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SAFETY CONTAINER CLOSURE

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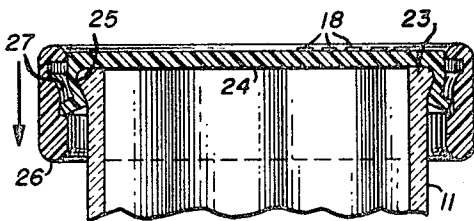
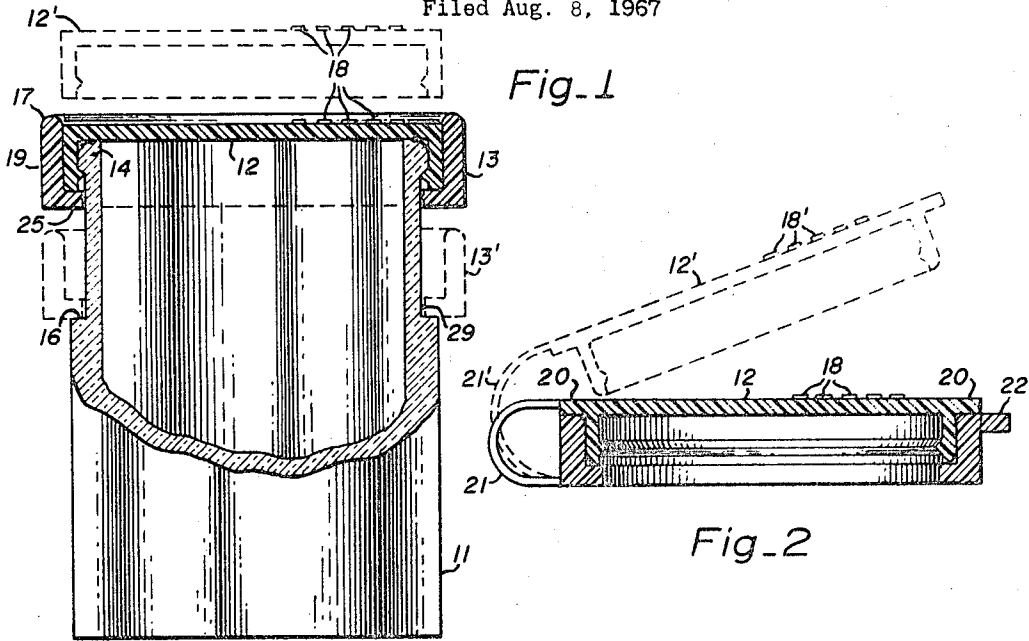


Fig. 3a

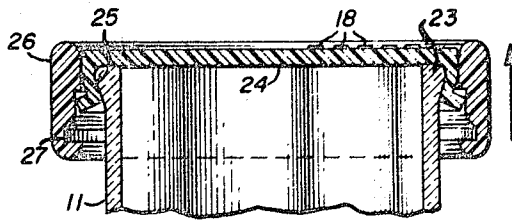


Fig. 4a

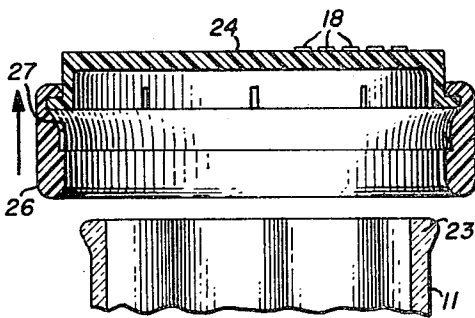


Fig. 3b

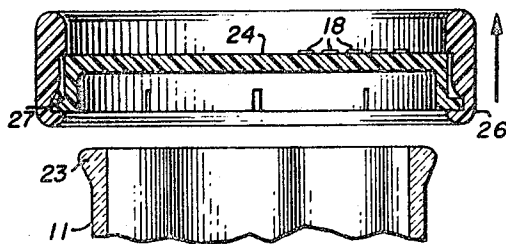


Fig. 4b

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**SAFETY CONTAINER CLOSURE**

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5 Claims

**ABSTRACT OF THE DISCLOSURE**

A safety closure for a bottle or like container includes a pliable cap and an outer retainer ring which normally holds the cap compressed over the bottle. Mating grooves and shoulders between the bottle and the cap secure the cap to the bottle until the retainer ring or collar is depressed, to permit expansion of the cap

