of the closure in use, wherein upon first opening of the closure the tamper-evident member moves at least partly into the void, whereby to indicate the closure has been opened at least once.

[0016] Tamper-evident members formed in accordance with the present invention may be frangibly connected to a closure body. Upon first opening of the clo-

sure the tamper-evident member can thereby be released from the body.

[0017] The closure body may comprise an open-indicative section and the tamper-evident member may comprise a mask which reveals the opening-indicative section upon first opening of the closure. The open-indicative section may comprise a further section or part of the closure, such as a spout.

[0018] The opening-indicative section may be formed so as to be highly visible so that once the tamper-evident member is moved there is clear evidence that the closure has been opened at least once. The opening-indicative section may be formed in a contrasting colour and/or texture to other parts of the closure to increase visibility.

[0019] The closure may comprise a window in which or through which the tamper-evident member is visible prior to first opening the window. Accordingly, upon first opening of the closure the tamper-evident member can fall out of or out of register with the window.

[0020] The tamper-evident member may be moveable from an unready position to a primed position. For example, the closure may comprise a plurality of components and the tamper-evident member is moved to the primed position only upon assembly of the closure component parts together. In other words, the tamper-evident system is only activated upon assembly.

[0021] The closure body may comprise a plurality of parts. For example, the closure body may comprise a first part and a second part such as a base and a lid which may be hingedly connected together. The closure may comprise a spout part through which the contents of an associated container can be dispensed. In one embodiment the closure comprises a base part connected to a lid by a hinge and a spout part which is internally received by the base/lid.

[0022] The closure may be formed from any suitable material, such as a plastics or metallic material. Different components of the closure may be formed from different materials.

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

Figure 1 is a perspective view of a closure formed according to a, first embodiment of the present invention shown in an unopened state;
Figure 2 is a perspective view of the closure of Figure 1 shown in an opened position;
Figure 3 is a perspective view of the closure of Figure 2 shown re-closed;
Figure 4 is a front elevation of the closure of Figure 3;
Figure 5 is a section of a closure formed according to a second embodiment and illustrating a closure body and a spout prior to assembly;
Figure 6 is a section of the closure of Figure 5 shown during assembly;
Figure 7 is a magnified view of the region of a tamper-evident member of the closure shown in Figure 6;
Figure 8 is a section of the closure of Figure 5 shown fully assembled;
Figure 9 is a magnified view of the region of the tamper-evident member of the closure shown in Figure 8;
Figure 10 is a perspective view of the region of the tamper-evident member shown in Figure 9;
Figure 11 is a perspective view of the closure of Figure 8 prior to first opening;
Figure 12 is a perspective view of the closure of Figure 11 shown opened;
Figure 13 is a perspective view of the closure of Figure 12 shown re-closed;
Figure 14 is a front elevation of the closure shown in Figure 13;
Figure 15 is a section of the closure shown in Figure 14;
Figure 16 is a magnified view of the region of the tamper-evident member of the closure shown in Figure 15;
Figure 17 is a perspective view of the magnified region of Figure 16;
Figure 18 is a magnified perspective view of the region of a tamper-evident member formed according to a third embodiment;
Figure 19 is a perspective view of another closure, with the lid in the initially closed position, according to a fourth embodiment;
Figure 20 is a perspective view of the closure of Figure 19 with the lid in the closed position but having been opened at least once;
Figure 21 is a perspective view of the closure of Figures 19 and 20 with the lid in the open position;
Figure 22 is a cross-sectional view of part of the closure of Figure 19;
Figure 23 is a cross-sectional view of part of the closure of Figure 20;
Figure 24 is a cross-sectional view of part of another closure, with the lid in the initially closed position, according to a fifth embodiment;
Figure 25 is a perspective view of the closure of Figure 24;
Figure 26 is a side view of the closure of Figure 24;
Figure 27 is a side view of the temper evident member of the closure of Figure 24;
Figure 28 is a front elevation of the closure of Figure 24 having been opened and reclosed;
Figure 29 is a side view of the spout member of the closure of Figure 24;
Figure 30 is a perspective view of another closure, with the lid in the initially closed position, according to a sixth embodiment;
Figure 31 is a perspective view of the closure of Figure 30, with the lid in the closed position but having been opened at least once;
Figure 32 is a perspective view of the closure of Figure 30 with the lid in the open position;
Figure 33 is a cross-sectional side view of part of the

closure of Figure 30; and

Figure 34 is a cross-sectional side view of part of the closure of Figure 31.

[0024] Referring first to Figure 1 there is shown a tamper-evident closure generally indicated 10. The closure 10 is intended for attachment to the neck 15 of a container.

[0025] The closure 10 comprises a base 20 and a lid 25 which together comprise a closure body. The lid 25 is connected to the base 20 by a hinge 26.

[0026] The base 20 comprises a cylindrical skirt 20a which is open at both ends. At the end of the skirt 20a adjacent the lid 25 a flange 24, or top or upper surface 24 of the base 20 extends radially inward.

[0027] The lid 25 comprises an upturned cup-shape body having a top plate 25a and a side skirt 25b depending from the periphery of the top plate 25a.

[0028] The skirt 25b is co-axial and concentric with the base skirt 20a. The flange 24 reduces the diameter of the base 20 to match the lid. Accordingly the flange 24 comprises an inward step.

[0029] The base 20 is provided with a tamper-evident tab 30. The tab 30 is shown in an upstanding position in which it is in register with a window 27 formed as a cut-out at the base of the lid skirt 25b.

[0030] The tab 30 is positioned at the mouth of a pocket 31 formed in the flange 24. The tab 30 is held in place by two frangible bridges (not shown). One bridge connects the tab 30 to the base 20 and the other connects the tab to the lid 25.

[0031] In order to open the closure 10 the lid 25 is hinged to the position shown in Figure 2 away from the base 20. When the lid is moved both of the frangible bridges are broken. The tab 30 is released into the pocket 31 where it is retained as shown in Figure 2.

[0032] When the lid 25 is returned to the closed position as shown in Figure 3 the window 27 of the lid 25 is no longer masked by the tab 30 because the tab is hidden from sight and so provides visible evidence that the closure has been opened.

[0033] The closure 10 may include a dispensing member (not shown) which would be visible through the window 27.

[0034] Referring now to Figure 5 there is shown a closure 110 according to a second embodiment.

[0035] The closure 110 includes a base 120 and a lid 125 which are connected together by a hinge (see Figures 11 to 13). Together the base and lid comprise a closure body.

[0036] The base 120 comprises a generally cylindrical skirt 120a with internal screw thread formations 121 and a retention bead 122 formed on its interior surface.

[0037] At one end of the base skirt 120a a tamper-evident drop band 123 is provided. The band 123 comprises an annular strip 123a with an upturned annular flap 123b at its free edge formed to engage under a retention bead of a container. The band 123a is connected to the lower end of the base 120 by frangible bridges 123c. At the other end of the skirt 120a a flange 124 extends radially inwardly to form a shoulder.

[0038] The lid 125 comprises a top plate 125a and a side skirt 125b which depends from the periphery of the skirt 125b. The underside of the top plate 125a is formed with a sealing spigot 125c. At the open end of the skirt 125b two diametrically opposed tamper-evident tabs 130 are provided. The tabs 130 are formed in windows 127 at the lower end of the skirt 120a and are frangibly connected to the windows 127 by bridges 132, as best shown in Figure 10.

[0039] The tabs 130 are generally L-shape in section and comprise a main plate 130a to which the frangible bridges 132 are centrally connected, and an undercut leg portion 131.

[0040] The flange 124 is formed with two diametrically opposed cut-out portions 124a which are in register with the tabs 130, as shown best in Figure 10.

[0041] The closure 110 is shown in its as-moulded condition (i.e. it is moulded in the closed position) in which the lid 125 is held on the base 120 by a hinge (see

[0042] Figures 11 and 12). Accordingly, the tabs 130 are effectively suspended from the windows 127 by the bridges 132. The relative dimensions of the tabs 130 and the recesses 124b of the flange 124 mean that in the as-moulded condition if the lid 125 was hinged away from the base 120 the tabs 130 would pass through the recesses 124 without breaking off.

[0043] The closure 110 further comprises a spout section generally indicated 140. The spout section 140 comprises a body with a frusto-conical nipple 141 which defines an aperture 141 a and is joined to a base section 142 at a shoulder 142a. A retention hook 143 extends transversely from the base 142. A sealing lip 144 depends from the free end of the base 142 and is intended to seal in the bore of a container neck (not shown).

[0044] Referring now to Figures 6 and 7 the closure 110 is shown in a partially assembled position.

[0045] The spout 140 is introduced into the interior of the closure 110 through the base skirt 120a to the position shown in Figure 6. It will be noted that the upper face of the bead 143 of the spout 140 engages the underside of the bead 122 of the base 120. Further, the spigot 125c begins to enter the aperture 141 a of the nipple 141.

[0046] It will also be noted that the rounded shoulder 142a of the spout 140 engages the tabs 130 at the intersection of the main plates 130a and the leg portions 131.

[0047] Referring now to Figures 8 to 11 the spout 140 is shown maximally inserted into the closure body. The continued insertion of the spout 140 means that the bead 143 snaps over the bead 122 to hold the spout 140 firmly in position. Further, the spigot 125c is sealingly engaged in the aperture 141 a.

[0048] The continued insertion of the spout 140 means that the shoulder 142a pushes on the tabs 130 to cause them to swing radially outwardly as they pivot about the bridges 132. This means that the leg portions 131 of the

tabs 130 engage under the flange 124 at the outside of the recesses 124a.

[0049] It will be noted that a void 150 is formed between the flange 124 and the annular retention bead 143.

[0050] Referring now to Figure 12 the lid 125 is shown flipped to its open position so that the nipple 141 is exposed through the base 120. The windows 127 in the open end of the lid skirt 125b are clearly shown.

[0051] It will be noted that the tabs 130 are hidden from view now that the lid 125 has been opened. This is because when the lid 125 is opened the legs 131 of the tabs 130 abut against the flange 124 to prevent the tabs 130 from being lifted with the rest of the lid. Accordingly, as the lid 125 is lifted the bridges 132 break which releases the tabs 130. The tabs 130 drop into the void 150 as shown in Figures 13 to 17. The tabs 130 are retained in the void 150 during subsequent opening and closing operations.

