United States Patent

[11] 3,633,779

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[21] Appl. No. **42**
[22] Filed **Jan. 2, 1970**
[45] Patented **Jan. 11, 1972**
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[54] **ROTATABLE SAFETY CLOSURE**
4 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **215/9,** 215/44, 215/95
[51] **Int. Cl.** **A61j 1/00,** B65d 55/02
[50] **Field of Search** 215/9, 43, 44, 95

[56] **References Cited**

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ABSTRACT: A safety closure to deter children from opening containers used to store potentially dangerous substances. The closure includes a skirt which is permanently fastened to the container and freely rotatable thereon, an overcap for sealing the container opening and a locking mechanism for securing the overcap to the skirt. The skirt has a generally cylindrical configuration with a portion of the locking mechanism either on the inside or outside of the skirt. The portion of the locking mechanism on the overcap is disengaged from the portion on the skirt when the overcap is rotated to a particular position with respect to the skirt. However, the overcap will remain in a locked position if the skirt is rotated together with the overcap.

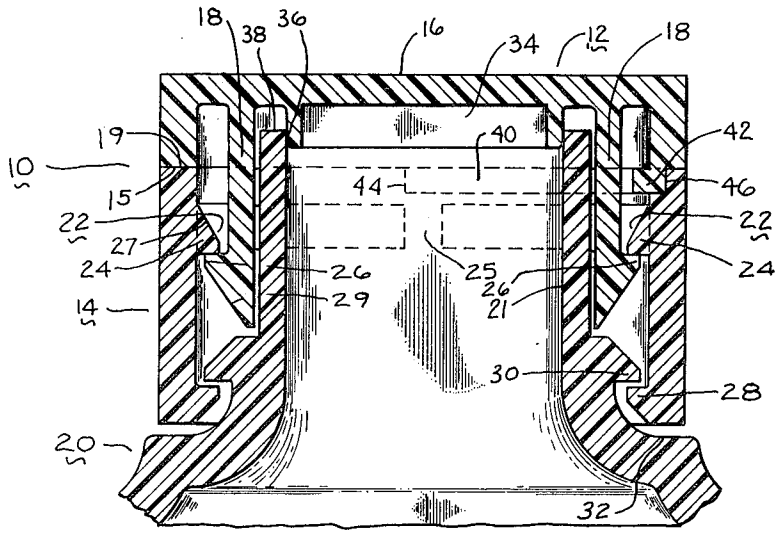


FIG. 1

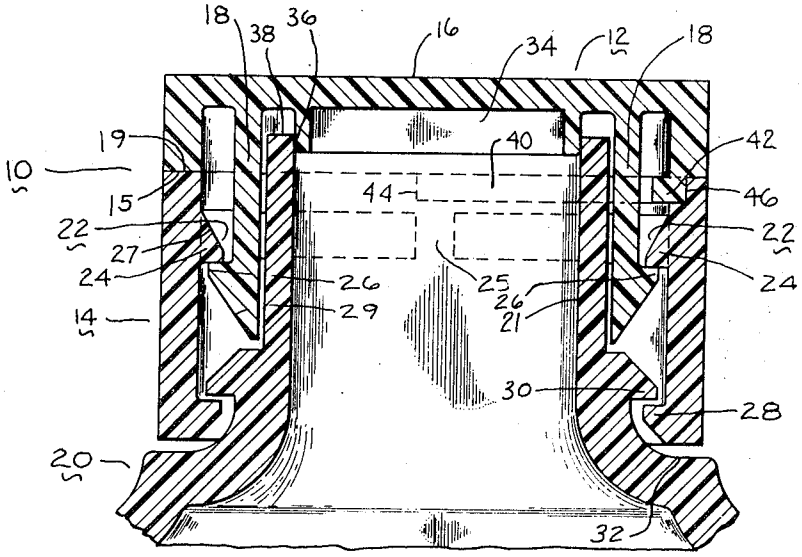
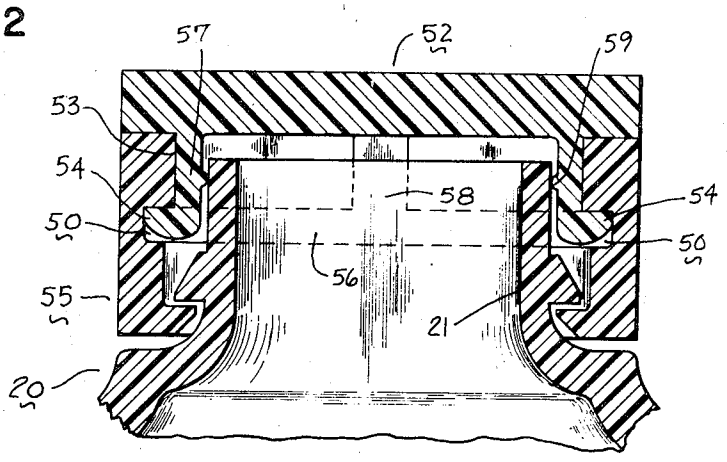


