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Mucsi

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[54] **SAFETY CLOSURE ASSEMBLY AND CONTAINER**

[76] Inventor: **Michael Mucsi,** 2474 S. Centinela Ave., Los Angeles, Calif. 90064

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 243,807, April 13, 1972, Pat. No. 3,790,014.

[52] **U.S. Cl.** **215/9**

[51] **Int. Cl.** **B65d 43/02**

[58] **Field of Search** ..... 215/9, 46 R

[56] **References Cited**

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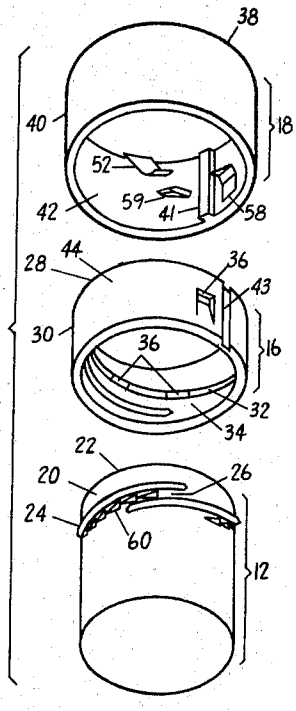
Primary Examiner—George T. Hall

Attorney, Agent, or Firm—Donald Diamond

[57] **ABSTRACT**

A safety package structure is provided comprising an externally threaded container and closure assembly therefor which includes an internally threaded cap for the container and a cover for the cap. The cover and cap are provided with corresponding and mating guide members to align the assembly, to permit longitudinal movement of the cover with respect to the cap and to impart torque to the cap. Yieldable means are disposed between the cover and the cap to maintain the cover in an axially compressible, predetermined uncompressed position. The cap side wall is provided with transverse apertures positioned on the path of and extending through the internal thread. Longitudinally resilient, ramplike ratchets are laterally disposed on the inner surface of the cover side wall so as to extend through the cap side wall apertures for releasably interlocking with corresponding detents in the thread groove on the neck of the container when the cover is in the uncompressed position. The configuration of the ratchets and detents is such that the ratchets will easily slide into and out of successive detents and, thus, permit conventional closing of the container by ordinary rotation of the closure assembly relative to the container. Reverse rotation of the closure assembly 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 assembly is removed from the container by simultaneously rotating the assembly and pressing on the cover top wall to move the cover to a compressed position whereby the ratchets, which follow the movement of the cover side wall, are withdrawn from the detents. Upon release of the pressing force, the yieldable means bias the cover to its original uncompressed position which realigns the ratchets to releasably interlock with the detents when the closure assembly is threadedly secured to the container.

