

May 25, 1965

D. H. SHARP

3,185,333

SAFETY CAP AND CLOSURE

Filed Dec. 19, 1963

3 Sheets-Sheet 1

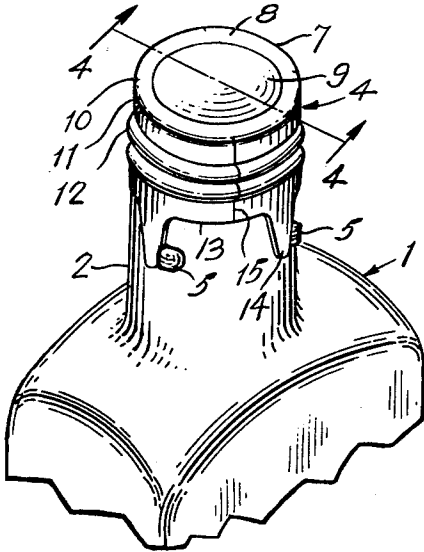


Fig. 1

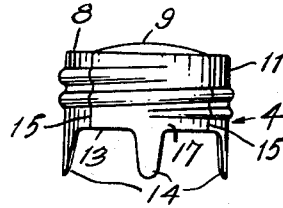


Fig. 2

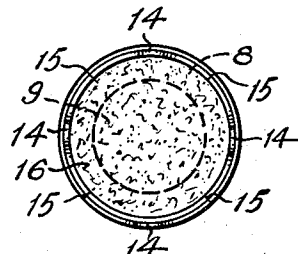


Fig. 3

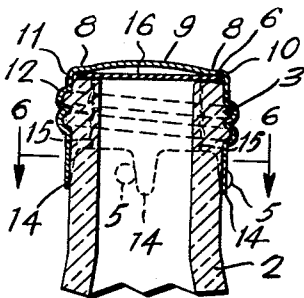


Fig. 4

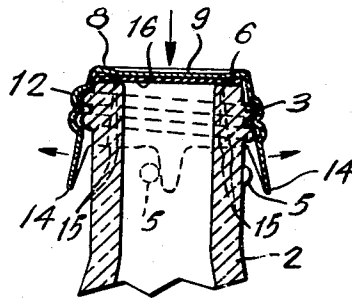


Fig. 5

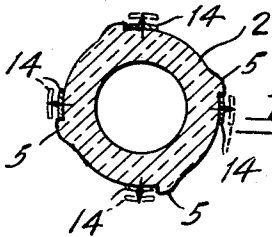


Fig. 6

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3 Sheets-Sheet 2

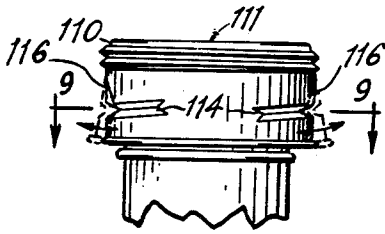


Fig. 7

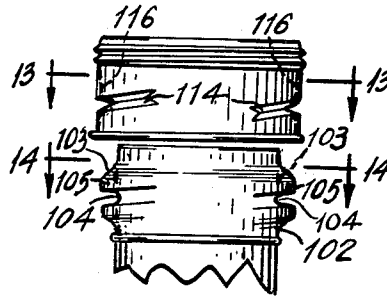


Fig. 12

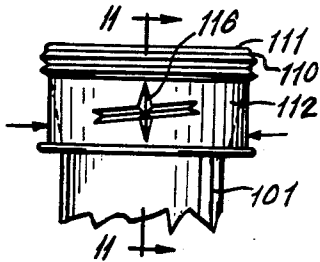


Fig. 8

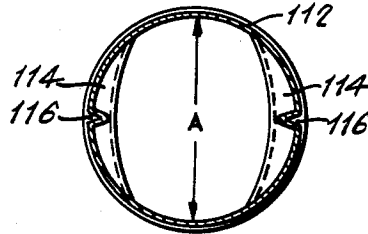


Fig. 13

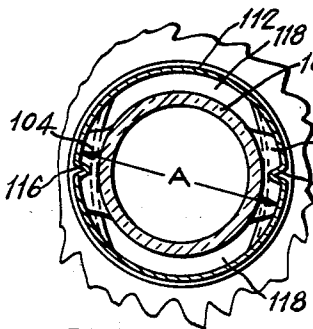


Fig. 9

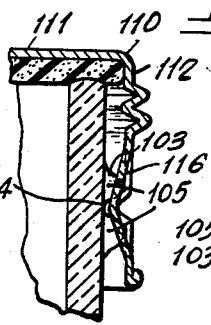


Fig. 11

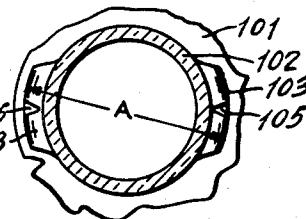


Fig. 14

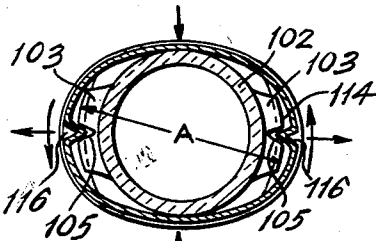


Fig. 10

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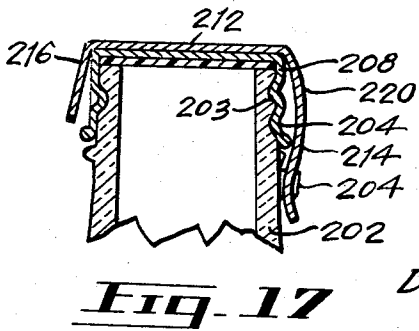
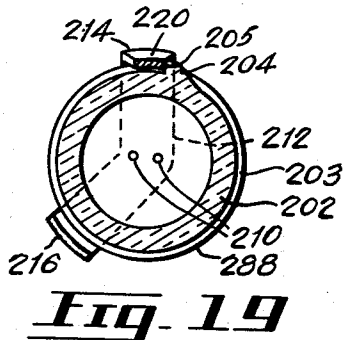
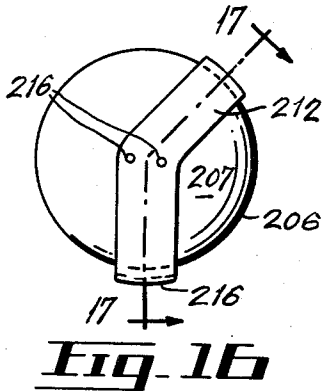
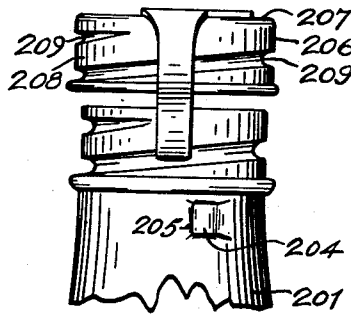
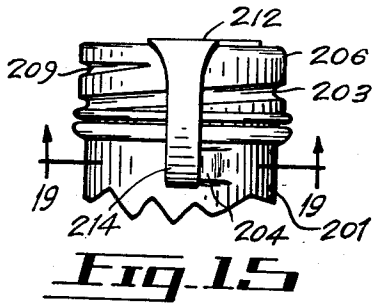
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3 Sheets-Sheet 3



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SAFETY CAP AND CLOSURE
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5 Claims. (Cl. 215-82)

This invention relates to safety closures for containers.

More particularly, this invention relates to containers or bottles having safety closures or caps which are effective in preventing children from gaining access to the contents of the container.

There have been a great number of serious accidents, particularly with young children, in which the contents of containers or bottles containing medicines or other poisonous substances are digested. There have been many attempts tried to prevent children from reaching these containers, in the main, either by locking the cabinet in which they are stored or by placing it out of reach of the child. Most of these methods make it extremely difficult for a person requiring the container to get hold of it quickly in the case of an emergency.

Many different types of container closures are known. In the main, they cannot normally be opened without first removing some type of "safety" device. For example, one of the more commonly used devices of this general nature consists of a "sprung" cap applied to a container. In another type, a depending flange formed around the top face of the cap is split downwardly into a plurality of parts whereby when it is desired to remove the cap from a container the flange is manually forced outward to "spring" the cap from the container. These and other types of container closures are relatively difficult to open and, it is not beyond the capabilities of a child to quickly learn how they operate.

The applicant has now developed a safety closure for containers or bottles which overcomes the disadvantages of the known types, which is easy to operate and effective in preventing children from gaining ready access to the contents of the container.

