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Schaefer

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[54] **SNAP-ON SAFETY CLOSURE FOR CONTAINERS**

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 276,181, July 28, 1972, Pat. No. 3,830,393.

[52] **U.S. Cl.** **215/224;** 215/216

[51] **Int. Cl.** **B65d 55/02;** A61j 1/00 B65d/85/56

[58] **Field of Search** 215/9, 216, 224, 321; 220/306

[56] **References Cited**

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[57] **ABSTRACT**

A child-proof snap-on closure for containers utilizes a flexible cap. An enlarged shoulder on the container body is engaged by the smaller perimeter of the cap when the latter is snapped upon the container mouth. By making the cap difficult to grasp in closed disposition, entry is obtained only by pressing down on the center of the cap. The couple created causes the flanged edge to lift up from the shoulder. Insertion of a fingernail under the perimetrical edge of the cap enables the cap to be peeled off. Instructions for the removal of the cap as well as for the reclosure thereof are incorporated on the cap to facilitate actuation by those of reading age.

12 Claims, 4 Drawing Figures

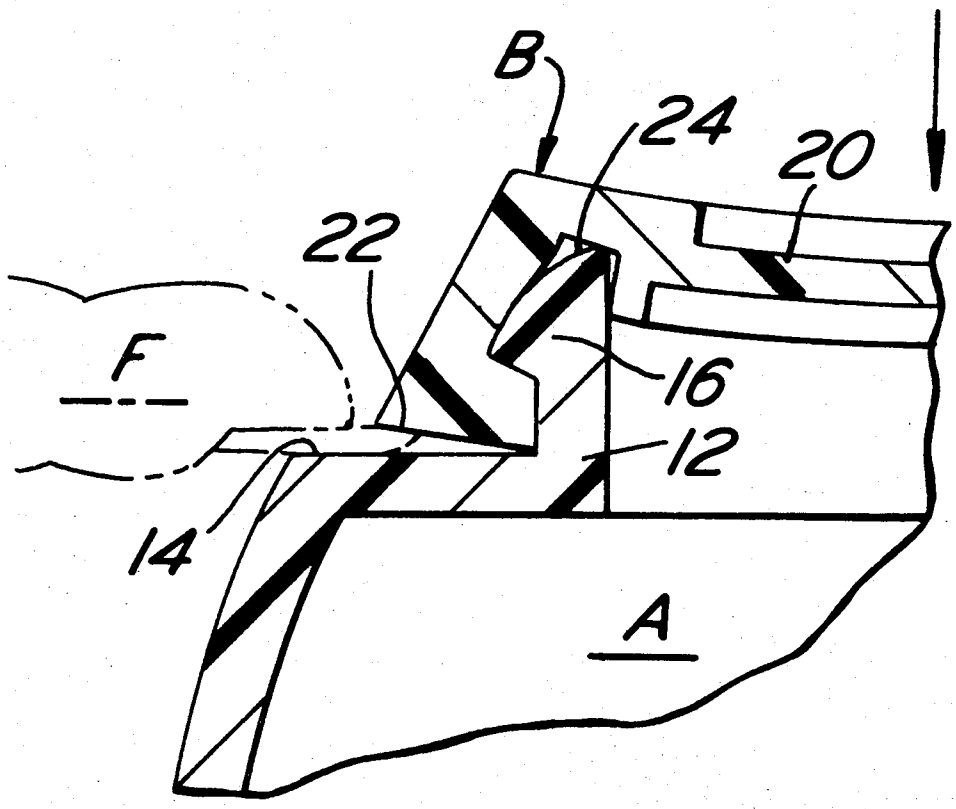


FIG. 1

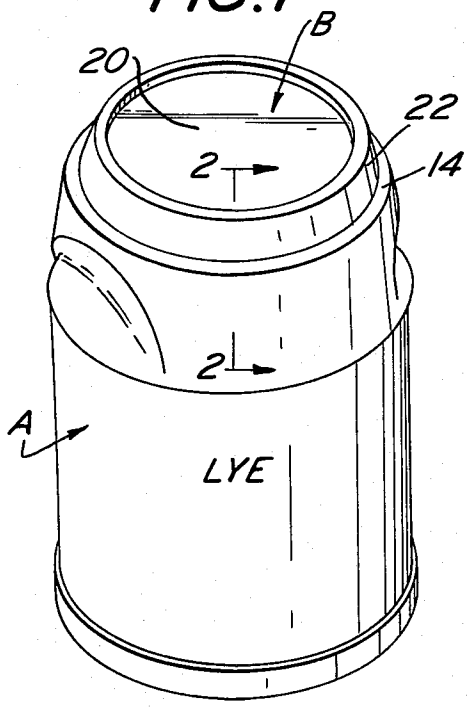
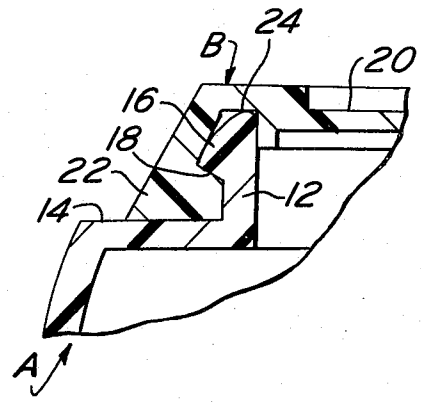


