

[54] **SAFETY BOTTLE CAP**
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Georgetown Rd., Bethesda, Md.
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[52] U.S. Cl. **215/9, 215/44**
[51] Int. Cl. **B65d 55/02**
[58] Field of Search **215/9, 44**

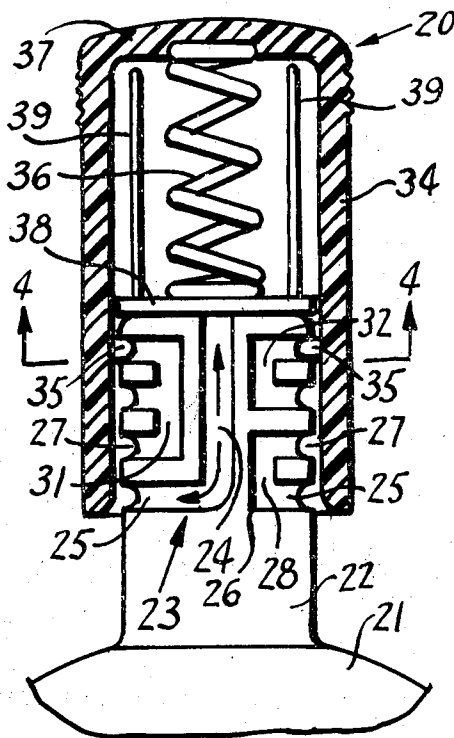
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Attorney—Alexander B. Blair et al.

[57] **ABSTRACT**
A safety bottle cap in which one or more detents is guided through a labyrinth maze in order to arrive at a point where the cap can be removed from the neck of the bottle. The construction of the labyrinth is such that the cap must be moved in a manner quite unlike the manner in which a cap is normally removed from a bottle.

[56] **References Cited**
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10 Claims, 18 Drawing Figures



