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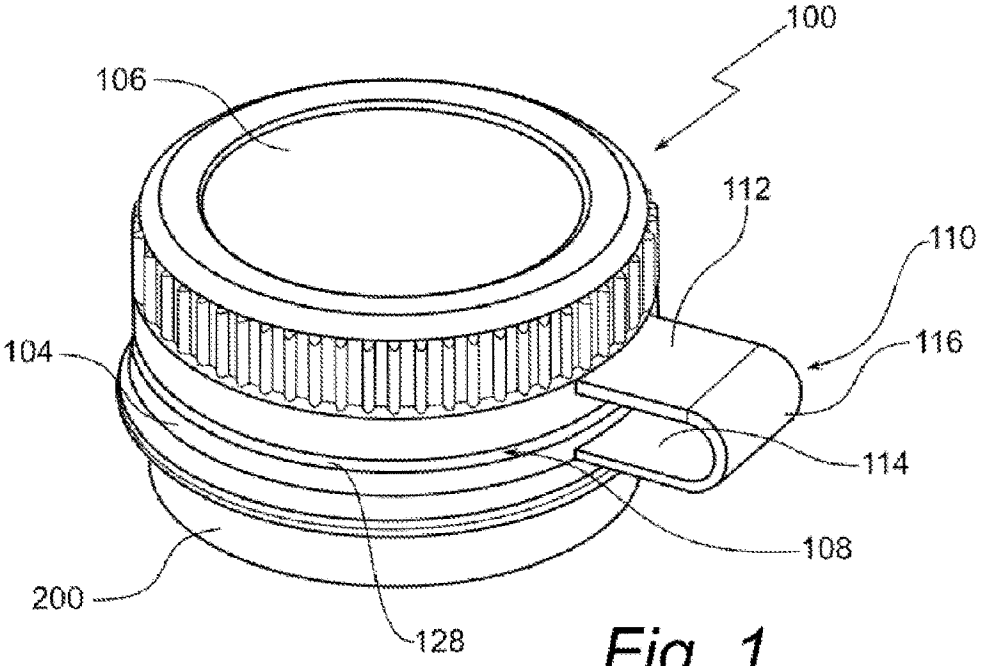

Fig. 1

(57) Abrégé/Abstract:
This invention relates to a tethered plastic stopper, having a tamper band positioned around the stopper, a closure shell positioned on top of the stopper above the tamper band, and a linking feature. The linking feature is configured to connect the tamper band to the closure shell, the linking feature including a first end configured to attach to the closure shell, a second end configured to attach to the tamper band, and a central portion. The central portion positioned between the first end and the second end, the central portion being situated furthest from the stopper when compared to the first end and the second end. The linking feature is positioned outside the periphery of the stopper and is configured to allow the central portion to flex during removal of the closure shell from a top of a bottle neck.

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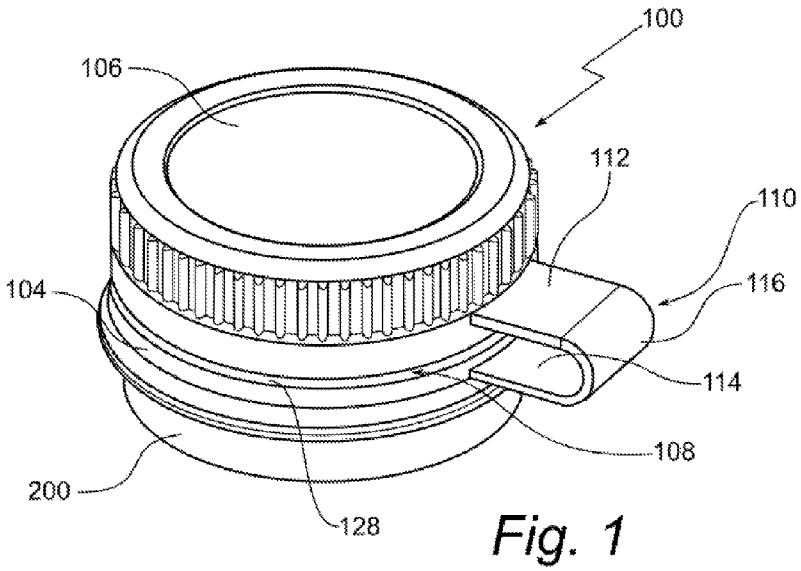

Fig. 1

(57) Abstract: This invention relates to a tethered plastic stopper, having a tamper band positioned around the stopper, a closure shell positioned on top of the stopper above the tamper band, and a linking feature. The linking feature is configured to connect the tamper band to the closure shell, the linking feature including a first end configured to attach to the closure shell, a second end configured to attach to the tamper band, and a central portion. The central portion positioned between the first end and the second end, the central portion being situated furthest from the stopper when compared to the first end and the second end. The linking feature is positioned outside the periphery of the stopper and is configured to allow the central portion to flex during removal of the closure shell from a top of a bottle neck.

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[Continued on next page]

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TETHERED PLASTIC STOPPER

TECHNICAL FIELD

[001] This invention relates to a tethered plastic stopper. More specifically, the present disclosure relates to linking a closure shell to a tamper band of a bottle neck.

BACKGROUND

[002] In the field of liquid packaging, it is very common to seal the aperture of a container with a stopper, often made from a plastic material. Such a container is usually a plastic bottle, but other materials may be used as well.

[003] The stopper typically has a tubular shape closed at its top edge by a top wall. The stopper comprises a closure shell attached to a tamper band through the implementation of bridges. Bridges are distributed around the circumference of the closure shell and the tamper band. Moreover, the bridges may be made when molding the stopper or after through undergoing a cutting step during the manufacturing process.

