United States Patent [19]

Scrocco et al.

[11] **3,913,769**

[45] **Oct. 21, 1975**

[54] **SAFETY LOCKING CAP**

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[73] Assignee: **Kabushiki Kaisha Suwa Seikosha,** Tokyo, Japan

[22] Filed: **Dec. 20, 1974**

[21] Appl. No.: **535,057**

[52] **U.S. Cl.** **215/206;** 215/216; 215/218

[51] **Int. Cl.²** **A61J 1/00;** B65D 55/02

[58] **Field of Search** 215/9, 206, 218, 216

[56] **References Cited**

UNITED STATES PATENTS

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Primary Examiner—George T. Hall

Attorney, Agent, or Firm—Blum, Moscovitz, Friedman & Kaplan

[57] **ABSTRACT**

A safety locking cap assembly for effecting closure of a bottle whereby inadvertent removal of the cap is prevented. A circular bottle neck is adapted to receive a cap and includes a radial projection. The cap includes an axially directed lug adapted to be positioned in interfering engagement with the radial projection by rotation of the cap in a first direction into closing engagement with the bottle neck to thereby prevent rotation of the cap in the other rotational direction. An axially directed finger is journaled to the cap and is adapted to cam the lug out of interfering engagement with the radial projection in response to radial alignment therebetween to thereby permit removal of the cap from the bottle neck by rotating same in the other rotational direction.

