United States Patent [19]

Mucsi

[11] **3,790,014**

[45] **Feb. 5, 1974**

[54] **SAFETY CLOSURE AND CONTAINER**

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[21] Appl. No.: **243,807**

[52] **U.S. Cl.** **215/9**
[51] **Int. Cl.** **B65d 55/02**
[58] **Field of Search** 215/9

[56] **References Cited**

UNITED STATES PATENTS

3,376,991	4/1968	Deaver	215/9
3,398,848	8/1968	Donovan	215/9

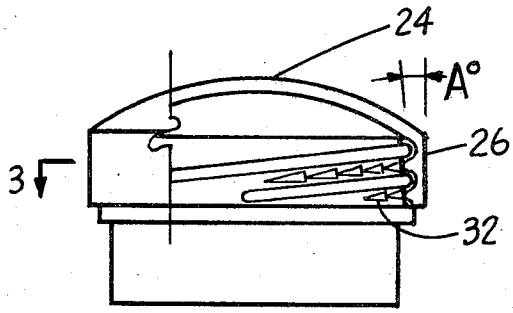
Primary Examiner—Donald F. Norton
Attorney, Agent, or Firm—Donald Diamond

[57] **ABSTRACT**

In an internally threaded closure for a container having an externally threaded neck, one or more ramplike ratchets are disposed on the internal thread of the closure for releasably interlocking with corresponding and mating ratchet detents disposed within the groove adjacent to the turns of the external thread on the neck of the container. The configuration of the ratchets and detents is such that the ratchets will easily slide into and out of successive detents and, thus, permits conventional closing of the container by ordinary rotation of the closure relative to the container. Reverse rotation of the closure relative to the container is prevented by corresponding locking side walls on the ratchets and detents which are in planes substantially in alignment with radii to the center of the package. The closure has a side wall and a resilient top wall. The closure is removed from the container by simultaneously rotating the closure relative to the container and pressing on the resilient top wall to dilate the side wall and disengage the ratchets from the ratchet detents.

In a variational embodiment, the ratchets are disposed on the groove of the neck of the container and the ratchet detents are disposed within the lateral side of the internal thread of the cap.

11 Claims, 9 Drawing Figures



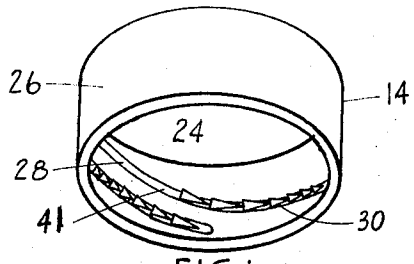


FIG. 1

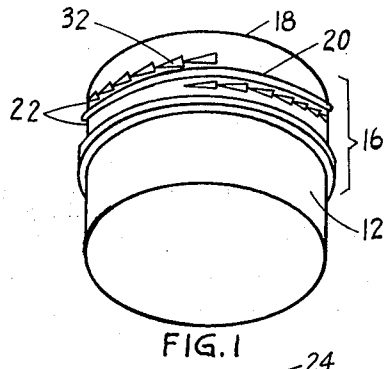


FIG. 1

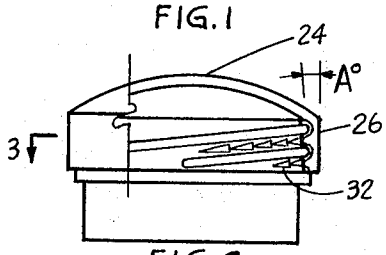


FIG. 2

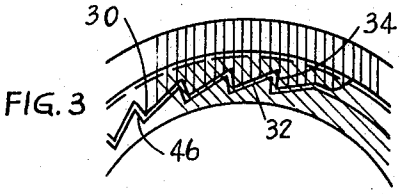


FIG. 3

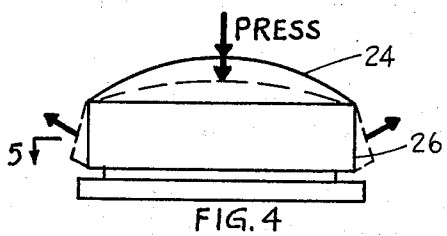


FIG. 4

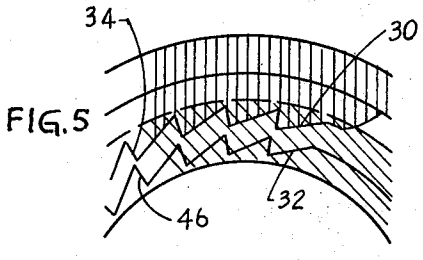


FIG. 5

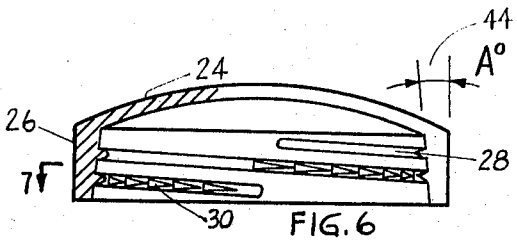


FIG. 6

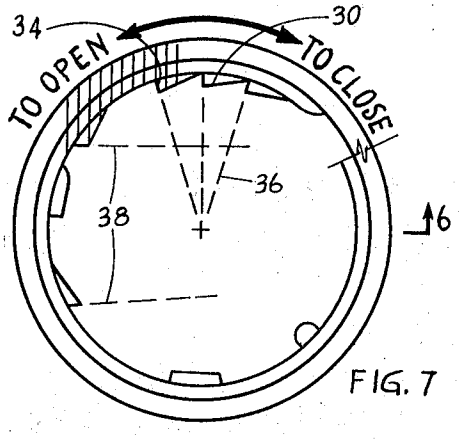


FIG. 7

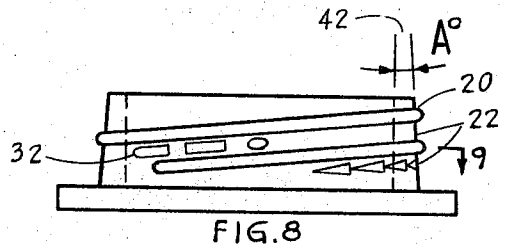


FIG. 8

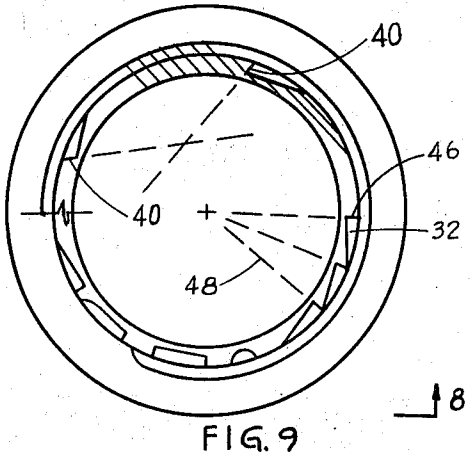


FIG. 9

SAFETY CLOSURE AND CONTAINER

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to threaded, open moutn containers and threaded closures therefor and, more particularly, to an improved safety closure for such containers.

Chemicals and medicinals encountered in the household are frequently packaged in open mouth containers having a threaded neck and a corresponding threaded closure therefor. Since the threaded closure can be easily removed from the container, it enables a young child to gain access to the contents of the container, often with serious consequences, by simply rotating and twisting the closure until it is disengaged from the container. Thus, it is highly desirable to provide a closure for a container which can be readily opened by an adult but which requires more coordination and dexterity to open than can usually be achieved by a young child.

2. Prior Art

The problem of providing a simple and economical container and safety closure therefor that cannot be readily opened by a child has been a long continuing one and a number of safety packages have been developed in an effort to meet this problem. See, for example, U. S. Pat. No. 3,181,718 (R. D. Chancellor, 1965); U. S. Pat. No. 3,233,769 (P. M. Jessop, 1966); U. S. Pat. No. 3,339,770 (B. Weigand, 1967); U. S. Pat. No. 3,376,991 (D. L. Deaver, 1968); U.S. Pat. No. 3,398,848 (F. W. Donovan, 1968); U. S. Pat. No. 3,435,975 (B. Weigand, 1969); U. S. Pat. No. 3,441,159 (L. S. Turner, 1969); U. S. Pat. No. 3,445,022 (F. A. Cilluffo, 1969); and U. S. Pat. No. 3,472,411 (L. S. Turner, 1969).

OBJECTS

Thus, an object of this invention is to provide a container and safety closure therefor which is simple in construction and economical to manufacture.

Another object of this invention is to provide a container and safety closure therefor which can be easily opened by an adult but which requires too much dexterity and coordination to be readily opened by a young child.

A further object of this invention is to provide a container and safety closure therefor which includes means for preventing removal of the closure from the container by either simple turning or simple pulling of the closure relative to the container or a combination of such forces, but which permits easy removal of the closure by simultaneously pressing the top wall of the closure and turning the closure relative to the container.

SUMMARY OF THE INVENTION

In accordance with this invention there is provided an open mouth container and safety closure cap therefor comprising in combination:

a. A container having a neck portion provided with an external spiral thread and a groove adjacent to the turns of the spiral thread with the neck portion terminating in an opening;

b. A cap for the container having a side wall and a resilient top wall and the side wall having an internal spiral thread adapted to engage and ride on the external spiral thread on the neck of the container; and

c. First engaging means disposed on the internal thread of the cap and second engaging means disposed within the groove on the neck of the container, and the first engaging means being adapted to releasably interlock with the second engaging means to prevent ordinary removal of the cap from the neck of the container unless force is simultaneously applied to the outer side of the resilient top wall of the cap to dilate the side wall and disengage the first and second engaging means.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of an axially separated cap and container illustrating an embodiment of the present invention.

FIG. 2 is a side view of the cap threaded to the container, with the cap in section.

FIG. 3 is a partial transverse section through the cap and container of FIG. 2 illustrating engagement of the interlocking means.

FIG. 4 is a perspective view of the cap threaded to the container and illustrating, in phantom lines, the expansion of the side wall of the cap upon application of force to the resilient top wall of the cap.

FIG. 5 is a transverse section through the cap and container of FIG. 4 illustrating disengagement of the interlocking means.

FIG. 6 is a side view, in section, of the cap.

FIG. 7 is a transverse section through the cap showing diverse configurations for the ratchets and illustrating ratchets with their locking walls on radii to the center and as well as ratchets with their locking walls on lines other than to the center of the cap.

FIG. 8 is a side view of the threaded neck of the container showing illustrative locations for the ratchet detents.

FIG. 9 is a transverse section through the threaded neck showing diverse configurations for the ratchet detents and illustrating ratchet detents with their locking walls on radii to the center as well as ratchet detents with their locking walls on lines other than to the center of the neck.

DETAILED DESCRIPTION

Referring now to the drawings and, in particular to FIG. 1, there is shown a package structure comprising an open mouth container **12** and a closure cap **14**. The container has a neck portion **16** which terminates at its outer extremity in an opening **18**. The neck of the container is provided with an external spiral thread **20** and a groove portion **22** adjacent to the turns of the thread.

The closure cap **14** has a resilient top wall **24** and a side wall **26** which is provided with an internal spiral thread **28** adapted to engage and ride on the external spiral thread **20** on the neck portion **16** of the container in order to threadedly secure the cap to the neck of the container. Although the resilient top wall of the closure is, preferably, convex as illustrated in FIGS. 2 and 4, it may, optionally, be either flat or concave.

The cap is provided with one or more protuberances **30** laterally disposed on the internal thread **28** for releasably interlocking with one or more corresponding and mating detents **32** disposed within the groove **22** on the neck portion of the container to prevent ordinary removal of the cap from the neck of the container unless force is applied to the outer side of the resilient top

wall of the cap to dilate the side wall and disengage the protuberances from the detents.

In a preferred embodiment, the protuberance is in the form of a ramplike ratchet as illustrated in FIGS. **3** and **5** and has a locking side wall **34** which is in a plane substantially in alignment with a radius **36** to the center of the cap as illustrated in FIG. **7.** The corresponding detent **32** for the ramplike ratchet has a locking side wall **46,** which is in a plane substantially in alignment with a radius **48** to the center of the neck of the container, for engaging the locking side wall **34** of the ratchet. Although protuberances having forms other than ramplike can be used as the laterally projecting engaging means as shown in FIGS. **7, 8,** and **9,** it should also be noted from FIG. **7** that when the locking side wall is in a non-radius plane **38** there is less effective interlocking with the corresponding and mating detent **40,** as shown in FIG. **9.**

The ratchets may be continuously disposed on the lateral side **41** of the internal thread of the cap as shown in FIG. **1** or they may be spaced or only one may be used to obtain releasable interlocking with the corresponding detents or detent. When the ratchets are spaced on the internal thread, the cylindrical space separation may be such that two ratchets are cylindrically spaced at 180°, or three ratchets cylindrically spaced at 120° or four ratchets cylindrically spaced at 90°, etc. In this connection, it should be noted that spacing is not critical and any suitable spacing may be utilized.

The outer wall of the neck of the container and the inner side wall of the cap are, typically, cylindrical with each having a substantially constant diameter throughout its length. However, improved interlocking between the ratchet and ratchet detent is obtained when the outer wall of the neck portion of the container converges towards the container opening at an angle up to about 15° or higher with respect to the vertical **42** as shown in FIG. **8,** and the inner wall of the cap converges towards the cap top wall at a corresponding angle **44** as shown in FIG. **6.** Thus, the angular relationship between the engaging walls of the neck and the cap is from 0.0 to about 15.0° or higher with respect to the vertical or longitudinal plane.

The closure cap is secured to the neck of the container by rotating the cap in a conventional manner, as, for example, in a clockwise direction relative to the container. The ramplike configuration of the ratchets and corresponding ratchet detents permit the ratchets to easily slide into and out of successive detents in the groove during the step of securing the cap to the container. When the cap is threaded to the neck of the container and the ratchets are disposed within the detents, the locking side walls of the ratchets **34** are in engagement with the locking side walls of the detents **46** as shown in FIG. **3** and the cap cannot be disengaged from the container by ordinary rotation.

In order to remove the cap from the container, it is necessary to apply force to the top of the cap and simultaneously rotate the cap in counterclockwise direction relative to the container. The application of force to the outer side of the resilient top wall of the cap dilates the side wall of the cap as shown in phantom lines in FIG. **4** and disengages the ratchets from the detents as illustrated in FIG. **5.**

Since the coordinated movements of simultaneously pressing and rotating are, in general, beyond the capability of a young child, it would be most difficult for a young child to accidentally open the safety package described herein.

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 resilient and yieldable plastic as, for example, a polyolefin such as polyethylene, although a resilient metal could be employed for the purpose.

In a variational embodiment of the present invention, the ramplike ratchets and ratchet detents are reversed with respect to location. Thus, the ramplike ratchets are disposed on the groove of the neck of the container and the corresponding and mating ratchet detents are disposed within the lateral side of the internal thread of the cap.

While in the foregoing description and accompanying drawing there has been shown and described the preferred embodiment of this invention, it will be understood, of course, that minor changes may be made in the details of construction as well as in the combination and arrangement of parts without departing from the spirit and scope of the invention as claimed.

That which is claimed is:

1. An open mouth container and safety closure cap therefor comprising in combination:

a container having a neck portion provided with an external spiral thread and a groove adjacent to the turns of the spiral thread with the neck portion terminating in an opening;

a cap closure for said container having a side wall and a resilient top wall, said side wall being provided with an internal spiral thread adapted to engage and ride on the external spiral thread on the neck of the container in order to threadedly secure the cap to the neck of the container; and

first engaging means disposed on the internal thread of the cap, second engaging means disposed within the groove on the neck of the container, said first engaging means being adapted to releasably interlock with said second engaging means to prevent ordinary removal of the cap from the neck of the container unless force is simultaneously applied to the outer side of the resilient top wall of the cap to dilate the side wall and disengage the first and second engaging means.

2. A structure in accordance with claim **1** wherein said first engaging means is at least one protuberance extending laterally from the internal thread of the cap and said second engaging means is at least one corresponding and mating detent in the groove on the neck of the container.

3. A structure in accordance with claim **1** wherein said first engaging means comprises a plurality of protuberances extending laterally from the internal thread of the cap and said second engaging means comprises a plurality of corresponding and mating detents in the groove on the neck of the container.

4. A structure in accordance with claim **1** wherein said first engaging means is a ramplike ratchet extending laterally from the internal thread of the cap and said second engaging means is a corresponding and mating ratchet detent in the groove on the neck of the container.

5. A structure in accordance with claim **1** wherein the first engaging means comprises a plurality of ramplike ratchets extending laterally from the internal

thread of the cap and said second engaging means comprises a plurality of corresponding and mating ratchet detents in the groove on the neck of the container.

6. A structure in accordance with claim **1** wherein the outer wall of the neck portion of the container converges towards the container opening at an angle up to about 15.0° with respect to the vertical and the inner wall of the cap converges towards the cap top wall at a corresponding angle.

7. A structure in accordance with claim **1** wherein the first engaging means is provided with a locking side wall which is in a plane substantially in alignment with a radius to the center of the cap and the second engaging means is provided with a corresponding locking side wall which is in a plane substantially in alignment with a radius to the center of the neck of the container, said locking side walls of said first and second engaging means cooperating to prevent disengagement of the cap from the neck of the container by simple rotation.

8. A structure in accordance with claim **1** wherein the second engaging means is at least one protuberance extending laterally from the groove on the neck of the container and the first engaging means is at least one corresponding and mating detent disposed within the laterally extending side of the internal thread of the cap.

9. A structure in accordance with claim **1** wherein the second engaging means comprises a plurality of protuberances extending laterally from the groove on the neck of the container and the first engaging means comprises a plurality of corresponding and mating detents disposed within the laterally extending side wall of the internal thread of the cap.

10. A structure in accordance with claim **1** wherein the second engaging means is at least one ramplike ratchet extending laterally from the groove on the neck of the container and the first engaging means is at least one corresponding and mating ratchet detent disposed within the laterally extending side of the internal thread of the cap.

11. A structure in accordance with claim **1** wherein the second engaging means comprises a plurality of ramplike ratchets extending laterally from the groove on the neck of the container and the first engaging means comprises a plurality of corresponding and mating ratchet detents disposed within the laterally extending side of the internal thread of the cap.

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