March 28, 1967 H. W. RIGOR 3,311,247

LOCKABLE CONTAINER CLOSURE

Filed Oct. 1, 1965

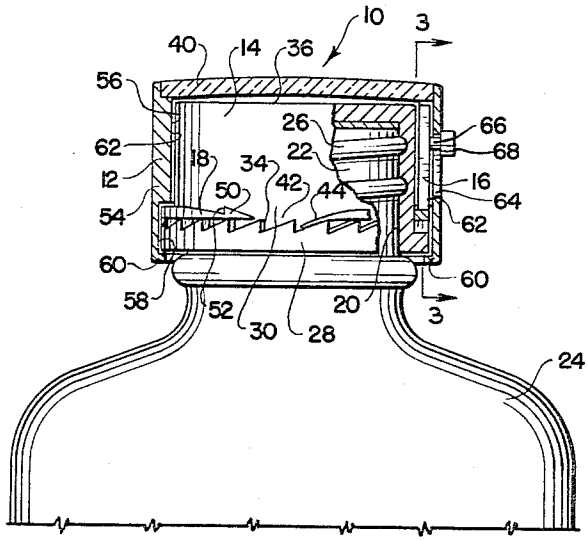


FIG. 1.

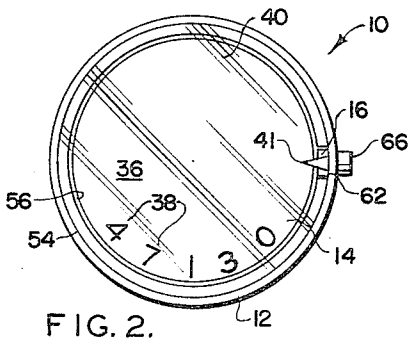


FIG. 2.

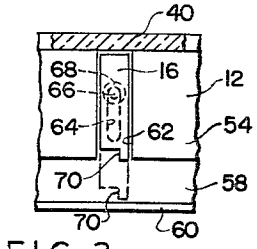


FIG. 3.

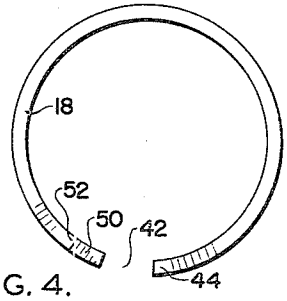


FIG. 4.

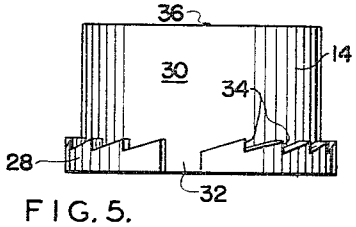


FIG. 5.

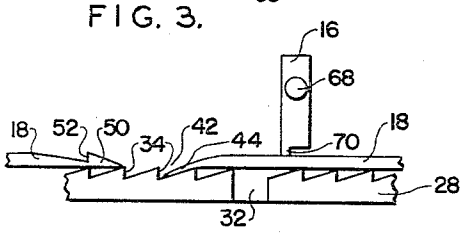


FIG. 7.

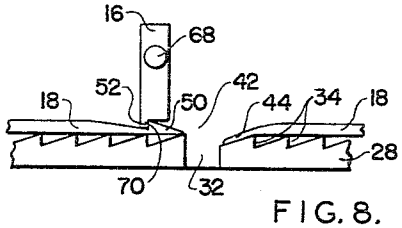


FIG. 8.

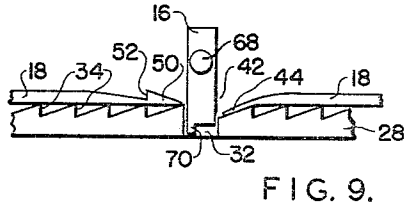


FIG. 9.

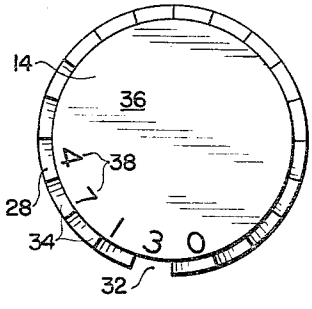


FIG. 6.

