Nov. 12, 1963 E. GOLDE 3,110,411

SAFETY SCREW CAP

Filed Nov. 3, 1961 2 Sheets-Sheet 1

Fig. 1.

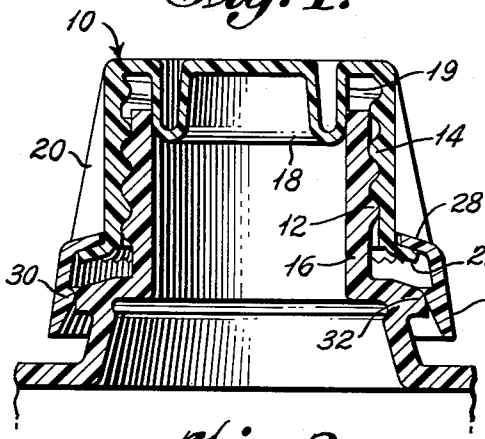


Fig. 4.

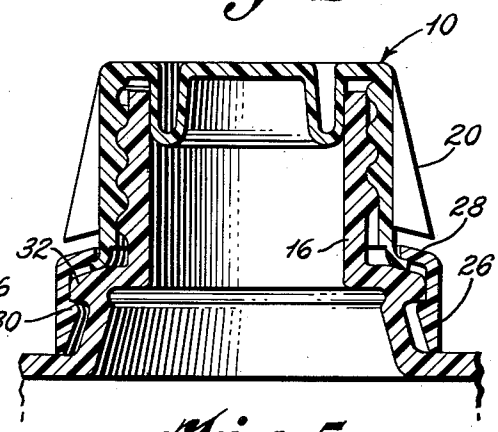


Fig. 2.

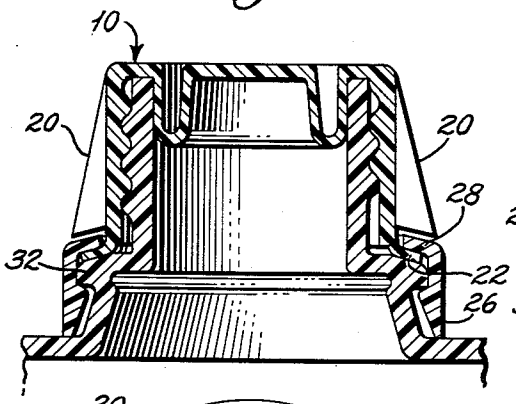
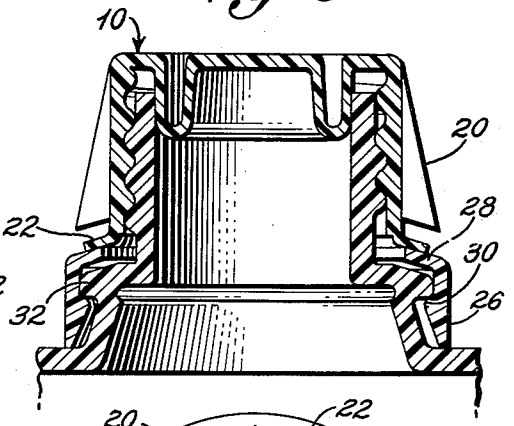


Fig. 5.



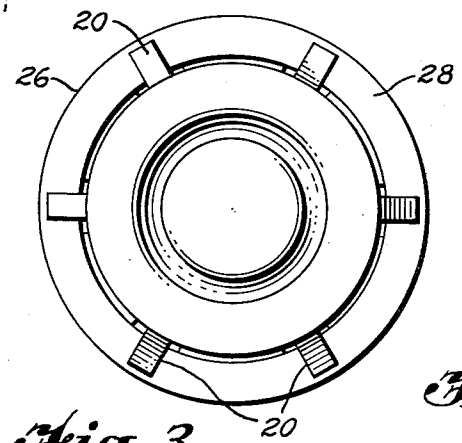


Fig. 3.

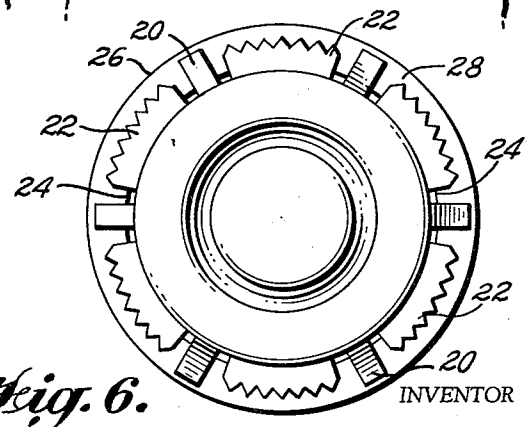


Fig. 6.

