July 19, 1966 R. T. McDONALD ETAL 3,261,490

SAFETY CLOSURE

Filed Dec. 23, 1964

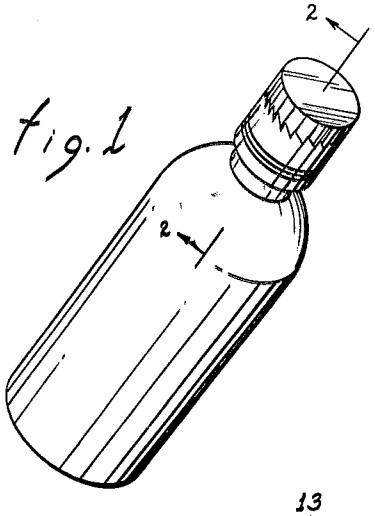


Fig. 1

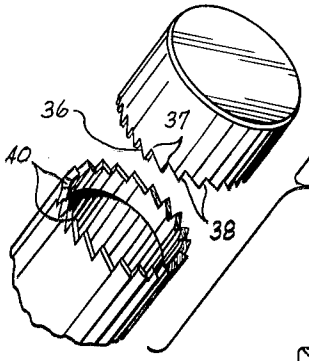


Fig. 4

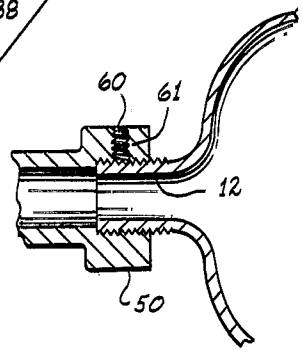


Fig 7

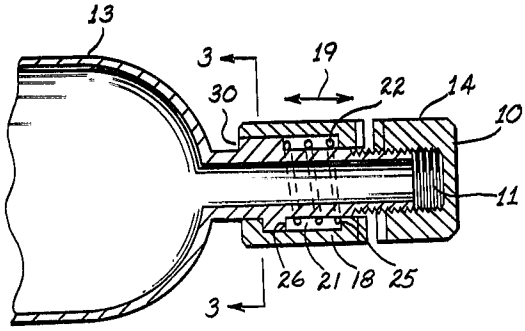


Fig. 2

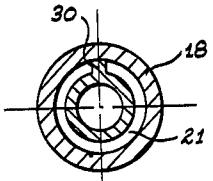


Fig. 3

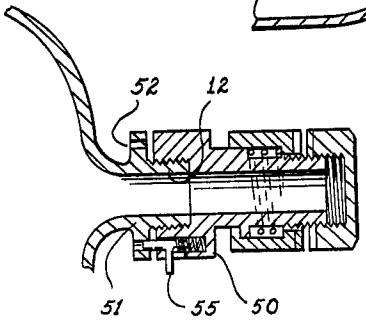


Fig. 5

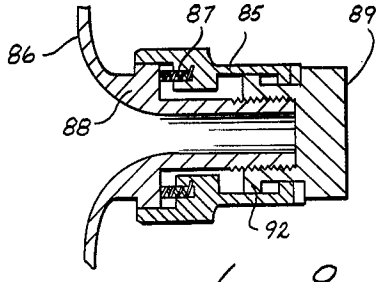


Fig. 8

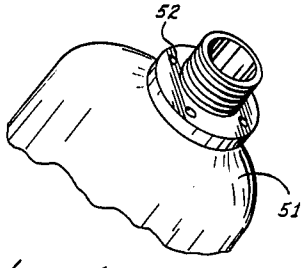


Fig 6

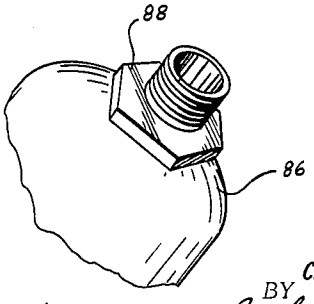


Fig. 9

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SAFETY CLOSURE

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9 Claims. (Cl. 215—9)

The present invention pertains to a safety closing device for use in connection with containers to render the containers substantially child-proof.

The number of medicinals usually available in the average household substantially increases the danger of accidental use by children. Although many safety precautions can be taken to minimize the risk of children obtaining and eating or drinking substances that are harmful, occasions nevertheless arise where small children manage to reach packages, bottles, or other containers of drugs and pharmaceuticals. The likelihood of such a mishap has only been increased in recent years through the advent of flavored medicines for children, thereby increasing their appetite for, and sharpening their already acute inquisitiveness concerning, a variety of drugs.

