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SAFETY CLOSURE FOR FLEXIBLE CONTAINER

Filed June 21, 1966

2 Sheets-Sheet 1

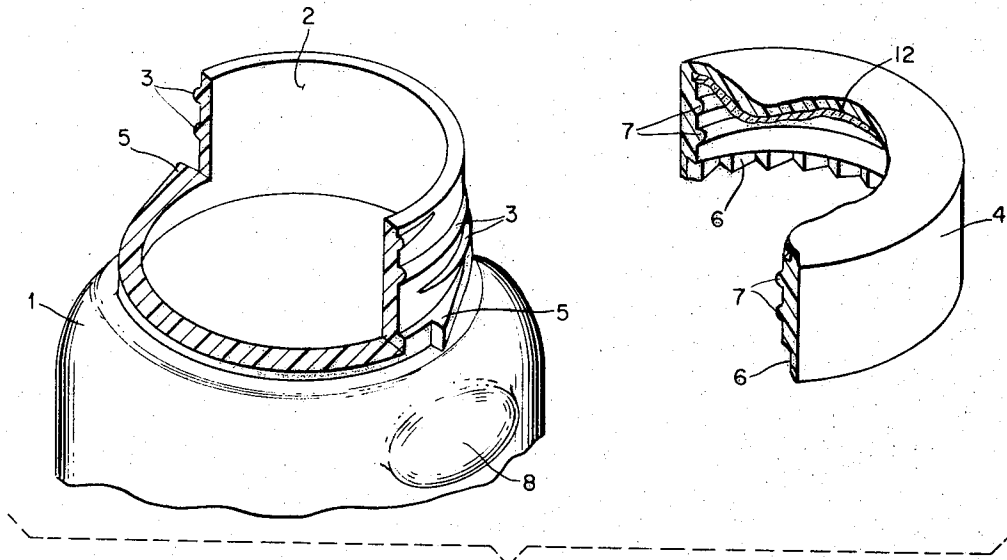


Fig. 1

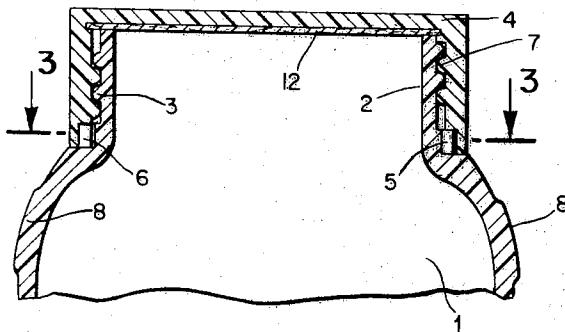


Fig. 2

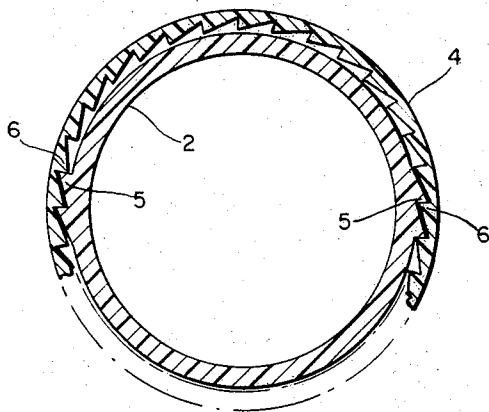


Fig. 3

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2 Sheets-Sheet 2

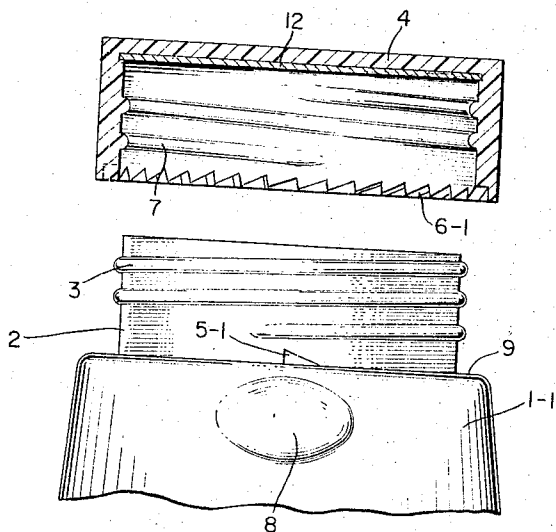


Fig. 4

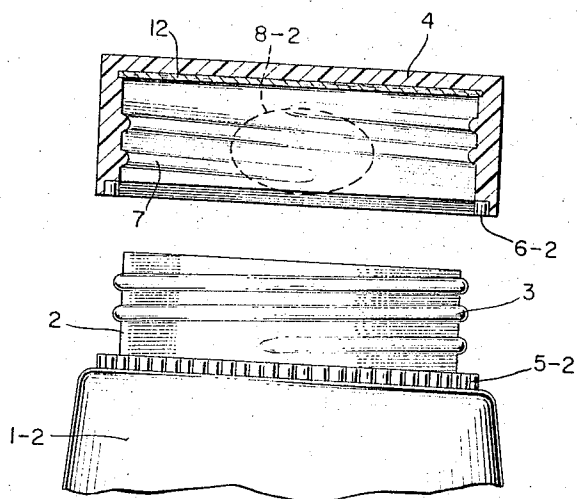


Fig. 5

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1

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SAFETY CLOSURE FOR FLEXIBLE CONTAINER
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ABSTRACT OF THE DISCLOSURE