[0052] It will be noted that because the tabs 130 are no longer in register with the windows 160, the spout nipple 141 is clearly visible through the lid 125. In this embodiment the spout nipple 141 and the lid 125 are formed from different coloured materials so that the spout 140 can be seen clearly through the windows 127 as an indicator that the tabs 130 are no longer present.

[0053] Referring now to Figure 18 there is shown a magnified section of the region of a tamper-evident tab 230 formed according to a third embodiment. The tab 230 is very similar to the tab 130 shown in Figure 10. However, whereas the tab 130 shown in Figure 10 is retained by a single bridge from above the tab 230 is retained by two flanking lateral bridges 232.

[0054] In Figure 19, a closure according to a fourth embodiment is referenced 310. The closure comprises a base 320 having a substantially cylindrical skirt 320a and a lid 325 having a top plate 325a. The lid 325 also comprises a substantially cylindrical side skirt 325b. In this embodiment, the side skirt 325b has a portion directly opposite the hinge which is similar to a visor in a motorcycle crash helmet.

[0055] At the junction between the top of the base 320 and the underside of the lid 325 a tamper-evident member 330 is visible. This tamper-evident member 330 is in the form of a tab and is frangibly connected to the lid 325. With reference to Figures 22 and 23, the tamper-evident member 330 has a projection 333 on its lower radially outward side. The lid is moulded in the open position. When the lid is initially closed at least part of the tamper-evident member 330 passes through an opening in the top surface 324 of the base partially into a void or pocket 331 provided in the base 320. The projection 333 engages underneath the top surface 324 of the base 320. The projection is formed such that it allows the tamper-evident member to pass through the opening in the top surface 324 but will not allow it to be removed. Accordingly, when the lid 325 is first opened the frangible bridges 332, which connect the tamper-evident member 330 to the lid 325, break since the projection 333 prevents the tamper-evident member 330 from leaving the void 331 provided underneath the hole in the top surface 324 of the base 320. When this occurs the tamper-evident member moves further into the void or pocket 331.

[0056] A cross sectional side view of part of the closure 310 is shown in Figure 23 in which the closure has been initially opened and then re-closed. Accordingly, the frangible bridges 332 have broken and the tamper-evident member 330 is resident in the void 331 provided under the top surface 324 of the base 320. A gap 327 is left between the underside of the lid 325 and the upper surface 324 of the base through which the dispensing member 340 is visible.

[0057] Figure 20 shows a perspective view of the closure after it has been initially opened and re-closed. The gap 327 is visible where the tamper-evident member 330 was previously present. No other parts of the closure lie between the gap 327 and the spout 340 which lies within the closure 310. Accordingly, the spout 340 is visible through the gap 327. If the spout is manufactured from a different material and/or
has a different colour from the lid and/or base, and in particular from the tamper-evident member 330, then it would be more clearly visible through the gap 327 and thus provide evidence of the closure having been opened and re-closed in a more obvious manner.

[0058] Figure 21 shows the closure 310 in the open position. The tamper-evident member 330 is not visible because it has dropped inside the void 331 provided in the upper surface 324 of the base 320. A gripping portion 325c is provided at the upper end of the lid 325 directly above the tamper-evident member 330. It is seen that the lid 325 is connected to the base 320 by a hinge 326. The lid and base may be moulded integrally together or may be formed as separate items. The closure 310 may be fitted to a container 315. The closure 310 may include an additional tamper-evident member 323 provided at the lower end of the base 320. This tamper-evident member 323 provides evidence that the closure has been removed from the container 315 and operates in the well-understood manner of tamper-evident drop bands.

[0059] Figures 24 to 29 relate to a fifth embodiment of the closures referenced 410.

Figure 24 is cross sectional view of the closure 410. It is seen that the closure 410 comprises a base 420 and a lid 425. The lid has a top surface 425a and a projection 425c on one side to aid gripping and opening of the lid 425. Within the closure 410 is a spout or dispensing member 440. This is a separate member which is fitted inside the base 420 and lid 425. The base 420 and lid 425 are pivoted together by the hinge 426. The lid 425 has an annular projection 425d which depends from the top surface 425a and presses against part of the spout 440 so as to provide a seal. Further, the lid 425 includes an annular projection depending from the underside of top surface 425a and which takes the form of a bore seal to seal against the inner surface of the spout 440 to prevent leakage of the contents of the container when the lid is in the

closed position.

The spout 440 includes a projection 441 which projects radially outward from the side of the spout 440 at approximately the same axial level, when assembled with the base and/or lid, as the parting plane between the underside of the lid 425 and the upper surface of the base 420. Furthermore, the skirt 425b of the lid 425 has a projection 425e. This projection projects radially inward at the lower end of the lid 425 in the circumferential region radially opposite the hinge 426. A gap 427 is left between the lower end of the side skirt 425b in a region approximately opposite the hinge 426 and the upper surface of the base 420. A void or pocket 431 is provided between the spout 440 and the base 420. A tamper-evident member 430 which takes the form of a separate element having an upper ring 430a and a lower ring 430b connects together by frangible connections 432 (refer to Figure 27) is assembled with the closure 410. Upon assembly, the tamper-evident member 430 fits between the base and the lid and radially outward of the spout 440. The tamper-evident member 430 includes an upper projection 434 which projects radially outwardly and a lower projection 433 which projects radially inwardly. When the tamper-evident member 430 is assembled with the closure 410 the upper projection 434 engages with the projection 425e provided on the radially inner surface of the side skirt 425b of the lid 425. Further, the lower projection 433 engages with the projection 441 provided on the spout 440. In this manner, when the lid is initially closed it cannot be opened without breaking the frangible connections 432. This is because the projections 434, 425e, 433, 441 prevent the lid being opened. The projections 434, 433, 425e, 441 are all shaped to allow initial installation in that they have angled surfaces on one side so that the corresponding projections may pass over one another during assembly. However, they also include undercuts, on the sides opposite to the sides having the angled surfaces, which engage with corresponding undercuts of the corresponding projections to prevent the projections from passing over one another following installation.

[0060] The spout 440 also includes a bore seal 444 which seals against the radially inner surface of an associated container (not shown). Furthermore, the closure 410 includes a tamper-evident member 423 at the lower end of the base 420 which operates in a similar manner to well known tamper-evident drop members.

[0061] In Figure 25, the hinge 426 is more clearly visible at the "rear" of the closure, radially or circumferentially opposite the gripping projection 425c. In Figure 26, the tamper-evident member 430 is visible between the base 420 and the lid 425. In Figure 28, the tamper-evident member has dropped into the void 431 as the lid 425 has been initially opened and then re-closed. Accordingly, part of the spout 440 is visible through the gap 427. In Figure 29 the spout 440 is more clearly shown. The spout includes the annular projection 441, referred to above, for engagement with the tamper-evident member 430. It also includes, at an axially lower position, an annular projection 442 which seals against the inside of the base 420.

[0062] Figures 30 to 34 relate to a sixth embodiment of the closure. This embodiment operates in a similar manner to that described above with respect to Figures 24 to 29 in that the closure has a separate tamper-evident member 530. In this embodiment the closure 510 is moulded with the lid 525 in the closed position. It may be connected to the base 520 via frangible bridges. The lid 525 of the closure 510 has a top surface 525a and a visor 525b in a similar manner to that described above. Further, the closure 510 may include a tamper-evident band 523 at the lower end of the base 520 in a similar manner to that described above. When the tamper-evident member 530 has dropped into the void 531 (refer to Figures 33 and 34) a gap 527 allows the spout 540 to be visible even when the lid 25 is in the re-closed position. The lid 525 may be connected to the base 520 by a hinge 526.

[0063] The tamper-evident member 530 has an upper ring 530a and a lower ring 530b. The upper ring 530a includes a projection 534 on the radially outer surface. The lower ring 530b includes a projection 533 on the radially inner surface. The spout 540 includes a projection 541 on its radially outer surface. The visor 525b includes a projection 525e on the radially inner surface at its lower end. When the tamper-evident band 530 is assembled with the closure the projections 534 and 525e engage with one another and the projections 541 and 533 engage with one another. The projections are all formed with angled surfaces on one side to allow the projections to pass over one another during assembly. They also include undercut surfaces, on the sides opposite the angled surfaces, which abut one another when the lid is initially opened such that the frangible connections 532 break and the lower ring 530b drops into the void 531 provided in the base 520.

[0064] With regard to the use of the relative terms such as "upper" and "lower" throughout the specification, these relate to the orientation of the closures shown in the figures and are not to be interpreted in any way to limit the invention. The term "axial" relates to the vertical (as shown in the figures) axis through the dispensing orifice of the closure and the term "radial" correspond to this axis.

[0065] Although several different embodiments are described in this specification many of the features present in each closure are similar and/or are identical. For instance, each closure may be retained on an associated container by means of snap-beads and/or screw threads. Further, the shape and appearance of the dispensing member or spout is similar in each closure having a "nipple" and means of engagement with the base. Accordingly, not all of the various features in each embodiment have been fully described.

Claims

1. A tamper-evident closure comprising a closure body

having a base and a lid, and a tamper-evident member which is visible prior to first opening of the closure, the lid comprises a.top plate and a side skirt, the base is provided with a pocket or void, and the tamper-evident member is frangibly connected to the lid side skirt, in which upon first opening the member is released from the lid and falls into the pocket or void and becomes at least partly hidden from view whereby to indicate the closure has been opened at least once.

2. A closure as claimed in Claim 1, in which the member becomes completely hidden from view in the pocket or void.

3. A closure as claimed in Claim 1 or Claim 2, in which the base and lid are integrally hinged to one another.

4. A closure as claimed in any preceding claim, in which the base and lid are manufactured as one piece.

5. A closure as claimed in any preceding claim, in which the closure comprises a window in which or through which the member is visible prior to first opening and in which upon first opening the member falls out of or out of register with the window.

6. A closure as claimed in any preceding claim, in which the closure comprises an open-indicative section and the member comprises a mask which reveals the section upon first opening of the closure.

7. A closure as claimed in any preceding claim, in which the member is movable from an unready position to a primed position.

