

[54] CHILD-PROOF CONTAINER CLOSURE MEANS

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[22] Filed: Jan. 22, 1971

[57] ABSTRACT

[21] Appl. No.: 108,868

A child-proof cap closure for containers. The container has a neck with a partial thread and a flange mounted below the thread. The cap has an annular recessed portion adapted to snap over the flange, and the cap has a partial thread adjacent the narrow portion. The positions of the said two partial threads are chosen so that the cap is snapped over the flange by turning the cap, and at the same time causes the threads to disengage. Therefore, the cap cannot be disconnected from the container by simple unscrewing motion, but only by unscrewing and pulling simultaneously to engage the partial threads.

[52] U.S. Cl.....215/9, 215/7, 215/41, 215/44, 215/43

[51] Int. Cl.....A61j 1/00

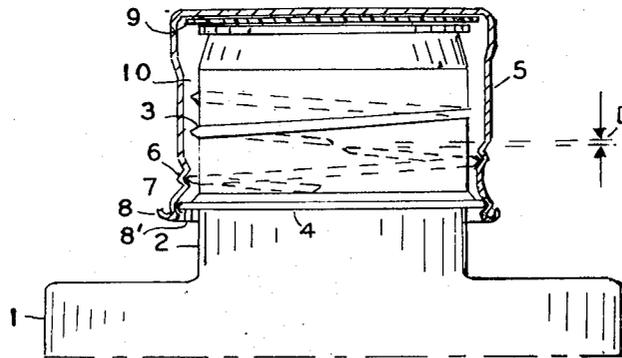
[58] Field of Search.....215/9, 7, 41, 44, 43

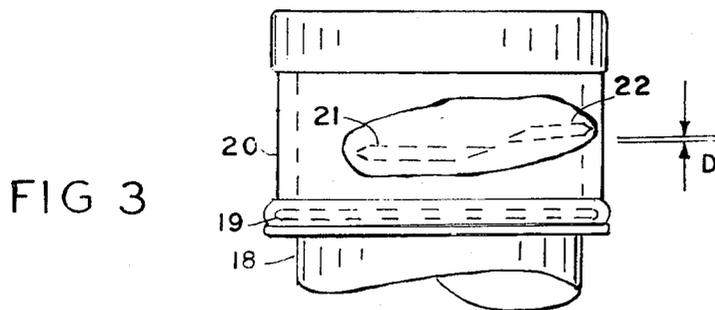
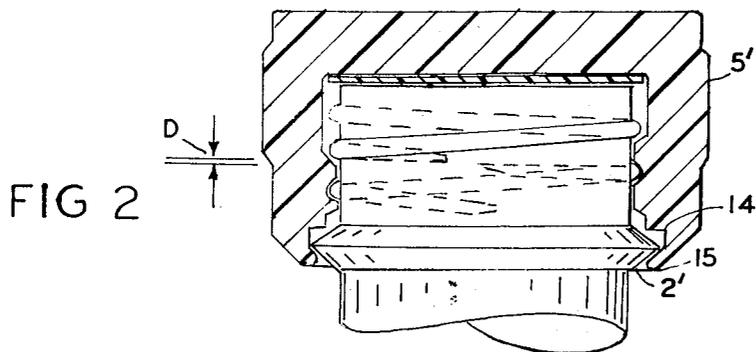
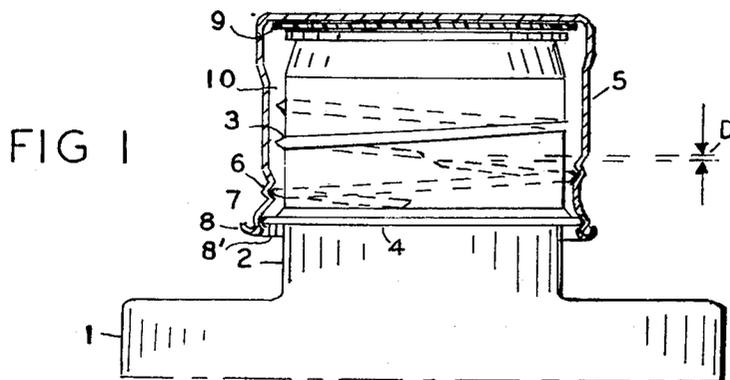
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10 Claims, 4 Drawing Figures





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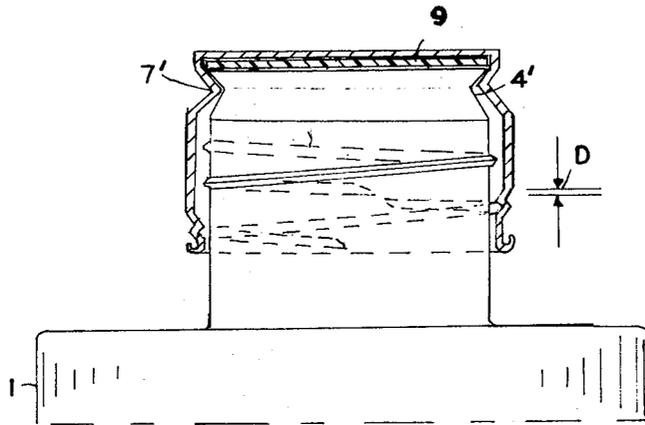


FIG 4

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CHILD-PROOF CONTAINER CLOSURE MEANS

This invention relates to child-proof container closure means and, more particularly, to inexpensive, one-piece caps for containers which require simultaneous unscrewing motion and axial pulling to remove the cap and/or unseal the container.

There is a need for a reliable, simple, and inexpensive one-piece cap type closure for containers of drugs, bleaches, and other substances which may be harmful to children. There are many child-proof cap closure means available. The present invention differs from those available or known in that the present invention requires compound motions, namely, a simultaneous unscrewing and pulling motion obtained through a simple, easy to manufacture, cap and container design. The present closure is designed so that both motions are required simultaneously and neither motion alone is sufficient to remove the cap.

Accordingly, it is a principal object of the invention to provide new and improved child-proof container closure means.

Another object of the invention is to provide new and improved child-proof container closure means requiring two simultaneous motions, each motion having a different direction, to remove the cap.

Another object of the invention is to provide new and improved child-proof container closure means comprising a container having a neck, said neck having a partial external thread, flange means on said neck above or below said thread, a cap having an annular recessed portion adapted to snap over said flange, said cap having a partial internal thread, said cap having an annular portion above said thread which does not engage any thread of said container, the positions of said partial internal threads being chosen so that said cap can be snapped over said flange by turning the cap, said snap action motion sealing the container and causing said threads to disengage so that said cap cannot be disconnected from said flange by simple unscrewing motion, but only by unscrewing and pulling simultaneously.

These and other objects of the invention will be apparent from the following specification and drawings, of which:

FIG. 1 is a side view partly in section of the embodiment of the invention showing a plastic container with a metal cap.

FIG. 2 is a side view partly in section of a modification of the invention illustrating a glass container and a plastic cap.

FIG. 3 is a side view partly cut away of a modification of the invention showing interrupted sections of threads.

FIG. 4 is a side view partly in section of an embodiment of the invention showing a locking cam lip above the threads.

Referring to FIG. 1, the invention generally comprises a container 1 having a neck 2 which has a partial external thread 3 of one revolution or less. Below the thread is mounted an annular flange 4.

The metal cap 5 has a single revolution or less internal thread 6. Below the cap thread is mounted an annular recessed portion 7, the strength of which is preferably reinforced by means of a turned over lip 8. The portion 7 and lip 8 may be segmented by slits 8', as desired, to vary the forces of sealing and locking the cap.

Above the thread 6 the cap has an annular recess 10 which is designed so that it does not contact the thread on the container neck.

The positions of said two partial threads are chosen so that the cap can be snapped over the flange by turning the cap, and at the same time, the snap action moves the cap axially due to its inclined surface which seals the container, and this axial motion also causes the threads to disengage. Therefore, the cap cannot be disconnected from the flange by simple unscrewing motion, but only by unscrewing and pulling simultaneously to again engage the threads. Therefore, in order to overcome the snap grip, it is necessary to use compound motions, namely, unscrewing the cap and pulling at the same time. It is improbable that a child would use both these motions simultaneously and with sufficient strength. Conversely, in order to apply the cap, it is only necessary to use a screwing motion.

The snap flange connection must be designed with the proper amount of flexibility and elasticity depending upon the materials used.

Thread disengagement clearance when the cap seals the container and is locked on the flange is shown by D, which may be a few thousandths of an inch. Therefore, it is necessary to pull to engage the threads, and turn to unsnap the cap from the flange. The mechanical advantage of the threads enables a comparatively small twisting force to overcome a large axial sealing force exerted by the snap engaged surfaces.

In this embodiment, the flange 2', being of glass, has limited flexibility, so that more flexibility must be designed into the cap 5'. The narrow recess 14 of the cap has a tapering lower inwardly extending lip 15 which is adapted to snap over the flange 2', as shown, to seal the container and move the threads into a disengaged position at the same time. The cap 5' in FIG. 2, being of plastic, requires a much thicker wall in order to obtain the desired strength and sealing force. If different materials are used, then they must be designed to meet this condition.

FIG. 3 shows another embodiment of the invention showing a container neck 18 having a flange 19 and a cap 20. This embodiment differs from the others in that both the cap threads 21 and the container threads 22 comprise interrupted sections of threads, for instance, three equally spaced interrupted sections of threads on both the container and the cap.

This arrangement limits the amount of turning required to engage the threads and results in three equally spaced thread surfaces for use in locking and unlocking the seal combination of the cap and container.

Therefore, the present invention discloses a new and improved child-proof cap closure which requires two separate simultaneous motions to unseal the container and to remove the cap.

While a single thread has been illustrated here, it is apparent that less than a single thread can be used, or, as shown in FIG. 3, various segmented combinations of threads, flange, or locking recess can be used to achieve the desired result. The design of the cap and container depend on the flexibility, strength, and other properties of the materials used. If the cap is of a strong metal, then thin wall construction may be used, whereas if the cap is of plastic, then a thicker wall construction may be used. Various combinations and permutations of designs and tolerances may be necessary, depending upon the flexibility and other characteristics of the materials used.

FIGS. 1 and 2 are approximately full scale illustrating the difference in wall thickness of metal and plastic caps respectively.

FIG. 4 shows another embodiment of the invention showing a locking cam lip 4' adapted to lock the narrow recess 7' of the cap, the locking lip being mounted at the top of the container. The threads are the same as previously described, and the operation is the same. The flange or locking lip on the container may be mounted above or below the threads, as desired.

I claim:

1. Child-proof container closure means comprising, a container having a neck, said neck having a partial external thread, locking means comprising a flange mounted on said neck, a cap having an annular narrow recessed portion adapted to snap over said flange, said cap having a partial internal thread, said cap having a large annular portion above said thread which does not engage any thread of said container, the positions of said partial internal and external threads being chosen so that said cap can be snapped over said flange by turning the cap, said snap action causing said threads to disengage so that said cap cannot be disconnected from said flange by simple unscrewing motion, but only by unscrewing and pulling simultaneously.
2. Apparatus as in claim 1 wherein said cap has a single thread of one revolution.
3. Apparatus as in claim 1 wherein said cap has a thread of less than one revolution.

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- 4. Apparatus as in claim 1 wherein one of said threads is segmented.
- 5. Apparatus as in claim 1 wherein both of said threads are segmented.
- 6. Apparatus as in claim 1 wherein said narrow recess portion of said cap, which is adapted to snap over said flange, is segmented.
- 7. Apparatus as in claim 1 wherein said flange is segmented, said annular recessed portion being adapted to snap over said flange.

- 8. Apparatus as in claim 1 wherein said locking means is below said threads.
- 9. Apparatus as in claim 1 wherein said locking means is above said threads.
- 10. Apparatus as in claim 1 wherein said locking means is an annular recess in said container and said cap has an internal annular recess adapted to lock into said container annular recess.

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