[004] Usually the bottle neck comprises outer fixation features, such as threads for screw type stopper or annular fixation rings for a snap type stopper that secures the stopper on the bottle neck.

[005] For screw type stoppers, the closure shell typically comprises inner thread(s) arranged inside side walls. The bottle neck fixation feature comprises outer thread(s). Such combinations of outer and inner thread(s) allow the stopper to be screwed on a bottle neck to seal it and unscrewed for bottle entirely opening. A snap type stopper comprises inner annular area and the bottle neck fixation feature comprises outer fixation ring, in order to slot in force the stopper on the bottle neck. A snap type stopper comprises a closure shell with a movable sealing roof from a closure position to a part opening, and reversely. The roof may be separating upon opening or may be connected with the closure shell.

[006] In a sealing position of the stopper, the tamper band is secured around the bottle neck finish through inner tamper band retaining features or through the tamper band diameter being smaller than a diameter of a tamper evident ring of the bottle neck finish.

[007] The closure shell is typically removable. During bottle opening, the bridges form a weakness line and are torn apart from the closure shell, so it can be separated from the

bottle. The weakness line is torn when user unscrews the closure shell of the stopper or when user lifts the roof by tilting.

[008] After opening, the closure shell can be completely removed and discarded (e.g., dropped), preventing subsequent closure of the bottle. Additionally, the removed closure can represent waste if not recycled.

[009] Other known art prior art systems include a tethered stopper comprising a spiral strip. The spiral strip is made during the stopper molding so there is no cutting or slitting operations. Other known prior art systems includes tethered stoppers comprising two strips linking the closure shell to the tamper band secured on the bottle neck.

SUMMARY

[0010] This invention relates to an improved tethered plastic stopper including a closure shell that remains attached to its tamper band after the bottle is opened through a linking feature. When the closure is removed, the linking feature remains connected to both the closure shell and the tamper band such.

[0011] According to one embodiment, the linking feature is shaped like a hinge and extends outwardly. It is designed to facilitate the manual opening and closing by a user. The shape of the linking feature also allows the closure shell to move aside the bottle neck in a way to not interfere during use (e.g. a customer when drinking from the bottle). The linking feature keeps the closure shell in a fully opened.

[0012] The linking feature may include a hollow between its ends attached to the tamper band and opposite to the closure shell, so when opening the linking feature is used to open the closure shell from the bottle neck, it deforms to get closer to the stopper. In addition, the closure shell may be reapplied by moving the linking feature in reverse.

[0013] In some embodiments, the linking feature is forms a C-shape and extends horizontally from the periphery of the stopper. In other embodiments, the linking feature is forms a V-shape and extends horizontally from the periphery of the stopper.

[0014] In some embodiments, the first end of the linking feature comprises two top tongues each connected to the closure shell, the second end of the linking feature comprises a bottom tongue connected to the tamper band, and the central portion connecting the top tongues and the bottom tongue is round. In some embodiments top tongue and/or the bottom tongues curve to form an S-shape.

[0015] Other systems, methods, features, and advantages of the invention will be or will become apparent to one with skill in the art upon examination of the following figures and detailed description. It is intended that all such additional systems, methods, features and advantages be included within this description, be within the scope of the invention, and be protected by the accompanying claims.

DESCRIPTION OF DRAWINGS

[0016] The figures are not necessarily to scale and some features may be exaggerated or minimized, such as to show details of particular components. Emphasis is placed on illustrating the principles of the invention. In the figures, like reference numerals designate corresponding parts throughout the different views.

[0017] Figure 1 is a diagrammatic perspective view of a first embodiment of a tethered stopper in a closed position.

[0018] Figure 2 is a diagrammatic section view of the first embodiment of the tethered stopper secured on a bottle neck in the closed position.

[0019] Figure 3 is a diagrammatic top view of the first embodiment of the tethered stopper in the closed position.

[0020] Figure 4 is a diagrammatic perspective view of a second embodiment of the tethered stopper in a closed position.

[0021] Figure 5 is a diagrammatic section view of the second embodiment of the tethered stopper secured on a bottle neck in the closed position.

[0022] Figure 6 is a diagrammatic top view of the second embodiment of the tethered stopper in the closed position.

[0023] Figure 7 is a diagrammatic perspective view of a third embodiment of the tethered stopper in a closed position.

[0024] Figure 8 is a diagrammatic section view of the third embodiment of the tethered stopper secured on a bottle neck in the closed position.

[0025] Figure 9 is a diagrammatic top view of the third embodiment of the tethered stopper in the closed position.

DETAILED DESCRIPTION

[0026] As required, detailed embodiments of the present disclosure are disclosed herein. The disclosed embodiments are merely examples that may be embodied in various and

alternative forms, and combinations thereof. As used herein, for example, exemplary, and similar terms, refer expansively to embodiments that serve as an illustration, specimen, model or pattern.

[0027] In some instances, well-known components, systems, materials or methods have not been described in detail in order to avoid obscuring the present disclosure. Therefore, specific structural and functional details disclosed herein are not to be interpreted as limiting, but merely as a basis for the claims and as a representative basis for teaching one skilled in the art to variously employ the present disclosure.

[0028] Phrasing such as 'configured to' perform a function, including in the claims, can include any or all of being sized, shaped, positioned in the arrangement, and comprising material to perform the function.

[0029] Terms indicating quantity, such as 'first' or 'second' are used for exemplary and explanation purposes and are not intended to dictate the specific ordering of a component with respect to other components. Terms indicating position such as 'upper' and 'lower' or 'front' and 'back' are used to indicate components relation to one another. One of skill in the art would recognize other configurations are possible.