A safety closure according to this invention is made of a threaded cap adapted to be wholly or partially screwed over a corresponding threaded top portion of a container, said cap consisting of a top lid portion and an integrally connected threaded cylindrical side wall portion. The side wall of the cap has at least one integrally connected, flexible projection downwardly extending therefrom while the lid portion may be provided with a central flexible bulged operating area.

The container to which the cap is intended to be applied carries at least one nodule located on its outer surface at a point removed from the threads. Preferably, the nodule is of a substantially semi-spherical shape. This nodule is intended to function as a "lock" means for the cap. Thus, when the cap is screwed on the container, the downwardly extending, flexible projection will slide over the nodule until the cap is tight, at which point, the nodule is effective to prevent the projection rotation or retraction of the cap, until the central portion bulged area is depressed permitting the projection to be "sprung" away from the nodule and the cap may be readily unscrewed.

In a modified form of this invention, downwardly extending projections on the closure cap are spaced apart to conform to the spacing of nodules on a container, or alternately are slightly offset in spacing to offer a greater number of positions for locking the cap. This latter arrangement permits the use of a soft cap which will compress when the cap is screwed on. The projections are each provided with an outwardly extending cavity corresponding in size and shape to the nodules.

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The threading of the closure cap is coordinated to the threading of the container in such a manner so that when the cap is screwed onto the full extent, the cavities of the projections are coextensive with and cover the nodules. In this embodiment, it is preferable to have 5 slits in the cylindrical side wall to facilitate removal of the closure cap.

In a further embodiment of the invention, the sides of the threads of both the cap and the container are 10 coordinated such that when the lid is depressed to "spring" the projections clear of the nodules on the container, the threads of the cap and the container remain in contact with each other.

According to a still further form of this invention, 15 the cap is made sufficiently flexible so that once pressure on the lid is released, the projections will spring back into their original position. This form has the advantage that the cap may be re-applied to the container in the form as it is removed from the container since the 20 projections are in position to engage the nodules. It is understood though that this form of invention also includes the possibility that once the lid has been depressed, the projections will not spring back of their own free will so that once the cap has been removed the projec- 25 tions will have to be snapped back into position before the cap is re-applied. A still further modified form of this invention contemplates that the projections will not spring back of their own free will once the lid of the cap is depressed, but when the cap is applied and threaded to 30 the container top, the top of the container will force the depressed lid outwards and spring the projections into position with the container neck.

In most forms of the invention, it is desirable that the number of projections on the top correspond to the 35 number of nodules on the container in order to obtain the maximum benefit. It will be understood, however, that the number, spacing and shape of the nodules and projections may vary depending on the type of the closure cap. For example, it is preferable that the nodules are 40 of a substantially semi-spherical shape, and in the case where the projections abut against the nodules, the side of the nodule is substantially flat.

Another form of the invention involves a novel cap including fragmentary thread and abutment portion en- 45 gageable with complementary portions on a container, and including deformable-lever portions providing means for deforming the fragmentary thread and abutment portions of the complementary portions of the container.

A generic form of the novel invention is to provide 50 a novel safety cap and container in which complementary abutment portions engage each other to prevent accidental removal of the cap by infants or relatively young children, and which include deformable lever portions effective to 55 disengage the complementary abutment portion to permit ready removal of the cap from the container.

These together with other and more specific objects will become apparent from a consideration of the following specification and drawings forming a part thereof, wherein:

60 FIGURE 1 is a perspective view of the upper part of a bottle with a cap in the closed position;

FIGURE 2 is an elevation view of the bottle cap of FIGURE 1;

65 FIGURE 3 is a bottom plan view of the bottle cap shown in FIGURE 2;

FIGURE 4 is a vertical cross-sectional view taken along the line 4-4 of FIGURE 1;

FIGURE 5 is a vertical cross-sectional view similar to FIGURE 4, with a bottle cap in a removable position;

70 FIGURE 6 is a horizontal cross-sectional view on the line 6-6 of FIGURE 4, showing by phantom lines the alternate position of the lock projections of FIGURE 5;

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FIGURE 7 is a fragmentary elevation of a container neck and cap illustrating another embodiment of the invention, showing by means of dotted arrows the manner in which portions of the cap are deformed prior to removal of the cap from the container neck;

FIGURE 8 is a view similar to FIGURE 7, looking from right to left at FIGURE 7, showing where force is applied to deform the cap illustrated in FIGURE 7;

FIGURE 9 is a horizontal section taken on the plane of line 9—9 of FIGURE 7;

FIGURE 10 is a view similar to FIGURE 9, showing the general shape assumed when inward pressure is applied as indicated, further illustrating the general direction in which intermediate portions are deformed, and further showing how the cap will be rotated off the container neck.