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SAFETY SCREW CAP

Filed Nov. 3, 1961 2 Sheets-Sheet 2

Fig. 7.

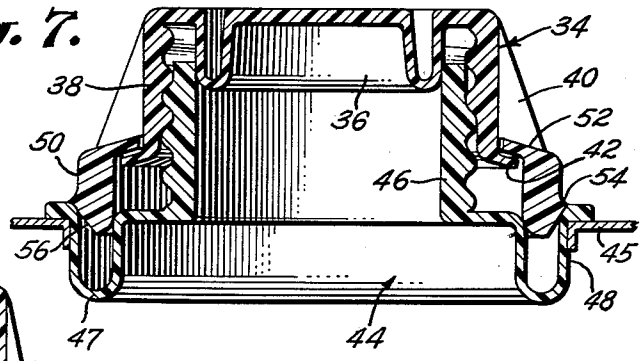


Fig. 10.

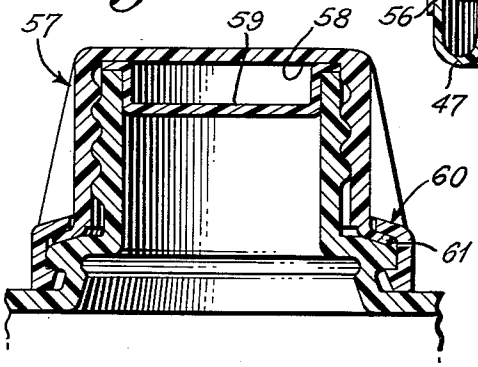


Fig. 8.

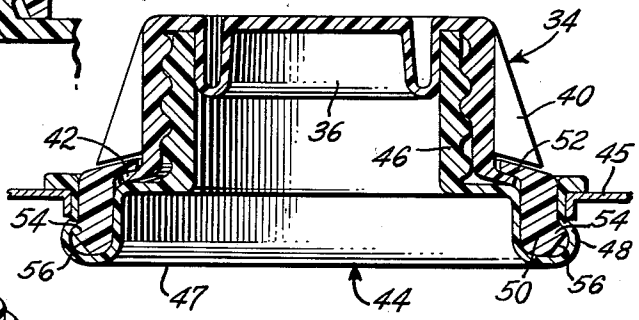


Fig. 11.

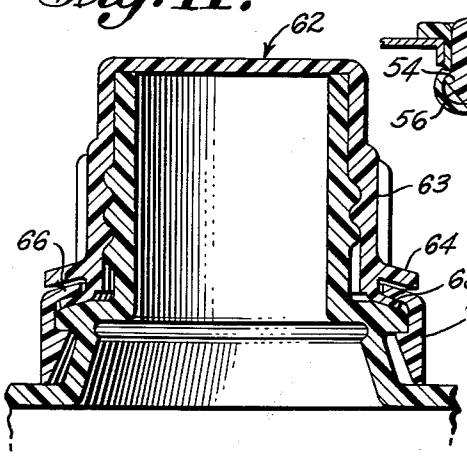
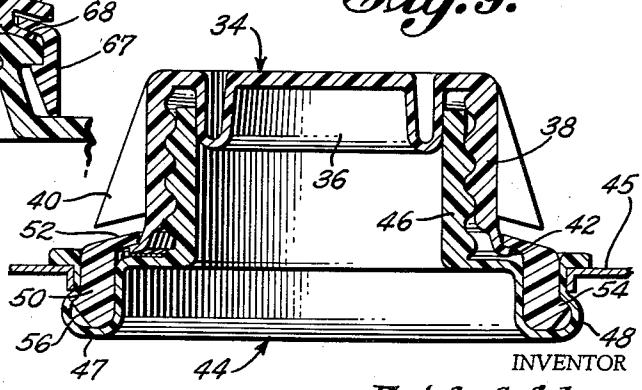


Fig. 9.



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1

3,110,411

SAFETY SCREW CAP

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Claims priority, application Germany Nov. 11, 1960
6 Claims. (Cl. 220—39)

This invention relates to improvements in safety screw caps having means for indicating unauthorized opening of the container to which the safety screw cap is applied.