[0030] Various embodiments of the present disclosure are disclosed herein. The described embodiments are merely exemplary illustrations of implementations set for a clear understanding of the principles of the disclosure. Variations, modifications, and combinations may be made to the described embodiments without departing from the scope of the claims. All such variations, modifications, and combinations are included herein by the scope of this disclosure and the claims.

[0031] Figure 1 illustrates a tethered plastic stopper 100, for closing a bottle neck 200. The stopper 100 is integrally made of a single plastic piece by a molding fabrication step. Other parts or elements of the stopper 100 can be further created into the entire plastic piece through a cutting or slitting step.

[0032] The stopper 100 can be a screw type or a snap type. It includes inner fixation features, such as thread(s) or inner annular ring(s), designed to cooperate with outer complementary fixation features made on the bottle neck 200.

[0033] The stopper 100 includes a tamper band 104 and a closure shell 106. The tamper band 104 and the closure shell 106 are linked together, the tamper band 104 may be connected to the bottom of the closure shell 106 and to the top of the tamper band 104.

[0034] Retaining features may be found connected to the tamper band 104. The retaining features secure the stopper 100 when sealing the bottle neck 200. The retaining features include a collar (not shown). When the bottle neck 200 is sealed, the collar (not shown) may be inverted inside the tamper band 104, which locks stopper 100 against a tamper band 104, which is positioned outwardly around the bottle neck 200.

[0035] The stopper 100 also includes at least a weakness line 108 between the closure shell 106 and the tamper band 104. The weakness line 108 is made of bridges 128. The bridges 128 are distributed along most of the weakness line 108, and may be in regular arrangement or not. The bridges 128 link the closure shell 106 to the tamper band 104. Thus, when opening the closure shell 106, the bridges 128 are torn apart from the closure shell 106 and from the tamper band 104. Once the bridges 128 are torn, the closure shell 106 can be manually removed by the consumer, in order to open the bottle neck 200.

[0036] In one embodiment, the stopper 100 comprises a linking feature 110, such as a hinge. The linking feature 110 is attached at a top end 112 to the closure shell 106 and at the bottom end 114 to the tamper band 104. Once opened, the closure shell 106 remains attached to the tamper band 104, which is also secured on the bottle neck 200 through its retaining features.

[0037] The linking feature 110 extends outward relative to the outer face of the stopper 100, specifically relative to the tamper band 104 and the closure shell 106. The linking feature 110 is hollowed between a top end 112 and a bottom end 114. The hollow shape of the linking feature 110 confers a resilience when first sealing the stopper 100 in the bottle neck 200. When opening the linking feature 110, elasticity assists the closure shell 106 in moving into an open position. The elasticity pushes the top end 112 away from the bottom end 114, which is attached to the tamper band 104 secured on the bottle neck 200. Hence the closure shell 106 may be easily opened and maintained in an opened position through the resilience of the linking feature 110.

[0038] The linking feature 110 is offset relative to the periphery of the stopper 100. The linking feature 110 may include a central portion 116 located farthest from the stopper 100 and between the top end 112 and the bottom end 114. The central portion 116 allows the linking feature 110 to include an inner hollow shape that allows the linking feature 110 to deform upon opening or closing. When opening by rotating the closure shell 106, the central portion 116 gets closer to the stopper 100, allowing the closure shell 106 to be upwardly

moved away from the bottle neck 200. When closing by rotating the closure shell 106 in the opposite direction, the central portion 116 is pushed away from the stopper 100, allowing the closure shell 106 to be moved closer to bottle neck 200.

[0039] According to an embodiment illustrated in Figures 1 through 3, the linking feature 110 is C-shaped or U-shaped and extends horizontally away from the bottle neck 200. Specifically, the top end 112 and the bottom end 114 are generally flat and connected to one another via the central portion 116. The central portion 116 has a curvature such that it connects to the flat top end 112 and flat bottom end 116, thus forming a C-shape. In some embodiments, the top end 112 may be attached to the closure shell 106. In some embodiments, the bottom end 114 may be attached to the tamper band 104.

[0040] According to another embodiment illustrated in Figures 4 through Figure 6, the linking feature 110 extends horizontally in a V-shaped manner. Specifically, the linking feature 110 includes two upper tongues 118 and a lower tongue 120 connected by the central portion 116. The upper tongues 118 are parallel to one another and connect to the central portion 116 at one side and the lower tongue 116 connects to the central portion from an opposite side of the central portion. The upper tongues 118 attach to the closure shell 106 and the lower tongue 120 attach to the tamper band 104.

[0041] The upper tongues 118 are separated by a free space 119 on either side of the upper tongues 118. In some embodiments, the tongues 118, 120 are manufactured as one component and in a subsequent operation (e.g., slitting operating), the upper tongues 118 are separated from the lower tongue 120, thus creating the free space 119.

[0042] In some embodiments, the upper tongues 118 attach to a top portion of the closure shell 106, as illustrated in Figure 4. In other embodiments, the upper tongues 118 attach to a body portion of the closure shell 104. For example, the upper tongues 118 attach at or near finger grips of the closure shell 104.

[0043] In some embodiments, as illustrated in Figures 4 and 5, the tongues 118, 120 include a curvature that creates an S-shaped profile. When opening the closure shell 106, the lower tongue 120 may insert into the free space 119 between the upper tongues 118, so the closure shell 106 remains opened.

[0044] According to another embodiment illustrated in Figures 7 through 9, the linking feature 110 includes two lateral tongues 122. The two tongues 122 are generally parallel to one another and separated by a free space 123. The tongues 122 are generally curved such

that one end attaches to the closure shell 106 and the opposite end attaches to the tamper band 104. In some embodiments, the linking feature 110 may then include a central portion 116 for each tongue 122. For example, the central portion 116 is integrated into the tongues 122, such that each tongue 122 includes the central portion 116 between the closure shell 106 and the tamper band 104.