FIGURE 11 is an enlarged, fragmentary vertical section taken substantially on the plane of line 11—11 of FIGURE 8;

FIGURE 12 is an exploded vertical elevation showing the cap and container of FIGURE 7;

FIGURE 13 is a horizontal section taken on the plane of line 13—13 of FIGURE 12;

FIGURE 14 is a horizontal section taken on the plane of line 14—14 of FIGURE 12;

FIGURE 15 is a vertical elevation showing a still further embodiment of the invention;

FIGURE 16 is a top plan view of FIGURE 15;

FIGURE 17 is a vertical section taken substantially on the plane of line 17—17 of FIGURE 16;

FIGURE 18 is an exploded vertical elevation of the cap and container neck of FIGURE 15; and

FIGURE 19 is a horizontal section taken on the plane of line 19—19 of FIGURE 15, showing how the abutment lug is displaced to permit the cap to be removed off the container neck.

Referring now to the drawings, and in particular to FIGURES 1 to 4, a bottle 1 is shown having a neck portion 2. The neck portion 2 is provided with screw threads 3 (FIGURE 4). A bottle cap 4 is formed to fit tightly around the neck portion 2 of the bottle 1 when in a closed position. The neck portion 2 of the bottle 1 is provided around the outside surface with spaced integral nodules 5, preferably three or four in number. The upper edge 6 of the bottle 1 is preferably flat. However, it will be understood that the invention contemplates the use of any type of bottle such that when the cap is applied to the bottle, a tight fit between the cap and bottle is formed.

The bottle cap 4 is formed with a top circular portion 7 which consists of a flat annular portion 8 and a central part 9. Part 9 is bulged upwards as shown in FIGURES 2 and 4, and could be made of a lighter metal than the flat part 8. The outer edge 10 of the top circular portion 7 is bent downwardly to form the cylindrical side wall 11 of the cap 4. Screw threads 12 are formed in the cylindrical side wall 11 of the bottle cap 4 which cooperate and engage the screw threads 3 on the neck portion 2. The lower edge 13 of the cylindrical side wall 11 is formed with several downwardly-extending flexible projections or lugs 14, preferably three or four in number, which extend below the nodules 5 on the bottle neck portion 2 of the bottle 1 when the bottle cap 4 is in closed position as shown in FIGURES 1 and 4. As will be seen from FIGURE 4, the projection or lug 14 abuts against the flattened side 5a of the nodule 5.

The vertical cylindrical side wall 11 of the bottle cap 4 as shown in FIGURES 1 and 2 is slit downwardly in several places 15, preferably three or four places in number, from the outer edge 10 of the top circular portion 9 to the lower edge 13 of the cylindrical side wall 11.

A sealed disc or gasket 16 is fitted inside the circular portion 7 of the bottle cap 4 for providing the desired sealing of the bottle contents when the bottle cap is in closed position.

The bulged central part 9 of the part 7 of the bottle

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cap 4 is sufficiently "springy" or resilient so that when it is pressed inwardly, as in some types of oil cans, it spreads the split parts of the vertical side wall 11 by means of the slits 15 sufficiently to permit the projections 14 to pass the nodules 5 and to unscrew the bottle cap from the bottle neck 2.

In operation with a gasket 16 fitted tightly to the bottle cap 4 against the top circular part 7, the cap 4 is placed on the top of the bottle and the cap 4 threaded. The projections 14 will slide-over the nodules 5 on the neck portion 2 of the bottle, since the split parts 17 of the cap will permit the projections 14 to be moved outwardly slightly. This will enable the bottle cap to be rotated to the desired closed position, as shown in FIGURES 1 and 4. If the projections 14 happen to come on top of the nodules 5, a slight turn one way or another will permit the projections 14 to click down against the side of the bottle neck portion 2.

Another method of putting the bottle cap 4 on the bottle 1 is to screw the bottle cap 4 on the bottle neck portion 2 by means of the cooperating screw threads 3 and 12, and when the projections 14 contact the nodules 5 press the bulged part inwardly until the bottle cap 4 is fully screwed on the bottle 1 and then release the bulged part 9 to permit the projections 14 to contact the side of the bottle neck portion 2.