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LOCKABLE CONTAINER CLOSURE

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5 Claims. (Cl. 215—9)

This invention relates to improvements in a screw-on type lockable container closure such as forms the subject matter of my U.S. Patent No. 3,120,318 that issued Feb. 4, 1964.

In my earlier patent, I disclose a closure which includes an inner screw-on cap having an integral annular rib depending therefrom which has ratchet teeth on its upper surface and a notch somewhere in its periphery. A non-continuous ring rests on this rib and is free to slide around on top of the teeth. Covering both the screw cap and ring is an outer cap that turns freely relative to the inner cap. Inside the outer cap is a pin which, upon proper manipulation, can be made to register with the notch in the inner cap to lock the two caps together for simultaneous rotation.

The whole purpose of the above-described assembly is, of course, to provide a closure for medicine bottles and the like which cannot be removed except by a person who knows precisely how to do so. Small children are thus prevented gaining access to harmful medicinals, poisons, etc., that are responsible for many deaths each year.

It has now been determined that, while the patented closure works quite well, it still possesses a few deficiencies which detract from its utility. The first of these is the fact that any examination of the closure will not reveal whether it is in the so-called "safe" position and cannot be opened by merely unscrewing it. In other words, to render the cap effective for its intended purpose, the locking mechanism must be disengaged once the cap is screwed in place, otherwise it can be removed in the same way as any screw cap. It is absolutely necessary, therefore, that the closure be placed in "safe" position for storage and, preferably, provide some visual indication of this fact.

The other problem is that the container and closure must be turned upside down before the locking mechanism can be disengaged and rendered "safe." Some potential users of the cap object to this procedure because it necessitates agitating the contents to a considerable degree. Some pills, for example, may break apart or slough off if shaken up repeatedly and the manufacturer is very reluctant to adopt such a package for his product. In the case of liquids, some leakage may occur if the cap is not screwed on tightly before the closure is placed in inverted position to release the locking mechanism.

It has now been found in accordance with the teaching of the instant invention that these and other shortcomings of my previous design can be eliminated by providing the outer cap with a vertical slot opening into the latch pin track and fastening a pin operator to said latch pin that works within said slot and enables the pin to be manually actuated. By this simple expedient, a glance at the pin operator reveals whether or not the closure is in "safe" position. In addition, the latch pin can be raised manually by moving the pin operator to the top of its slot and the locking mechanism can be thus disengaged without turning the container upside down as was previously required. Furthermore, by pressing down on the pin operator with the latch pin resting atop the ratchet teeth of the annular rib, the closure can be tightened more securely on the container than was heretofore possible when gravity alone had to be relied upon to hold the latch pin in engagement with these teeth.

It is, therefore, the principal object of the present invention to provide a novel and improved lockable closure for medicine bottles and the like.

A second objective is the provision of a device of the character described which prevents small children from gaining access to the harmful contents of a container, yet, which can be operated by an adult quite easily.

Another objective is the provision of a locking closure that gives an immediate visual indication as to whether it is "safe" or "unsafe."

Still another object of the invention herein disclosed and claimed is to provide a locking closure that can be rendered safe without disturbing the contents.

An additional objective of the invention is to provide a protective cap that includes manually-operable means for tightening same securely in place.

Further objectives of the invention herein disclosed and claimed are to provide a locking bottle closure that is inexpensive, versatile, easy to use, compact, reliable, rugged and decorative in appearance.

Other objects will be in part apparent and in part pointed out specifically hereinafter in connection with the description of the drawings that follows, and in which:

FIGURE 1 is a fragmentary elevation showing the closure in place on top of a bottle, portions of both the outer and inner caps having been broken away and shown in section;

FIGURE 2 is a top plan view of the closure alone;

FIGURE 3 is a section taken away along line 3—3 of FIGURE 1;

FIGURE 4 is a top plan view of the split ring;

FIGURE 5 is a side elevation of the inner cap;

FIGURE 6 is a top plan view of the inner cap;

FIGURE 7 is a schematic view showing the elements of the locking assembly in "safe" position;

FIGURE 8 is a schematic similar to FIGURE 7 except that the opening in the split ring has been turned around by the locking pin into alignment with the notch in the annular rib; and

FIGURE 9 is a schematic similar to FIGURES 7 and 8 showing the elements of the locking assembly in the "unsafe" or open position.