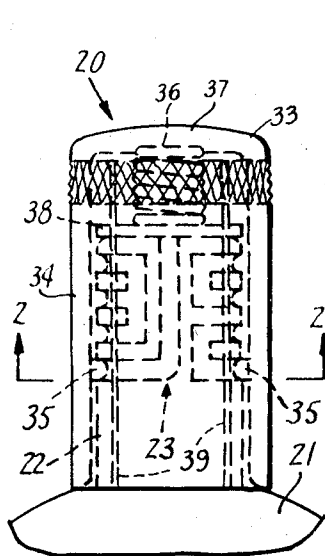


FIG. 1

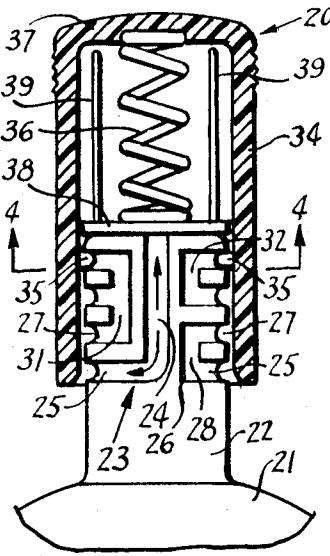


FIG. 3

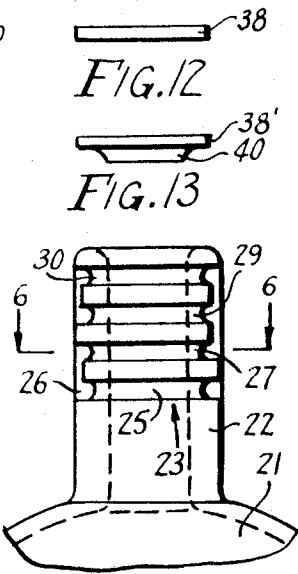


FIG. 5

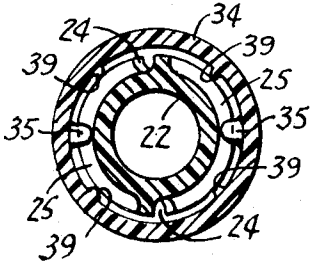


FIG. 2

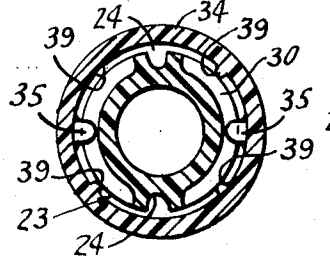


FIG. 4

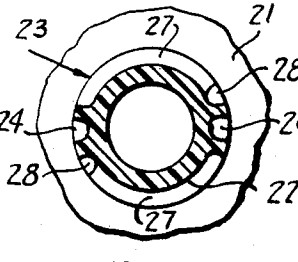


FIG. 6

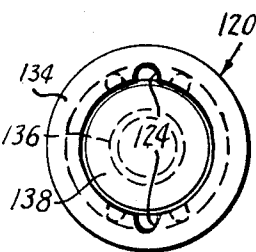


FIG. 8

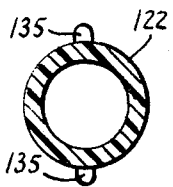


FIG. 9

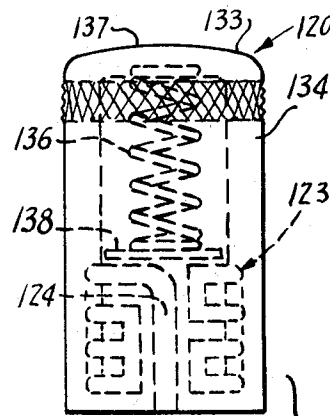


FIG. 7

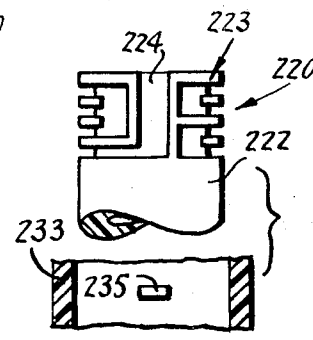
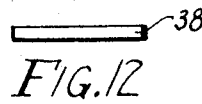
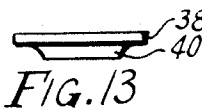