Some safety screw caps have been in use but are subject to many disadvantages. Some such caps have a collar-shaped extension thread for overlapping an under cut on a bottleneck. In order to open the bottle for the first time, it is necessary to cut the collar-shaped extension or to rip the collar-shaped extension. Also, screw caps of plastic material have been used in which the collar-shaped extension is connected with the cap by a few narrow webs which are intended to tear when the cap is being unscrewed. The unscrewing of such caps often requires considerable effort and sometimes requires the use of tools to separate the cap from the collar-shaped extension. In addition, such caps can be produced only in very costly molds and must be applied to the container manually.

An object of this invention is to provide a safety cap for containers which includes means for indicating unauthorized opening of a container.

A further object of this invention is to provide a safety screw cap for containers which may be opened easily without requiring the use of a tool.

A still further object of this invention is to provide a safety screw cap for containers which is made of plastic and which can be molded easily and economically.

A still further object of this invention is to provide a safety screw cap which can be applied to a container by machine.

These objects may be accomplished according to certain embodiments of the invention by providing a screw cap of suitable plastic material and a separate safety ring of elastic thermoplastic material. The cap is provided with a flange extending laterally from the lower end of the cap. The cap includes a plurality of vertical ribs radially spaced on the exterior of the side wall of the cap. The safety ring includes an inwardly extending flange adjacent its upper end which is adapted to fit between the lower ends of the ribs on the cap and the flange at the bottom of the cap. Preferably, the ribs are sloped outwardly from the top of the cap to the lower ends to facilitate positioning the safety ring on the cap. Adjacent the lower end of the safety ring is an inwardly extending shoulder which is adapted to engage a projection on the neck of the container to which the cap is applied.

In applying the safety screw cap, the safety ring is initially forced over the top of the cap downwardly to the bottom of the ribs until the upper flange of the safety ring snaps into place between the bottom of the vertical ribs and the flange on the bottom of the cap. The cap is then screwed onto the container. While the cap is being screwed on the container, the safety ring is moved therewith. The downward movement of the cap forces the shoulder of the safety ring into engagement with the projection on the neck of the container.

When the cap is unscrewed, this shoulder will maintain the safety ring in place on the container and the flange of the screw cap will be slipped from under the flange of the safety ring upwardly with the cap. When the cap is reapplied to the container, the lower flange of the cap can not slip down under the flange on the safety ring and will be positioned above the flange on the safety ring, thus indicating that the cap has previously been

2

removed. This flange may be of a different color than the safety ring, thus making the detection of the flange more obvious.

In another embodiment of this invention, in addition to the screw cap and safety ring, an insert is provided which may be employed to adapt this safety screw cap for use with sheet metal containers or the like. In this embodiment, the safety ring is adapted to be secured to the insert so that when the screw cap is removed, the safety ring will remain on the insert and the flange on the screw cap will give notice that the container has previously been opened.

FIGURE 1 is a side sectional view of one embodiment of the invention showing the cap partially applied to the container with the safety ring in proper position on the cap;

FIGURE 2 is a side-sectional view of this embodiment with the cap and safety ring in place in closed position on the container;

FIGURE 3 is a plan view of this embodiment in the position shown in FIGURE 2.

FIGURE 4 is a side-sectional view of this embodiment in a position wherein the cap is being removed and the flange is being withdrawn from below the flange on the safety ring;

FIGURE 5, is a side-sectional view of this embodiment with the cap reapplied and the flange on the screw cap bearing on top of the flange on the safety ring;

FIGURE 6 is a plan view of this embodiment in the position shown in FIGURE 5;

FIGURE 7 is a side-sectional view of another embodiment of this invention which includes insert means for adapting the invention to be used with a sheet metal container showing the screw cap and safety ring being applied to the insert which is in position in the opening of a container;

FIGURE 8 is a side-sectional view of this embodiment with the screw cap and safety ring in closed position;

FIGURE 9 is a side-sectional vew of this embodiment with the screw cap being partially unscrewed from the insert;

FIGURE 10 is a side-sectional view of a further embodiment of this invention showing the screw cap in closed position; and

FIGURE 11 is a side-sectional view of still a further embodiment of this invention showing the screw cap in closed position.

In the embodiment disclosed in FIGURE 1, the screw cap consists of suitable elastic thermoplastic material having a side wall 12 which is provided with internal threads 14 thereon for engaging a threaded neck 16 of a container. The cap 10, in the embodiment, is provided with a sealing extension 18. The sealing extension 18 consists of a hollow annular collar having a substantially U-shaped cross section. The sealing extension depends downwardly from the top of the cap a sufficient length to provide a suitable sealing means when inserted into the neck of a container. The outer wall 19 of the sealing extension 18 is adapted to engage firmly the interior wall of the neck 16 of a container for sealing the container.