Referring now to the drawings for a detailed description of the present invention and initially to FIGURE 1 for this purpose, the cap assembly which has been designated in a general way by reference numeral **10** will be seen to comprise an outer cap **12**, an inner cap **14**, a locking pin **16** and a split ring **18**. The inner cap **14** has a cylindrical recess **20** therein adapted to accept the neck **22** of a bottle or like container **24**. The bottle **24** may contain either liquids or solids and may be of any standard design so long as the neck **22** is formed to receive some type of closure which releasably locks into place by being rotated relative thereto. While the neck **22** of the bottle as shown herein has been provided with a screw thread **26** as has the inside surface of the inner cap, it is to be understood that this is merely illustrative of one type that can be used. For example, interrupted threads and bayonet connections are also widely used for releasably fastening a closure onto the neck of a container and both of the latter, which form no part of the invention, could be substituted for the screw thread shown because they all require that the cap be rotated relative to the neck to tighten and release same. Thus, the inside of the inner cap **14** is entirely conventional.

By referring to FIGURES 1, 5 and 6, it will be noted that the ouside of the inner cap **14** is provided with an interrupted annular flange **28** that is formed integral with the hollow cylindrical skirt-forming portion **30** that encircles the neck of the bottle. This flange is provided with a single pin-receiving notch **32** in its periphery, the

function of which will be outlined presently. The upper surface of radial flange **28** is provided with a circular series of ratchet-forming teeth **34**. The top **36** of the inner cap **14** is provided with suitable indicia **38** visible through the transparent window **40** in the top of the outer cap and which locates the position of notch **32** in the periphery of the annular flange. An index mark **41** (FIGURE 2) visible through window **40** and movable therewith can be aligned with any one of the indicia **38** as the outer cap is rotated relative to inner cap **14**.

FIGURE 1, 4 and 7–9, inclusive, show the ring **18** which rests and slides around the step-cut upper surface of annular flange **28** on the inner cap. Ring **18** is broken at **42** and is, therefore, the non-continuous or "split" type. One of the terminal ends **44** of the ring is bent forming a pawl adapted to engage the step-teeth **34** of the ratchet surface formed on the radial flange **28**. Thus, ring **18** can only turn one direction on the flange of the inner cap, namely, counterclockwise as viewed from above. The other terminal end of the ring is beveled to a feathered edge that leads onto an upwardly inclined ramp-like portion **50**. This ramp-forming portion **50** terminates at its uppermost extremity which lies spaced circumferentially from the feathered edge in a step **52** that defines a stop or abutment for the locking pin as will be explained shortly.

The construction of the outer cap **12** can best be seen in FIGURES 1, 2 and 3 to which reference will now be made. The transparent window **40** comprises the top of the outer cap while a circumferential skirt portion **54** surrounds the edge of the latter and cooperates therewith to define a generally cylindrical recess or socket **56** (FIGURE 1) adapted to loosely receive the inner cap **14**. This skirt is preferably fabricated from an opaque material and extends downwardly beyond the lower margin of the inner cap thereby completely covering the latter and preventing said inner cap from being grasped by the user so that it could be removed from the neck of the bottle. In other words, the outer cap turns freely on the inner cap, and, in the absence of an operative connection therebetween, there is no way of turning the inner cap one way or the other.

The inside surface of the outer cap has an annular groove **58** formed therein adapted to receive the annular flange **28** of the inner cap along with ring **18** when the latter is resting on the former. The inturned lip **60** bordering the bottom of skirt **54** locks beneath the annular flange **28** on the inner cap and holds the elements in assembled relation. With lip **60** formed integral with the skirt as shown in FIGURE 1, the outer cap must be fabricated from a deformable material which will stretch enough to slip over flange **28**, otherwise, an element **60** must be a separate piece such as shown in my earlier patent.

The inside generally cylindrical wall surface of outer cap **12** is provided with a vertically-disposed pin track **62** which loosely receives locking pin **16** for movement between the retracted or unlocked position of FIGURES 1 and 7 and the extended or locked position of FIGURE 9. In the bottom of this track opening onto the outside surface of the outer cap is a vertical slot **64** (FIGURES 1 and 3) that is somewhat narrower and shorter than the pin track and within which rides the manually-operable pin actuator **66** that constitutes the major improvement in my closure. The pin actuator **66** is provided with an enlarged head **68** located externally of the outer cap by means of which the locking pin or pawl **16** can be raised and lowered within its track.