A container is provided having a screw-cap closure which is opened only by the expenditure of abnormal effort to guard against opening of the container by children. The container has a pair or plurality of locking teeth on its neck portion which are arranged to mesh with an opposing plurality or pair of locking teeth in the screw-cap. Pressure is applied to the flexible member to distort same and disengage the meshed teeth to unscrew the cap.

This invention relates to a combination of a container and screw-cap closure at least one of which is flexible. In particular, the invention relates to a novel, safety-oriented, hand operable screw-cap closure in combination with a dispensing type of container, such as a bottle or jar, used for dispensing medicinals or other hazardous materials in the form of pills, capsules or liquids.

Containers for medicinals are commonly made with screw-cap tops. A possible source of danger with this type of container is that an infant often may readily open the container to gain access to its contents. An object of the invention is to provide a safety screw-cap closure and container combination which can be opened readily by an adult or by a child old enough to read, but which combination is normally inoperable by an infant or child of pre-reading age, especially one having a weak grip. Another object is to provide a closure which is sufficiently difficult to open initially so that caution will be used by the opener during the opening step and the contents of the bottle therefore will be less likely to be spilled.

The invention comprises a flexible plastic container having threads on its neck portion for receiving a screw-cap closure, and having either on the base of the neck or in the screw-cap a pair of sets of locking teeth consisting of at least one tooth per set, each set being positioned diametrically opposite the other set, each set of teeth being arranged to mesh in locking position with a plurality of similarly designed opposing locking teeth extending around the inner annular surface of the open end of the screw-cap or around the base of the neck of the container, respectively. In other words, a pair of locking teeth on one member and a plurality of locking teeth on the other member form a part of the combination. An additional element of the combination is a pair of pressure areas associated with said locking teeth and positioned adjacent to the teeth in their meshed and locked position.

When the screw-cap is tightened on the container, the teeth of the screw-cap will lock with the teeth of the container. When pressure is applied to the container or screw-cap closure upon a designated pair of pressure areas of the container assembly (immediately below each set of the pair of sets of teeth when on the neck of the container, or 90° away from each set of the pair of teeth when on the screw-cap closure), i.e. by squeezing the screw-cap or container at the designated places, the flexible container on the screw-cap is sufficiently distorted to displace the locking teeth of one member from engagement with the teeth of the other member.

The screw-cap can then readily be unscrewed from the container.

The invention can be further understood from the accompanying drawing wherein:

2

FIG. 1 is a perspective and fragmented view of the top of a screw-cap bottle according to the invention and having one locking tooth per set. Also shown in FIGURE 1 is a perspective fragmented section of the screw-cap for the bottle.

FIG. 2 is a sectional side view of a closed container showing the container and screw-cap in locked position and having two locking teeth per set.

FIG. 3 is a section through line 3—3 of FIGURE 2.

FIG. 4 is a side elevational view of a container and screw-cap showing an embodiment with the sets of locking teeth on the shoulder of the container.

FIG. 5 is a side elevational view of still another embodiment with a semi-circular design of teeth on the container and screw-cap.

In the drawing, the same numbers refer to the same items.

Referring more in detail to the drawing:

1 is a flexible plastic bottle, e.g. polyethylene, polypropylene, polyvinyl chloride-polyolefin copolymer, polytetrafluoroethylene, or similar plastic material container, having a neck of a reduced diameter. The neck 2 is provided with conventional bottle type screw threads 3 on its upper outer surface for receiving a screw-cap type of closure 4. The neck 2 is provided with two sets of one tooth each of diametrically opposed locking teeth 5 disposed on the outer circumference of the neck below the last thread 3. The bite of each tooth 5 faces clockwise and the base of each tooth is integral with the neck of the bottle. Below each tooth 5 is an indicated area 8 which is provided for indicating the area where pressure is to be applied simultaneously when the screw-cap 4 is to be removed from the bottle. The screw-cap 4 has a series of circumferentially spaced locking teeth 6 extending toward the center from the inner annular surface and edge of the open end of the screw-cap 4 below the screw threads 7. The bite of the teeth 6 faces counterclockwise, and the base of each tooth 6 is integral with the inner annular surface and edge of the screw-cap. When the screw-cap 4 is screwed onto the neck 2 of the bottle 1, the threads 7 engage the threads 3 of the bottle. As the screw-cap is further screwed down, the teeth 6 flex and snap over the teeth 5 as the cap is drawn up to its fully closed position.

