CHILD-PROOF CLOSURE

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UNITED STATES PATENTS
2,752,060 6/1956 Martin 215/9 X

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ABSTRACT

A child-proof snap-on closure for a container, the container pouring lip and the closure skirt including upper opposed beads retaining the closure on the container. The container neck and the closure skirt including lower spaced opposed threads for removal of the snap-on closure. The threaded lower skirt portion being flexible around its entire periphery and deflectable inwardly at generally diametrically opposed points to engage the threaded neck portion where upon relative rotation, the threaded skirt is driven upwardly on the threaded neck, thus forcing the skirt bead upwardly over the pouring lip bead to remove the closure.

8 Claims, 5 Drawing Figures
CHILD-PROOF CLOSURE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to container closures and in particular to an improved closure which is difficult for a child to open.

2. Description of Prior Art

Recently, much attention is being focused on the packaging industry to provide a more effective container closure for pills, poisons and household products which are harmful if ingested. Children in particular are often injured seriously by eating products which are harmful to the body if consumed.

Many child-proof closures have been invented and patented for the above purpose. U.S. Pat. No. 3,371,808 and U.S. Pat. No. 3,391,813 are typical of child-proof closures found in the art. While the prior art child-proof closures have afforded protection against serious accidents to children, the art is always trying to produce a more effective and economical child-proof closure.

SUMMARY OF THE INVENTION

By the present invention, it is proposed to provide a new and improved child-proof closure so as to reduce or eliminate the accidents as encountered heretofore.

This is accomplished generally by the provision of a snap-on closure for a container having a pouring lip with a bead thereon and a screw thread on the neck of the container. The closure consists of a panel portion and a downwardly extending skirt. The skirt includes an internally inwardly beaded upper portion whereby the closure can be snapped on the container in sealing engagement thereto and an internally inwardly threaded lower portion for pry-off removal therefrom.

To remove the tightly engaged snap-on closure, the threaded lower skirt portion is deflected inwardly at generally diametrically opposed points to ovalize the skirt in order to engage the threaded neck. Upon subsequent relative rotation of the closure and the container, the lower skirt portion is driven upwardly on the threaded neck thus applying force to the upper beaded skirt portion to lift the skirt bead over the pouring lip bead for closure removal.

In view of the foregoing, the primary object of this invention is to provide a novel child-proof closure of the snap-on type wherein the lower skirt portion is flexible around its entire circumference and is provided internally with at least one complete thread.

Another object of this invention is to provide a novel child-proof closure of the snap-on type wherein the lower skirt portion is flexible around its entire circumference and is provided internally with a diametrically opposite thread formation.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claims and the several views illustrated in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a vertical view partially in section of a child-proof snap-on closure positioned on a container.

FIG. 2 is a sectional view of the combination snap-on closure and container of FIG. 1 taken along the line 2—2.

FIG. 3 is an enlarged partial vertical sectional view of the closure and container of FIG. 1 and illustrating the lower skirt portion deflected inwardly for engagement with the threaded neck at one of diametrically opposite side points as indicated by the arrows in FIG. 1.

FIG. 4 is a vertical sectional view of an alternative embodiment of a child-proof snap-on closure on a bottle top utilizing a standard bottle thread between the bottle neck and the closure.

FIG. 5 is a bottom sectional view taken in the direction of the arrows in FIG. 4 of an alternative embodiment of a snap-on closure on the bottle top of FIG. 4 illustrating the invention utilizing a discontinuous thread on the closure and a continuous thread on the bottle. The closure being shown oval in broken lines to indicate the closure shape when finger pressure is applied in the direction of the arrows.

PREFERRED EMBODIMENT

In FIGS. 1 and 2, there is shown a container 20 and a closure 10 of the child-proof snap-on type in snapped-on engagement. The closure 10 is preferably made of plastic material or the like. The closure 10 comprises a panel portion 11 and a downwardly extending skirt 12 having a circular cross-section. The skirt 12 includes an upper portion 13 having an internally radially inwardly projecting bead 14 for snap-on attachment of the closure 10 to the container 20 and a circumferentially flexible lower portion 15 having a plurality of internal radially projecting threads 16 for removal of the closure 10.

In the preferred embodiment, the container 20 is a bottle or the like and includes a body 21 with an upper annular shoulder 22 and a pouring lip 25 at the upper and outer end. Integral with body 21 and extending outwardly therefrom and below said pouring lip 25 is a neck 23 having a plurality of external threads 24. The pouring lip 25 and the external neck threads 24 are separated by a circumferential annular groove 26. As shown in FIG. 1, pouring lip 25 may be viewed as a narrow annular ledge 27 surrounded by an external radially outwardly projecting bead 28.

To attach the closure 10 to the container 20 to form the container seal, the closure 10 is placed over the pouring lip 25 so that the skirt 12 coaxially surrounds and is spaced from the neck 23; the bead 14 being above and abutting the pouring lip 25. By a quick relative axial movement of the closure 10 and container 20, the bead 14 may be snapped on snugly under pouring lip 25 to create a tension in upper skirt portion 13 which causes sealing panel 11 to sealing abut and engage pouring lip 25 at the annular ledge 27. The engagement tolerances of the beads 14,28 are such that the closure 10 is difficult to pull off. More than moderate hand force is required. Normally, a child is not capable of applying this much hand force to pull off the closure 10. Regarding engagement tolerances, annular bead 14 does not completely fill groove 26; however, this feature should not be viewed as a limitation on the invention. By a proper choice of bead configuration and material, groove 26 may be entirely filled.
As is best illustrated in FIGS. 1 and 2, in the snapped-on condition, the skirt 12 coaxially surrounds the neck 23. In addition, the minor diameter 40 of internal threads 16 is larger than the major diameter 39 of external threads 24. This results in skirt 12 being radially outwardly spaced from neck 23 to provide an annular gap 29 between the neck 23 and the skirt 12. Thus, removal by a child is difficult since a simple rotation of the closure will not cause removal thereof. Nor is simple wedging action possible to remove the closure 10 since in the snapped-on condition, the bottom annular surface 30 of skirt 12 closely opposes annular shoulder 22. At most, only a minimum opening or gap 31 is provided. Consequently, a child is prevented from inserting his finger or teeth into said opening to obtain a wedging action to remove the closure 10.

In FIG. 3, there is shown the closure 10 in the first stage of removal. The lower portion 15 of skirt 12 having been squeezed radially inwardly at one of diametrically opposite side points as shown by the direction of the arrows in FIG. 1. Since the lower portion 15 of skirt 12 is flexible around its entire periphery, the skirt 12 may be grasped and squeezed at two diametrically opposite points.

In order to open container 20, a combination inward squeezing action plus a twisting action or rotation is required. In operation, the lower skirt portion 15 of closure 10 is deflected or flexed radially inwardly so that threads 16 contact or mesh with threads 24. Next, a simultaneous twisting of rotation is applied to closure 10 to drive the closure 10 upwardly on the threaded neck 23, thus forcing the skirt bead 14 upwardly over the pouring lip bead 28 to pry off the closure. Alternatively, container 20 may be rotated while holding closure 10 stationary. A child is not normally capable of doing this whereas an adult can readily perform these simultaneous operations.

In FIG. 4, there is shown an alternative form of the invention including a similar snap-on closure 40 and a standard bottle or container 50. Closure 40 and bottle 50 are each provided with a standard bottle thread 35,36 for removal of the closure 40 as heretofore described. The lower portion 38 of the skirt 37 is flexible around its entire periphery. In operation, the lower portion 38 is squeezed radially inwardly so that thread 36 rides on thread 35. The application of a simultaneous twist to closure 40 will drive the closure 40 upwardly thus prying internal closure bead 34 up and over pouring lip bead 39 to open the container.

In FIG. 5, there is shown another alternative form of the invention including a similar snap-on closure 60 on a container or bottle 70. This form of the invention utilizes a pair of circumferential diametrically opposite internal thread segments 61,61 in the closure 60 and a continuous external thread 72 on the container neck 71 for removal of the closure 60. The closure 60 is shown ovalized in broken lines 63 to indicate that finger pressure should be applied to the flexible lower skirt portion adjacent the thread segments 61,61.

This form of the invention utilizing the thread segments 61,61 provides an additional margin of child safety in that closure removal can only be accomplished by grasping and deflecting the closure skirt at two discrete points along its periphery.

What is claimed is:

1. A snap-on closure for a container having a threaded neck portion and an upper pouring lip, said pouring lip and said threaded neck portion being separated by a circumferential annular groove, which comprises:
   a top panel having a skirt extending downwardly therefrom;
   said skirt including an upper portion having an internal annular bead for engagement with said groove when said bead is snapped on over said pouring lip;
   said skirt including a lower portion having at least one circumferential internal thereon, said thread being radially spaced from said threaded neck portion and engageable therewith for prying off said closure; and
   said lower skirt portion being circumferentially flexible whereby being flexed radially inwardly at generally diametrically opposed points into engagement with said threaded neck portion and relative rotation of said closure and said container said skirt is driven upwardly on said threaded neck portion to pry off said closure from said container.

2. The snap-on closure as recited in claim 1 wherein said internal thread comprises a pair of diametrically opposite thread segments.

3. A snap-on closure for a container having a pouring lip with a radially extending annular bead thereon and a screw threaded neck below said pouring lip, which comprises:
   a top panel having a downwardly extending skirt;
   said skirt including an internally annularly beaded upper portion engageable with said pouring lip bead for snap-on attachment to said container and an internally threaded lower portion having at least one complete thread thereon for pry-off removal therefrom, said closure from said container.

4. The snap-on closure as recited in claim 3 wherein said thread comprises a pair of diametrically opposite thread segments.

5. The combination which comprises:
   a container and a closure therefor;
   said container having a neck with external threads thereon and a pouring lip at its outer and upper end;
   said external threads and said pouring lip being separated by a circumferential annular groove;
   said closure having a top panel for abutting and engagement with said pouring lip and a downwardly extending skirt with an internally annularly beaded upper portion for engagement with said groove when said bead is snapped on over said pouring lip and an internally threaded lower portion having at least one circumferential thread thereon and being radially spaced from said threaded neck portion and engageable therewith for prying off said closure;
   said lower skirt portion being circumferentially flexible whereby upon being flexed radially inwardly at generally diametrically opposed points into engagement with said threaded neck portion and relative rotation of said closure and said container said skirt is driven upwardly on said threaded neck portion to pry off said closure from said container.
6. The combination as recited in claim 5 wherein said thread comprises a pair of diametrically opposite thread segments.

7. The combination as recited in claim 5 wherein said container comprises a body having an upper annular shoulder and said neck extending outwardly therefrom and wherein said snapped-on skirt includes a bottom annular surface closely opposing said shoulder.

8. The combination as recited in claim 7 wherein said thread comprises a pair of diametrically opposite thread segments.