FIG. 10



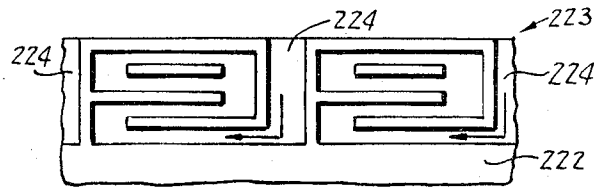


FIG. 11

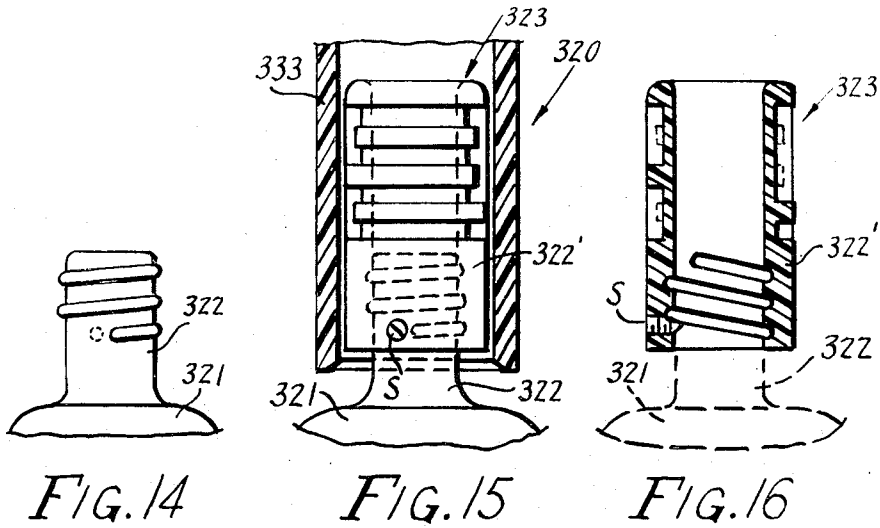


FIG. 14

FIG. 15

FIG. 16

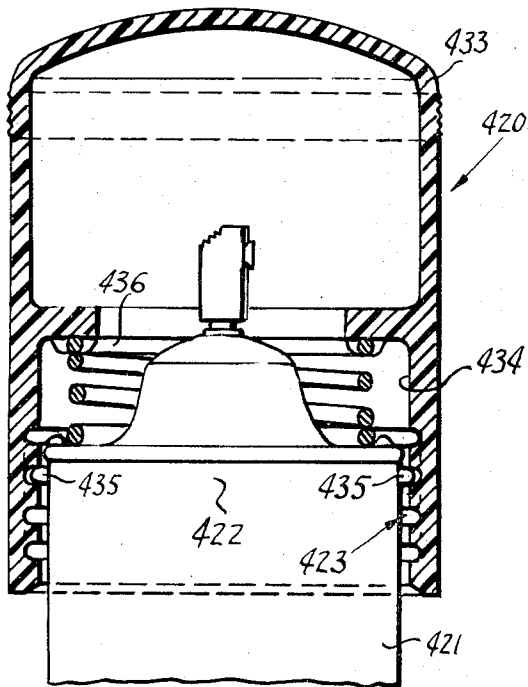


FIG. 17

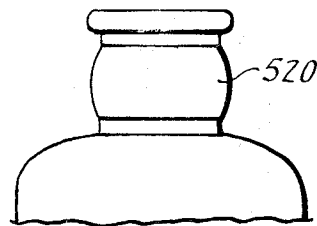


FIG. 18

SAFETY BOTTLE CAP

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

The present invention relates to safety caps for bottles, or other containers, and particularly to safety caps which will deter a child from gaining access to the contents thereof.

SUMMARY OF THE INVENTION

A safety cap combination with a bottle in which either the cap or bottle is provided with a labyrinth maze and the opposite member is provided with detent means, such as pins or lugs, which are guided through the maze in order to arrive at a point where the cap can be removed from the bottle.

The primary object of the invention is to provide a safety cap for bottles which will prevent children from readily gaining access to the contents of the bottle.

Other objects and advantages will become apparent in the following specification when considered in the light of the attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation of the invention;

FIG. 2 is a transverse sectional view taken along the line 2—2 of FIG. 1 looking in the direction of the arrows;

FIG. 3 is a vertical sectional view with the cap in an upper position with respect to the bottle;

FIG. 4 is a transverse sectional view taken substantially along the line 4—4 of FIG. 3 looking in the direction of the arrows;

FIG. 5 is a side elevation of the bottle neck 90° removed from the position of the bottle neck in FIG. 3;

FIG. 6 is a transverse sectional view taken along the line 6—6 of FIG. 5 looking in the direction of the arrows;

FIG. 7 is a side elevation of a modified form of the invention with the cap shown removed from the bottle neck;

FIG. 8 is a bottom plan view of the cap illustrated in FIG. 7;

FIG. 9 is a transverse sectional view taken along the line 9—9 of FIG. 7 looking in the direction of the arrows;

FIG. 10 is a fragmentary side elevation of another modified form of the invention shown partially broken away and in section for convenience of illustration;

FIG. 11 is a side elevation of the maze illustrated in FIG. 10 with the maze unwrapped to a flat position;

FIG. 12 is a side elevation of one of the bottle seals used with the invention;

FIG. 13 is a side elevation of another bottle seal used with the invention;

FIG. 14 is a side elevation of a bottle neck to which the invention is adapted to be attached;

FIG. 15 is a side elevation of another modified form of the invention adapted to be attached to the bottle neck of FIG. 14 shown partially broken away and in section for convenience of illustration;

FIG. 16 is a sectional view of the neck adapter illustrated in FIG. 15;

FIG. 17 is a side elevation of still another modified form of the invention shown partially broken away and in section for convenience of illustration; and

FIG. 18 is an elevational view of an alternative shape of bottle neck, to which the instant invention may be applied.

Referring now to the drawings in detail wherein like reference characters indicate like parts throughout the several figures the reference numeral 20 indicates generally a safety bottle cap constructed in accordance with the invention.