Operation

In operation, to remove the bottle cap 4 to get at the contents of the bottle 1, it is necessary to inwardly depress the bulged central part (as shown in FIGURE 5) to permit the projections 14 to spread outwardly from the full line position to the dotted line position as shown in FIGURE 6. Once the projections 14 are clear or are above the nodules 5, the pressure on the bulged part 9 is removed and the bottle cap is unscrewed in a manner similar to a common "screw-type" cap.

To apply the cap 4 to the bottle 1, the cap is screwed onto the container until the cap is tight in a manner similar to a common "screw-type" cap. The projections 14 of the cap 4 will readily slide over the nodules 5 under normal pressure. Once the cap 4 is applied to the bottle 1 it will be seen that it cannot be removed, without first inwardly depressing the central part to permit the projections 14 to clear the nodules 5, as any attempt to unscrew the cap 4 will result in the projections 14 to abut the nodules 5.

The closure cap of this invention can be made from any type of material normal to the art. For example, the major proportion of caps presently in use are made from light metals e.g., aluminum, tin, etc., or from suitable resinous material. Similarly, the container per se is made from materials common to the art, e.g., glass, metals, etc.

Referring to FIGURES 7—14, another embodiment of the invention is illustrated. A container neck is indicated at 101 and includes an upper generally cylindrical portion 102 which includes diametrically opposed enlargements 103 which include in the outer surface thereof fragmentary recessed thread-track portions 104. The enlargements include generally vertical recess portions 105; see FIGURES 10—12 and 14.

A bottle cap 110 is constructed of any suitable material and comprises a generally flat top 111 integral with a cylindrical skirt or flange 112. The diameter of the cap 110 is generally equal to the diameter between the outer surfaces of the enlargements 104 as indicated at A; see FIGURES 9, 10, 13 and 14.

The flange 112 includes fragmentary threads 114 and a vertically disposed abutment 116. The portions 114 and 116 are complementary to and will be removably received on the portions 104 and 105, respectively, of the container or bottle neck 102.

As clearly seen in FIGURE 9, the skirt 112 is spaced from the neck portion 102 intermediately of the enlarge-

ments 103 to form opposed spaces 118 into which adjacent portions of the skirt can be deformed, as seen in FIGURE 10. When the skirt is deformed into the portions between enlargements 103, the complementary stop portions 104, 105 and 114, 116 are separated to permit the cap to be readily rotated free of the bottle neck.

It is believed clearly evident that unless a child were actually shown how to remove cap 111, he would experience considerable difficulty when attempting to open the bottle. A suitable sealing gasket 120 is provided beneath top 111; see FIGURE 11, to engage the upper edge of the bottle neck 102.

Referring to FIGURES 15-19, another embodiment is disclosed. A bottle neck 201 includes an upper cylindrical portion 202 having a threaded portion 203. The neck portion 202 has formed below the threads 203 an inclined abutment portion 204 having a shoulder 205; see FIGURES 15, 18 and 19.

A bottle cap 206 includes a flat top 207 integral with a depending skirt, having threads 208 and 209 complementary and engageable with threads 203.

Secured to the top 207 of the cap by spot welds, rivets, etc. 210, is a lock strap 212 including a depending, flexible abutment lug or strap 214 which will be threaded over abutment portion or nodule 204 and engage behind shoulder 205.

The strap 212 includes in generally opposed relation to lug or strap 214 a second depending strap 216 which facilitates rotation of the cap either onto or off the container neck.

The strap 214 will be deformed generally at the area marked by arrow 220 to bend the strap 214 away from the shoulder 205 whereafter the cap may be readily rotated off the bottle neck.

It will be noted in all of the disclosed embodiments there is an abutment engageable with a portion of a bottle cap to permit removal off the bottle neck and the cap includes a deformable portion permitting the cap to be removed off the bottle neck.

This invention also contemplates the use of, in all embodiments, that in place of, for example the nodule 5 shown in FIGURES 1 to 6, a depression or hollow being provided on the bottle while projections 14 may be provided with a corresponding protrusion adapted to meet with the hollow.

It will be obvious to those skilled in the art that various changes may be made without departing from the spirit of the invention and therefore the invention is not limited to what is shown in the drawings and described in the specification, but only as indicated in the appended claims.