FIG. 2



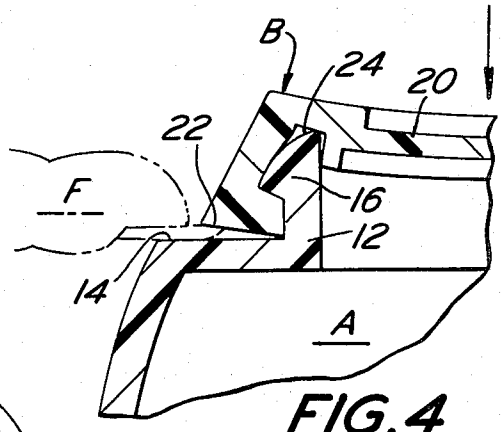


FIG. 4

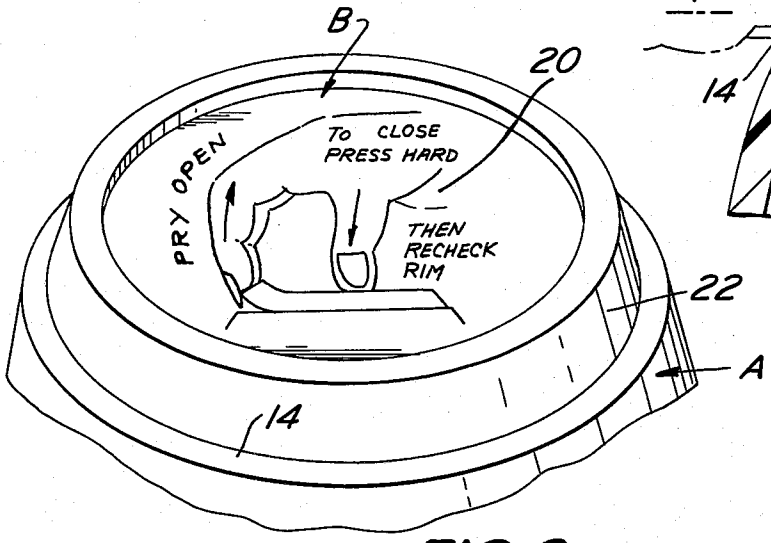


FIG. 3

SNAP-ON SAFETY CLOSURE FOR CONTAINERS

This is a continuation-in-part of my prior co-pending application, Ser. No. 276,181 filed July 28, 1972, now U.S. Pat. No. 3,830,393.

This invention relates to child-proof closures for containers, and more particularly relates to a safety snap-on closoure which is resistant to removal by small children as in the case where the container is used for dispensing medicaments or hazardous materials, either in liquid, capsular or particulate form.

Since many injuries and deaths are caused each year, especially to very young children, by easy access to bottles and other containers carrying poison or other harmful substances, the Poison Prevention Packaging Act of 1970 has been enacted. In general, this act requires that such toxic substances be specially packaged in a manner which renders it significantly difficult for a child under 5 years to gain access to the contents within a reasonable time without affording difficulty to an older child or adult to obtain entry.

In my prior application, Ser. No. 276,181; there is shown and described a flexible plastic container which employs an enlarged shoulder and a snap-on closure. Entry is obtained by applying pressure upon the sidewall of the container, a sufficient amount to cause distortion of the shoulder. A gap created between the edges of the cap and shoulder under the container neck permitted entry of a fingernail or tip of the finger and allowed the cap to be lifted. One of the problems of the prior system is the tendency of the user to turn the bottle portion into horizontal position in order to grasp and press in the sidewall, thereby making spillage likely when the cap is lifted.

The present invention is also directed to a snap-on type closure using a cap that is difficult to grasp and manipulate when locked over the container mouth. However, in the instant case, application of pressure is upon the cap only such that the container is retained in upright position. Again, a gap is created under the edge of the cap and the shoulder, this time as a result of the couple formed at the fulcrum of the container mouth whereby the cap may be peeled off.