The safety bottle cap 20 is adapted for use with a bottle 21 having a generally cylindrical neck 22 extending upwardly therefrom. The neck 22 is provided with a labyrinth maze generally indicated at 23 which includes one or more identical elongate slots 24 which extend parallel to the axis of the neck 22 and open through the outer end thereof. An inner slot 25 communicates with the inner end of the slot 24 and extends perpendicularly thereto around the neck 22 of the bottle 21 terminating at a point 26 substantially around the neck 22. A slot 27 extends around each side of the neck 22 parallel to the slot 25 and is connected to the slot 25 by a slot 28 which extends parallel to the slot 24. A slot 29 extends around the neck 22 of the bottle 21 parallel to the slot 25 and slightly spaced above the slot 27. A slot 30 extends around the bottle neck 22 parallel to the slot 25 and slightly spaced above the slot 29. An elongate slot 31 extends parallel to the slot 24 and connects the ends of the slots 27, 29 and 30. A somewhat shorter slot 32 extends parallel to the slot 24 and connects the opposite ends of the slots 29, 30.

A cover 33 has a generally cylindrical side wall 34 which is adapted to encompass the neck 22. The cylindrical side wall 34 is provided with one or more detents, such as a pair of pins 35 arranged in diametrically opposed relation and extending inwardly thereof. The dimensions of the pins 35 are such to permit them to freely engage in the slots 24, 25, 27, 28, 29, 30, 31 and 32 as the cover 33 is removed from the bottle 21 and replaced thereon. Resilient means, such as a compression coil spring 36 is mounted in the cover 33 and engages the top wall 37 thereof at one end and a flat circular bottle neck sealing disk 38 at the other end. With the cover 33 in place on the neck 22 the spring 36 holds the seal 38 in sealed condition against the open end of the neck 22, and the top in a constantly locked position requiring a counter pressure to start the unlocking maneuver. Upright alignment ribs 39 are formed in the cover 33 to align the seal 38 and cover 33, and guide them as they move on the neck 22. In some instances the seal 38 must be adapted to the shape of the neck 22 in order to provide a proper seal and such a seal is illustrated in FIG. 13 at 38' having a portion 40 which engages in the open end of the neck 22. The arrangement is thus such that the cap may only be removed when pins 35 are aligned with grooves 24 whereupon the cap may be readily removed. Such alignment can be effected only when spring 36 is compressed and the cap alternatively rotatably moved and counter moved to follow the path formed by the above described slots to enter groove 25 and thence onto the lower end of groove 24.

In FIGS. 7 through 9 a modified form of safety cap is indicated generally at 120. The safety cap 120 includes a neck 122 of a bottle (not shown) and a cover 133 cooperates therewith.

A maze 123 identical to the maze 23 but inverted is formed in the inner surface of a generally cylindrical side wall 134 of the cap 133. Pins or detents 135 are in-

regally formed on the neck 122 to cooperate with the maze 123. The long slots 124 open through the bottom of the cap 133. A coil spring or other resilient means 136 is positioned in the cap 133 to spring urge a sealing washer 138 into positive sealing engagement with the open end of the neck 122 and to retain cap 133 in firm tension locked position, with relation to the bottle.

The removal and replacement of the cap 133 from the neck 122 is identical to that of the cap 33 with respect to the neck 22, similar alignment ribs being provided if desired.

In FIGS. 10 and 11 another modified safety cap is indicated generally at 220. The locking cap 220 includes a neck 222 having a labyrinth maze 223 formed therein. The labyrinth maze 223 has the same general form as the labyrinth maze 23 except that the grooves which extend parallel to the axis of the neck 222 such as groove 224 are somewhat wider than the groove 24. The cap 223 has a generally rectangular lug 235 which is adapted to cooperate with the grooves 224 and others in the maze 223. The operation of the safety cap 220 is identical to the safety cap 20.