10 Claims, 8 Drawing Figures

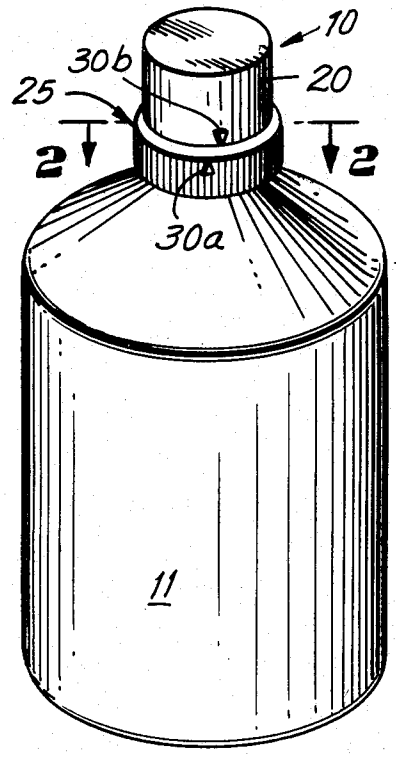


FIG. 1

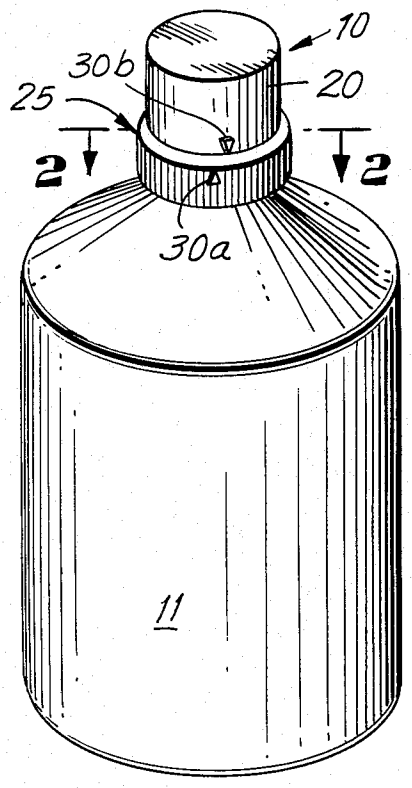


FIG. 2

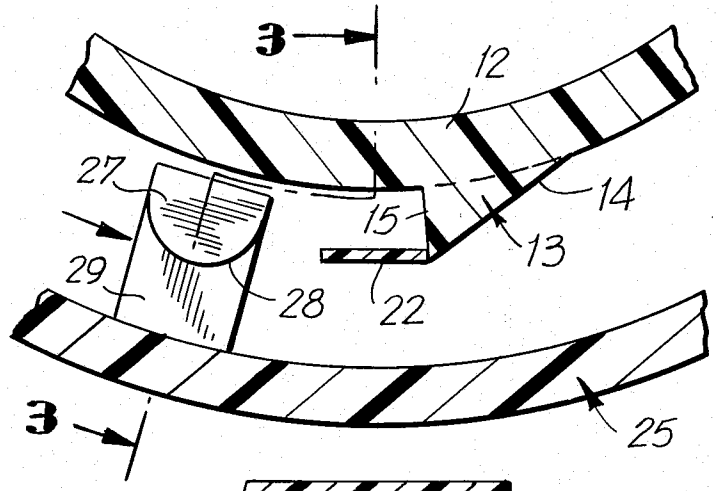


FIG. 3

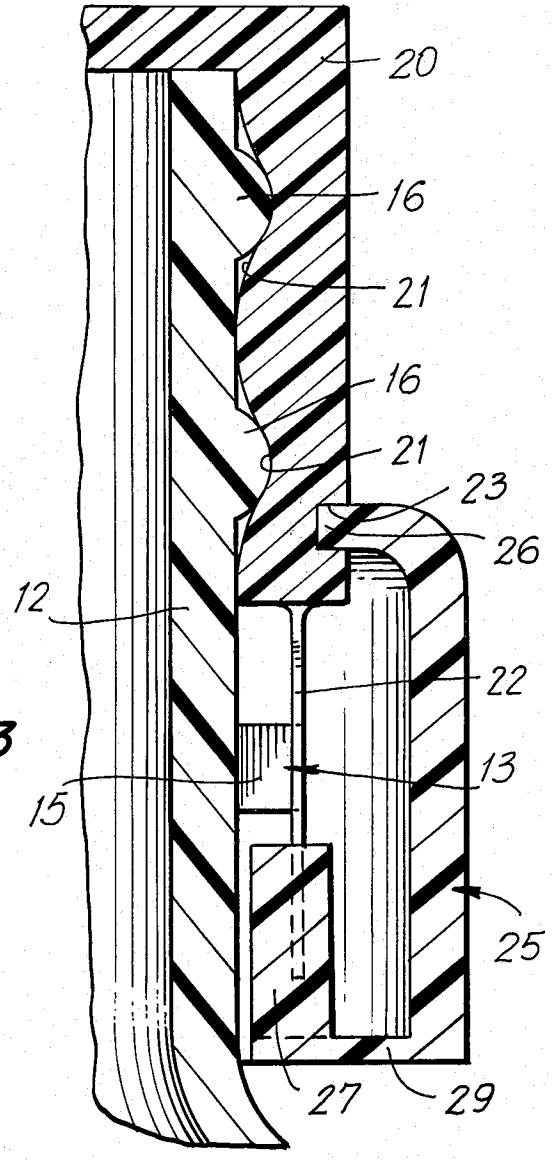


FIG. 4

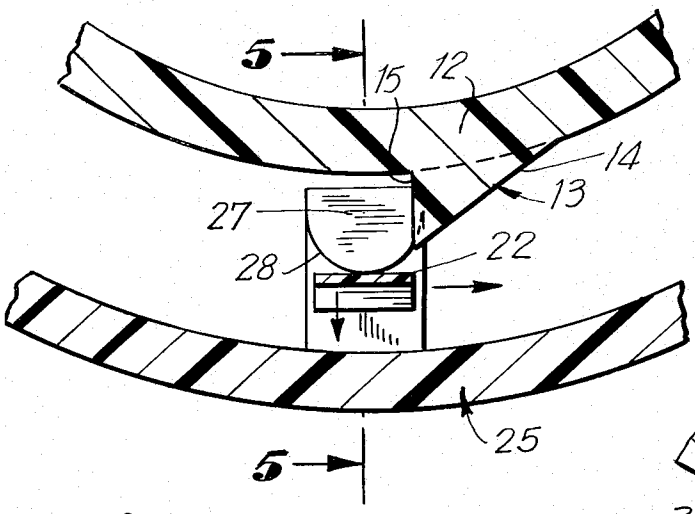


FIG. 5

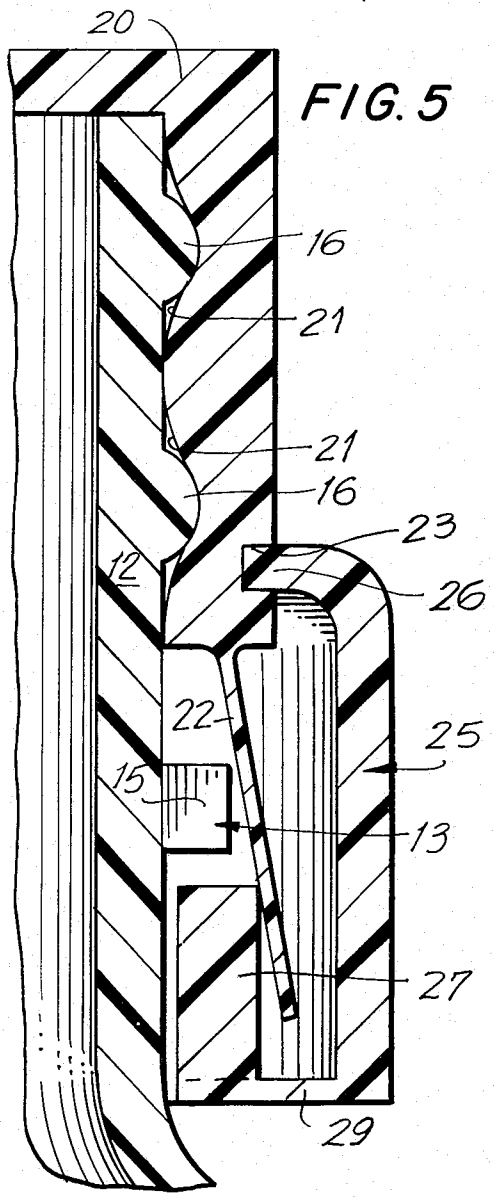


FIG. 6

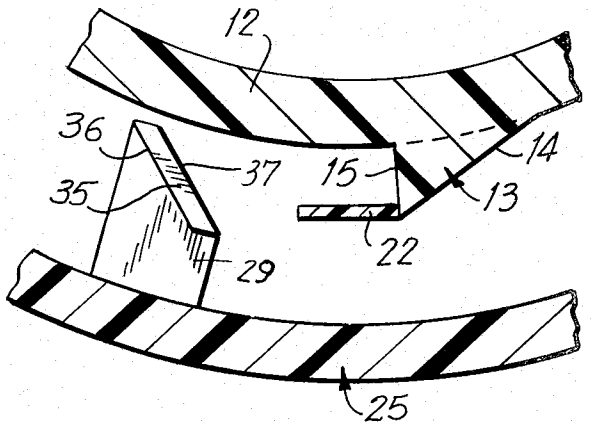


FIG. 7

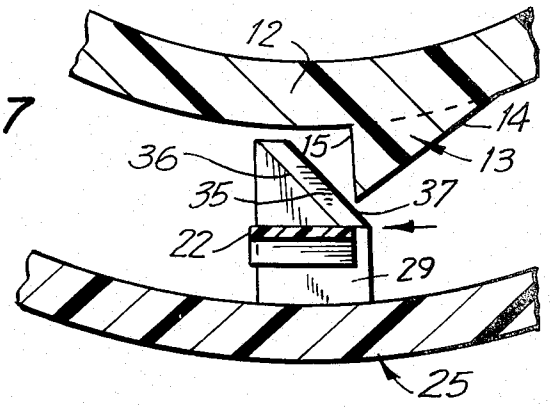
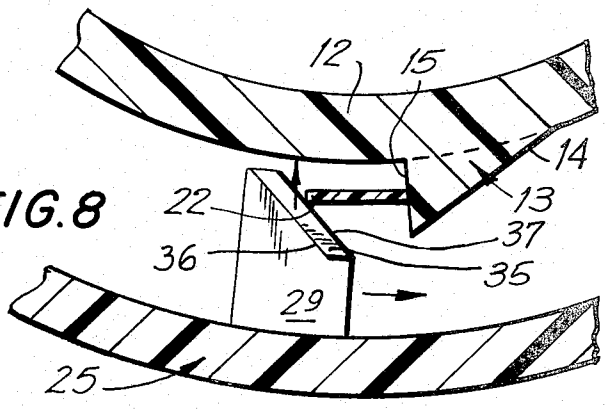


FIG. 8



SAFETY LOCKING CAP

BACKGROUND OF THE INVENTION

This invention is directed to a safety locking cap assembly adapted to provide a closure for a bottle opening, whereby inadvertent opening of same is prevented, and in particular to a safety locking cap assembly wherein the safety feature provided by the cap is not diminished by the facility with which same can be removed from the bottle.

The packaging of dangerous substances for home use, has resulted in the development of safety bottle caps designed to prevent inadvertent removal of same by a child. Nevertheless, such bottle caps although successfully preventing opening of the bottle by children, have presented an equally difficult challenge to an adult attempting to open same. For example, safety caps capable of locking the cap to the bottle to prevent inadvertent removal, usually require undue force to effect unlocking and removal of the cap, thereby rendering such caps less than completely satisfactory.