8. A closure as claimed in any preceding claim, in which the base comprises a dispensing member.

9. A closure as claimed in Claim 8, in which the dispensing member is integral with the base.

10. A closure as claimed in Claim 8 or Claim 9, in which when the member is released the dispensing member is revealed.

11. A closure as claimed in any preceding claim, in which the closure is formed from plastics material.

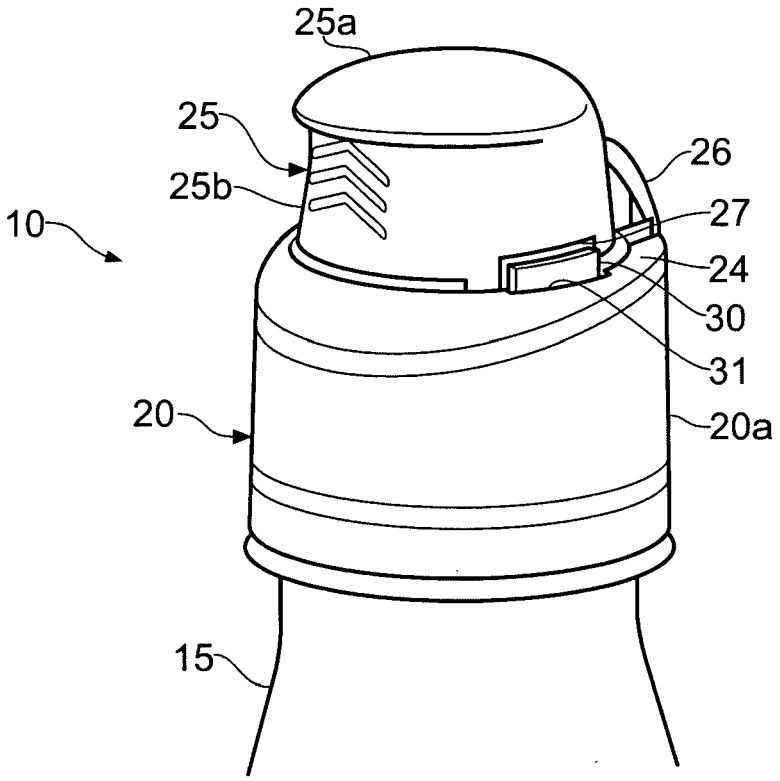

25a
25
25b
10
26
27
24
30
31
20
20a
15

FIG. 1

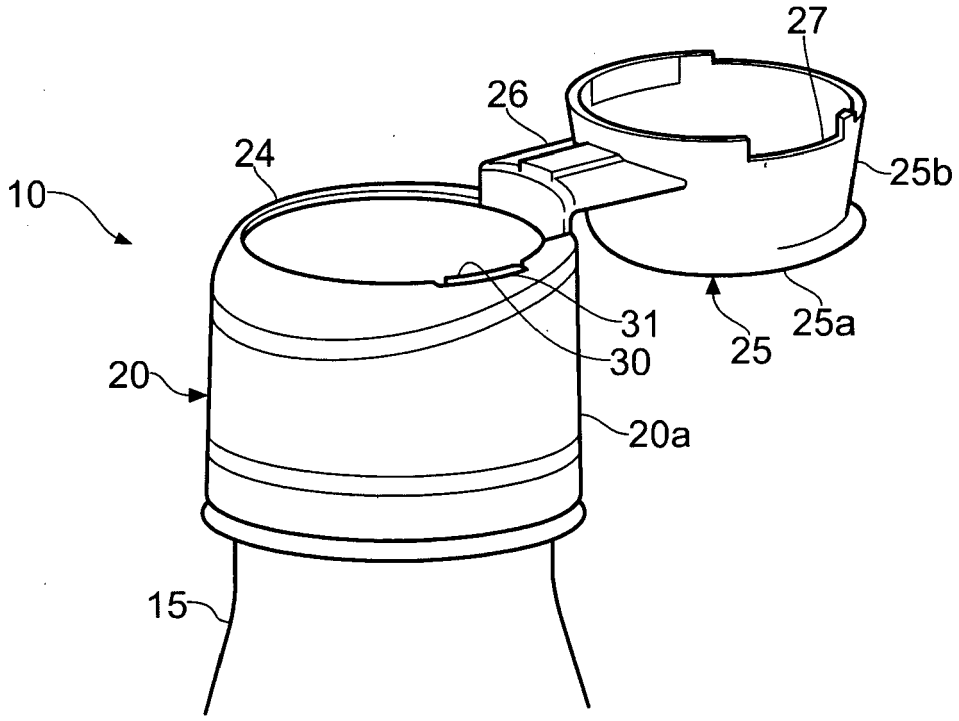

27
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25b
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25a
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20a
15