Many prior art safety devices have been developed in an attempt to present a child-proof container for harmful drugs and medicinals; however, such devices have proven to be complicated, expensive, and generally unreliable since the requirements for such a device are not only that it be child-proof, but also that the device permit an adult to readily obtain the contents of the container in an emergency.

It is therefore an object of the present invention to provide a safety closure for use in connection with containers to render the latter child-proof.

It is another object of the present invention to provide a safety closure that is positive and absolute in its locking action and the prevention of opening by a small child.

It is another object of the present invention to provide a safety closure that, while being child-proof, may readily permit access to the container by an adult.

It is still another object of the present invention to provide a safety closure to render a container child-proof while nevertheless being economical to manufacture.

Other objects and advantages of the present invention will become apparent to those skilled in the art as the description thereof proceeds.

Briefly, in accordance with one embodiment of the present invention, a safety closure is provided having a threaded cap adapted to be screwed onto the threaded neck of a container. A barrel member is provided that fits over the bottle or container neck and is movable longitudinally along the neck while being spring-urged outwardly away from the container. The cap and barrel member are provided with mating locking teeth that, when engaged, prevent the cap from being unscrewed. An adult may readily push the barrel member toward the container while holding the container in the same hand. Simultaneously, the adult may then unscrew the bottle cap to gain access to the contents. The manipulation necessary to remove the cap is a near physical impossibility for a child since it requires a level of co-ordination unattainable by a child and also requires a hand large enough to simultaneously hold the container and the barrel member—a hand size rarely, if ever, present on a small child. The present invention may more readily be described by reference to the accompanying drawings in which:

FIGURE 1 is a side elevation of a container having a safety closure constructed in accordance with the teachings of the present invention.

FIGURE 2 is a sectional view of a portion of FIGURE 1 taken along line 2—2.

FIGURE 3 is a sectional view of FIGURE 2 taken along line 3—3.

FIGURE 4 is an isometric view showing the locking teeth on the end of the barrel member and on the end of the cap.

FIGURE 5 is a cross-sectional view, similar to FIGURE 2, showing a means for extending the neck of a container for use with the safety closure of the present invention.

FIGURE 6 is an isometric illustration of the end of a container for use in connection with the neck extension of FIGURE 5.

FIGURE 7 is an illustration of another method for attaching a neck extension to a container to be used in connection with the safety closure of the present invention.

FIGURE 8 is a cross-sectional view of another embodiment of the safety closure of the present invention useful in those instances where the safety closure is to be reused and the container is to be discarded after use.

FIGURE 9 is an isometric view of the end of the container manufactured for use in combination with the safety closure of the present invention.

Referring to FIGURES 1–4, the present invention contemplates the utilization of a cap **10** having a bore **11** appropriately threaded to be screwed onto the neck **12** of a container **13**. The cap may be serrated on the outside surface **14** to provide a more convenient means for gripping the cap. A barrel member **18** is positioned over the neck **12** and is longitudinally movable relative to the neck as indicated by the arrow **19**. The barrel member **18** includes an internal annular space **21** to permit the mounting of a coil spring **22**. The spring **22** abuts one end of the space **21** formed by an internal shoulder **25**, and also abuts an annular shoulder **26** formed in the neck **12**. The barrel member **18** is thus free to move toward and away from the container **13** as indicated by the arrow **19**, but is urged away from the container **13** by the expansion force of the spring **22**. The barrel member **18** is also prevented from rotating relative to the container **13** by a key **30** formed in the neck **12**. It will be obvious to those skilled in the art that many modifications may be used in the spring-mounting system shown in FIGURE 2 and that the key **30** may readily be replaced by any means for preventing relative rotation between the barrel member **18** and the container **13** such as by providing "flats" or hexagonal cross-section to the neck **12** in the vicinity of the key **30**.

The cap **10** includes a plurality of locking teeth **35** depending from the bottom of the cap or from the surface of the cap closest to the container **13** perpendicular to the axis of the bore **11**. The teeth **35** are formed with a relatively gentle sloping surface **36** extending from the root **37** of the teeth, each sloping surface intersecting a surface **38** extending perpendicularly from the root **37**. The barrel member **18** is also provided with a plurality of locking teeth at the end thereof opposing the locking teeth on the cap. The teeth **40** on the barrel member are formed identically to those on the cap and may thus engage the cap teeth to prevent counter-clockwise or unscrewing rotation between the barrel member **18** and the cap **10**. The sloping surfaces **36** of the mating teeth permit rotation in a clockwise or closing rotational direction, thus enabling the cap **10** to be rotated clockwise relative to the barrel member but preventing the cap **10** from being screwed counter-clockwise relative to the barrel member **18**.