This invention relates to containers or bottles for storage of medicine, drugs or other potentially hazardous materials, and, more particularly, this invention relates to safety caps for such containers. When it may become necessary to store drugs or the like in a household, special effort should be made to prevent access thereto by small children. It may not be sufficient to place a potentially harmful substance in an ordinary container within a medicine cabinet or high cupboard, since the children have been known to climb up and gain access to such places even though an effort is made to make the storage place inaccessible to them. It is therefore desirable to further protect children from the medicines and drugs by the use of containers with safety caps thereon.

It is an object of this invention to provide an improved bottle with an improved safety closure to prevent the opening thereof by a small child, and, more particularly, it is an object to provide an improved safety cap for a bottle with a closure which can be removed upwardly by expansion over a lip or enlarged diameter at the mouth of the bottle, but which is held compressed by a collar which must first be moved downwardly such that the bottle must be opened by separate movements in opposite directions.

A further object is to provide an improved closure for a bottle that may be used as a safety cap requiring both the separate downward and upward movements for removal thereof, or, alternatively, the collar or retainer ring may be reversed to permit cap removal with a single upward movement of the collar and the cap.

Another object is to provide an improved safety closure which includes both a cap and retainer ring molded as a single unit from a pliable material such that the cap and ring from the same molded piece may be folded together to cooperate with each other in a position to close over a container.

A further object is to provide an improved safety closure for a bottle or the like which includes a cap with an enlarged diameter extension overlying a retainer ring which compresses and secures a cap over the bottle such that removal of the closure may be accomplished only by downward pressure on one or more specific tabs arranged for that purpose.

Other objects and advantages will become apparent throughout the progress of the specification which follows. The accompanying drawing illustrates certain selected embodiments of this invention and the views therein are as follows:

FIGURE 1 is a sectional view of a bottle closure in accordance with a first embodiment of this invention;

FIGURE 2 is a sectional view of a second embodiment which is of a single unitary molding;

FIGURE 3a is a sectional view of a third embodiment of a safety cap shown in a closed and locked position over a bottle;

FIGURE 3b is a similar section of the third embodiment but with the retainer ring depressed to permit the cap to be removed;

FIGURE 4a is a similar section of the third embodiment wherein the retainer ring has been reversed to convert the safety closure into a simple release closure; and

FIGURE 4b is a similar section of the third embodiment illustrating the manner in which the closure with the reversed retainer ring may be removed by a single upward movement.

For purposes of this patent application, it will be assumed that the bottle will be standing upright with the closures over the top thereof and that the directions of "upwardly" and "downwardly" will be related to this normal upright positioning of the bottle. Thus, the cap must always be removed in an "upward" direction from the mouth of the bottle, and the upward and downward movements of the retainer ring are likewise with respect to normal, upright positioning of the bottle.

Briefly stated, in accordance with certain preferred embodiments of this invention, a safety closure for a bottle 11 includes a cap 12 of pliable material and a retainer ring or collar 13 (see FIGURE 1).

The bottle 11 is formed with a lip 14 of enlarged outside diameter, and the cap is formed with a mating lip 15 of reduced inside diameter which may be pressed over the bottle lip 14. The retainer ring 13 fits snugly over the cap 12 and tends to compress and secure the cap tightly over the bottle 11. To remove the security closure from the bottle 11, the retainer ring 13 is first pressed downwardly to a position 13', and thence the pliable cap may be pulled upwardly from the bottle as shown at 12'.

FIGURE 1 illustrates a glass or a plastic pill bottle which is substantially the same in diameter from top to bottom. In this case, a shoulder 16 may be formed slightly below the lip enlargement 14 to engage and hold the compression ring 13, and to prevent the ring from falling free from the bottle when in the depressed position 13'. Obviously, the specific shoulder 16 would not be necessary if the bottle were formed with a comparatively small diameter neck over an enlarged main body.