FIG. 2

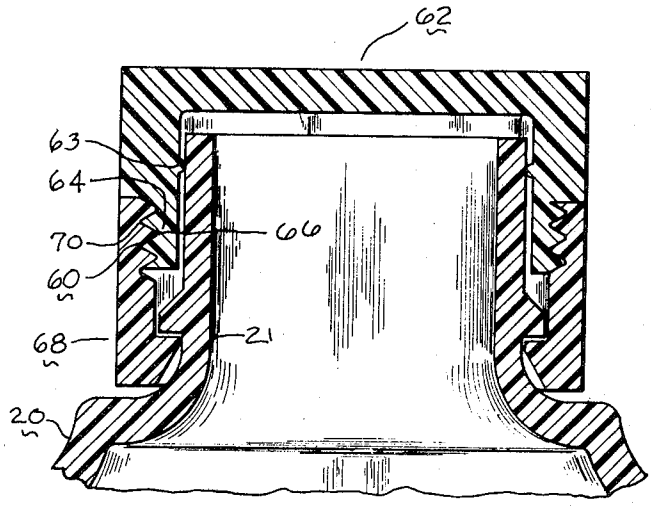


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FIG. 3



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ROTATABLE SAFETY CLOSURE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a closure for a container, and more specifically to a safety closure for a container used to store medicaments and other potentially dangerous substances.

2. Description of the Prior Art

Medicines, drugs and other potentially dangerous substances such as insecticides, weed killers, chemicals, fungicides, harsh detergents and the like must occasionally be stored in containers kept in a home. This creates a hazard if the containers are accessible to children. Therefore, it is desirable to provide a closure for a container which can be readily opened by an adult but which requires more manual dexterity and coordination than can normally be achieved by a child. Many of the safety closures proposed in the past have suffered from various defects. For example, safety closures that depend solely on the strength of the user may be unsatisfactory if the closure must be opened by an elderly person or someone weakened by illness. Another problem is that such closures frequently embody complicated mechanical structures having numerous parts which make them too expensive and untrustworthy for general application. Still others are too difficult to refasten to the container and consequently users have a tendency not to fully secure the safety mechanism.

SUMMARY OF THE INVENTION

Now there has been developed a new safety closure hereto unknown to the prior art, which resolves the problems described above.

Accordingly, the main object of the present invention is to provide an improved safety closure for a container.

Another object of the present invention is to provide a safety closure which can be used on containers having conventional nonthreaded neck finishes.

An additional object of the present invention is to provide a safety closure having a self-contained locking mechanism entirely associated with the closure itself, without any dependence on special container finishes.

Another object of the present invention is to provide a safety closure which does not leak despite tolerance variations in the dimensions of the container and/or the closure.

A further object of the present invention is to provide a safety closure which can be mounted on a container by means of conventional capping equipment without requiring any rotational orientation of the closure with respect to the container.

Other objects and advantages of the present invention will in part be obvious and will in part appear hereafter.

These and other objects are obtained by providing a safety closure for an opening of a container comprising an overcap to cover the opening of the container; a skirt adapted for mounting on a container wall defining the opening; locking means associated with the overcap and the skirt for releasably securing the overcap to the skirt, the locking means being adapted to unlock when the overcap is rotated with respect to the skirt, yet remain locked when the skirt is rotated together with the overcap; means for sealing the opening of the container; and means for fastening the skirt to the container such that the skirt can rotate freely with respect to the container while fastened on the container.