[0045] In some embodiments as illustrated in Figures 7 and 8, the linking feature 110 includes a vertical link 124 positioned between the tongues 122. The vertical link 124 extends vertically between the tongues 122 near the free space 123. Specifically, the vertical link 124 extends to connect a portion of the closure shell 106 to a portion of the tamper band 104.

[0046] In operation, the vertical link 124 serves to retain the lateral tongues 122 and assists the closure shell 106 to remain in an open position and closed position. The vertical link 124 maintains separation between the closure shell 106 and the tamper band 104. The vertical link also reduces the amount of force that is applied to the tongues 122 during opening and closing of the closure shell 106 than when the vertical link is not present.

[0047] In some embodiments where the closure shell 106 is a snap type, the closure shell 106 includes a handing feature 130 that is configured to be manually gripped by the user. The handing feature 130 is, for example, integrated into a peripheral edge of the closure shell 106. The handling feature 130 extends outwardly, relative to the stopper 100 and the tamper band 104, especially at a position opposite to the linking feature 110.

[0048] The closure shell 106 also may include a locking feature 107, such as a hook, extending inwardly and downwardly relative to a bottom face of the closure shell 106. The hook 107 may be configured to grasp or retain the closure shell 106 on an outer annular ring (not shown) at the top of the bottle neck 200, such that when the linking feature 110 is locked, the hook 107 prevents the closure shell 106 from accidentally opening.

[0049] In the sealed position, the hook 107 attaches to the tamper band 104 through a separation feature 105, such as a flange, extending vertically from the top edge of the tamper band 104 to the bottom edge of the hook 107. In operation during opening of the stopper 100, the separation feature 105 tears apart from the bottom of the hook 107 from the top of the flange 105. When resealed (e.g., closed), the torn hook 107 and separation feature 105 displays evidence of tampering.

[0050] While various embodiments of the invention have been described, it will be apparent to those of ordinary skill in the art that many more embodiments and implementations are possible that are within the scope of this invention.

CLAIMS

What is claimed is:

1. A tethered plastic stopper, comprising

a tamper band positioned around the stopper;

a closure shell positioned on top of the stopper above the tamper band; and

a linking feature connecting the tamper band to the closure shell, the linking feature comprising:

a first end configured to attach to the closure shell;

a second end configured to attach to the tamper band; and

a central portion positioned between the first end and the second end, the central portion being situated furthest from the stopper when compared to the first end and the second end;

wherein the linking feature is positioned outside the periphery of the stopper and is configured to allow the central portion to flex during removal of the closure shell from a top of a bottle neck.

2. A tethered plastic stopper, according to claim 1, wherein the linking feature is configured to allow flexibility of the central portion to assist in closing the closure shell.

3. The tethered plastic stopper according to claim 1, wherein the linking feature is forms a C-shape and extends horizontally from the periphery of the stopper.

4. The tethered plastic stopper according to claim 1, wherein the linking feature is forms a V-shape and extends horizontally from the periphery of the stopper.

5. The tethered plastic stopper according to claim 4, wherein:

the first end comprises two top tongues each connected to the closure shell,

the second end comprises a bottom tongue connected to the tamper band, and

the central portion connecting the top tongues and the bottom tongue is round.

6. The tethered plastic stopper according to claim 5, wherein at least one top tongue and the bottom tongues curve to form an S-shape.

7. The tethered plastic stopper according to claim 2, wherein the linking feature further comprises two lateral tongues which are curved in shape, the lateral tongues forming a free space therebetween.

8. The tethered plastic stopper according to claim 7, wherein the linking feature further comprises a vertical link located between the tongues and attached at one end to the closure shell and attached another end to the tamper band.

9. The tethered plastic stopper according to claim 8, wherein the closure shell further comprises a hook that extends inward and downward relative to the closure shell, the hook configured to connect the closure shell to an outer annular ring at the top of the bottle neck.

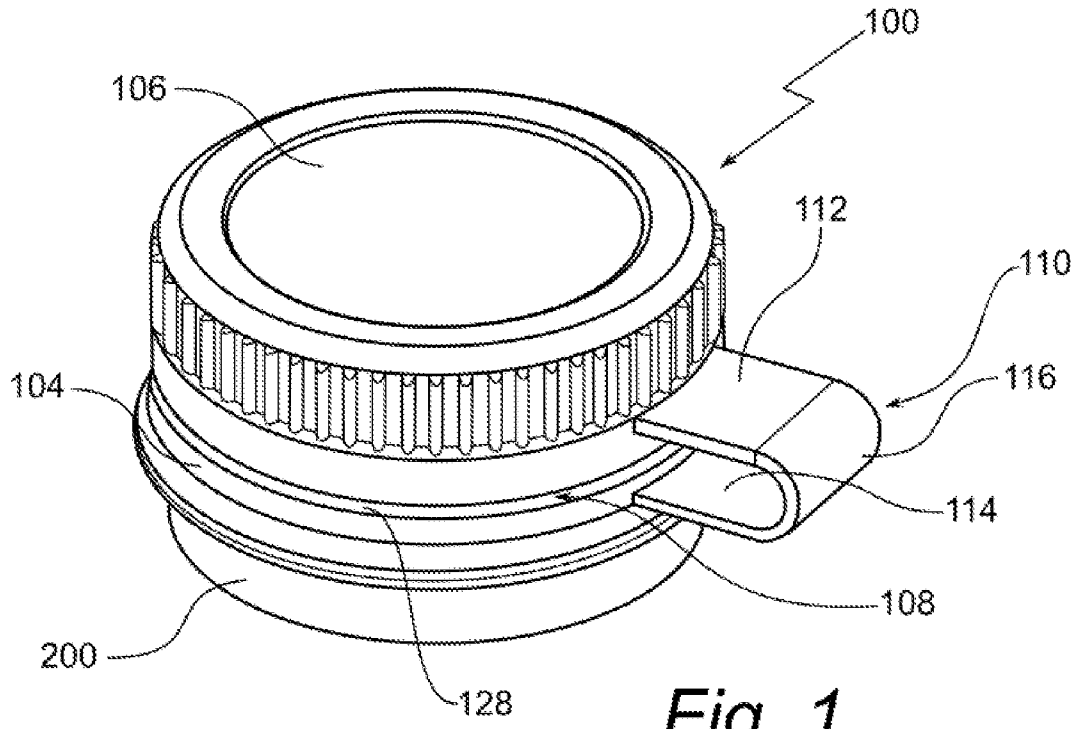
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Fig. 1