9 Claims, 5 Drawing Figures



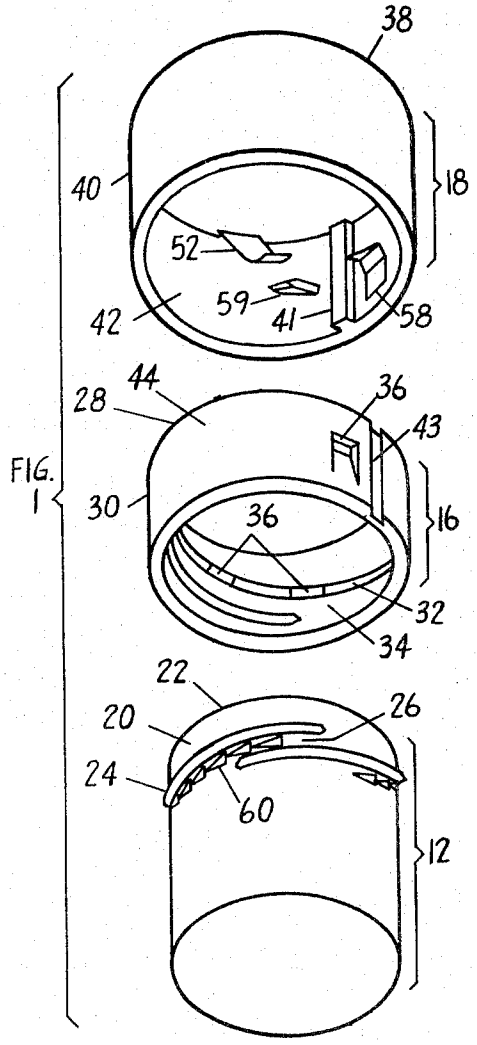


FIG. 1

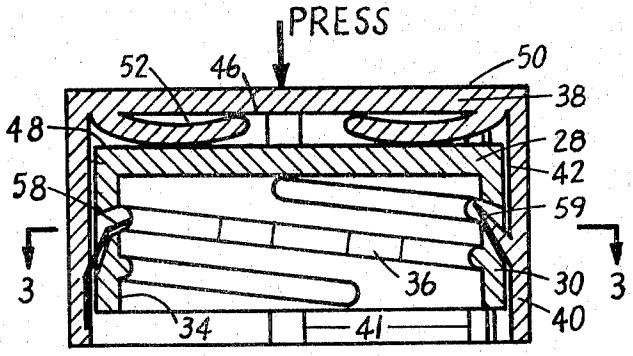


FIG. 3

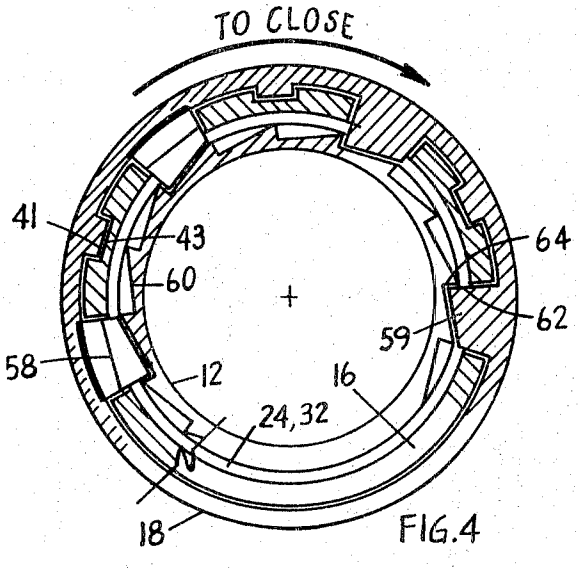


FIG. 4

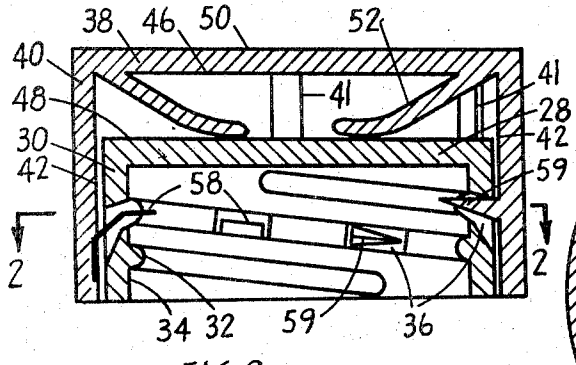


FIG. 2

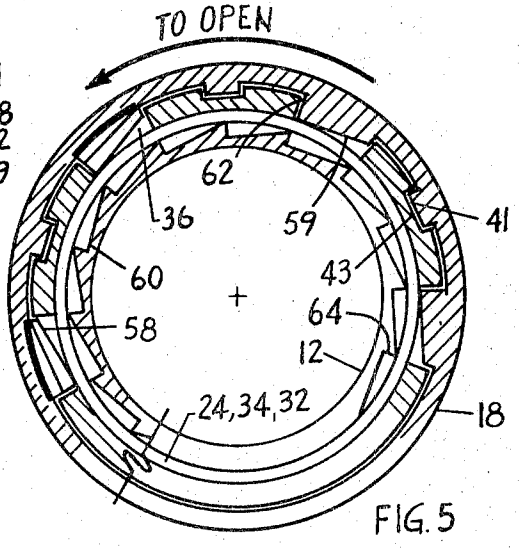


FIG. 5

SAFETY CLOSURE ASSEMBLY AND CONTAINER

CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of U.S. Patent application Ser. No. 243,807 filed Apr. 13, 1972 and entitled Safety Closure and Container, now U.S. Pat. No. 3,791,014.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to threaded, open mouth containers and threaded closures therefor and, more particularly, to an improved safety closure assembly 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 (D. 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

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

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

SUMMARY OF THE INVENTION

In accordance with this invention, there is provided an improved open mouth container and safety closure assembly therefor.

The open mouth container has an arcuate neck portion provided with an external spiral thread which defines a thread groove adjacent to the thread. An arcuate cap and cover assembly is designed to releasably enclose the neck portion of the container. The cap is 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 container; and the cover is adapted to fit over the cap in an axial, slidable relationship.

First guide means are associated with the outer surface of the cap side wall and second guide means are associated with the inner surface of the cover side wall. The first and second guide means are adapted to cooperatively engage to align the cap and cover assembly, to permit axial movement of the cover with respect to the cap, and to impart torque to the cap.

Yieldable means are disposed between the cap top and cover top which permit the cover, upon application of an axially compressing force, to be moved axially towards the cap from an uncompressed position to a compressed position. Upon release of this force, the yieldable means bias the cover to its original uncompressed position.

The cap side wall is provided with transverse apertures positioned on the path of and extending through the internal thread.

First resilient engaging means are associated with the inner surface of the cover sidewall and positioned to extend through the transverse apertures in the cap side wall when the cover is in the uncompressed position. Second engaging means are associated with the thread groove on the neck of the container. The first and second engaging means are adapted to releasably interlock when the cover is in the uncompressed position in order to prevent ordinary removal of the cap and cover assembly from the container. Removal of the assembly is effected by simultaneously rotating and applying axial force to the cover to move the same to the compressed position and thereby disengage the first and second engaging means.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a disassembled, perspective view of the container, cap and cover illustrating an embodiment of the present invention.

FIG. 2 is a longitudinal, transverse section through the neck portion of the assembled package illustrating the cover in the uncompressed position and showing the lateral projections extending from the cover side wall through the apertures in the cap side wall into locking engagement with corresponding detents in the neck of the container.

FIG. 3 is a longitudinal, transverse section through the neck portion of the assembled package illustrating the cover in the compressed position and showing the lateral projections from the cover side wall disengaged from the detents in the neck of the container.

FIG. 4 is a horizontal section along plane 2–2 of FIG. 2.

FIG. 5 is a horizontal section along plane 3—3 of FIG. 3.

DETAILED DESCRIPTIONS

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 corresponding safety closure assembly therefor including a cap **16** and cover **18.** The container has a substantially cylindrical neck portion **20** which terminates at its outer extremity in an opening **22.** An external spiral thread **24** is disposed about the outer surface of the container neck and defines a thread groove **26** adjacent to the external thread.

The cap **16** includes a substantially cylindrical top wall **28** and a continuous substantially cylindrical side wall **30** depending from the peripheral edge of the top wall. An internal spiral thread **32** is disposed about the inner surface **34** of the cap side wall and is adapted to engage and ride on the external spiral thread **24** on the neck portion of the container in order to threadedly secure the cap to the neck of the container.

The cap side wall is provided with transverse apertures **36** which are positioned on the path of and extend through the internal thread **32.** These apertures have an appropriate and suitable configuration for accommodating lateral projections from the cover side wall as hereinafter described.

The cover member **18** of the closure assembly, which is adapted to fit over the cap in axially slidable relationship, has a substantially cylindrical top wall **38** and a continuous substantially cylindrical side wall **40** depending from the peripheral edge of the top wall.

In the assembled position, the cap and cover members are aligned by one or more longitudinal rails **41** disposed on the inner surface **42** of the cover side wall which engage corresponding and mating longitudinal grooves **43** in the outer surface **44** of the cap side wall. The rail and groove members, advantageously, extend the full height of the side walls on which they are disposed. It is apparent, of course, that the positions of the alignment members may be reversed and that the rails may be disposed on the outer surface of the cap side wall with the corresponding grooves being located on the inner surface of the cover side wall. In addition to the alignment function, the rail and groove arrangement permits axial movement of the cover with respect to the cap and imparts torque to the cap upon application of rotational force to the cover.

Yieldable means, in the form of appropriate resilient structures, are disposed between the inner surface **46** of the cover top wall and the outer surface **48** of the cap top wall to maintain the assembled cover and cap members in an axially compressible, predetermined uncompressed position as shown in FIG. **2.** When the closure assembly is threadedly secured to a container, the application of axial force to the outer surface **50** of the cover top wall will cause the cover to move axially from the uncompressed position to the compressed position as shown in FIG. **3.** Upon release of the axial force, the biased yieldable means will return the cover to its original uncompressed position. The yieldable means may take the form of springs or resilient members **52** made from plastic or metal and depending from inner surface **46** of the top wall of the cover. Where the cover is molded from resilient plastic, the mold may advantageously be designed to include the depending, resilient spacing member in the finished product as shown in FIGS. **2** and **3.**

The inner surface **42** of the cover side wall is provided with one or more laterally disposed, longitudinally resilient protuberances. The protuberances, which may be metal members **58** or plastic members **59,** are positioned so as to extend through the cap side wall apertures **36** into releasable interlocking engagement with corresponding and mating detents **60** within the thread groove **26** on the neck of the container when the closure assembly is threadedly secured to the container and the cover is in the uncompressed position.

In a preferred embodiment, the protuberance is in the form of a ramplike ratchet and has a locking side wall **62** which is in a plane substantially in alignment with a radius to the center of the cover. The corresponding detent has a locking side wall **64,** which is in a plane substantially in alignment with a radius to the center of the neck of the container, for engaging the locking side wall of the ratchet.