It is therefore an object of this invention to provide a safety snap-on closure for containers holding poisonous or hazardous substances.

Another object of this invention is to provide a snap-on closure for containers which is difficult to remove by small children who do not have the required two-hand coordination for correct manipulation of the closure in order to gain access to the contents.

Yet another object of this invention is to provide a safety snap-on closure which is readily fabricated from commonly available materials and whose parts may be easily operated after reading the instructions by an adult or older child to release the cap, but not readily opened by a child below reading age.

Still another object of this invention is to provide a child-proof closure in which adults will remove the cap without tilting the container.

Other objects of this invention are to provide an improved device of the character described that is easily and economically produced, sturdy in construction and both highly efficient and effective in operation.

With the above and related objects in view, this invention consists of the details of construction and combination of parts as will be more fully understood from

the following detailed description when read in conjunction with the accompanying drawing in which:

FIG. **1** is a perspective view of a flexible container having a snap-on safety closure embodying this invention.

FIG. **2** is a sectioned view taken along lines **2—2** of FIG. **1.**

FIG. **3** is a fragmentary perspective view showing the manner of manipulating the container in order to expose the underside of the closure preliminary to removal.

FIG. **4** is a sectional view taken along lines **4—4** of FIG. **3.**

Referring now in greater detail to the drawings in which similar reference characters refer to similar parts, there is shown a snap-on safety closure for containers which makes access significantly difficult for very young children without presenting undue burdens to normal adults.

The container includes a body portion A having a snap-on cap B molded of a suitable flexible and resilient plastic material, such as polyethylene, polypropylene, polyvinyl chloride, polytetrafluorethylene or the like. The body portion A which can be flexible or rigid, such as glass, may be of any configuration and includes a generally tubular neck **12** which projects from an extended surface shoulder portion **14.** The neck **12** serves as the mouth of the container. A bead **16** formed peripherally about a medial portion of the neck acts as a detent for engaging a complementary groove **18** formed on the interior wall of the cap B.

The cap B includes a central disk portion **20** having a skirt or flange portion **22** extending entirely thereabout. The perimeter of the skirt **22** is smaller than the circumference of the shoulder **14** so that the outer margin of the shoulder always extends beyond the periphery of the skirt. The under edge of the cap B is preferably flat to make surface to surface abutment with the flat face of the shoulder thereby normally defining an extremely fine line about the entire area of contact. Thus, when the cap B is snapped over the neck **12** there is ordinarily no gap between the shoulder **14** and the skirt **22** which is readily engaged for lifting the cap. In addition, the cap B is of extremely shallow construction and having a truncated conical configuration wherein the outer wall of the skirt **22** diverges outwardly from the central portion **20** so that grasping the cap B when stretched in place over the neck **12** under normal circumstances is most difficult. See FIGS. **1** and **2.**

In order to remove the cap B, the center of the cap is depressed at a medial point **20** such that a couple is created at the mouth edge **24** of the neck, the edge **24** defining a fulcrum about which the flange portion **22** is caused to pivot. It is contemplated that the bottom of the container A may be rested upon a table top when pressure is applied to the cap center **20.** As is apparent from FIGS. **3** and **4,** the gap provided under the lip of the skirt **22** when the cap center **20** is depressed allows entry of a tip or nail or a finger F whereby the cap B may then be lifted and peeled off from the neck **12.** The closure is capable of being resealed simply by pressing down upon the center portion **20** of the cap B after it has been applied to the mouth of the neck. In this regard, the bead **12** has an upper surface which makes an angle of **60°** with the horizontal and a lower surface which makes an angle of **30°** with the horizontal thereby functioning as a tooth. The upper surface of

the bead thus acts as a ramp for camming the skirt **22** over the bead and the lower surface of the bead effects interlocking engagement with the groove **18.**

It is also evident that the external configuration of the cap B may be spherical or faceted in design rather than conical, so long as the shape resists being securely grasped by one's fingers when the cap is locked in place. While it is preferable that the undersurface of the skirt **22** and upper surface of the shoulder **14** are flat and at right angles to the axis of the neck **12,** so long as the lip of the skirt forms a flush line at its outer edge inwardly of the shoulder, the deterrent closure is effected.

It is also to be observed that the written instructions on the cap B serve to advise one of reading age to take the appropriate steps to remove the cap B and to replace it. However, a non-reader would experience difficulty in removing the cap.

Although this invention has been described in considerable detail, such description is intended as being illustrative rather than limiting, since the invention may be variously embodied without departing from the spirit thereof, and the scope of the invention is to be determined as claimed.