In fully closed position, teeth 6 of the screw-cap are lockingly meshed with the sets of teeth 5 on the container 1. When the bottle is to be opened, pressure is applied by the thumb and forefinger, for example, on the indicated areas 8 on the bottle 1. The pressure distorts the circumference of the bottle, forcing the teeth 5 to disengage from the teeth 6. The screw-cap is then unscrewed in the usual counterclockwise direction. When the screw-cap has been unscrewed to clear above the neck position of teeth 5, the pressure on the bottle 1 may be released and the screw-cap is then completely removed in the usual manner.

In FIGURE 2 is shown a screw-cap 4 in closed position on the bottle 1. In FIGURE 2, 12 is a gasket such as is commonly used in a bottle cap.

FIGURE 3 shows the locked position of the two sets of locking teeth when the teeth 5 of the bottle are meshed with the teeth 6 in the bottle of FIGURE 2. Each set in his embodiment and that of FIGURE 2 has two teeth.

Although the method of arranging the sets of teeth 5 on the side of the bottle in FIGURES 1 and 2 is a preferred embodiment, the sets of locking teeth also can be arranged in other ways to achieve the same result. For example, in FIGURE 4 is shown an embodiment in which the sets of teeth 5-1 on the bottle 1-1 are disposed on the shoulder 9 immediately below the neck 2 of the bottle 1-1. A plurality of matching locking teeth 6-1 of the screw cap are shown disposed circumferentially spaced

3

along the inner annular surface and end of the screw-cap 4 with the bite of the teeth 6-1 facing counterclockwise, while the diametrically opposed sets of teeth 5-1 on the bottle 1-1 have their bites facing clockwise. The teeth 5-1 preferably are as wide as they are high; and the teeth 6-1 preferably are as wide as they are deep and correspond in size and configuration to the teeth 5-1. When the screw-cap 4 is screwed down on the bottle 1-1 of FIGURE 4, screw threads 7 engage with the screw threads 3 of the bottle. The teeth 6-1 snap over the teeth 5-1 as the cap is drawn up to full closed position. When the bottle is to be opened, pressure is applied to the indicated pressure points 8 (which are similar to the pressure points on the bottles 1 of FIGURE 1 and FIGURE 2), causing the neck 2 of the bottle 1-1 to distort, making the diameter of the bottle between the pressure points 8 and the teeth 5-1 smaller than the diameter of the screw-cap inner annulus and the teeth 6-1. The screw-cap then can be unscrewed counterclockwise without the teeth 6-1 being restricted by the teeth 5-1.

In FIGURE 5 is shown a flexible screw-cap closure in combination with a substantially less flexible container 1-2. In this embodiment, the pressure points 8 are disposed on the opposite sides of the screw-cap 4. Also, in this embodiment, sets of locking teeth shown as 6-2 are on the screw-cap. The set of teeth 6-2 are diametrically opposite to each other as are the sets of teeth 5 in FIGURE 1. However, the pressure points 8 on the screw-cap 4 are diametrically opposed midway between the sets of teeth 6-2, each pressure point being about 90° from each set of teeth. The corresponding locking teeth 5-2 at the bottom of the neck 2 of bottle 1-2 are circumferentially spaced and disposed about the neck of the bottle. The vertical configuration of the sets of teeth 6-2 preferably is such that these teeth will glide smoothly over the outermost portions of the plurality of teeth 5-2 of the bottle 1-2. Preferably, the innermost edges of the teeth 6-2 and the outermost edges of the teeth 5-2 are rounded. The teeth 6-2 and 5-2 preferably are made so that they will mesh tightly when the screw-cap 4 is drawn down fully on the neck of the bottle 1-2. When the bottle 1-2 is to be opened, pressure is applied to the pair of pressure points 8-2 of the cap 4, as by thumb and forefinger. The screw-cap then will distort, relieving the pressure of the teeth 6-2 upon the teeth 5-2. The screw-cap 4 then readily can be unscrewed in the usual counterclockwise direction.

The sizes and configurations of the locking teeth in any embodiment are a matter of engineering design, and the heights, depths and widths of the teeth can be readily designed by one skilled in the art to obtain the desired degree of resistance to opening in the absence of depression of the pressure points. The number of teeth per locking set can be increased to provide greater resistance, but should not be so numerous that abnormally high distortion of the container neck or screw-cap closure will be necessary to unlock them.

In each of the embodiments illustrating the invention, it is to be noted that when the screw-cap 4 is fully drawn down on the bottle or container neck, the cap cannot be untwisted from the bottle without applying an unusual amount of force, or by depressing the bottle or container at the pressure points as described above, in which case the screw-cap readily is removed. Thus, the utility of this type of screw-cap and closure combination will be readily apparent as a safety device, particularly for keeping medicinals and poisons away from access by infants and pre-school age children. It will be obvious that when the cap is tightly locked, a child of pre-school age will have difficulty understanding how to unscrew the cap unless someone were to show him, and unless the child also has sufficient strength. The child thus will be prevented from helping himself to the contents. Also, the bottle and screw-cap combination of this invention is useful for the storage of medicinals which should be safe-guarded against accidental taking. For

4

example, one in a groggy state would be less likely to mistake a difficult-to-open bottle of the invention containing sleeping pills for an easily openable one of the prior art containing aspirin pills.

It will be obvious to those skilled in the art that the invention may be embodied in other specific forms without departing from the spirit or essential characteristics of the embodiments shown. It is intended that the invention include such other embodiments as well as those illustrated, as embraced in the claims thereof.

I claim:

1. In a container assembly comprising a container member having a neck and having a threaded screw top opening enclosed by a flexible screw-cap closure member, a safety container and closure combination, said combination comprising:

(a) a pair of sets of locking teeth consisting of at least one tooth per set, each set being positioned substantially diametrically opposite the other set on the closure circumference of the screw-cap closure member below screw threads on said member,

(b) a plurality of circumferentially spaced opposing locking teeth positioned below screw threads on the closure circumference of the container member and arranged to mesh lockingly with the teeth of said screw-cap closure member when the members are fully engaged by screwing down on the threads thereof,

(c) a pair of pressure areas on the screw-cap closure member and associated with said member's teeth and being positioned about 90° away from each set of the locking teeth of the screw-cap closure member so that when the members are fully engaged and pressure is applied on the pressure areas the screw-cap closure member is distorted, causing the meshed teeth to unlock and to permit the members to be unscrewed from one another.

2. In a container assembly comprising a container with a neck and having a threaded top opening enclosed by a flexible screw-cap enclosure member, a safety container and closure combination, said combination comprising:

(a) a threaded screw-cap closure including a pair of sets of locking teeth consisting of at least one tooth per set, each set being positioned substantially diametrically opposite the other set on the inner annular surface and edge of the open end of the screw-cap closure below the screw threads thereof with the base of the teeth integral with the inner surface of the screw-cap and with the bite of each tooth facing clockwise,

(b) a container with a threaded neck opening adapted to receive said screw-cap closure and including a plurality of circumferentially spaced locking teeth positioned on the outer circumference of the neck of the container below the last thread thereof with the base of the teeth integral with the neck of the bottle and with the bite of each tooth facing counterclockwise, and

(c) a pair of pressure surfaces indicated on the outer surface of the screw-cap closure substantially diametrically opposite each other and about 90° from each set of the locking teeth of the screw-cap.

3. In a container assembly comprising a container with a neck and having a threaded screw top opening enclosed by a screw-cap closure member, a safety container and closure combination, said combination comprising:

(a) a pair of sets of locking teeth consisting of at least one tooth per set, each set being positioned substantially diametrically opposite the other set on the outer circumference of the neck of a container having screw threads below the last thread thereof with the base of the teeth integral with the neck of the bottle and with the bite of each tooth facing clockwise,

(b) in a screw-cap closure for said container, a plu-

5

ality of circumferentially spaced locking teeth extending toward the center of the screw-cap from the inner annular surface and edge of the open end of the screw-cap below the screw threads thereof with the base of the teeth integral with the inner surface of the screw-cap and with the bite of each tooth facing counterclockwise, and

(c) a pair of pressure surfaces indicated on the outer surface of the container below the neck of the bottle and immediately adjacent to and below the pair of teeth on the neck of the bottle.

4. In combination:

- (a) a plastic bottle having a neck, said neck being open,
- (b) conventional screw threads on the upper outer surface of the neck for receiving a screw-cap type of closure,
- (c) a pair of sets of locking teeth consisting of at least one tooth per set, each set being positioned substantially diametrically opposite the other set on the outer circumference of the neck of the bottle below the last thread with the base of the teeth integral with the neck of the bottle and with the bite of each tooth facing clockwise,

25

6

(d) a screw-cap closure having threads adapted to engage the threads on the neck of the container and having a plurality of circumferentially spaced locking teeth extending toward the center of the screw-cap from the inner annular surface and edge of the open end of the screw-cap below the screw threads thereof, with the base of the teeth being integral with the inner annular surface and the edge of the cap, and with the bite of each tooth facing counterclockwise,

(e) a pair of pressure areas on the outer surface of the bottle below the neck of the bottle diametrically opposite each other and adjacent to and below the sets of teeth on the neck of the bottle.

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JOSEPH R. LECLAIR, *Primary Examiner*.

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