SUMMARY OF THE INVENTION

Generally speaking, in accordance with the invention, a safety locking cap assembly adapted to prevent inadvertent removal of the cap from the bottle is provided. A circular bottle neck including a radial projection is adapted to rotatably receive the cap. The cap includes an axially directed lug adapted to be positioned in interfering engagement with the radial projection by rotation of the cap in a first direction into closing engagement with the bottle neck to prevent rotation of the cap in the other rotational direction. An axially directed finger is journaled to the cap and is adapted to cam the lug out of interfering engagement with the radial projection in response to radial alignment therebetween to thereby permit removal of the cap from the bottle neck by rotation of same in the other rotational direction.

Accordingly, it is an object of this invention to provide an improved safety locking cap assembly wherein inadvertent opening of the cap by children is avoided.

Another object of this invention is to provide a safety locking cap assembly wherein the safety feature of the cap is not diminished by the facility with which same can be removed from the bottle.

Still other objects and advantages of the invention will in part be obvious and will in part be apparent from the specification.

The invention accordingly comprises the features of construction, combinations of elements, and arangement of parts which will be exemplified in the constructions hereinafter set forth, and the scope of the invention will be indicated in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the invention, reference is had to the following description taken in connection with the accompanying drawings, in which:

FIG. 1 is a perspective view of a safety locking cap assembly constructed in accordance with the instant invention;

FIG. 2 is a partial sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is a sectional view taken along line 3—3 of FIG. 2;

FIG. 4 is a partial sectional view in accordance with the view depicted in FIG. 2, illustrating an operative principle of the instant invention;

FIG. 5 is a sectional view taken along line 5—5 of FIG. 4; and

FIGS. 6, 7, and 8 are partial sectional views of a safety bottle cap assembly constructed in accordance with an alternate embodiment of the instant invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference is now made to FIGS. 1 through 5, wherein a safety locking cap assembly, generally indicated at 10, provides a safety closure for a bottle 11 in accordance with a preferred embodiment of the instant invention. Bottle 11 includes a circular neck 12 having integrally molded thereon a radially directed projection 13, including a first inclined surface 14 and a second flat surface 15 perpendicular to the tangent of the bottle neck. Additionally, bottle neck 12 includes threads 16 integrally formed thereon to permit a bottle cap having internal threads to be screwed thereon into a closed position.

A circular bottle cap 20 includes internal threads 21 to allow the cap to be screwed onto the threads of the bottle neck to thereby effect the closing of the bottle neck in a conventional manner. The cap further includes an integrally formed axially extending lug 22 adapted to extend considerably past the bottle neck projection 13. Accordingly, when the cap 20 is screwed on the bottle neck 12, lug 22 is rotated in a clockwise direction and is cammed over the inclined surface 14 of projection 13. Whem the cap is rotated into a fully closed position, lug 22 is positioned in interfering engagement with flat surface 15 of projection 13, to thereby prevent rotation of same in a counterclockwise direction, hence preventing removal of the cap from the bottle neck.

Cap 20 includes annular recess 23 adapted to rotatably secure a journal ring, generally indicated as 25, to said cap. The journal ring includes a radially directed annular wall 26 rotatably secured in recess 23 to effect journaling of said journal ring therein. A finger 27 is joined by radial wall 29 to journal ring 25, to radially position the axial extent of finger 27 in substantial alignment with lug 22 and projection 13. As is specifically illustrated in FIG. 2, finger 27 further includes an arcuate camming surface 28 to be more fully explained below with respect to the operation of the instant invention. Finally, journal ring 25 includes an indicator arrow 30*a* integrally molded on the outer surface thereof in radial alignment with finger 27. A second indicator arrow 30*b* is integrally molded on cap 20 in radial alignment with lug 22 and is designed to point in the direction of indicator arrow 30*a*.

In operation, the bottle neck is closed by a rotation of the cap 20 in a clockwise direction, whereby lug 22 is cammed over inclined surface 14 of projection 13 and engages flat surface 15 to effect locking of the cap by preventing rotation of the cap in a counterclockwise direction. Removal of the cap is effected by rotating journal ring 25 until finger 27 is radially aligned with lug 22. As is particularly illustrated in FIG. 4, arcuate surface 28 effects a camming of lug 22 to a certain radial extent so that same clears flat surface 15 of projection 13 to thereby permit rotation of cap 20 in a counterclockwise direction thereby allowing the cap to be

unscrewed from the bottle neck. In order to facilitate alignment of the finger with the lug, to effect camming of same, alignment of indicator arrows **30***a* and **30***b*, respectively disposed on journal ring **25** and cap **20**, indicates that removal of the cap is possible. It is noted that the above described safety locking cap assembly provides a secure locking of the cap to the bottle neck, to prevent inadvertent opening of same by a child, yet simplifies the manner in which such cap can be removed from the bottle when removal is required.