FIG. 2

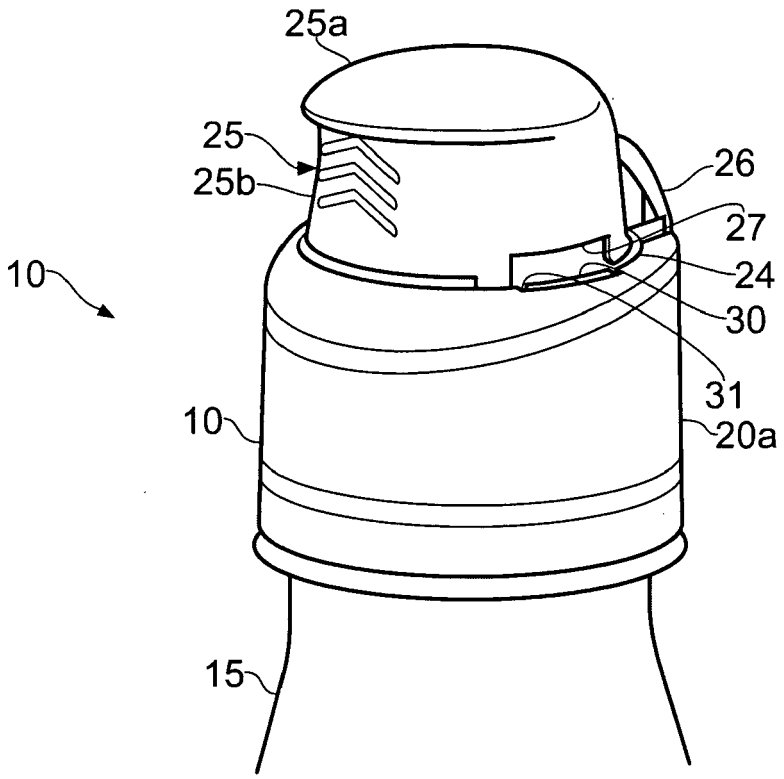


FIG. 3

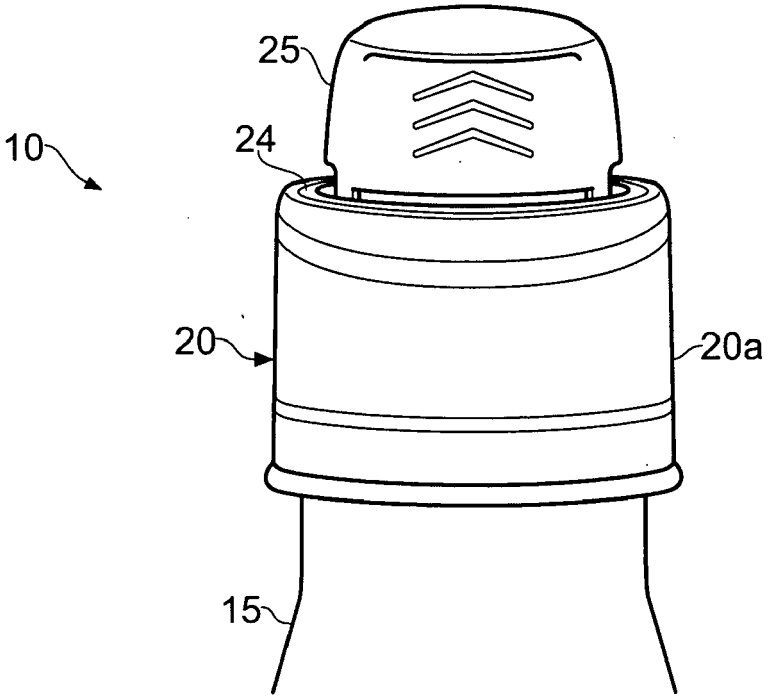


FIG. 4

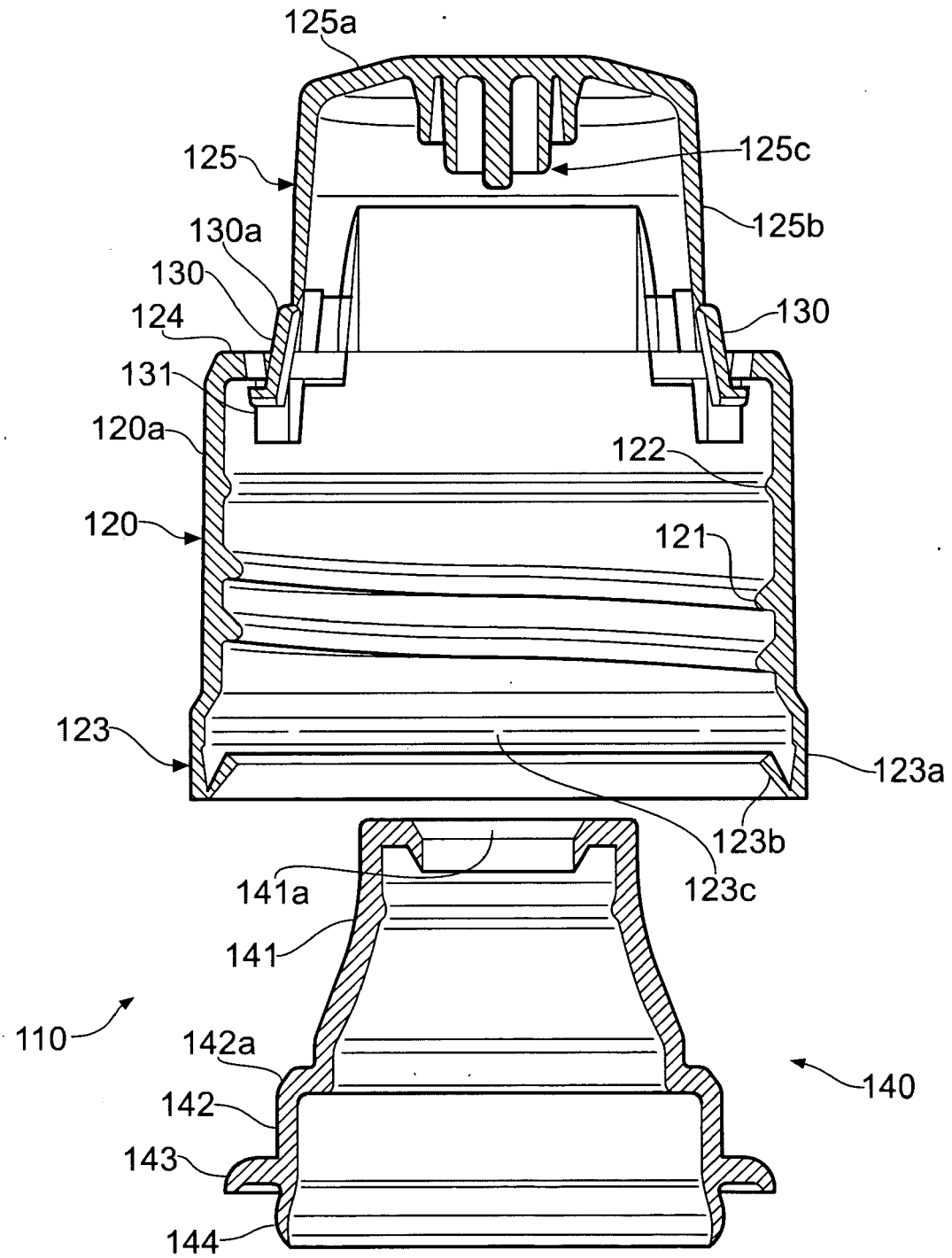

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125
125c
125b
130a
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124
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120a
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123
123a
123b
123c
141a
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142a
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FIG. 5

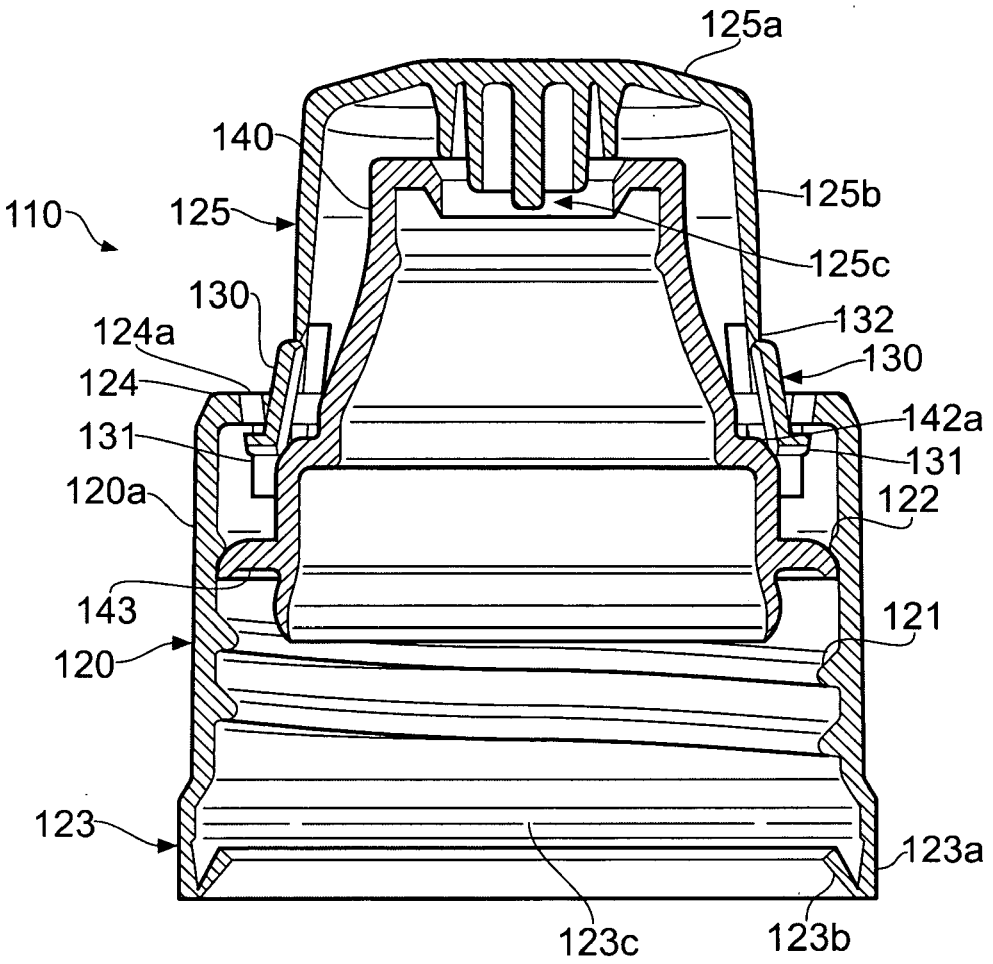

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125b
125c
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123a
123c
123b

FIG. 6

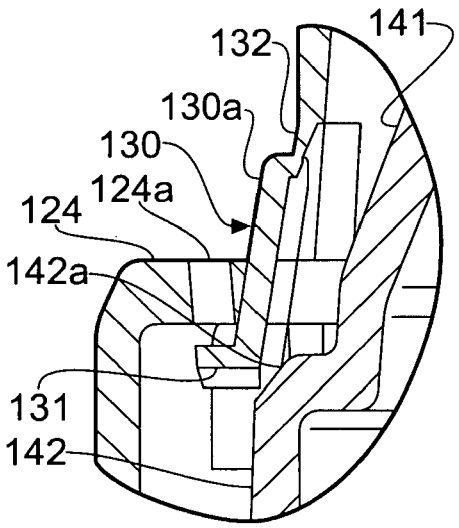

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FIG. 7

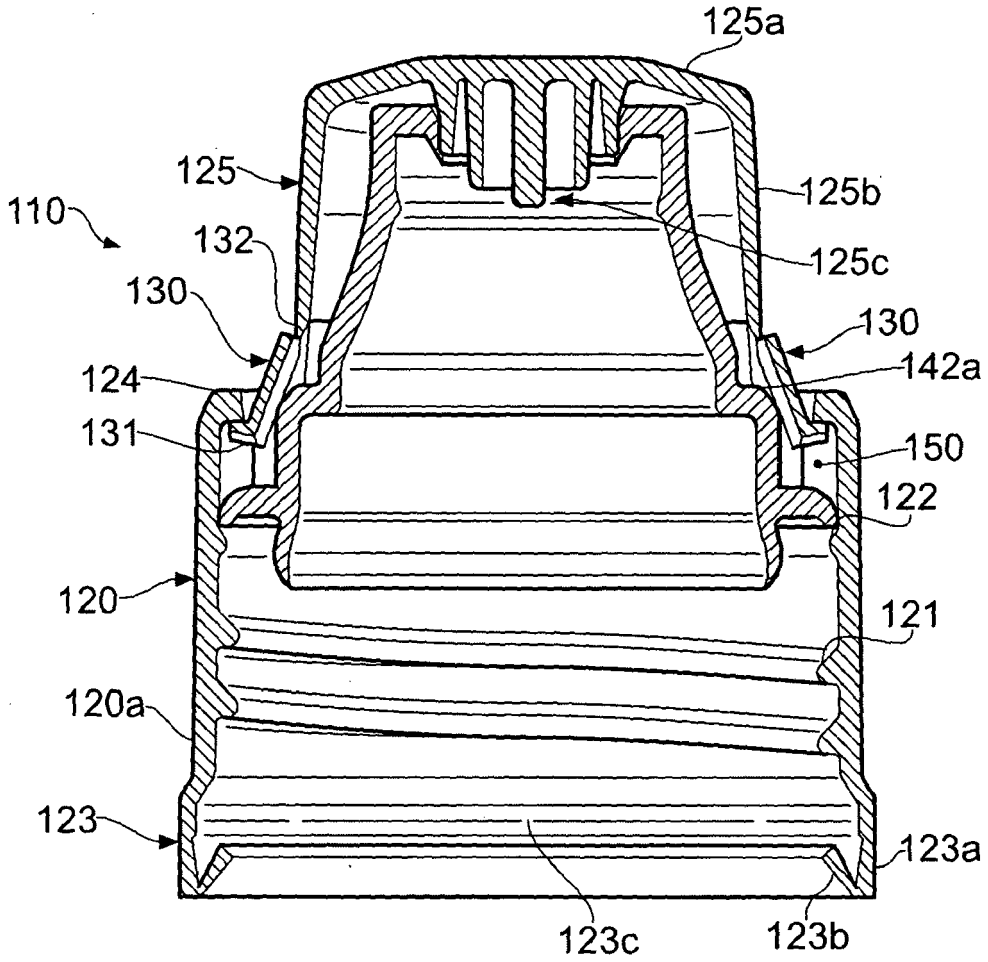

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142a
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123a
123c
123b