The preferred locking means can be either a flange or channel extending substantially around the periphery of the skirt and cooperating arm depending from the overcap. The arm has a lug or projection which is adapted to move underneath the flange or within the channel and pass through an inlet slot extending to the upper peripheral edge of the skirt. The lug or projection is sized such that it cannot be lifted vertically over the flange or out of the channel unless it is vertically aligned with the slot. Alternatively, the locking means may include threads on a surface of the skirt and cooperating threads on a curved wall depending from the overcap.

BRIEF DESCRIPTION OF THE DRAWINGS

In describing the overall invention, reference will be made to the accompanying drawings in which:

FIG. 1 is a side view section of a preferred embodiment of a safety closure in locking position on a container; and

FIGS. 2 and 3 are side view sections of alternative embodiments of the invention.

DESCRIPTION OF THE ILLUSTRATED EMBODIMENTS

With reference to the drawings there is shown in FIG. 1 a safety closure **10** for an opening in a container **20** comprising an overcap **12**, a skirt **14** and a locking means **22**.

The overcap **12** has a generally circular planar top wall **16** and two opposing locking members or arms **18** depending from a limited area of the underside of top wall **16**.

The skirt **14** surrounds a neck **21** of the container **20** and has a generally cylindrical configuration. If the container **20** is being used to dispense liquids it is desirable to have the upper edge **15** of skirt **14** below the upper edge **38** of container neck **21** to permit dispensing without interference by skirt **14**.

The locking means **22** includes two opposing arms **18** depending from the overcap **12** and a horizontal, inwardly projecting flange **24** extending substantially around the inner periphery of skirt **14** and being interrupted to form two opposing slots **25** extending vertically through the flange **24**. Each slot **25** is sufficiently wide to enable a projection **26** which extends horizontally from the lower portion of the arm **18** to pass vertically through the slot **25**. The flange **24** may have a gradually tapered upper surface **27** and the cooperating projection **26** can have a tapered lower surface **29** adapted to slide down over surface **27** when the skirt **14** or arm **18** is sufficiently resilient. Alternatively, if the arm **18** and the skirt **14** are rigid it may be necessary to align the projections **26** with the slots **25** and slide the projections **26** down through slots **25** to a position beneath flange **24** and then rotate the overcap **12** into locking position wherein the projections **26** extend underneath the flange **24**. Although a single arm **18** and single slot **25** will make it more difficult to disengage the locking means **22**, the use of two or more arms **18** enables the overcap **12** to be more evenly secured to the skirt **14**. The arms **18** must be located at a radial position such that when overcap **12** is fastened to skirt **14** arms **18** will extend between the inner surface of skirt **14** and the outer surface of neck **21**.

A means for rotatably fastening the skirt **14** to the container neck **21** is provided such as the fastening rim **28** projecting inwardly from the lower portion of the skirt **14**. When the skirt **14** is fastened onto the container neck **21** an outwardly projecting bead **30** on the container neck **21** lies above rim **28** and a laterally projecting shoulder **32** lies below rim **28** to prevent skirt **14** from moving up or down in a vertical direction along neck **21**. However, the vertical distance between bead **30** and shoulder **32** must be greater than the vertical extent of the portion of rim **28** lying between bead **30** and shoulder **32** so as to permit skirt **14** to rotate freely on neck **21**. The shoulder **32** must be located at a precise height on the container neck **21** in order to support skirt **14** at a vertical position which will permit engagement of locking means **22** when the overcap **12** is lowered onto skirt **14**. The flange **24** must lie a distance above rim **28** such that projection **26** and underlying bead **30** may both be lodged between flange **24** and rim **28**.

A means for sealing the opening of the container **20** is also provided such as a resilient circular seal ring **34** depending from the underside of top wall **16** of overcap **12**. A portion of the outer surface **36** of seal ring **34** is adapted to sealingly engage an upper portion of the inner surface of neck **21** when the overcap **12** is in locking position. The circular surface **36** must lie inside the perimeter of arms **18** at a distance sufficient to enable the sidewall of neck **21** to wedge between surface **36** and arms **18**. The frictional force between surface **36** of the seal ring and neck **21** is substantially less than the sum of the frictional force between flange **24** and projections **26** and the frictional force between the upper surface **15** of skirt **14** and the lower surface **19** of overcap **12** in order that overcap **12**

and skirt 14 will rotate as one integral unit unless a restraining force is applied to one of the skirt 14 or the overcap 12 while the other is rotated.

FIG. 1 also illustrates a registration means which facilitates the alignment of the locking means 22. A skirt 14 is provided with a recessed registration channel 40 extending horizontally along the upper peripheral edge of the inner surface of skirt 14. Overcap 12 is provided with a depending registration member 42 adapted to ride horizontally within the registration channel 40 when the overcap 12 is mounted on skirt 14 and rotated with respect to skirt 14. The registration channel 40 has one stop 44 denoting an unlocked position in which projections 26 are aligned with slots 25. A second stop 46 denotes the locked position in which projections 26 extend underneath flange 24.

An alternative embodiment of a locking means 50 is illustrated in FIG. 2. The overcap 52 has a depending resilient cylindrical wall 57 and two opposing outwardly projecting lugs 54 connected to the bottom of wall 57. The skirt 55 has a channel with a locking section 56 extending substantially around the inner surface of the skirt 55. The locking section 56 of the channel is preferably horizontal, but may be angular. Opposing vertical channel inlet sections or slots 58 extend from the upper peripheral edge of the channel locking section 56 to the upper peripheral edge of skirt 55. The lugs 54 are adapted for movement within inlet sections 58 and the locking section 56 of the channel. When it is desired to lock the overcap 52 into position the lugs 54 are aligned with the vertical inlet sections 58 and slipped down into the channel locking section 56. The overcap 52 is then rotated until the lugs 54 are out of alignment with the vertical inlet sections 58. The extent to which each lug 54 lies horizontally within the channel locking section 56 is such that when overcap 52 is in locked position it cannot be removed from the skirt 55 by the application of axial force to separate overcap 52 from skirt 55. Markings can be provided on the overcap and skirt to enable one to properly align the lugs 26 with the vertical channel inlet sections 58 for engagement and disengagement. The unlocking and removal of the overcap 52 can be made more difficult by modifying the channel configuration to include additional vertical, horizontal, and/or angular sections through which the lugs 54 must pass in order to be unlocked and disengaged from skirt 55. A registration means similar to that described with respect to FIG. 1 may be provided to facilitate the engagement and disengagement of the locking means 50. The opening of the container 20 is sealed by means of a circular bead 59 which projects inwardly from cylindrical wall 57 and sealingly engages the outer surface of neck 21. The friction between bead 59 and the outer surface of neck 21 is substantially less than the friction between the outer surface of cylindrical wall 57 and the inner surface 53 of skirt 55 in order that skirt 55 and overcap 52 will rotate as one integral unit unless a restraining force is applied to one while the other is rotated. The skirt 55 is rotatably fastened to neck 21 as described with respect to FIG. 1.

FIG. 3 illustrates another embodiment of the locking means 60 in which overcap 62 is provided with a depending cylindrical wall 64 having threads 66 on the outer surface of cylindrical wall 64. Skirt 68 has threads 70 on its inner surface adapted to cooperate with threads 66. The overcap 62 may be secured into locking position by screwing the overcap 62 with one hand while restraining skirt 68 from rotating with the other hand. Threads 66 and 70 will have a sufficiently close tolerance so that if overcap 62 is rotated skirt 68 will rotate with overcap 62 and vice versa. The means for rotatably fastening skirt 68 to container 20 is similar to that described with respect to FIG. 1. When the skirt 68 and overcap 62 are locked together they rotate freely as one integral unit around neck 21 while skirt 68 remains fastened to neck 21. Therefore, to disengage locking means 60 it is necessary to restrain skirt 68 while rotating overcap 62 with respect to skirt 68 or vice versa. In an alternative configuration the threaded cylindrical wall depending from the overcap may surround the skirt and the position of the threads on the overcap and skirt will be reversed from that shown in FIG. 3 such that the threads are on the outer surface of the skirt and the inner surface of the cylindrical wall. The opening of the container 20 is sealed by means of a circular bead 63 which sealingly engages the outer surface of neck 21 as described above with respect to FIG. 2. The friction between bead 63 and neck 21 is substantially less than the friction between threads 66 and 70 in order that the overcap 62 and skirt 68 will rotate as an integral unit unless a restraining force is applied to one while the other is rotated.

In general the preferred materials which find particular use in this invention are plastics such as polyethylene, polypropylene, polyurethane, polystyrene and polyvinyl chloride. The resilient characteristics of polyethylene, polyurethane, and polypropylene are especially suitable for use in a resilient skirt such as that described with respect to FIG. 1. The overcap material does not have to be as resilient as the skirt material and therefore materials such as polystyrene and polyvinyl chloride could also be used in the overcap.

The present invention finds utility in safety closures for containers which must be used to store potentially dangerous substances. The several embodiments described for the locking means all depend on the principle that the user must place each hand in a certain location and rotate the overcap to a particular position with respect to the skirt in order to disengage the locking means. The user then applies axial separating force to remove the overcap from the skirt and container. The skirt is rotatably mounted on a container such that the skirt can rotate freely while remaining fastened to the container. The portions of the locking means on the skirt and overcap have sufficiently close tolerances such that the overcap will rotate with the skirt and vice versa unless a restraining force is applied to one while the other is rotated. The outer configuration and finish of the overcap and skirt will be such that they appear to blend together as one unit to a casual observer or a child. Therefore, a user must know previously or be alert and sufficiently mature to comprehend the procedure for removing the overcap. A child or unattentive adult would assume that the overcap and skirt formed an integral unit and therefore, would most likely rotate the entire closure assembly together in an unsuccessful attempt to disengage the locking means.

The closure assembly may be mounted with conventional capping equipment on an unthreaded container neck because of the simple snap-on fastening mechanism of the skirt. Furthermore, because the entire locking mechanism is self-contained in the skirt and overcap portions of the closure, the molding operation is simplified and the cooperating members of the locking mechanism can be more easily molded within the required tolerances, without any dependence on tolerance variations in the container dimensions.

Although the invention has been described with a certain degree of particularity, it is understood that the present disclosure has been made only by way of example, and that many variations and modifications of the details of construction and combination and arrangement of parts herein described will be obvious to those skilled in the art and may be carried out without departing from the spirit and scope of the invention as hereinafter claimed.

What is claimed is:

1. A safety closure for an opening of a container comprising:

a. an overcap to cover the opening of said container;

b. a skirt adapted for mounting on a container wall defining said opening;

c. locking means comprising a flange extending substantially around the periphery of said skirt, said flange being interrupted to form a slot, and a locking member depending from said overcap, said locking member having a projection underneath said flange when said overcap is in a locked position on said skirt, said projection having a width such that it can pass through said slot, yet the extent to which said projection lies underneath said flange is

such that said projection remains underneath said flange when axial separating force is applied to said overcap with respect to said skirt;

d. means for sealing the opening of said container; and

e. means for fastening said skirt to said container such that said skirt can rotate freely with respect to said container while fastened on said container.

2. The device of claim 1 wherein an upper peripheral portion of said skirt has a substantially horizontally extending registration channel and said overcap has a depending registration member adapted to ride within said registration channel when said overcap is mounted on said skirt, said registration channel having one stop denoting an unlocked position and a second stop denoting a locked position for said overcap with respect to said skirt.

3. A safety closure for an opening of a container comprising:

a. an overcap to cover the opening of said container;

b. a skirt adapted for mounting on a container wall defining said opening;

c. locking means comprising a channel in a surface of said skirt and a locking member depending from said overcap, said channel having a locking section and an inlet section extending between said locking section and the upper peripheral edge of said skirt, said locking member having a lug for movement through said inlet section and said locking section of said channel, said lug being sized such that when said overcap is in a locked position on said skirt said lug remains engaged in said locking section of said channel when separating force is applied to said overcap with respect to said skirt;

d. means for sealing the opening of said container; and

e. means for fastening said skirt to said container such that said skirt can rotate freely with respect to said container while fastened on said container.

4. The device of claim 3 wherein an upper peripheral portion of said skirt has a substantially horizontally extending registration channel and said overcap has a depending registration member adapted to ride within said registration channel when said overcap is mounted on said skirt, said registration channel having one stop denoting an unlocked position and a second stop denoting a locked position for said overcap with respect to said skirt.

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