The retainer ring 13 includes an inwardly extending flange 25 which may fit closely over the reduced neck diameter of the bottle 11. The ring 13 may be sufficiently pliable that the inward flange 25 may be initially pressed and forced over the enlarged lip 14 of the bottle 11, and thence will be "captured" around the bottle neck. Thus, the upward and downward movement of the retainer ring 13 will be limited by the enlarged diameter lip 14 at the top and the shoulder 16 or bottle enlargement at the bottom. It may be desirable in some embodiments for the retainer ring 13 to frictionally engage the narrow portion of the bottle neck. In this case, three or more rounded inwardly extending protrusions, or dimples, 29 may be integrally molded with the flange 25 of the retainer ring 13. The dimples 29 will bear against the bottle neck to provide a desired degree of friction.

The retainer ring or collar 13 is formed with a rounded upper edge 17 dimensioned to protrude upwardly somewhat higher than the top surface of the cap. This feature is an aid for depressing the ring by a person's fingers or thumbs. The initial downward movement of the ring 13 may be instituted by direct downward pressure from above to break any static seal which may form between the compression ring 13 and the cap 12. After the initial downward movement or break away between the members 12 and 13, the compression ring 13 will continue to move more easily to the ultimate position 13'.

In a preferred embodiment of this invention, the bottle 11 may be formed of glass or of a hard plastic such as polystyrene, and the cap 12 may be formed of a softer, pliable plastic such as polyethylene or polypropylene. The retainer ring 13 may also be of the pliable plastic such as polypropylene, but as shown in FIGURE 1, the wall thickness of the retainer ring 13 may be greater or more massive, which will tend to reduce the pliability of the ring as compared to the cap.

It is desirable that the retainer ring or collar 13 be more rigid, or less pliable, than the cap 12. This degree of stiffness may be accomplished by forming the retainer ring more massively than the cap, such that the wall thickness of the ring is more than that of the cap. Alternatively, the retainer ring 13 may be molded from a plastic having more rigidity than that of the cap 12.

Since the cap 12 and ring 13 would ordinarily be formed by a molding operation, the surfaces thereof may contain integrally formed, raised letters 18, or other indicia, which may constitute a label or a trademark or the like. Indeed, the letters may be written instructions for opening the security closure which would be intelligible to an adult, but not to a child of pre-school age. The peripheral surfaces of the ring 19 may be striated or knurled.

FIGURE 2 illustrates an embodiment of this invention wherein both the retainer ring and the cap may be molded integrally with each other in a single casting or molding operation. The cap 12 and the retainer ring 13 may be actually joined by a connecting strap, or strip, 21 as shown by the dashed lines 12'. The cap and the retainer ring 13 are initially spaced apart, joined only by the strap structure 21', such that the retainer ring 13 may be first positioned over the neck of the bottle. The cap 12' may then also be pressed over a bottle lip 14, as shown in FIGURE 1, and then the retainer ring 13 may be moved upwardly to compress and secure the cap in place.

One or more tabs 22 may be formed integrally with the retainer ring 13, at various points about the periphery thereof, to provide a surface or structure against which an adult may exert downward pressure to remove the retainer ring 13 as a first step in removing the cap 12. An enlarged diameter extension 20 of the cap 12 covers the top surface of the compression ring 13, to enhance the security of the closure. In this case, no downward or upward pressure will release the closure except downward pressure specifically on the tab 22. Pressure against the periphery of the cap 12 will be ineffective since the cap itself cannot be moved, either upwardly or downwardly, until the retainer ring 13 is moved downwardly. Therefore, the tab is the key structure which must be pressed downwardly to remove the closure from the bottle 11.

FIGURES 3a, 3b, 4a and 4b illustrate another embodiment wherein the closure may be a safety locking device or, alternatively, may be used as a more conventional non-safety cap, at the user's option. The bottle 11 is formed with an enlarged-diameter lip 23 over which a pliable cap 24 may be pressed into position. The cap 24 includes internal surfaces 25 which are complementary and when compressed will mate with the enlarged lip 23. As shown in FIGURE 3a, a retainer ring 26 engages and compresses the periphery of the cap 24 to secure the cap in place. The retainer ring 26 includes interior cam 27, which increases in diameter and releases the cap from its compressed state as the ring is forced downwardly. Thus, FIGURE 3b illustrates the method for removing the cap from the bottle by first pressing downwardly on the retainer ring and thence drawing the cap upwardly. After the first downward movement of the retainer ring, the compressional forces of the cap are relaxed, and the cap may then be easily removed from the bottle.