The ratchets may be continuously disposed on the inner surface of the cap side wall or they may be spaced or only one may be used to obtain releasable interlocking with the corresponding detents. Although one or more corresponding detents may be used, it is advantageous to continuously dispose the detents within the thread groove as shown in FIG. **1.**

The cover **18** and cap **16** members are assembled by aligning the rail **41** and groove **43** components of each and compressing the members so that the ratchets **59** on the cover side wall are in alignment with and extend through the transverse apertures **36** in the cap side wall **30.**

The closure assembly is secured to the threaded neck of the container by rotating the assembly in a conventional manner, as, for example, in a clockwise direction relative to the container. The ramplike configuration of the ratchets and corresponding detents permits the ratchets to easily slide into and out of successive detents in the thread groove during the step of securing the closure assembly to the container. When the closure assembly is threadedly secured to the neck of the container and the ratchets are disposed within the detents, the locking side walls of the ratchets are in interlocking engagement with the locking side walls of the detents as shown in FIG. **4** and the closure assembly cannot be disengaged from the container by ordinary rotation.

In order to remove the closure assembly from the container, it is necessary to apply force to the outer surface **50** of the cover top wall **38** while simultaneously rotating the closure assembly in a counterclockwise direction relative to the container. The application of force to the cover causes the cover to move on the rail **41** and groove **43** assembly from the uncompressed position to compressed position. as a result of this movement, the yieldable means **52** between the cover and cap are urged from the unbiased to the biased position and the longitudinally resilient ratchets **59** are withdrawn from the detents **60** by following the cover side wall and pivoting and flexing about the lower edge of the cap side wall transverse apertures **36.** Upon release of the force being applied to the cover, the yieldable means bias the cover to its original uncompressed position which realigns the ratchets with the cap side wall apertures and permits the ratchets to releasably interlock with the detents when the closure assembly is threadedly secured to the neck of the container.

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. Although the cap can be made from either rigid or resilient plastic, the cover, preferably, is made of a resilient and yieldable plastic as, for example, a polyolefin such as polyethylene.

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 assembly therefor comprising in combination:

a container having an arcuate neck portion terminating in an opening with the outer surface of the neck portion being provided with an external spiral thread which defines a thread groove adjacent to said external thread;

an arcuate cap and cover assembly for said container;

said cap having a top wall and a continuous side wall depending from the peripheral edge of the top wall, with each wall having an outer surface and an inner surface and the inner surface of the cap 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;

said cap side wall being provided with transverse apertures positioned on the path of and extending through said internal thread for accommodating first engaging means as hereinafter defined;

said cover having a top wall and a continuous side wall depending from the peripheral edge of the top wall, with each wall having an inner surface and an outer surface and said cover being adapted to fit over said cap in a longitudinal, slidable relationship;

first guide means assocated with the outer surface of the cap side wall, second guide means associated with the inner surface of the cover side wall, said first and second guide means being adapted to cooperatively engage to align the cap and cover assembly, to permit longitudinal movement of the cover with respect to the cap and to impart torque to the cap;

yieldable means are disposed between the top wall of the cover and top wall of the cap to maintain the cover in an axially compressible, predetermined uncompressed position with respect to the cap, said yieldable means permitting said cover to be axially moved towards said cap from said uncompressed position to a compressed position upon application of force to the outer surface of the cover top wall and said yieldable means biasing said cover to its original uncompressed position upon release of said force;

first resilient engaging means associated with the inner surface of said cover side wall and positioned to extend through the transverse apertures within the side wall of the cap when the cover is in the uncompressed position, second engaging means associated with the thread groove on the neck of the container, said first and second engaging means being adapted to releasably interlock when the cover is in the uncompressed position to prevent ordinary removal of the cap and cover from the container unless force is simultaneously applied to the cover to move the same to the compressed position and thereby 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 inner surface of the cover side wall and said second engaging means is at least one corresponding and mating detent in the thread 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 inner surface of the cover side wall, and said second engaging means comprises a plurality of corresponding and mating detents in the thread groove on the neck of the container, and said cap includes corresponding transverse apertures for said protuberances.

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

5. A structure in accordance with claim **1** wherein said first engaging means comprises a plurality of ramplike ratchets extending laterally from the inner surface of the cover side wall and said second engaging means comprises a plurality of corresponding and mating ratchet detents in the thread groove on the neck of the container, and said cap includes corresponding transverse apertures for said ramplike ratchets.

6. A structure in accordance with claim **1** wherein said 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 cover and said 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 and cover from the neck of the container by simple rotation.

7. A structure in accordance with claim **1** wherein said first guide means is a longitudinal groove in the outer surface of the cap side wall and said second guide means is a corresponding and mating longitudinal rail disposed on the inner surface of the cover side wall.

8. A structure in accordance with claim **1** wherein said first guide means comprises a plurality of longitudinal grooves in the outer surface of the cap side wall and the second guide means comprises a plurality of corresponding and mating longitudinal rails disposed on the inner surface of the cover side wall.

9. A structure in accordance with claim **1** wherein said yieldable means comprises a plurality of spring members depending from the inner surface of the cover top wall.

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