In the particular form shown in FIGURES 3, 7, 8 and 9, the locking pawl **16** is rectangular and has a step **70** cut in its lower edge adapted to engage the shoulder **52** provided on the split ring as revealed in FIGURE 8. With the step **70** of the pawl engaging shoulder **52** of the ring, counterclockwise rotation of the outer cap will cause the pawl to slide the ring **18** around the annular rib **28** until the gap **42** between the ends of the ring becomes vertically aligned with notch **32** in said rib as shown in FIGURE 8.

Now, the normal or so-called "safe" position of the assembly is that shown in FIGURE 7 where the locking pawl is all the way to the top of its track as visually indicated by the actuator pin and where the split ring **18** occupies a rotarial position covering the notch **32** in the edge of the annular flange **28** of the inner cap. The locking pin **16** rests on top of the split ring as shown in FIGURES 1, 7 and 8 in all rotarial positions except when it is placed in register with the gap **42** of the split ring whereupon it drops down onto the step-cut surface of the annular flange on the inner cap but still remains ineffective to lock the inner and outer caps together for counterclockwise rotation because it is not in register with notch **32** in said flange. In other words, with the split ring **18** so located that it covers the notch **42** in the annular flange **28**, the outer cap together with the pin **16** can be rotated freely in a clockwise direction as viewed in FIGURE 2 relative to both the inner cap and split ring. Note, however, that as a practical matter it is only possible to rotate the outer cap clockwise a maximum of slightly less than one complete revolution before pin **16** drops through the gap **42** onto the split ring and engages one of the ratchet teeth **34** of the annular flange, whereupon, the inner and outer caps will be locked together insofar as continued clockwise rotation is concerned carrying the split ring along with them. When the cap assembly is screwed tightly on the neck of the bottle and cannot be turned any farther clockwise, the outer cap will merely stop whenever the pin drops into position engaging one of the ratchet teeth as outlined above. Ordinarily one would think that this relationship would be useful in screwing the closure onto the bottle; however, this is not the case because before the cap can be removed, the several elements of the assembly must occupy the interlocked relationship shown in FIGURE 9 and in nearly every instance they will remain this way until the cap is again screwed onto the bottle where the same interlocked relationship is employed.

Assuming, therefore, that the split ring is located as shown in FIGURE 7 with the gap **42** thereof out of alignment with the notch **32** in radial flange **28**, the outer cap must first be turned counterclockwise until the step **70** on pin **16** engages the shoulder **52** at the end of said ring. Once this relationship exists, continued counterclockwise rotation of the outer cap will cause the latter element and the split ring to turn as a unit relative to the inner cap. Perhaps it should be mentioned that if the pin is, in fact, resting on the step-cut surface of the annular flange rather than the surface of the split ring when counterclockwise rotation of the outer cap is commenced, the pin **16** will merely ride up the inclined face of the tooth and the adjoining inclined face of the downturned end **44** of the split ring until it rests on top of the latter and can continue on around to stop **52**.

The outer cap, pin and split ring are turned counterclockwise as a unit until index mark **41** (FIGURE 2) on the transparent window **40** is located opposite the number or other indicia **38** on the inner cap that signifies to the user that the gap **42** in the split ring is in registry with the notch **32** in the annular flange **28**, this position being the one shown in FIGURE 8. The relative positions of the split ring and radial flange are not, of course, visible to the user through the opaque skirt **54** of the outer cap which hides these elements and it is necessary that this information or "combination" be supplied at the time of purchase or, perhaps, carried on the bottled label in coded form. As illustrated in FIGURE 6, when the index arrow lies opposite the numeral 1 on the scale **38**, gap **42** and notch **32** are in registry with one another.