What is claimed is:

1. A dispensing container having a snap-on closure resistant to removal by small children comprising

a body portion including a tubular neck projecting from an extended shoulder portion, said tubular neck having a bead means in the form of an annular ridge circumscribing an exterior surface of said tubular neck, said bead means being in concentric disposition with an open end of said tubular neck which serves as the opening for the container, said bead means being suitably configured for engaged, interlocking relation with a groove means disposed on a cap for closing the container,

a cap of flexible material including a center portion and a skirt, said skirt having an internal dimension complementary with the exterior of said neck and an exterior perimeter smaller than the periphery of said shoulder portion,

groove means, disposed on an internal surface of said skirt and suitably disposed for engaged interlocking relation with said bead means, for detachably locking said cap on said neck so that the margin of the skirt abuts entirely against said shoulder portion,

the exterior of said cap being so configured and arranged when in locked disposition on said neck as to render grasping thereof by one's fingers difficult, and

a pressure zone at the center of said cap for affecting a bowing couple in said cap when pressure is applied downward on the center of the cap,

wherein said skirt is disposed with respect to said center portion that when said cap is in engaged relation with said body portion, by having been snapped on said body portion, the application of a suitable downward force upon said pressure zone, creating a bowing couple in said cap, will result in said skirt moving slightly away from said shoulder portion, as said skirt groove means rotates slightly about said bead means, said movement of said skirt away from said shoulder portion creating only a small space into which one may insert one's fingernail and pry said cap from said body portion.

2. The container of claim **1** wherein the bead means circumscribing said neck and said groove means in the interior of said skirt are so disposed as to permit engaged interlocking relation of said bead means and said groove means at any angular position to which said cap may be rotated with respect to said body portion.

3. The container of claim **1** wherein said shoulder portion is substantially flat.

4. The container of claim **1** wherein said cap is of shallow configuration.

5. The container of claim **1** wherein the cap may be replaced and interlocked over the neck after having been previously lifted.

6. A closeable child-proof container of the reopenable type, said container being child-proof by virtue of requiring, to be opened, two distinct yet simultaneous manual operations to be applied thereto, said two distinct, simultaneous manual operations being of a type requiring manual facility, dexterity and coordination not found in small children, and said container requiring, to be closed, only a single manual operation, comprising:

a. a body portion having a generally cylindrical form, being closed at one end of the cylinder and having body securing means at the other end of the cylinder, said body securing means being means for retaining said body portion and a cap portion in engaged, interlocking relation until said cap portion is removed from said body portion, said body securing means performing this function by fitting in mated disposition with a cap securing means, said body securing means comprising:

i. an extended shoulder portion, having a generally disk like form, extending radially inward from the cylinder wall, terminating in a tubular neck portion;

ii. a tubular neck position having a generally cylindrical form, having the axis of rotation of the cylinder generally coincidental with the axis of rotation of the cylindrical body portion, said tubular neck portion extending outwardly from said extended shoulder portion at substantially a right angle therefrom, thereby extending the length of said body portion;

iii. a bead portion extending generally radially outward from the outer surface of said tubular neck portion, said bead portion being located remote from where said tubular neck portion extends from said shoulder portion;

and

b. cap portion means for closing said container, said cap portion means being suitably disposed for engaged, interlocking relation with said body portion and for removal from said body portion, said cap portion means comprising:

i. a disk portion of generally circular form;

ii. a flange portion having the general form of a truncated cone;

iii. a groove disposed annularly about the inside of said flange portion;

wherein said disk portion is disposed at the smaller end of said truncated cone so as to close that smaller end of the cone and wherein said groove is parallel to the edge at the base of said cone;

wherein said groove and said bead portion are suitably disposed for engaged interlocking relation when said

body portion and said cap portion are secured together resulting in closure of said container.

7. The closeable, child-proof container of claim **6** wherein at least a portion of said extended shoulder portion is a planar surface, wherein the open, larger end of said flange portion has a flat surface suitably disposed for complemental flush fitting relation with said planar surface portion of said extended shoulder portion, and wherein when said container is closed, said planar surface portion of said extended shoulder portion abuts said flat surface of said flange portion, such abutment resulting in extremely close fitting at the exposed juncture of said cap portion and said body portion whereby any gap between said cap portion and said body portion is of a size substantially smaller than the thickness of a human fingernail, whereby such juncture appears to the human eye as an extremely fine line.

8. The closeable, child-proof container of claim **7** wherein said extended shoulder portion is of such a size larger than said open end of said flange portion in the form of a truncated cone that when said cap portion and said body portion are in engaged, interlocking relation, and said container is consequently in the closed condition, said extended shoulder extends beyond said flange portion in the form of a truncated cone.