I claim:

1. In combination, a closure cap and a container removably receiving said closure cap thereon, said closure cap including a top and depending skirt, said skirt including a portion integral therewith comprising at least one flexible strap depending therefrom and generally in intersecting relation to said threaded portion, said container including a neck portion upon which said top and said skirt are removably received, said neck portion including a thread portion complementary to and engageable with said threaded portion of said cap, said neck portion including an abutment portion disposed below the thread portion thereof and engageable with said abutment portion of said cap for preventing relative rotation between said cap and neck comprising a lateral enlargement having an angular surface merging into the outer surface of the container for camming said flexible strap thereover, said cap including a manually deformable portion operative to separate said abutment portions to permit removal of said cap from said container neck portion.

2. In combination, a closure cap and a container removably receiving said closure cap thereon, said closure cap including a top and depending skirt, said skirt including a threaded portion thereon, said cap including an abutment portion integral therewith comprising a plurality of

flexible straps depending from said skirt below the thread portion thereon and generally in intersecting relation to said threaded portion, said skirt including vertical slits therein to permit said flexible straps to pivot outwardly therefrom, said container including a neck portion upon which said top and skirt are removably received, said neck portion including a thread portion complementary to and engageable with said threaded portion of said cap, said neck portion including an abutment portion comprising a plurality of lateral enlargements thereon each having an inclined face for camming said flexible straps thereover when said cap is threaded onto said container neck and for preventing relative rotation between said cap and said neck, said cap including a manually deformable portion comprising an upwardly bowed portion on said container top operative to separate said abutment portions to permit removal of said cap from said container neck portion.

3. In combination, a closure cap and a container removably receiving said closure cap thereon, said closure cap including a top and depending skirt, said skirt including a threaded portion thereon, said cap including an abutment portion integral therewith comprising at least one flexible strap depending therefrom and generally in intersecting relation to said threaded portion, said flexible strap including an intermediate, deformable outwardly bowed portion extending away from said skirt, said strap being deformable off said container neck abutment portion for permitting said cap to be rotated off said container neck, said container including a neck portion upon which said top and said skirt are removably received, said neck portion including a thread portion complementary to and engageable with said threaded portion of said cap, said neck portion including an abutment portion disposed below the thread portion thereof and engageable with said abutment portion of said cap for preventing relative rotation between said cap and neck comprising a lateral enlargement having an angular surface merging into the outer surface of the container for camming said flexible strap thereover, said cap including a manually deformable portion operative to separate said abutment portions to permit removal of said cap from said container neck portion.

4. In combination, a closure cap and a container removably receiving said closure cap thereon, said closure cap including a top and depending skirt, said skirt including a threaded portion, said cap including an abutment portion integral therewith and generally in intersecting relation to said threaded portion and including a flexible strap having a flat top portion integrally connected to said top of said cap, a first depending portion extending below the threaded portion thereof and a second depending portion extending below the top of said cap and outwardly extending from said skirt, said first depending portion including an intermediate bowed portion extending outwardly from said skirt, said container including a neck portion upon which said top and skirt are removably received, said neck including a thread portion complementary to and engageable with said threaded portion of said cap, said container neck including an abutment portion engageable with said abutment portion of said cap for preventing relative rotation between said cap and neck and including a lateral enlargement on said neck disposed below the thread portion thereof and having an angular surface merging into the outer surface of said container neck.

5. In combination, a closure cap and a container removably receiving said closure cap thereon, said closure cap including a top and depending skirt, said skirt including a threaded portion including a pair of opposed inwardly extending inclined thread tracks, said cap including an abutment portion integral therewith and generally in intersecting relation to said threaded portion, said abutment portion of said cap including an opposed pair of inwardly extending vertical grooves in said skirt portion,

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each groove being in intersecting relationship to said thread tracks, said container including a neck portion upon which said top and skirt are removably received, said neck including a thread portion complementary to and engageable with said threaded portion of said cap and comprising a pair of opposed enlargements outwardly extending therefrom and merging into the outer surface of said container neck, said enlargements having on their outer surface inwardly extending inclined thread tracks complementary to and engageable with said thread portion on said cap, said container neck including an abutment portion engageable with said abutment portion comprising an inwardly extending substantially vertical groove in each inclined thread track portion on said container

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neck and in intersecting relationship to said thread tracks, said grooves being complementary to and engageable with said abutment portion of said cap, said cap including a manually deformable portion operative to separate said abutment portions to permit removal of said cap from said container neck portion.

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