Retainer ring 26 is reversible, as shown in FIGURES 4a and 4b, and if it is not desired to use the safety

feature of this bottle closure, the cap 24 may be pressed over the bottle 11 with the retainer ring in the reversed position. As illustrated by FIGURE 4a, the retainer lip 26 compresses and secures the cap 24 over the bottle lip 23. However, the whole bottle closure, cap and ring, may be simply removed by upward pressure which will first release the retainer ring 26, permitting the cap periphery to expand over the cam surfaces 27, whereupon continued upward pressure will remove the entire closure assembly from the bottle 11' (see FIGURE 4b).

It may be appreciated that this invention provides a measure of security for bottles or other containers by requiring two separate and opposed movements in order to remove a closure assembly from the bottle, since a compression ring must be forced downwardly and thence the cap must be withdrawn upwardly. The structure provided is simple and economical to manufacture, involving known techniques of plastic molding. The completed closure provides a distinct advantage over other types of security bottle closures, in that there are no hidden cavities into which medicine, food particles, or the like, may accumulate and possibly spoil with the passage of time to create an unsanitary condition. The bottle cap and retainer ring are simple structures which may be easily cleaned, with all surfaces easily accessible.

The invention is claimed as follows:

1. A bottle and a safety closure therefore comprising a cap and a retainer ring, said bottle being formed of a rigid material and having a neck of reduced diameter extending between an enlarged body and an enlarged lip, said cap being pliable material and having a lip of reduced diameter dimensioned to mate with the lip of the bottle, said pliable cap being capable of being pressed over the enlarged lip of the bottle, said retainer ring including an inward flange, said flange being initially forced downwardly over the lip of the bottle, said flange being captured below the lip of the bottle and the retainer ring remaining permanently around the neck of the bottle and being movable upwardly and downwardly between limits established by the enlarged lip and the enlarged body of the bottle, said retainer ring being removable from the cap by downward movement, said cap being removable from the bottle by upward movement only when the retainer ring has been moved downwardly and removed therefrom, said cap being replaceable on the bottle by again being pressed downwardly over the enlarged lip, and said retainer ring being movable upwardly to resecure the cap on the bottle.

2. A container and a safety closure therefor comprising a cap and a retainer ring, said container and said cap having complementary enlarged and reduced mating surfaces, said cap being pliable and capable of being pressed over the enlarged surfaces of the container, said retainer ring being dimensioned to fit snugly over the cap to compress the cap against the mating surfaces of the container, said retainer ring and said cap having complementary parts for engagement to prevent removal of the retainer ring by upward movement thereof, said retainer ring being movable to relax pressure on the cap by downward movement, said retainer ring being further movable to again compress the cap against the mating surfaces of the container by subsequent upward movement, said cap being removable from the container by upward movement only when the retainer ring has been moved downwardly to relax the pressure thereon, said retainer ring including a pressure surface extending above the cap when the container is closed and secured, said pressure surface being operable to receive downward pressure to move the retainer ring downwardly.

3. A container and a safety closure therefor comprising a cap and a retainer ring, said container and said cap having complementary enlarged and reduced mating surfaces, said cap being pliable and capable of being pressed over the enlarged surfaces of the container, said retainer ring being dimensioned to fit snugly over the cap and

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to compress the cap against the mating surfaces of the container, said cap being removable from the container by upward movement, said retainer ring being reversible, said retainer ring being operable to compress the cap in a first position and movable downwardly to relax the compression on the cap, whereby the cap may be withdrawn upwardly from the container, said retainer ring being further operable to compress the cap in a reversed position and movable upwardly to relax compression on the cap whereby both the retainer ring and the cap may be removed by upward movement.

4. A container and a safety closure therefor in accordance with claim 3 wherein the retainer ring is formed with interior cam surfaces dimensioned to bear upon the cap, said cam surfaces having an enlarged and a reduced diameter, said reduced diameter cam surfaces being operable to compress the cap upon the container, said en-

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larged diameter cam surfaces being operable to relax the compression upon the cap.

5. A container and a safety closure therefor in accordance with claim 4 wherein the cap includes an enlarged diameter flange for engagement with the cam surfaces of the retainer ring.

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