Reference is now made to FIGS. **6** through **8** wherein an alternate embodiment of the safety locking cap assembly of the instant invention is depicted, like reference numerals being utilized to denote like elements depicted in FIGS. **1** through **5**. A finger **35** having first and second axially extended camming surfaces **36** and **37** is supported by radial wall **29** to provide a further safety feature to the locking cap assembly. As specifically indicated in FIG. **7**, rotation of journal ring **25** in a direction utilized to screw the cap into locking engagement with the bottle, effects a camming of lug **22** by camming surface **36** out of engagement with projection **13**. On the other hand, rotation of journal ring **25** in the opposite direction required to secure the cap to the bottle effects a camming of lug **22** by camming surface **37** toward the center of the bottle neck, to thereby allow finger **27** to pass thereover and maintain the cap in a locked position. Accordingly, a further safety feature is provided in that the journal ring must be rotated in the opposite rotational direction required for removal of the cap to thereby prevent inadvertent unlocking of the cap when the journal ring is turned in the direction of cap removal.

It is noted, that the safety locking cap assembly discussed above provides a locking cap wherein unlocking of same can be achieved without a person having to use undue force or to push and pull a movable element on the cap. Additionally, the journal ring can be rotatably secured to the bottle neck to effect the requisit positioning of the finger to achieve an unlocking in the manner discussed above.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above constructions without departing from the spirit and scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

What is claimed is:

1. A safety locking cap assembly comprising in combination a circular bottle neck adapted to rotatably receive a cap, said bottle neck including a radial projection, a cap including an axially directed lug adapted to be positioned in interfering engagement with said radial projection by rotation of said cap in a first direction into closing engagement with said bottle neck, thereby preventing rotation of said cap in the other rotational direction, and an axially directed finger rotatably disposed with respect to said cap and bottle neck and adapted to cam said lug out of interfering engagement with said radial projection in response to radial alignment between said lug and said finger to thereby permit removal of the cap from said bottle neck by rotation of same in the other rotational direction.

2. A safety locking cap assembly as claimed in claim **1**, wherein said axially directed finger is journaled to said cap.

3. A safety locking cap assembly as claimed in claim **2**, wherein said cap includes indicia thereon radially aligned with said lug, alignment of said finger with said indicia effecting camming of said lug out of engagement with said projection.

4. A safety locking cap assembly as claimed in claim **2**, wherein said finger include a first cam surface and a second cam surface, said first cam surface being adapted to cam said lug out of interfering engagement with said radial projection in response to rotation of same in a first rotational direction, said other cam surface being adapted to maintain said finger in engagement with said projection and allow said finger to be cammed over said lug without removing the lug from interfering engagement with said radial projection in response to rotation of said finger in the other rotational direction.

5. A safety locking cap assembly as claimed in claim **2**, wherein said circular bottle neck is threaded, and said cap includes internal threads to effect securing of the cap to the bottle neck by screwing of said cap in said first rotational direction.

6. A safety locking cap assembly as claimed in claim **2**, wherein said projection includes an inclined surface for camming said lug thereover to prevent engagement therewith when said cap is rotated in said first rotational direction, and further includes a flat surface perpendicular to the tangent of said bottle neck to effect interfering engagement of said lug with said projection and thereby prevent rotation of said cap in said other rotational direction.

7. A safety locking cap assembly as claimed in claim **6**, wherein the axial extent of said lug is substantially past the projection on said bottle neck.

8. A safety locking cap assembly as claimed in claim **7**, wherein the axial extent of said finger is limited to prevent same from contacting said projection.

9. A safety locking cap assembly as claimed in claim **8**, wherein said projection includes an inclined surface for camming said lug thereover to prevent engagement therewith when said cap is rotated in said first rotational direction, and further includes a flat surface perpendicular to the tangent of said bottle neck, to effect interfering engagement of said lug with said projection and prevent rotation of said cap in said other rotational direction.

10. A safety locking cap assembly as claimed in claim **9**, wherein said finger include a first cam surface and a second cam surface, said first cam surface being adapted to cam said lug out of interfering engagement with said radial projection in response to rotation of same in a first rotational direction, said other cam surface being adapted to maintain said finger in engagement with said projection and allow said finger to be cammed over said lug without removing the lug from interfering engagement with said radial projection in response to rotation of said finger in the other rotational direction.

* * * * *

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 3,913,769
DATED : October 21, 1975
INVENTOR(S) : Joseph Scrocco and Hugh Cottingham

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Title Page, line [73] change "Assignee: Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan" to -- Black Hole Nebula, Inc., a New Jersey corporation. --

Signed and Sealed this

Twenty-fourth Day of August 1976

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks