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3,376,991

SAFETY CLOSURE

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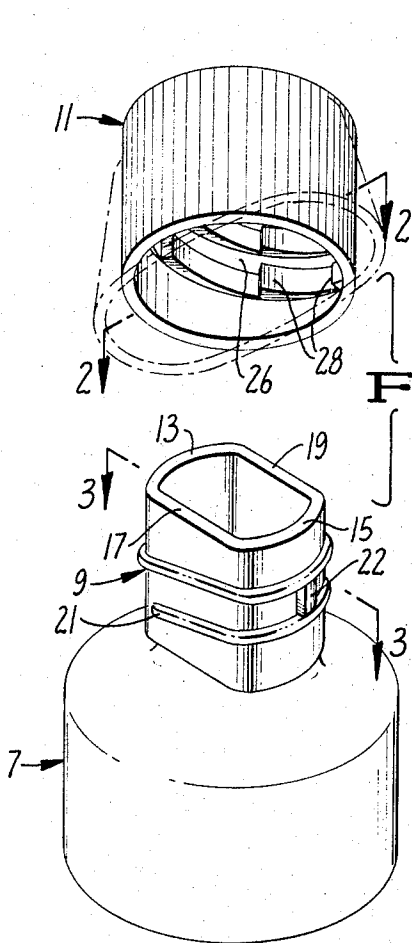


FIG. 1.

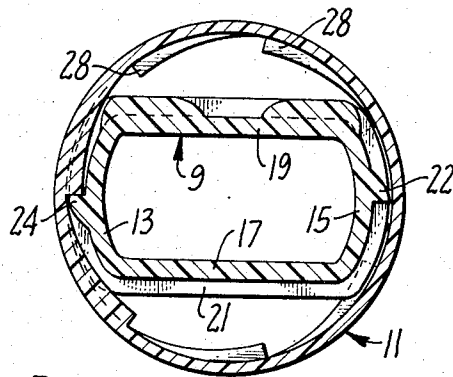


FIG. 4.

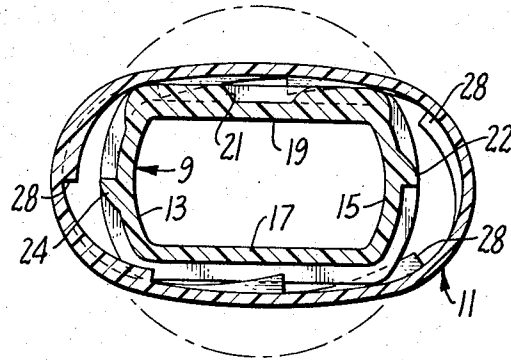


FIG. 5.

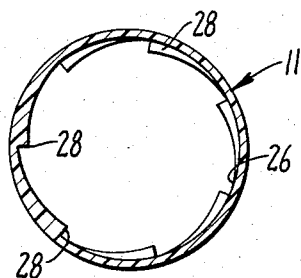


FIG. 2.

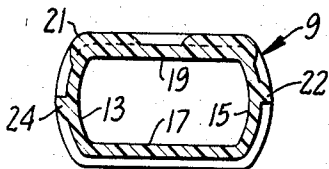


FIG. 3.

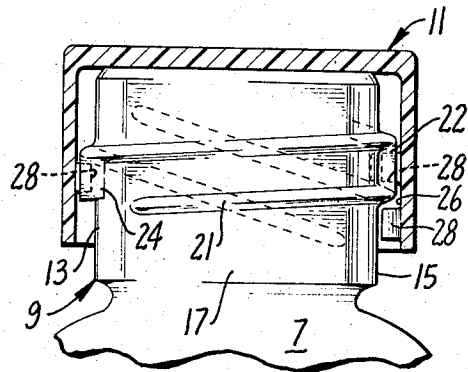


FIG. 6.

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1

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SAFETY CLOSURE

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ABSTRACT OF THE DISCLOSURE

A safety closure wherein the container has an oval neck with threads thereon with ratchet members interposed within the threads on the short sides of the oval and a cap of a deformable material having threads normally mating with those on the short side of the oval and having ratchets around its periphery mating with and opposing the ratchets on the neck, said cap being deformable to an oval configuration whereby the mating ratchet members are released and the threads in the cap are brought into contact with the threads on the long side of the oval neck whereby the cap can be partially unscrewed and can be fully unscrewed by successive repetitions of said movement.

Summary of the invention

It is highly 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 be achieved by a child. Drugs, pharmaceutical, preparations, solvents, cleaning preparations and insecticides are some typical examples of normal domestic solutions which should be kept from children yet which must be available for use by adults. A number of safety closures have been proposed in the past but these have suffered from various defects. One is that the secret to opening the container is frequently so simple that a child can accidentally discover it. Others depend on the strength of the user. This is unsatisfactory since a small boy may be stronger than his mother. Another is that such structures frequently embody complicated mechanical structures having a number of parts, making them too expensive and untrustworthy for widespread application. In the patents mentioned above, a yieldable skirt is provided on a cap and is distorted into an oval configuration to release the skirt from some form of holding structure. A child might accidentally squeeze once at the proper place and then be able to remove the cap.

In accordance with the present invention, both the container and cap are easily molded to the desired configurations so that the safety closure of the present invention need be no more expensive than a conventional closure. Further, there is not a single release motion for unscrewing the cap of the present invention, as is brought out in detail in the specification, but instead, a series of coordinated movements is required to fully remove the cap so that it is almost impossible for a child to accidentally stumble on to the secret and remove the cap.

A brief description of the drawings

FIGURE 1 is an exploded, perspective view of a container and cap embodying the present invention.

FIGURE 2 is a section on the line 2-2 of FIGURE 1.

FIGURE 3 is a section on the line 3-3 of FIGURE 1.

FIGURE 4 is an enlarged section through the neck and cap showing the parts in a normally unstressed, locked condition.

FIGURE 5 is a section similar to FIGURE 4 but showing the parts in the stressed condition necessary to achieve opening of the container.

2

FIGURE 6 is a side view, with the closure in section, of a device embodying the present invention.

Description of a preferred embodiment

Referring now to the drawing by reference characters, there is shown a container, generally designated 7, having a neck, generally designated 9, and a cap, generally designated 11. It will be understood that the container 7 forms no part of the present invention and can be in the form of any conventional container, such as a glass or plastic bottle, a metal can of any configuration or the like. The neck 9 is of generally oval configuration so that the neck has two short sides 13 and 15 and two long sides 17 and 19. In the embodiment illustrated, the sides 17 and 19 are substantially flat but this is not necessarily so since they can be curved slightly as in a normal oval. The sides 13 and 15 if continued would form a circle onto which the cap 11 would fit. The neck 9 is provided with one or more threads 21 which may be in the form of a single or a double thread. The single thread is safer but requires a longer time to remove the cap while a double thread is faster and under most conditions provides a sufficient safety factor. Interposed between the threads at least one of the two short sides, i.e. the longer axis of the oval, is a ramp-like ratchet member although preferably two such members 22 and 24 are employed. The purpose of these will be later explained.

The cap portion 11 has threads 26 therein, generally mating with the threads 21 on the neck. Interposed between the threads in the neck are a series of ratchet members 28. These extend completely around the periphery of the inside of the cap and normally seven or eight are employed, although other numbers might be used.

Since the neck is oval and the cap is round, the cap will not completely engage the threads of the neck but will normally engage only those on the short sides of the oval, as is best seen in FIGURE 4. At the same time, some of the ratchet members of the cap 28 are in engagement with either or both of the opposed ratchet members 22 and 24 on the neck. Thus, because of the opposed relationship of the ratchet members, it is obvious that the cap cannot be unscrewed. Further, because of the mating action of the threads, the cap cannot be pulled directly off. However, if one now applies pressure, as is easily done with the thumb and forefinger, against the deformable cap adjacent to the long sides of the oval, the cap is distorted into the shape shown in FIGURE 5 or as is shown in phantom in FIGURE 1. As can best be seen from FIGURE 5, the ratchets 28 are now released from the ratchets 24 and 22 of the neck, while at the same time the threads of the cap are squeezed inwardly so that they now engage the threads on the long sides 17 and 19 of the oval. In this position, the cap can be unscrewed for approximately one-fourth turn, but as the thumb and finger approach the edges between the long and short sides of the oval, the shape of the distorted top will change, again causing the ratchets to engage and stop further rotational movement. When this happens, it is necessary to repeat the operation so that a large number of coordinated squeezing and twisting movements are necessary before the cap can be unscrewed. These coordinated squeezing and twisting movements are normally beyond the movements which a child can exercise and it would be most difficult for a child to open the container by a series of accidental movements. The cap can be easily replaced merely by screwing it on in the manner of a conventional cap since the ramplike shape of the ratchets is such that as one attempts to screw on the cap, the top merely distorts sufficiently for the ramps to clear.

The neck of the container can be made of any material such as glass, metal, plastic or the like which is

normally hard enough to serve its intended purpose. The cap is preferably made of a soft, yieldable plastic such as a polyolefin, although a springly metal could be employed for the purpose.

Many variations can be made in the structure shown without departing from the spirit of this invention.

I claim:

1. A safety closure including a container having a threaded neck and a cap for said neck comprising in combination:

- (a) a threaded neck on a container, said neck being of generally oval shape whereby said neck has a pair of opposed short sides and, at 90° to each, a pair of long sides;
- (b) a ramplike ratchet member on at least one of said short sides, interposed between said threads;
- (c) a yieldable cap portion, said cap portion being round in its normal unstressed condition and having a diameter approximating that of the long axis of said oval and having threads mating with the threads on the short sides of said neck;
- (d) said cap portion having ramplike ratchet members interposed between the threads and mating with and opposing the ratchet members on said neck;

- (e) said mating threads and ratchets normally preventing the unscrewing or pulling off of the cap; and
- (f) said cap being deformable by pressure therein whereby said cap assumes an oval configuration releasing the ratchets and engaging the cap threads with the threads on the long sides of the oval whereby said cap can be unscrewed for a small fraction of a revolution and can be fully unscrewed by successive repetitions thereof.

2. The structure of claim 1 wherein the thread is a double thread.

3. The structure of claim 1 wherein each short neck side has a ratchet thereon.

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