FIG. 8

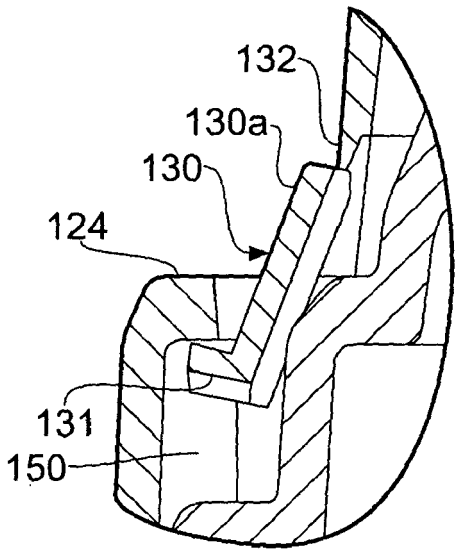

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FIG. 9

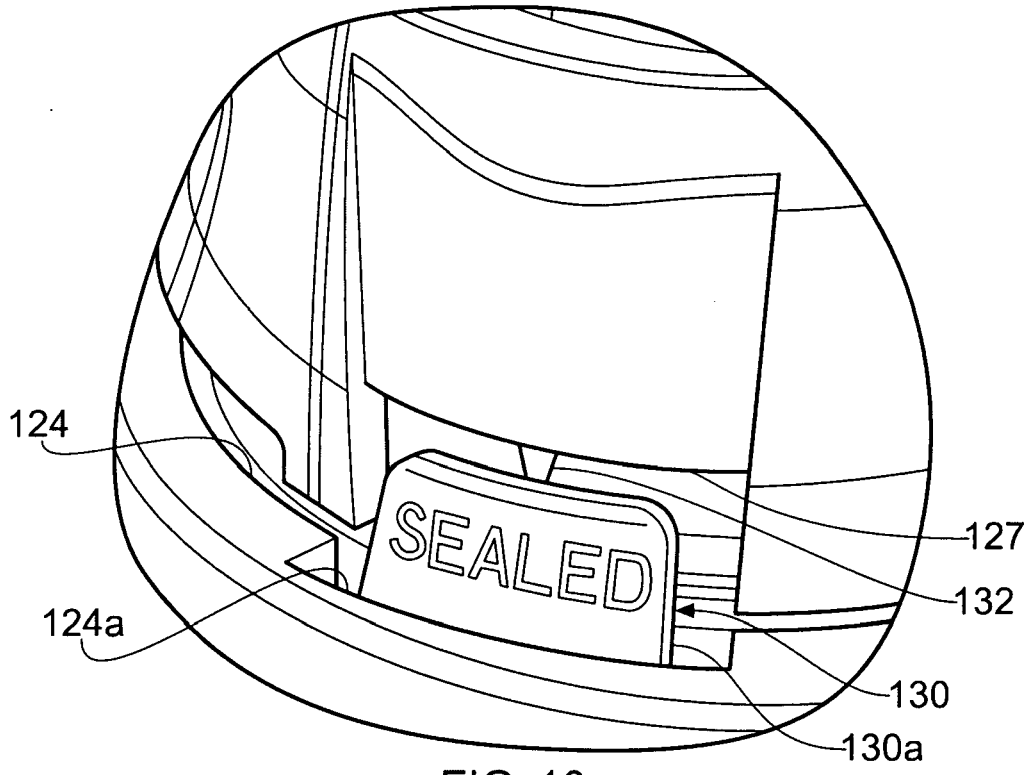

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FIG. 10

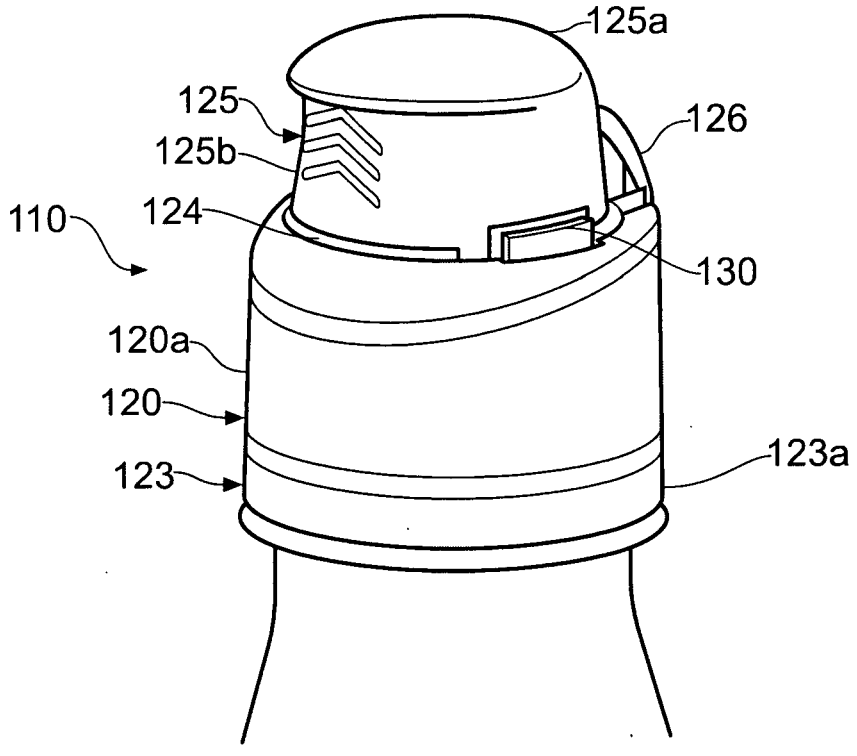

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FIG. 11

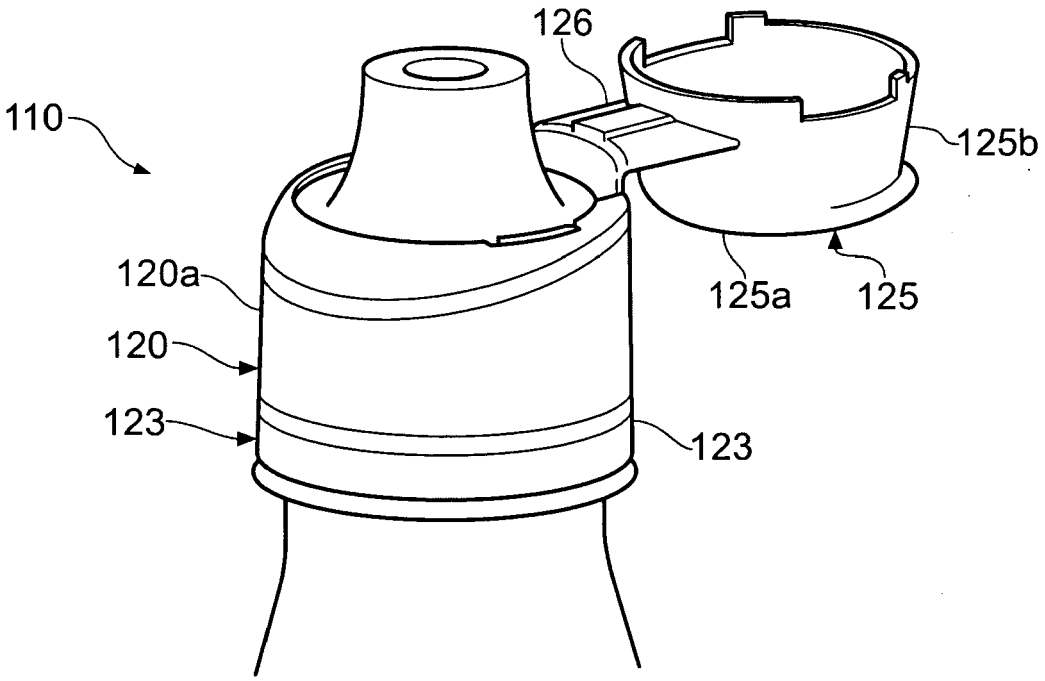

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FIG. 12

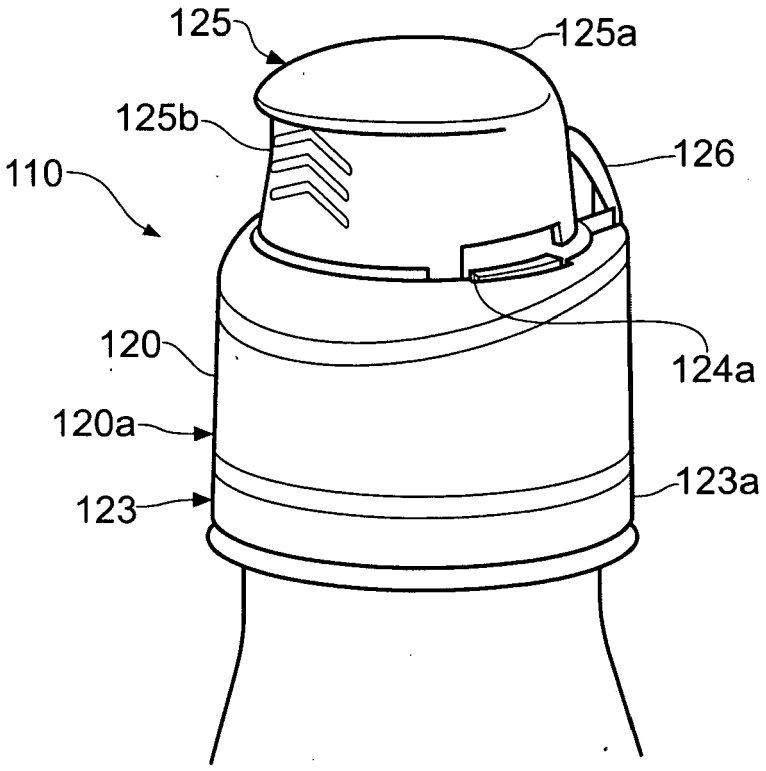

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123a
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FIG. 13