Having once attained the relationship shown in FIGURE 8, the outer cap is then turned clockwise nearly one full turn until the pin track **62** in the outer cap is aligned

with the gap 42 and notch 32; whereupon, the pin 16 drops through the gap and slot thereby completing the operative connection between all of the elements of the assembly that has been shown in FIGURE 9. Finally, by gripping the outer cap and again rotating it counterclockwise, the inner cap unscrews from the threaded neck of the bottle. As soon as the pawl 16 drops into the position of FIGURE 9 (dotted line position of FIGURE 3) signifying that the closure can be removed, an immediate external visual indication of this fact is provided for the user as the head 68 of pin actuator 66 will drop down to the bottom of slot 64. In other words, whenever pin 66 has dropped down in its slot, the closure is in "unsafe" condition. As shown FIGURE 6, the index mark will be at numeral 3 when the closure is in position to be removed. Note, however, that the closure is not always in unsafe position when the index is at numeral 3 because this can be the situation with the elements in the position shown in FIGURE 7 also.

Having removed the contents of the bottle, the closure is returned thereto and screwed on with the locking assembly still occupying the positions shown in FIGURE 9.

In my previous design it was necessary at this point to invert the container in order to retract the locking pawl from within notch 32 because there was no other means provided for lifting this pin. In this improved version, however, the pin is lifted manually out of notch 32 by grasping pin actuator 66 by its head 68 and pushing it to the top of slot 62. The bottle remains right-side-up during this step and its contents are essentially undisturbed. Once the locking pawl has been retracted as above-mentioned, the outer cap is given a partial turn counterclockwise until it no longer registers with gap 42 and notch 32 that remain aligned; whereupon, the pin is pushed down on top of the ring so that it is in a position to engage shoulder 52 upon continued counterclockwise rotation. Once the pawl and ring are interlocked, any counterclockwise motion thereof will carry gap 42 out of register with notch 32 thus returning the assembly to the "safe" position of FIGURE 7.

Having thus described the several useful and novel features of the present invention in connection with the accompanying drawings, it will be apparent that the many worthwhile objectives for which it was designed have been achieved. Although but a single specific embodiment of the closure assembly has been illustrated and described, I realize that certain changes and modifications therein may well occur to those skilled in the art within the broad teaching hereof; hence, it is my intention that the scope of protection afforded hereby shall be limited only insofar as said limitations are expressly set forth in the appended claims.

What is claimed is:

1. In a container closure of the type including an inner cup-shaped screw-on cap bordered by an annular flange having a notch therein, an outer cap mounted on the inner cap for independent relative rotation, and latch means mounted for reciprocating movement inside the outer cap between an unlocked position riding above the annular flange and a locked position passing into the notch to form an operative connection between said inner and outer caps, the improvement which comprises: a vertically-disposed slot within the outer cap opening onto said latch means, latch unlocking means accessible from the outside of the outer cap and connected to the latch means through said vertically-disposed slot, said unlocking means being operative upon manual manipulation to move the latch means to unlocked position and provide an external visual indication of said position.

2. The improvement as set forth in claim 1 in which: the latch unlocking means comprises a pin connected to the latch means operating within the slot in the wall of the outer cap.

3. The detachable bottle closure which comprises: an inner generally cup-shaped cap rotatable between open and closed positions, said inner cap having an annular flange encircling same with a notch therein and its upper surface provided with ratchet teeth, a split ring having a step cut in its upper surface and a gap between the ends thereof mounted atop the flange for rotational movement relative thereto into a position where said gap and notch register with one another, an outer cup-shaped cap mounted on the inner cap for independent relative rotation, said outer cap including a vertically extending track opening onto the interior thereof and a vertical slot within the bottom of said track opening onto the exterior, latch means mounted within the track in the outer cap for vertical reciprocating motion between an unlocked position riding atop the split ring and a locked position passing through the gap and notch when in aligned position, said latch means in unlocked position being operative upon rotation of the outer cap in one direction to engage the step on the split ring and move the gap therein into registry with the notch in the annular flange, and said latch means in locked position being operative to interconnect the outer and inner caps for simultaneous rotation, and latch unlocking means mounted on the latch means for movement therewith and within the vertical slot in the outer cap, said unlocking means providing means accessible from the outside of the outer cap manually operable to raise the latch means into unlocked position without inverting the closure.

4. The closure as set forth in claim 3 in which: the slot is of a length selected to provide a visual indication that the latch means is in unlocked position when the latch unlocking means is located in the upper extremity thereof and the locked position when at the bottom.

5. The closure as set forth in claim 3 in which: the portion of the latch means riding upon the split ring is provided with a step facing in a direction opposite to the direction of the step in the upper surface of said split ring and adapted to cooperate therewith in moving the gap in the latter into registry with the notch.

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