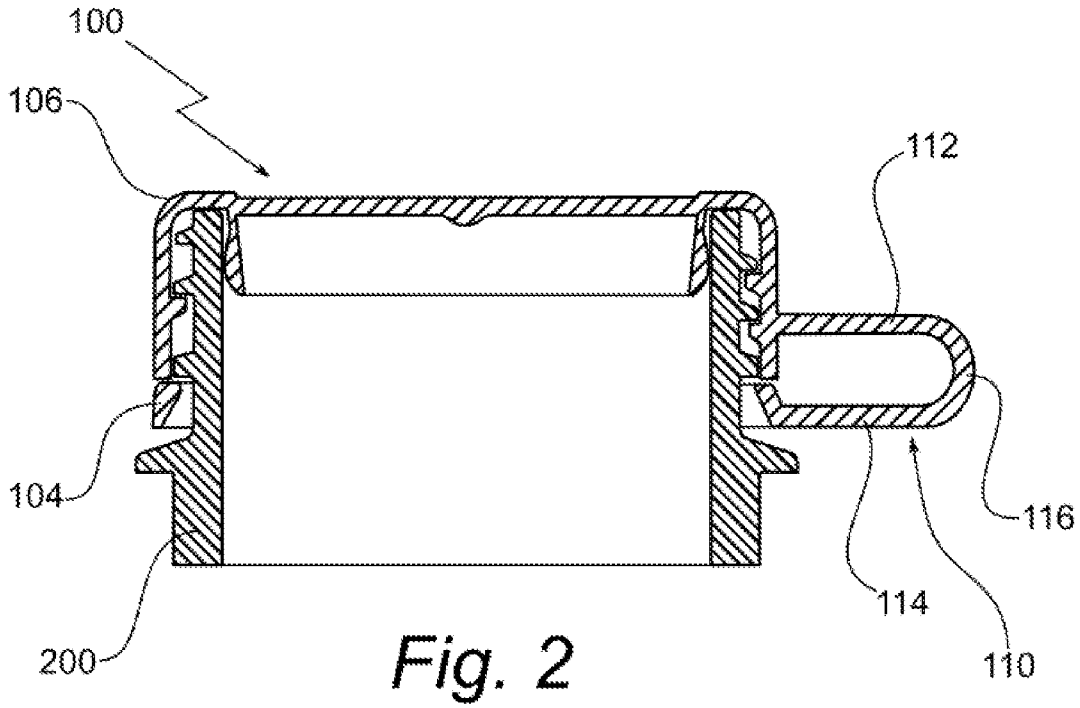
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Fig. 2

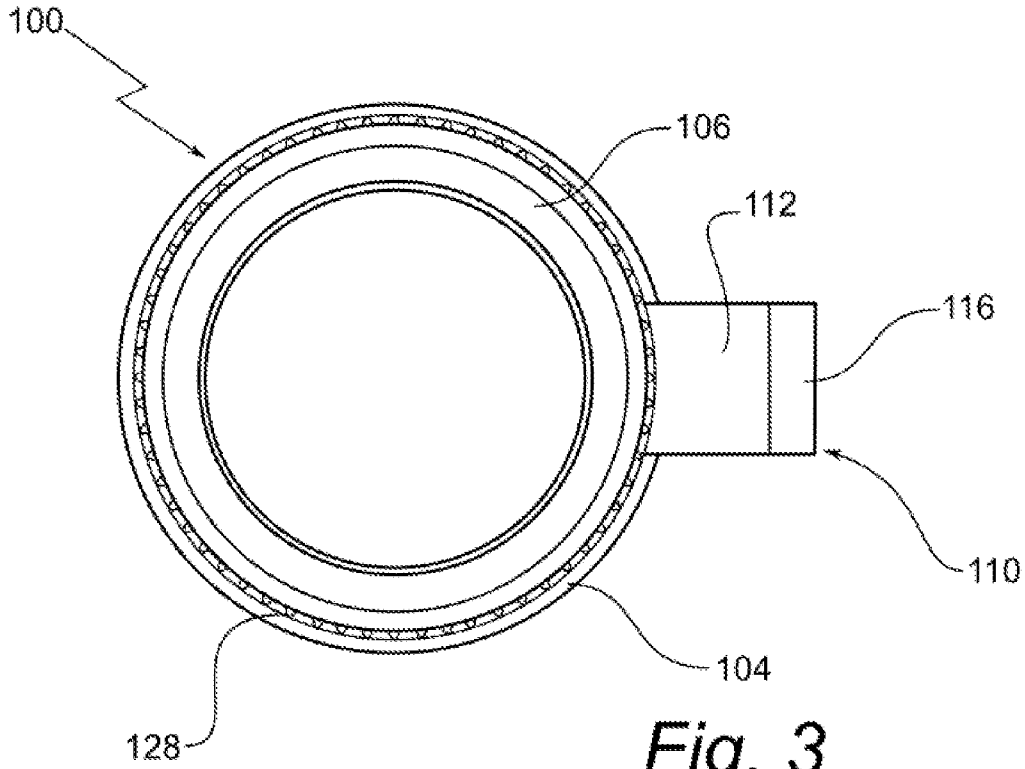
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Fig. 3

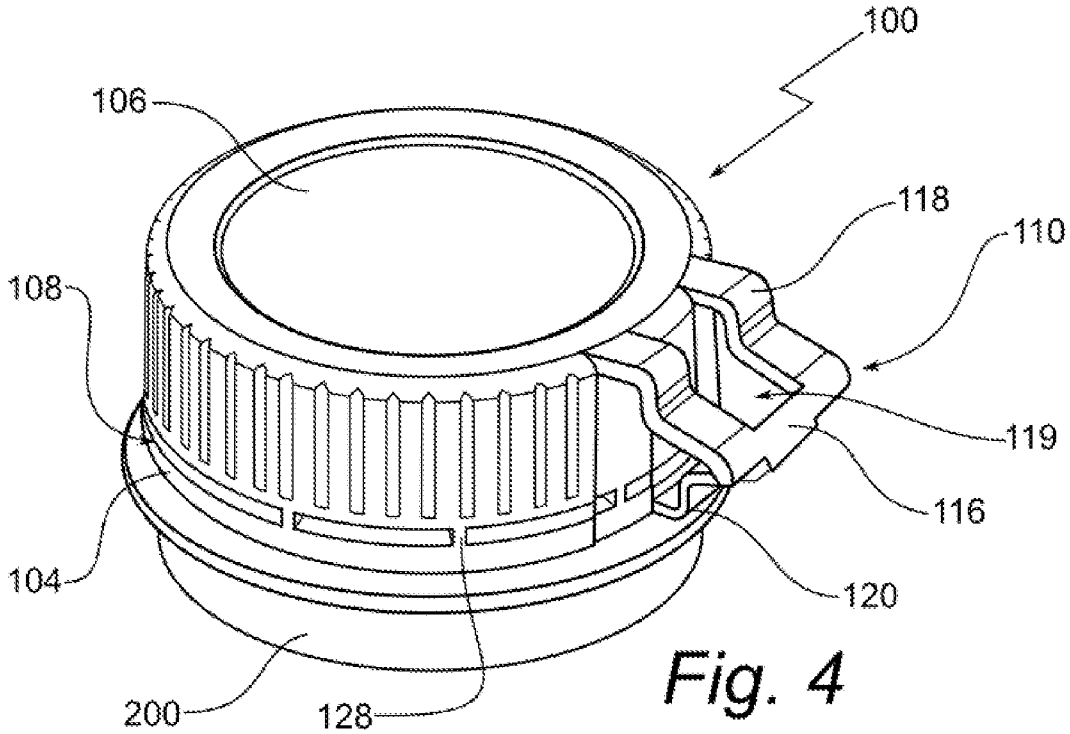
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Fig. 4

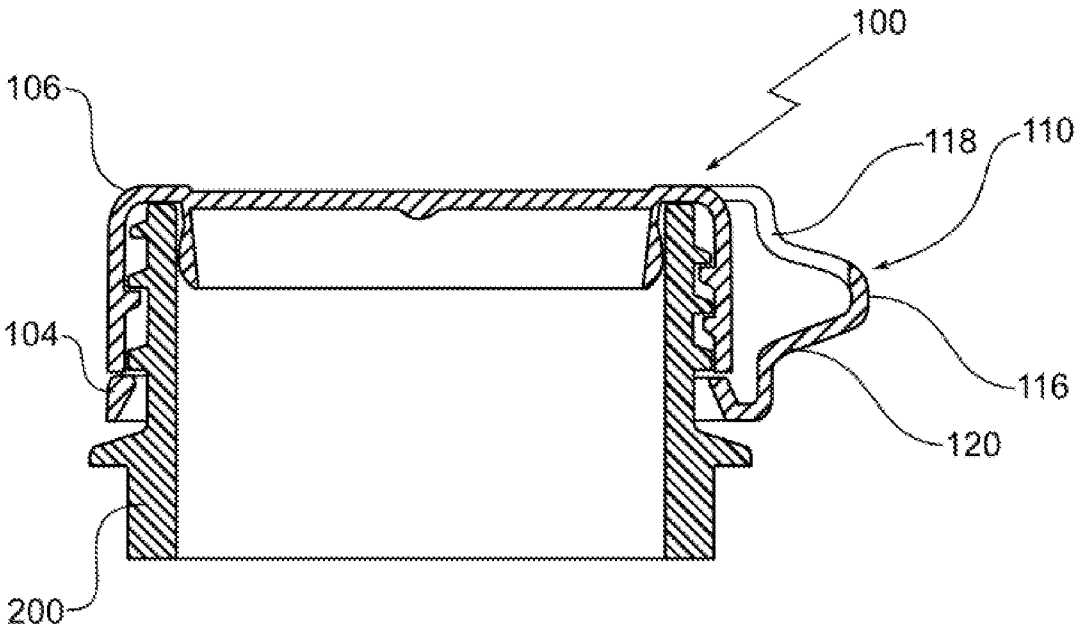
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Fig. 5