The operation of the embodiment shown in FIGURES 1–4 may now be described. Assuming that the container is open and the barrel member **18** has been urged to the extent permissable away from the container **13**, the cap **10** may be placed on the neck **12** by screwing the cap

onto the neck in the usual fashion. As the cap is screwed onto the neck, the cap **10** approaches the barrel member **18** and ultimately causes the teeth **35** of the cap to engage the teeth **40** of the barrel member **18**. Since the sloping surfaces of the respective locking teeth permit the cap to rotate clockwise relative to the barrel member, continued rotation in that direction of the cap **10** merely forces the barrel member **18** to move toward the container **13**. The key **30** prevents the barrel member **18** from rotating with the cap and the spring **22** continues to urge the barrel member away from the container **13** and into engagement with the cap **10**. The cap **10** may continue to be tightened until the desired tightness of fit has been achieved, and the container is then locked and cannot be opened by small children. Any attempt to turn the cap **10** counter-clockwise relative to the container **13** is met with resistance caused by the engagement of the locking teeth on the cap and barrel member **18**. When it is desired that entry be gained to the container **13**, the barrel member **18** must be forced towards the container against the force of the coil spring **22** to thereby disengage the locking teeth on the barrel member from the locking teeth on the cap **10**. The cap **10** may then be unscrewed in the normal manner and the barrel member released to resume its extended position as shown in FIGURE 2. It has been found that it is veritably impossible for small children to understand the operation of this safety closure; however, even if the operation is carefully explained, a small child seldom is capable of simultaneously supporting the container, withdrawing the barrel member toward the container, and unscrewing the cap **10**.

The embodiment shown in FIGURES 1–4 may be utilized on containers having relatively short necks as shown in FIGURES 5 and 6. Referring to FIGURE 5, it may be seen that the apparatus of the present invention is substantially the same as that shown in FIGURE 2; however, to permit the safety closure of the present invention to be used interchangeably on bottles having short necks, a container neck extension **50** is provided that may be screwed onto the threaded portion of a container neck in the conventional manner. The container, in this instance, is provided with a flange **51** having a plurality of holes **52** extending longitudinally of the neck. The neck extension **50** includes a spring-loaded locking lug **55** that, when released to its rest position, will engage one of the holes **52** and prevent relative rotation between the neck extension **50** and the container neck **12**. In this manner, inexpensive containers may be manufactured and the safety closure of the present invention reused when the container is empty. FIGURE 6 illustrates a typical example of an inexpensive container configuration having the flange **51** and holes **52** therein as it would appear without the safety closure of the present invention.

Referring to FIGURE 7, another approach to providing a container neck extension is shown. Using modern-day plastics, it is possible to secure the neck extension **50** to the neck **12** of a container, and prevent relative rotation between the two, by a simple set screw **60** mounted in a threaded hole **61**. The set screw **60**, being a harder material than the plastic material of the neck **12**, will make an indentation in the neck **12** and, when tightened, will prevent the extension **50** from rotating relative to the neck.

A different embodiment of the present invention is shown in FIGURE 8 wherein it may be seen that a barrel member **85** is urged away from a container **86** by a plurality of small springs **87** each of which is secured to the barrel member **85** and each of which abuts the neck **88** of the container. The barrel member **85** is provided with locking teeth that engage with corresponding locking teeth on the cap **89**. The barrel member **85** is prevented from rotating relative to the container **86** by the hexagonal shape of the container neck **88** adjacent the container **86**. It may also be noted that the cap **89** includes an annular shoulder **92** that prevents the complete separation of the cap **89** from the barrel **85**. Thus, when access is to be gained to the container **86**, the barrel **85** is forced against the spring pressure toward the container and the cap **89** is unscrewed until it disengages the neck **88**. When the cap is withdrawn from the neck, the barrel member **85** is removed with the cap **89** and the entire safety closure remains as a unit. The springs **87**, secured as mentioned above to the barrel member **85**, are also withdrawn with the safety closure unit thereby leaving the container as shown in FIGURE 9. The embodiment shown in FIGURE 8 therefore permits containers to be manufactured at no greater expense than at present while nevertheless providing a reuseable safety closure that prevents children from gaining access to the contents of the container. The embodiment of FIGURE 8 renders possible the utilization of a variety of spring means for urging the barrel member away from the container and into contact with the cap. For example, the barrel may itself be formed of a flexible plastic material that will yield under the force exerted by the cap as the latter is screwed onto the neck of the container. The spring means may also be placed so that they do not contact the container but instead urge the barrel member away from the container by exerting a force tending to draw the cap toward the container thus engaging the locking teeth.

It will be obvious to those skilled in the art that many other modifications may be made in the embodiments chosen for illustration without departing from the spirit and scope of the invention. It is therefore intended that the present invention be limited only by the interpretation of the claims appended hereto.