In FIGS. 14 through 16 another modified safety cap 320 is illustrated generally. The safety cap 320 is for use with a bottle 321 having a conventional screw type neck 322 forming a part thereof. A generally cylindrical adapter 322' is screw threaded internally to fit the screw threads of the neck 322 and is threaded thereon and locked in place as by means of setscrew S. Alternatively a hard setting adhesive may be placed on the threads. The generally cylindrical adapter 322' has a labyrinth maze 323 formed on its outer surface and identical to the labyrinth maze 23. A cap 333 cooperates with the adapter 322' in exactly the same manner as the cap 33 cooperates with the neck 22, the skirt of the cap being of sufficient length to preclude access to the setscrew.

In FIG. 17 still another modified safety cap is illustrated generally at 420. The safety cap 420 is used with an aerosol spray type can 421 having an upper cylindrical wall portion 422 forming part thereof. A labyrinth maze indicated generally at 423 is formed on the inner surface of the cylindrical side wall 434 of a cap 433. Pins 435 on the cylindrical portion 422 of the container 421 cooperate with the maze 423 in exactly the same manner as the pins 35 cooperate with the maze 23 in the preferred form of the invention. A coil spring 436 maintains tension on the cap 433 so that the cap 433 is kept in a tension locked position, requiring a counter pressure to start the unlocking maneuver.

By means of the above described adapter, the locking cap may be utilized with bottles or containers having non-threaded necks or necks of other than cylindrical shape such, for example, as a bulbous shape, as shown at 520 in FIG. 18. The setscrew S holds the adapter securely in position.

Alternatively, detents such as 135, may be formed on a non-cylindrical bottle neck, such as neck 520, for use with a cap such as 120.

In all of the above described modifications of the invention opening of the bottle or container may be effected only by combined pressure and rotative action on the cap, the rotative action being alternate, causing the detent means to follow a prescribed path until aligned with the vertical slots, as 24, whereupon the cap may be readily withdrawn. Random rotation or pull on the cap as by a child can result in such alignment

only by chance and hence removal of the cap can be achieved only by such prolonged and concentrated effort as normally will discourage the child before success is achieved. Conversely, an adult familiar with the construction may remove the cap without difficulty in a few seconds.

Having thus described preferred forms of the invention it should be understood that numerous structural modifications and adaptations may be resorted to without departing from the spirit of the invention, as defined in the appended claims.

I claim:

1. A safety cap for containers comprising a pair of generally cylindrical telescoping members one of which is the neck of the container and the other the cap for the container, a labyrinth maze formed on one of said telescoping members in the surface thereof adjacent to the other of said telescoping members, said labyrinth maze including a plurality of intercommunicating grooves, detent means formed on the other of said members projecting outwardly from the surface thereof adjacent to said labyrinth maze, said detent means engaging in the grooves of said labyrinth maze to releasably secure said telescoping members together, said grooves having openings therein permitting passage of said detents therethrough and removal of said cap and additional openings therein permitting movement of said detents into a cul-de-sac groove in a direction away from said container while preventing removal of said cap from said neck, a seal loosely mounted in said cap, and resilient means biasing said cap and said seal apart with said seal engaging said neck thus sealing said neck and urging said detent means into locking engagement with the edges of said grooves, to afford locking engagement of said neck and cap and maintain sealing pressure on said seal in any position of said cap on said neck.

2. A device as claimed in claim 1 wherein said labyrinth maze is formed on the outer surface of the neck of the bottle and said detent means are secured to the inner surface of the cap.

3. A device as claimed in claim 1 wherein said labyrinth maze is formed in the inner surface of said cap and said detent means are secured to the outer surface of said neck.

4. A device as claimed in claim 1 wherein said neck has the same diameter as said container and said cap encompasses the upper portion of said container.

5. The structure of claim 1 wherein said resilient means comprises a spring in said cap.

6. A device as claimed in claim 1 wherein said telescoping members include an adapter means securing said adapter to one of said telescoping members, said adapter having said labyrinth maze formed on the surface thereof adjacent said other member.

7. The structure of claim 6 wherein the adapter is mounted on said container and setscrew means are provided for securing said adapter to said container.

8. The structure of claim 7 wherein the skirt of said cap normally covers said setscrew means.

9. The structure of claim 6 wherein said securing means constitutes a hard setting adhesive.

10. The structure of claim 1 wherein alignment ribs are formed on one of said members for centering said cap relative to said neck.

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