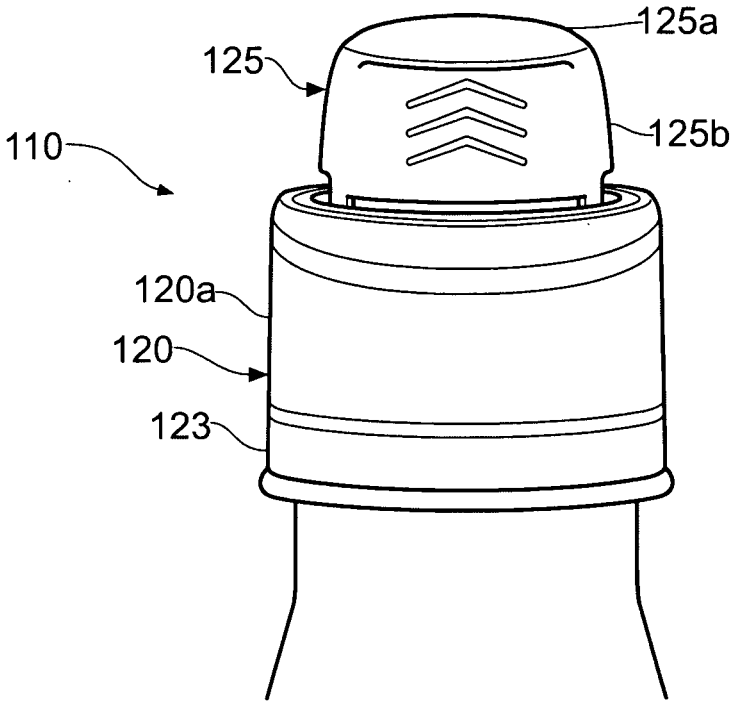

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FIG. 14

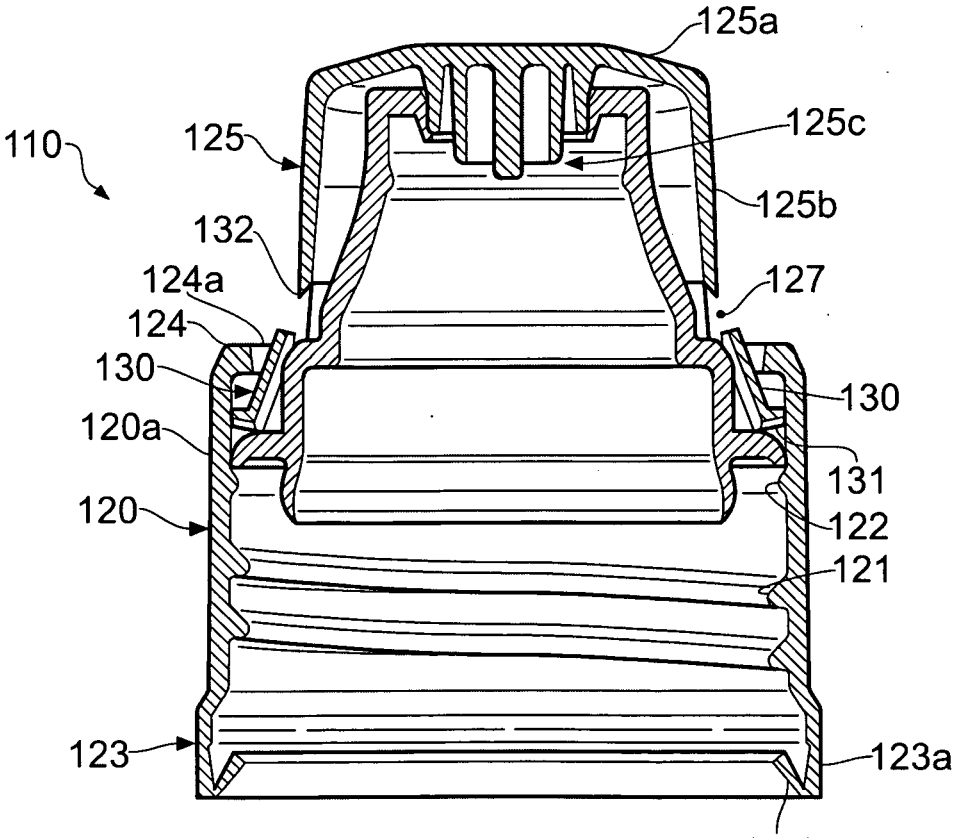

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FIG. 15

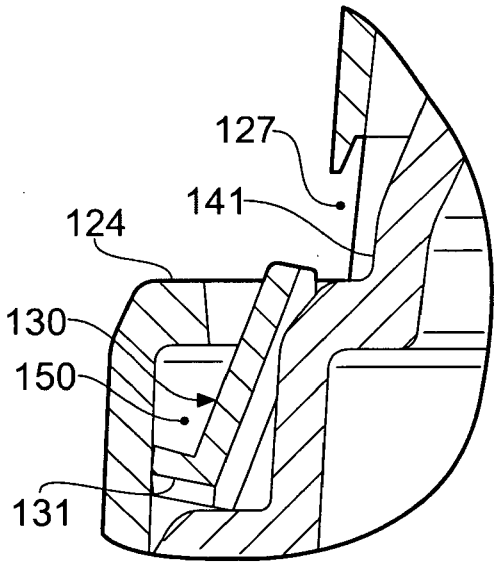


FIG. 16

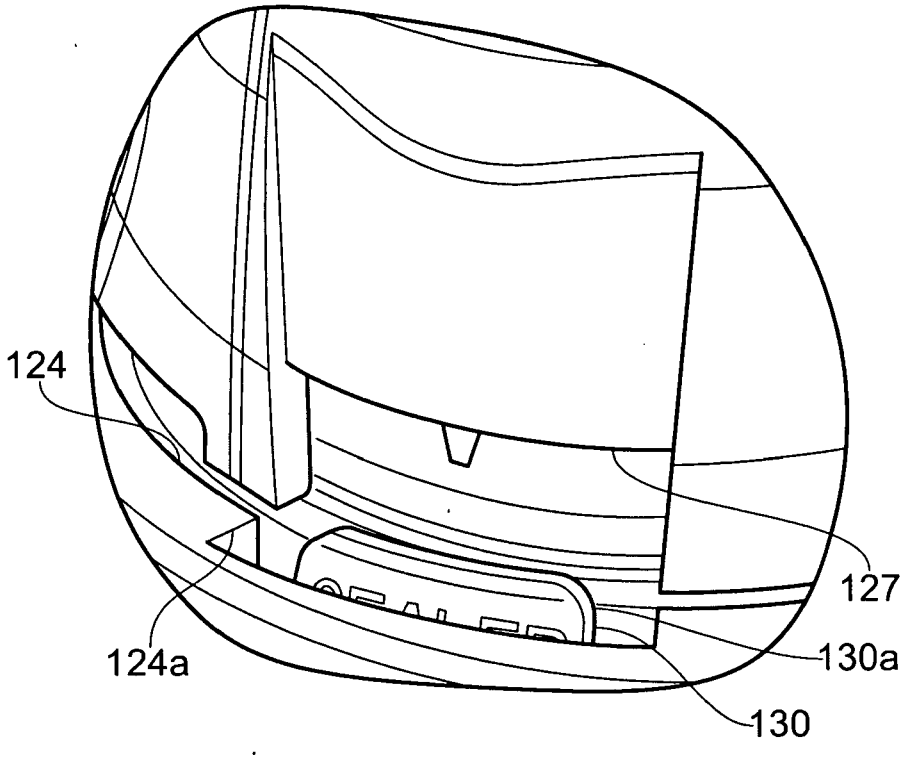


FIG. 17

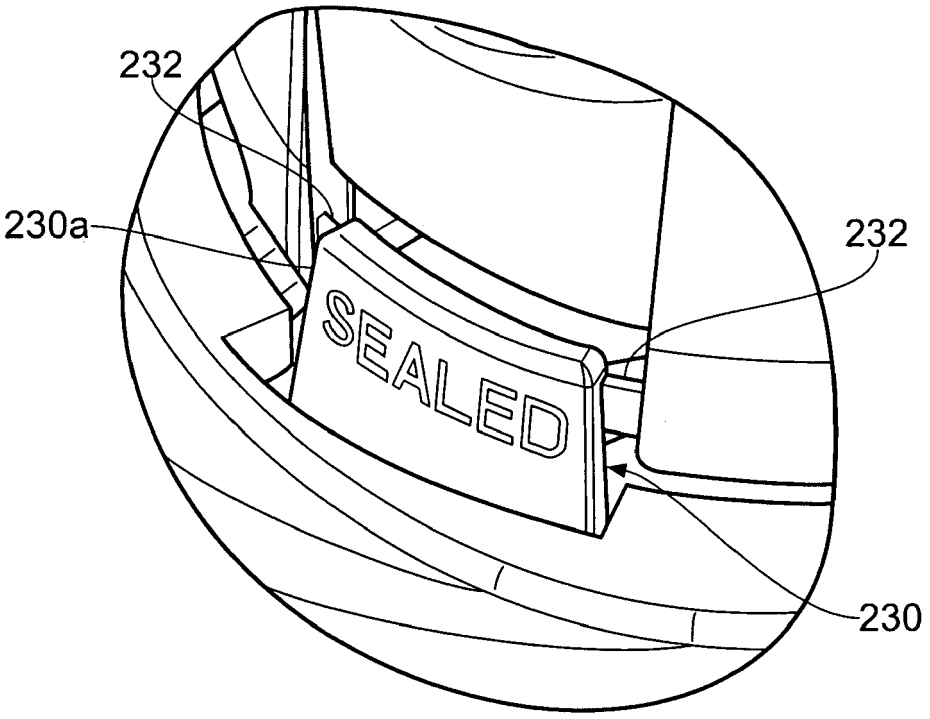


FIG. 18

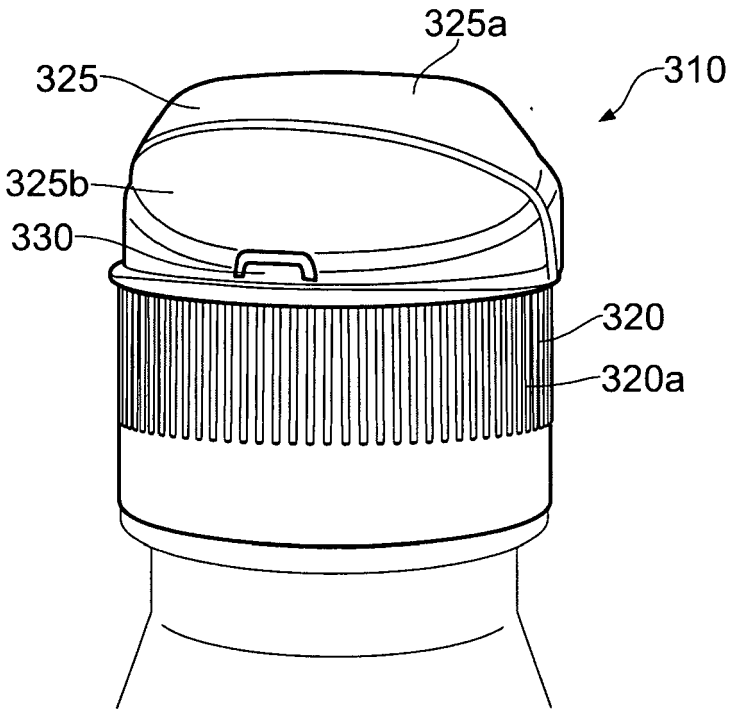


FIG. 19

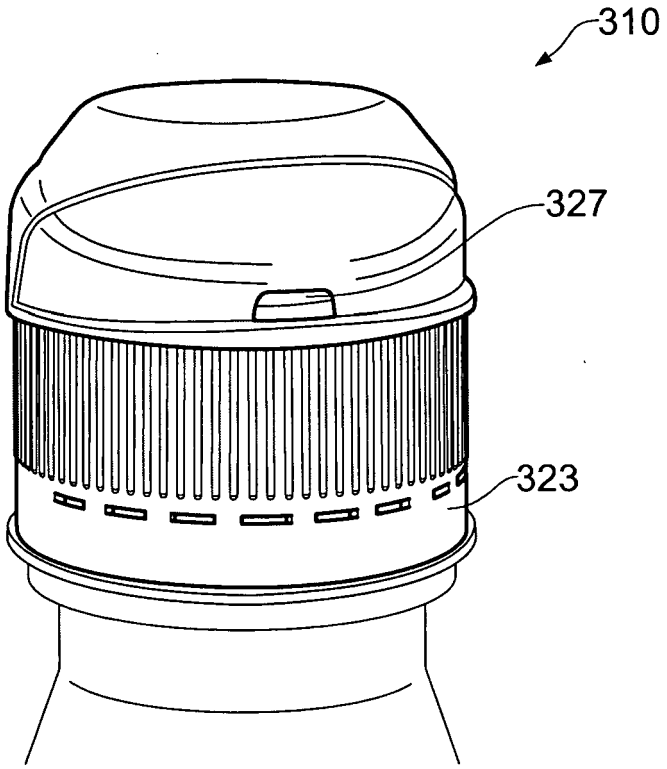


FIG. 20

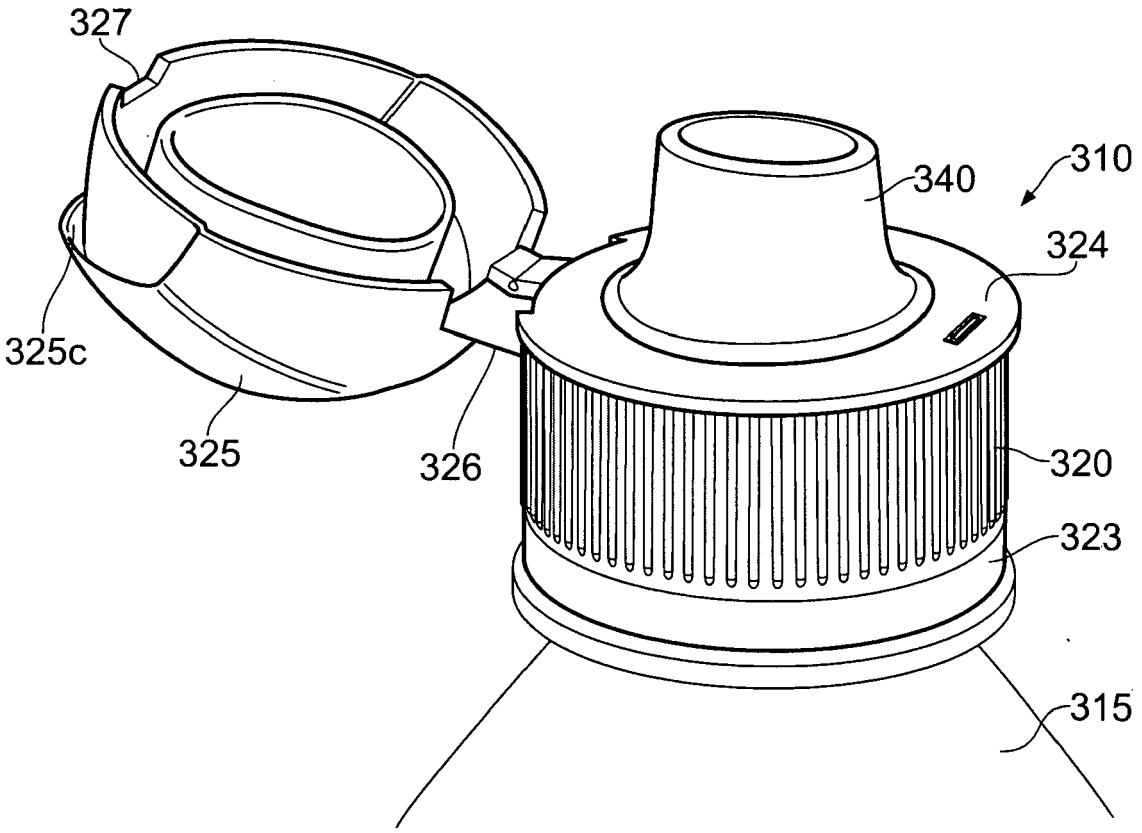


FIG. 21

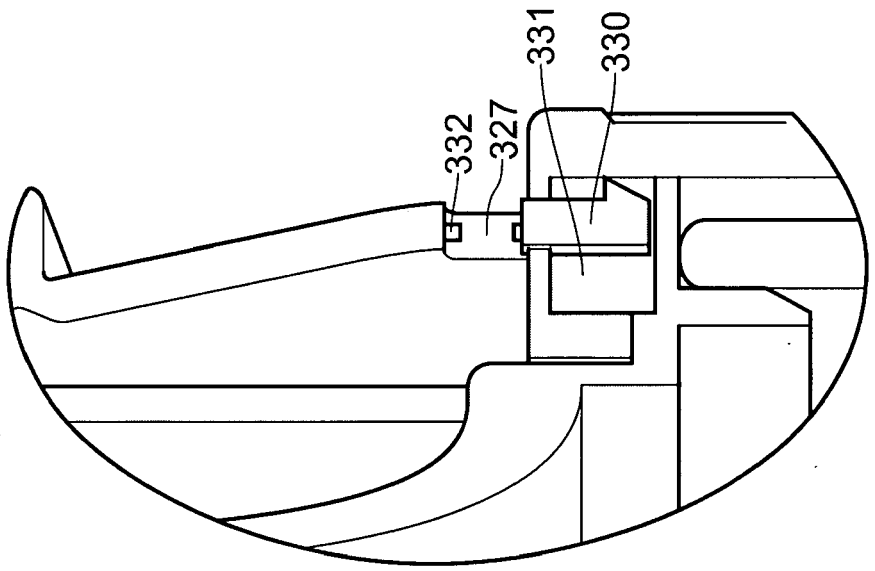


FIG. 23

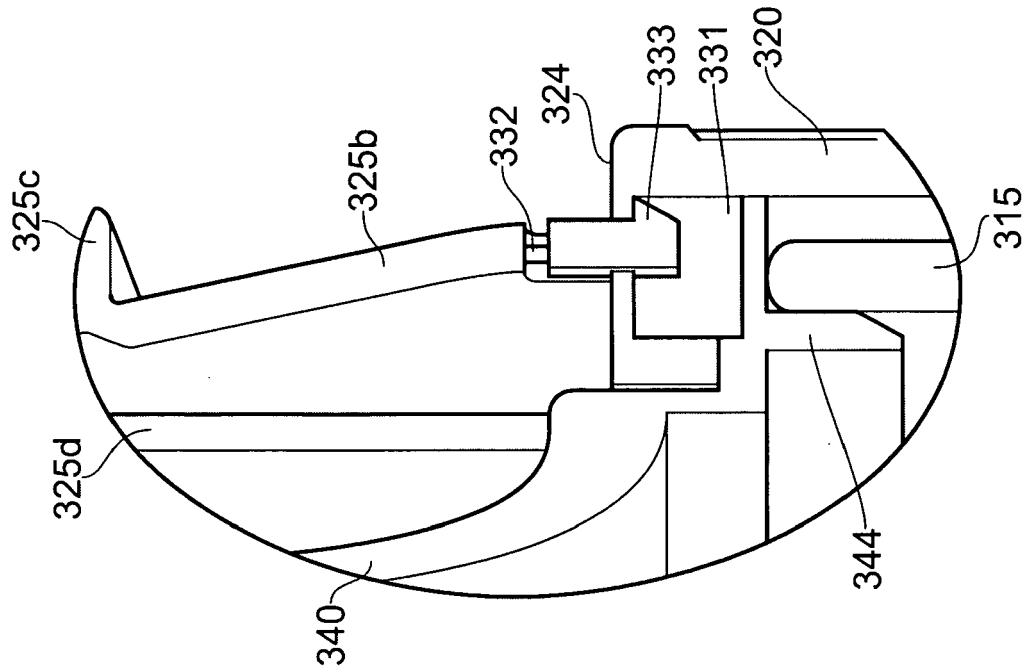


FIG. 22

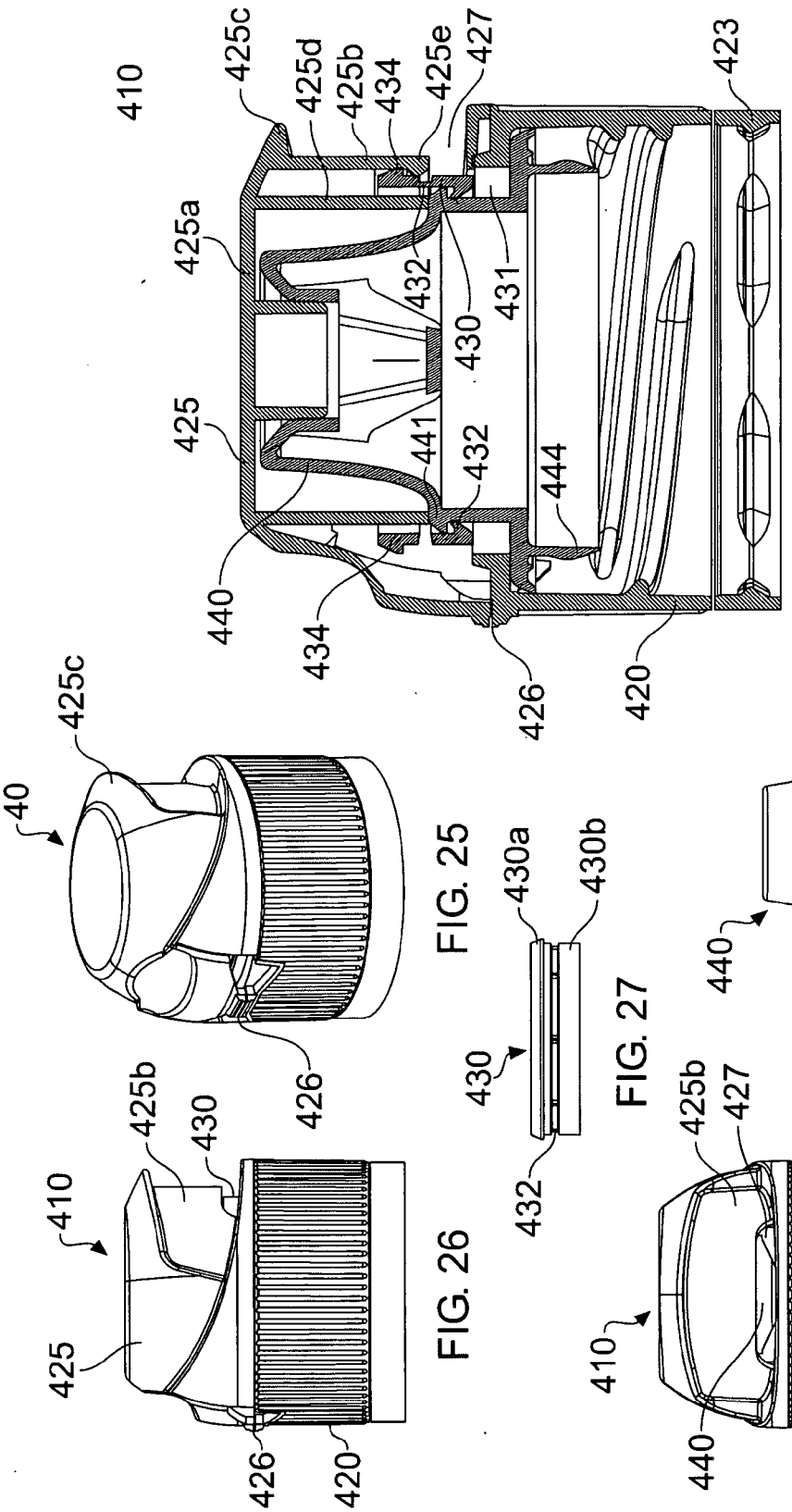


FIG. 24

FIG. 25

FIG. 26

FIG. 27

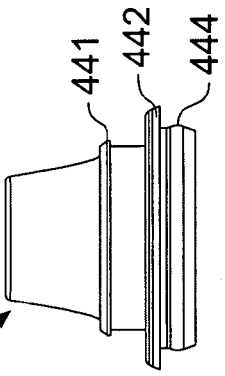


FIG. 29