Radially spaced about the wall 12 of the cap 10 are a plurality of ribs 20. The ribs 20 are somewhat triangular in shape and slope outwardly and downwardly from the top of the screw cap 10 and terminate adjacent the bottom of the screw cap 10.

Extending from the bottom edge of the side wall 12 of the screw cap 10 is a flange 22. The flange 22 is spaced below the extremity of the ribs 20. The flange 22 may be provided with a plurality of notches 24, as best seen in FIGURE 6.

A safety ring 26 is provided having an inwardly ex-

tending flange 28 adjacent its upper portion. The flange 28 defines an opening which is approximately of the same diameter as the diameter of the screw cap 10. Adjacent the lower portion of the safety ring 26 is an annular shoulder 30 extending inwardly thereof. The shoulder 30 is adapted to engage a projection 32 on the neck of a container. The safety ring 26 may be made from a suitable elastic thermoplastic material. The flange 28 is of a thickness so that it may be inserted between the ends of the ribs 20 and the flange 22.

When the screw cap 10 is to be inserted onto the neck of the container, the safety ring 26 is first positioned on the screw cap 10 with its flange 28 between the flange 22 and the ends of the ribs 20. This may be accomplished by sliding the ring downwardly over the screw cap. The safety ring 26 is sufficiently flexible so that it may be stretched over the ribs while sliding downwardly to the bottom of the cap screw. The ribs 20 are sloped in a manner to facilitate sliding the safety ring 26 over the screw cap 10. When the flange 28 of the safety ring 26 reaches the ends of the ribs 20, it will snap into place between the bottom of the ribs 20 and the flange 22 of the screw cap 10.

The screw cap 10 is then screwed onto the neck of a container. It will be noted that as the screw cap 10 is screwed downwardly on a container neck, the screw cap will carry the safety ring 26 along with it. As the cap approaches its closed position, the shoulder 30 on the safety ring 26 rides over a projection 32 on the neck of a container and when in the closed position, the shoulder will snap inwardly toward the neck of the container below the projection 32. The shoulder 30 will hold safety ring firmly on the neck of a container. The closed position of the screw cap 10 and safety ring 26 is illustrated in FIGURE 2 of the drawings.

In this embodiment of the invention, when the screw cap 10 is unscrewed from the container, the flange 22 will be pulled from beneath the flange 28 of the safety ring 26. This position is disclosed in FIGURE 4. The safety ring 26 is firmly held on the neck of the container by the engagement of the shoulder 30 with the projection 32. The notches 24 in the flange 22 facilitates the withdrawal of the flange 22 from beneath the flange 28. Also, the flange 22 is flexible so that it bends easily for removal from beneath the flange 28 of the safety ring 26. However, the flange 22 may be made rigid and the flange 28 on the safety ring 26 constructed so as to be pliable for releasing the rigid flange on the screw cap from engagement therewith.

When the screw cap 10 is reapplied to the neck of the container, the flange 22 cannot be inserted under the flange 28 and therefore will lie above the flange 28. This position is shown in FIGURE 5 and FIGURE 6. It becomes apparent that the bottle has been opened at least once when the flange is in this position. If desired, the edge of the flange may be serrated as shown in FIGURE 6 and the safety ring 26 may be of a color different from that of the cap thereby making the flange more obvious when it is disposed in its position above the flange 28 of the safety ring 26.

FIGURES 7 through 9 illustrate another embodiment of the invention wherein a specially shaped outlet fitting of plastic material is provided for adapting the cap for use with sheet metal containers or the like. The screw cap 34 is of similar construction to the cap 10 of the above-described embodiment. The screw cap 34 in this embodiment is provided with a sealing extension 36. The wall 38 of the screw cap 34 is provided with internal threads and has ribs 40 thereon. The ribs 40 are similar in shape to the ribs 20 of the first embodiment and serve the same purpose. The screw cap 34 is provided with a flexible flange 42 at the bottom of the wall 38 and spaced from the bottom of the ribs 40.

In this embodiment, an outlet fitting 44 is provided which is adapted to be inserted into the filling hole,

indicated at 45 in FIGURES 7 through 9, of a metal container or the like. The outlet fitting has a neck portion 46 which is threaded for engagement with the screw cap 34. The outlet fitting 44 includes a depending flange 47 substantially U-shaped in cross section. The outer wall 48 of the flange is adapted to engage and to bear against the opening 45 of the metal container with sufficient force for holding the outlet fitting 44 in the container opening 45. The outlet fitting may be made of a suitable elastic thermoplastic material. Other suitable resilient materials may be employed, if so desired. A safety ring 50 has a flange 52 at the upper end thereof which is adapted to fit between the lower end of the ribs 40 and the flange 42 in a manner similar to that described in the embodiment above. The lower portion of the safety ring 50 is provided with an annular bead 54 on the outer surface thereof. The lower outer edge of the safety ring 50 is beveled at 56.

The operation of the screw cap 34 is similar to that of the screw cap 10 described above. The saety ring 50 is first slid over the screw cap 34 and the ribs 40 until the flange 52 snaps into the space between the ends of the ribs 40 and the flange 42 of the screw cap 34. The screw cap 34 is then screwed onto the neck portion 46 of the outlet fitting 44. As the screw cap 34 is screwed downwardly, it carries therewith the safety ring 50. The lower portion of the safety ring 50 is inserted into the cavity of the flange 47 of the outlet fitting 44. The beveled edge 56 facilitates the introduction of the safety ring 50 into the cavity of the flange 47.

When the screw cap 34 is screwed down fully onto the neck 46 of the outlet fitting 44, the lower portion of the safety ring 50 is fully enclosed within the cavity of the flange 47. The annular bead 54 on the safety ring 50 deforms the flange 47 so that the outer wall 48 of the flange 47 conforms to the shape of the bead 54, as shown in FIGURE 8. This bead aids in maintaining the outlet fitting securely within the opening 45 of the metal container.

In this position, as shown in FIGURE 8, the flange 42 is hidden beneath the flange 52 of the safety ring 50. When the screw cap 34 is initially unscrewed, the flange 42 is withdrawn from beneath the flange 52 in the same manner as described above. It will be seen that when the screw cap 34 is reapplied to the neck portion 46 of the outlet fitting 44, the flange 42 will remain above the flange 52 thereby giving notice that the screw cap 34 has previously been removed.

Since the screw cap, when the container is being closed after initially being open, cannot be screwed down as far as during the first closing, proper sealing can no longer occur on the upper annular surface of the mouth of the bottle or container unless the screw cap is provided with a sealing extension. The embodiment disclosed in FIGURE 10, shows a somewhat modified cap 57 having a flat inner surface 58. A seal 59 is placed in the mouth of the container and the sealing extension is omitted from the cap. The separate seal 59 in this embodiment would prevent contamination of the contents of the container. The screw cap 57 is provided with a safety ring 60 of the same construction as the safety ring 26, having a projection which overlies a flange 61 on the screw cap 57.

FIGURE 11 discloses a still further embodiment wherein the screw cap 62 is secured on a container having a long neck. The screw cap 62 does not have a sealing extension such as the screw caps 10 and 34. When the screw cap 62 is screwed downwardly after initially opening the container, even though the screw cap 62 cannot be screwed down as originally applied, the long neck on the container provides an adequate seal for the container.

Also in this embodiment, the ribs 63 are somewhat different in that they lie substantially flat against the wall of the screw cap 62. Each rib is provided with a lateral projection 64 adjacent its lower end. Each projection 64 overlies a flange 66 on the safety ring 67. The screw cap

62 of this embodiment has a flange 68, similar to the detection flange of the screw caps described above, which is disposed below the flange 66 of the safety ring 67 when the screw cap 62 is in closed position as shown in FIGURE 11. When the screw cap 62 is removed from the container, the flange 68 will be withdrawn from beneath the flange 66 of the safety ring 67. When the screw cap 62 is reapplied to the container, the flange 68 will disclose that the container has previously been opened.

It will be understood that the flange on the screw cap may be made rigid in all embodiments of this invention instead of flexible as shown. In this event, the projection on the safety ring would be made flexible for permitting withdrawal of the flange on the screw cap. Also the flange on the screw cap may be notched as illustrated in FIGURE 4 on all the embodiments of the invention.

With this construction of a safety cap, all parts thereof may be molded easily and economically.

Because the screw cap carries the safety ring as it is applied to a container and also causes the safety ring to be secured to the container, the screw cap according to this invention may be applied to a container by a machine. The initial closing of a container can be accomplished mechanically in one operation.

Although, the elements of the screw cap have been illustrated and described as being of thermoplastic elastic material, other materials having suitable resilient qualities may be employed.

While the invention has been illustrated and described in certain embodiments, it is recognized that other variations and changes may be made therein without departing from the invention as set forth in the claims.

I claim:

1. A safety closure for containers comprising an internally threaded screw cap provided adjacent its lower end with at least one outward projection extending radially outward beyond the wall of the cap and a safety ring arranged about the lower end of the cap and provided near its upper end with at least one inward projection which initially overlies the outward projection on the screw cap, the said safety ring being adapted for locking engagement with the container, at least one of said projections is resilient so as to permit removal of the cap while the safety ring remains in position without permanent deformation of either projection, and whereby when the cap is reapplied to the container, the projection thereon will overlie the coacting projection on the safety ring, thereby providing a visual indication that the cap has previously been removed.

2. A safety closure for containers, comprising an internally threaded screw cap provided adjacent its lower end with at least one outward projection extending radially outward beyond the wall of the cap and a safety ring arranged around the lower end of the cap and provided near its upper end with at least one inward projection which initially overlies the outward projection on the cap, means on said cap for holding said outward projection of said safety ring in said overlying position while said cap is being applied to the container, said safety ring being adapted for locking engagement with the container, and characterized in that at least one of said projections is resilient so as to permit removal of the cap while the safety ring remains in position and whereby when the cap is reapplied to the container, the projection thereon will overlie the coacting projection on the safety ring, thereby providing a visual indication that the cap has been previously removed.

3. A safety closure for containers, comprising an internally threaded screw cap provided adjacent its lower end with a laterally extending flange, a plurality of radially spaced ribs on said screw cap extending from the top of said cap to a point spaced above said flange, a safety ring having an inwardly extending flange adjacent the upper portion thereof and adapted to be positioned in overlying relation with said outwardly extending projection on said cap and beneath said ribs, an annular shoulder on said safety ring adapted for locking engagement with a container, said laterally extending flange of said cap being resilient so as to permit removal of the cap while the safety ring remains in position and whereby when the cap is reapplied to the container, the flange on the cap will overlie the projection on the safety ring, thereby providing visual indication that the cap has previously been removed.

4. A safety closure for containers, comprising an internally threaded screw cap provided adjacent its lower end with a projection, an outlet fitting adapted to engage an opening of a container and having a threaded neck portion for engagement with said threaded screw cap, said outlet fitting including an annular hollow flange, a safety ring having an inwardly extending projection adjacent the top thereof and adapted to initially overlie the projection of the screw cap, said safety ring having a lower portion adapted to be inserted into said hollow flange of said outlet for locking engagement therewith, at least one of said projections being resilient so as to permit removal of the cap while the safety ring remains in position and whereby when the cap is reapplied to the outlet fitting, the projection thereon will overlie the coacting projection on the safety ring, thereby providing a visual indication that the cap has previously been removed.

5. A safety closure for containers comprising an internally threaded screw cap provided adjacent its lower end with a laterally extending flexible flange and a safety ring arranged about the lower end of the cap and provided near its upper end with an inward projection which initially overlies the flange on the cap, means on said cap for releasably securing said safety ring to said cap, said inward projection on said safety ring defining an opening having a diameter substantially equal to the diameter of said cap, said safety ring being resilient so that it may be slid downwardly over the top of the cap to its position overlying said flange, said safety ring being adapted for locking engagement with the container and characterized in that said flexible flange permitting the removal of the cap while the safety ring remains in position and whereby when the cap is reapplied to the container the flexible flange will overlie the projection on the safety ring thereby providing a visual indication that the cap has previously been removed.

6. A safety closure for containers, comprising an outlet fitting having an annular hollow flange adapted to engage an opening of a container, said outlet fitting having a threaded neck portion, an internally threaded screw cap adapted to be secured on said neck portion, said screw cap having a flexible flange adjacent its lower end, a sealing extension depending from the top of the cap for sealing engagement with the neck portion of the outlet fitting, a plurality of radially spaced ribs extending outwardly of the side wall of the cap, the lower end of said ribs being spaced above said flange, a safety ring having an inwardly extending projection adapted to lie in the space between the lower ends of said ribs and said flange, said safety ring having a lower portion adapted to be inserted into said hollow flange of said outlet fitting for locking engagement therewith, said flexible flange having a plurality of notches therein for facilitating removal of the cap while the safety ring remains in position and whereby when the cap is reapplied to the outlet fitting, the flange thereon will overlie the projection on the safety ring, thereby providing a visual indication that the cap has previously been removed.

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