We claim:

1. A safety closure, for use in connection with a container, comprising:

(a) a threaded cap for engaging threads on a container neck,

(b) a first plurality of locking teeth, integral with said cap,

(c) a barrel member, non-rotatable relative to said container, mountable on the neck of a container and movable toward and away from said container when mounted on said neck,

(d) a second plurality of locking teeth, integral with said barrel member, engageable with said first plurality of locking teeth when said cap is mounted on said neck and when said barrel is moved away from said container,

(e) yieldable means for urging said barrel member away from said container and into engagement with said cap to thereby engage said first and second plurality of locking teeth and prevent rotation of said cap relative to said container.

2. A safety closure, for use in connection with a container, comprising:

(a) an internally threaded cap for engaging threads on a container neck,

(b) a first plurality of locking teeth, integral with said cap, extending toward said container when said cap is screwed onto said container,

(c) a barrel member, non-rotatable relative to said container, mountable on the neck of a container and movable toward and away from said container when mounted on said neck,

(d) a second plurality of locking teeth, integral with said barrel member, engageable with said first plurality of locking teeth when said cap is mounted on said neck and when said barrel is moved away from said container, and

(e) resilient means for urging said barrel member away from said container and into engagement with said cap to thereby engage said first and second plurality of locking teeth and prevent rotation of said cap relative to said container.

3. The device defined in claim **2** wherein said teeth are formed having a sloping surface extending from the

tooth root to a surface extending perpendicularly from the tooth root.

4. A safety closure, for use in connection with a container, comprising:

(a) a cap having a cylindrical threaded bore extending partially therethrough for engaging threads on a container neck,

(b) a first plurality of locking teeth depending from a surface on said cap perpendicular to the axis of said bore toward said container,

(c) a barrel member, a non-rotatable relative to said container, mountable on the neck of a container and movable toward and away from said container when mounted on said neck,

(d) a second plurality of locking teeth, integral with said barrel member, engageable with said first plurality of locking teeth when said cap is mounted on said neck, and when said barrel is moved away from said container, and

(e) resilient means for urging said barrel member away from said container and into engagement with said cap to thereby engage said first and second plurality of locking teeth and prevent rotation of said cap relative to said container.

5. The device defined in claim 4 wherein said teeth are formed having a sloping surface extending from the tooth root to a surface extending perpendicularly from the tooth root.

6. A safety closure, for use in connection with a container, comprising:

(a) an internally threaded cap for engaging threads on a container neck,

(b) a first plurality of locking teeth, integral with said cap, extending toward said container when said cap is screwed onto said container,

(c) a barrel member, slidably keyed to said container neck to permit movement toward and away from said container and to prevent relative rotation between said barrel member and said container,

(d) a second plurality of locking teeth, integral with said barrel member, engageable with said first plurality of locking teeth when said cap is mounted on said neck and when said barrel is moved away from said container, and

(e) a resilient means for urging said barrel member away from said container and into engagement with said cap to thereby engage said first and second plurality of locking teeth and prevent rotation of said cap relative to said container.

7. A safety closure, for use in connection with a container, comprising:

(a) a cap having a cylindrical threaded bore extending partially therethrough for engaging threads on a container neck,

(b) a first plurality of locking teeth depending from a surface on said cap perpendicular to the axis of said bore toward said container,

(c) a barrel member, slidably keyed to said container neck to permit movement toward and away from said container and to prevent relative rotation between said barrel member and said container,

(d) a second plurality of locking teeth, integral with said barrel member, engageable with said first plurality of locking teeth when said cap is mounted on said neck and when said barrel is moved away from said container, and

(e) resilient means for urging said barrel member away from said container and into engagement with said cap to thereby engage said first and second plurality of locking teeth and prevent rotation of said cap relative to said container.

8. A safety closure, for use in connection with a container, comprising:

(a) a cap having a cylindrical threaded bore extending partially therethrough for engaging threads on a container neck,

(b) a first plurality of locking teeth depending from a surface on said cap perpendicular to the axis of said bore toward said container,

(c) a barrel member, slidably keyed to said container neck to permit movement toward and away from said container and to prevent relative rotation between said barrel member and said container,

(d) a second plurality of locking teeth, integral with said barrel member, engageable with said first plurality of locking teeth when said cap is mounted on said neck and when said barrel is moved away from said container, and

(e) spring means, secured to said barrel member, for urging said barrel member away from said container and into engagement with said cap to thereby engage said first and second plurality of locking teeth and prevent rotation of said cap relative to said container.

9. The device defined in claim 8 wherein said teeth are formed having a sloping surface extending from the tooth root to a surface extending perpendicularly from the tooth root.

No references cited.

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