FIG. 28

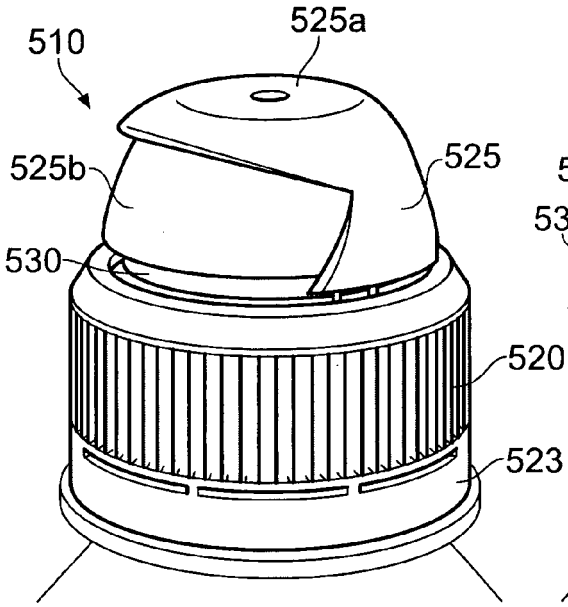


FIG. 30

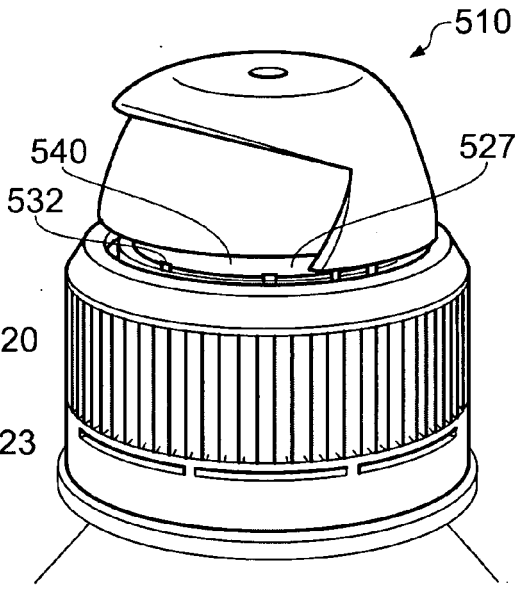


FIG. 31

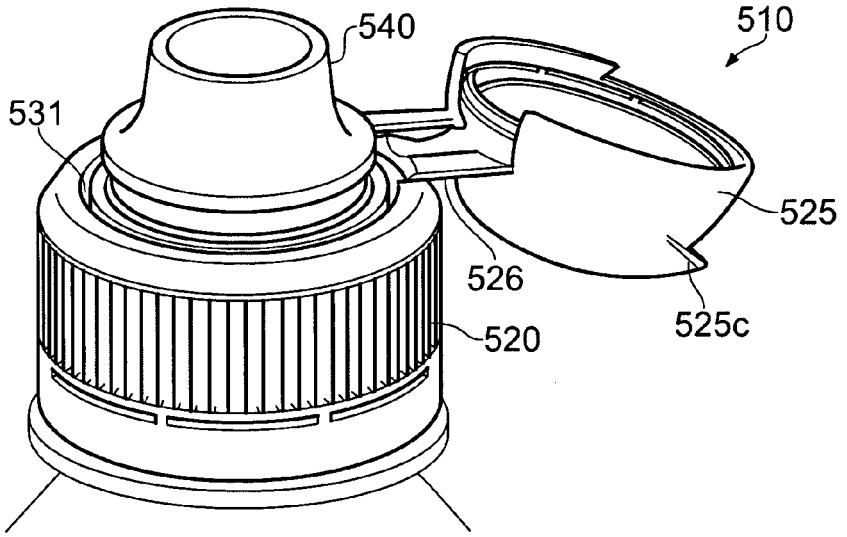


FIG. 32

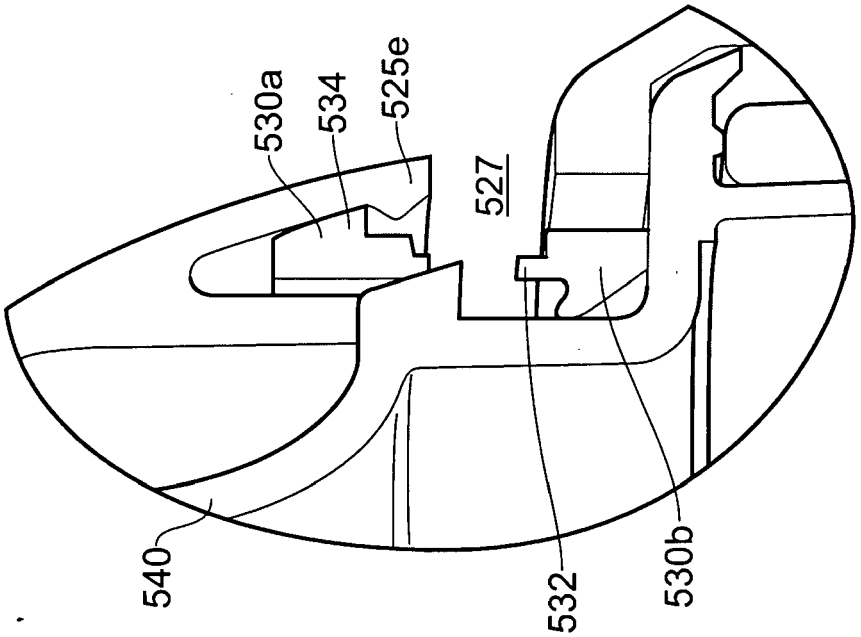

530a
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FIG. 34

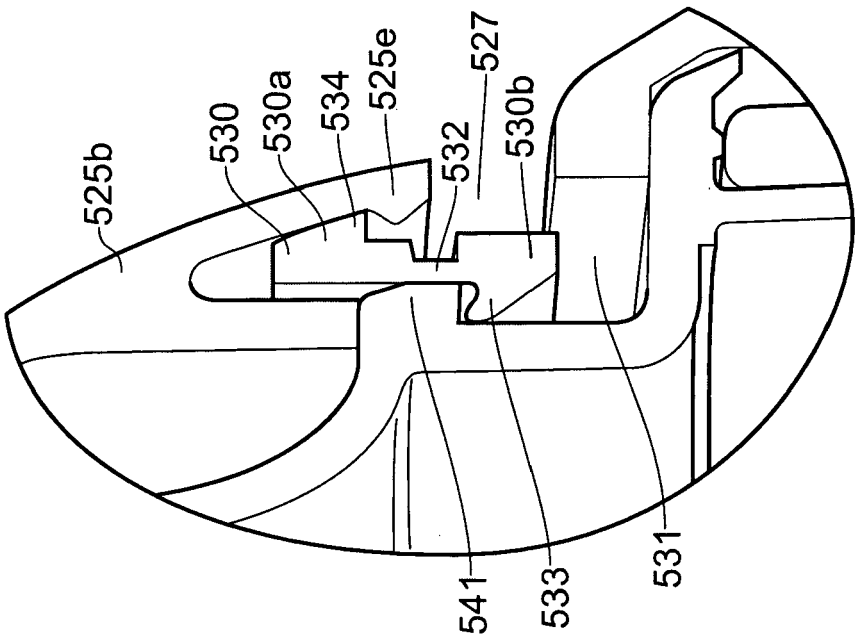

525b
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FIG. 33

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EUROPEAN SEARCH REPORT

Application Number
EP 10 00 3258

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y A	US 6 269 986 B1 (GROSS RICHARD A [US]) 7 August 2001 (2001-08-07) * column 5, line 15 - column 8, line 40; figures 7,11 *	1-5,7-9, 11 6 10	INV. B65D47/08 ADD. B65D55/02
X	WO 98/57864 A1 (APTARGROUP INC [US]) 23 December 1998 (1998-12-23) * abstract; figures * * page 5, line 10 - page 10, line 28 *	1,3,4, 7-9,11	
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A	WO 96/11150 A (APTARGROUP INC [US]) 18 April 1996 (1996-04-18) * abstract; claims; figures * * page 3, line 5 - page 4, line 6 * * page 7, line 17 - page 12, line 20 *	1-11	
A	US 4 941 592 A (KITTERMAN LAWRENCE R [US]) 17 July 1990 (1990-07-17) * column 2, line 40 - column 4, line 15; figures * * column 5, line 26 - column 6, line 2 *	1-11	TECHNICAL FIELDS SEARCHED (IPC) B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	19 May 2010	Dederichs, August

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19-05-2010

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