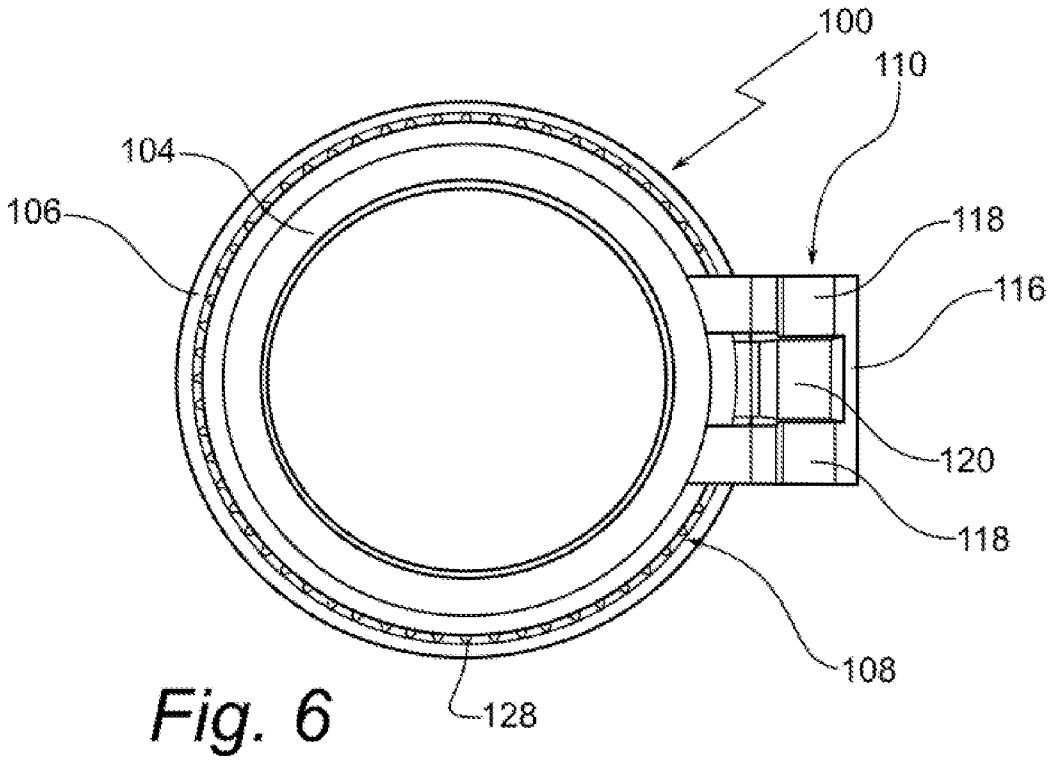
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Fig. 6

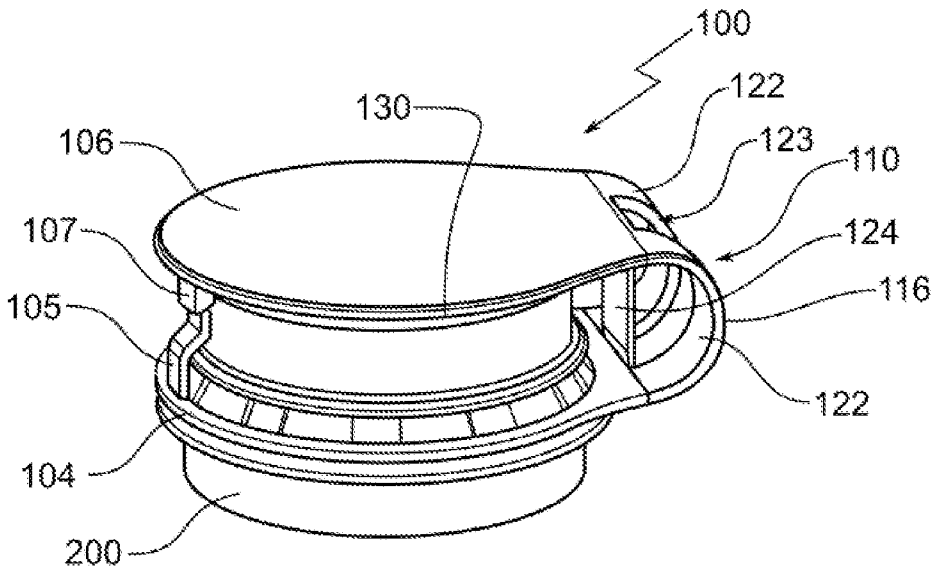
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Fig. 7

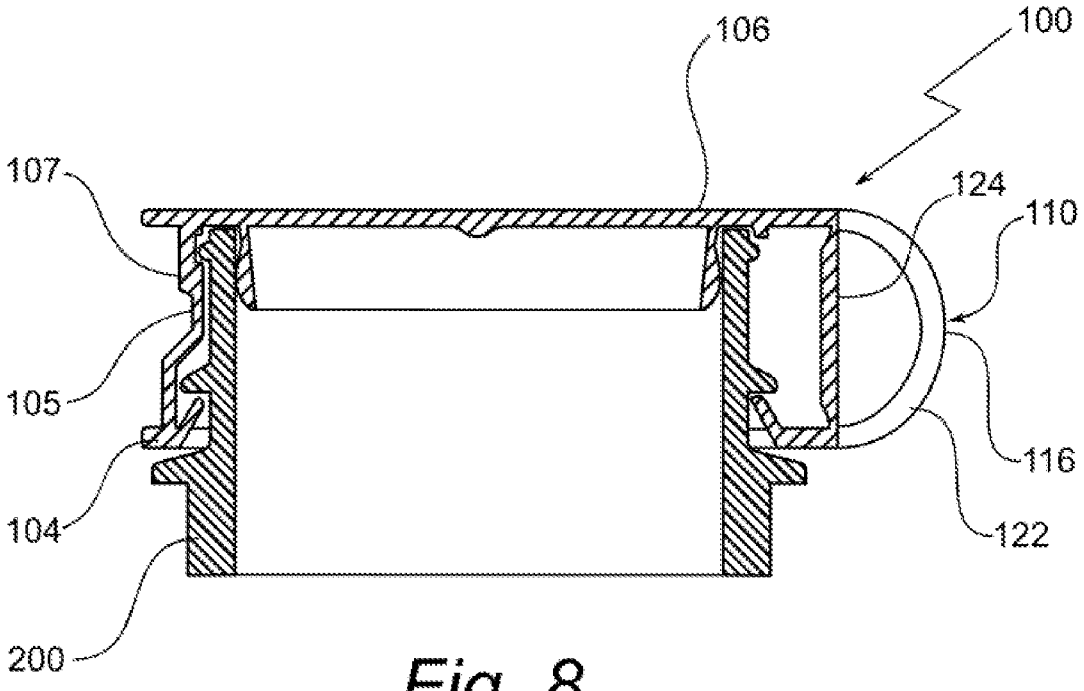
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Fig. 8