9. The closeable child-proof container of claim **8** wherein said bead portion, extending radially outward from the outer surface of said tubular neck portion, extends outward therefrom as a structure having two planar surfaces, a first, upper one of these planar surfaces being the surface more remote from said extended shoulder, extending away from said tubular neck at an angle of substantially 60° from the horizontal, and a second, lower one of these planar surfaces being the surface more proximate to said extended shoulder, extending away from said tubular neck at an angle of substantially 30° from the horizontal, said two planar surfaces intersecting at an angle of substantially 90° thereby forming a tooth-like structure for interlocking with said groove inside said cap structure, and wherein said annular groove has four annular surfaces comprising:

a. a first annular planar surface which has a truncated cone shape and is substantially parallel to said truncated cone surface of said flange portion,

b. a second annular planar surface which intersects said first annular surface at an angle of substantially 90° thereby forming with said first annular planar surface a receptical area for said tooth-like structure of said bead;

c. a third annular planar surface intersecting said first annular planar surface at a position remote from where said second annular planar surface intersects said first annular planar surface, said third annular planar surface being oriented parallel to said disk portion of said cap and having a shape as would be formed by the area between two concentric circles;

d. a fourth annular planar surface intersecting said third annular planar surface at a position remote from where said first annular planar surface intersects said third annular planar surface;

wherein said body portion is so disposed with respect to said cap portion that when said cap portion is in engaged relation with said body portion, having been snapped on said body portion, said tooth-like structure of said bead being in engaged relation with said groove whereby the intersection of said two planar surfaces of said bead is located at said receptical area of said groove, the application of a suitable downward force at the center of said disk portion of said cap portion will affect a bowing couple in said cap portion which will result in said flange portion of said cap portion moving slightly away from said extended shoulder portion of said body portion, at the juncture of said extended shoulder portion and said flange portion, as said flange portion rotates with respect to said tubular neck portion, said rotation being generally centered about said tooth-like structure of said bead, said movement of said flange portion away from said shoulder portion creating a small space at said juncture into which one may insert one's fingernail and pry the cap portion away from the body portion;

wherein said cap portion and said body portion are disposed for reengagement once separated, by the application of suitable finger pressure to said cap portion while said cap portion and said body portion are closely disposed together in suitable contacting relation but are not in interlocking engagement; and

wherein said cap portion and said body portion are further so disposed such that said cap portion may be engaged with said body portion at any rotational orientation of said cap portion with respect to said body portion.

10. The closeable child-proof container in claim **9** wherein said bead portion extends circumferentially entirely around said tubular neck portion; wherein said groove means extends circumferentially entirely around the inside of said flange portion; wherein said upper surface of said bead portion is suitably disposed to permit camming of the flange portion over the bead portion when said cap portion is used to close said body portion; wherein, when said bowing couple is applied to said cap portion, said lower surface of said bead portion is suitably disposed to permit camming the flange portion partially over the bead portion only to the extent that a gap is created at said juncture sufficiently large to allow insertion of a fingernail so as to pry off the cap portion from the body portion, whereby said cap portion is removed from said body portion to open said container; and wherein said bead portion, in addition to providing surfaces for said camming of said cap portion, is in combination with said groove means, a means for locking said cap portion means onto said body portion thereby resulting in a closed, locked container.

11. The closeable child-proof container in claim **10** wherein the disk portion of said cap portion has indicia, as an integral part thereof, at the surface of said disk portion which is exposed when said container is in the closed condition, for indicating the correct steps one must follow to remove the cap portion from the body portion and to replace the cap portion onto the body portion, and for indicating the appropriate position on said disk portion for applying a downward force to affect a bowing couple in said cap portion, said bowing couple being necessary to remove said cap portion from said body portion.

12. The closeable child-proof container of claim **11** wherein said cap portion is a single piece of flexible plastic material, said flexible plastic material having a memory characteristic whereby said cap portion upon being deformed will attempt to return to the non-deformed state, such that when a downward force is ap-

plied to said cap portion, while said cap portion is in engaged relation with said body portion, said downward force producing a bowing couple resulting in movement of said skirt portion of said cap portion away from said shoulder portion a small distance, and then said downward force is no longer applied, said cap portion will regain the configuration it had before said downward force was applied thereto with said skirt portion moved back toward said shoulder portion said small distance so that said skirt portion again abuts said shoulder portion in extremely close fitting relation such that a human fingernail cannot be thrust into the juncture between said skirt portion and said shoulder portion.

* * * * *