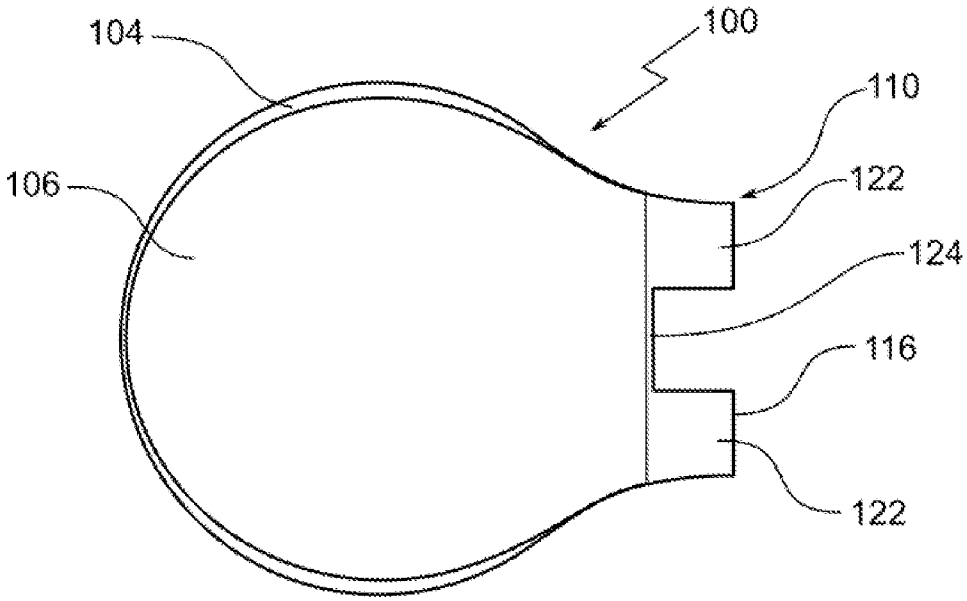

Fig. 9

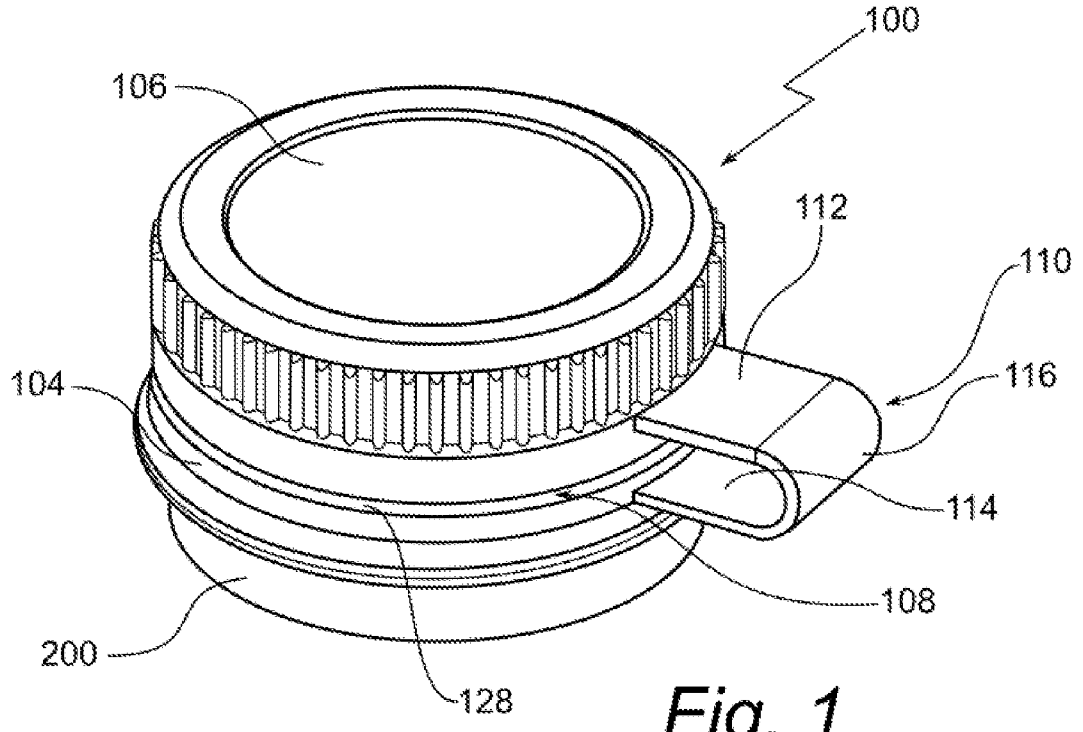

Fig. 1