This invention relates to closures for containers and, more specifically, to caps for medicine bottles and the like incorporating a novel and improved releasable locking device.

Every year several children are killed or made seriously ill from swallowing poisons and other toxic substances found around the average home. Despite numerous national and local campaigns cautioning parents to keep dangerous substances out of the reach of children, such tragic accidents still occur.

There have, in the past, been a number of attempts made to solve this situation by providing locks on medicine chests, making the medicinal substances bitter to the taste and providing the bottle with special closures that a child cannot open yet which present no problem to an adult user. Of these several approaches to the problem, the latter held the most promise; however, unfortunately, the prior art attempts to design such a closure have met with little, if any, success for several reasons. To begin with, many of these devices were so complicated and expensive to manufacture that their use on an ordinary medicine bottle, to say nothing of a less expensive household product, become prohibitive. Along this same line, some were so difficult to operate that even adults experienced difficulty due to their complexity. Other units were capable of being used on either liquid containers or pill dispensers but not both. Still others were bulky or required specially designed containers.

It has not been found in accordance with the teaching of the instant invention that these and other problems can be completely eliminated through the use of a relatively simple cap-type closure that operates on the principle of of combination lock yet which is not nearly so complex. The unit is equally well-suited to liquid or solid material containers. It is quite compact and requires no special bottle.

These useful ends are achieved by providing an inner cap that screws onto the neck of the container in the usual way and an outer cap that covers the inner cap so completely that the latter cannot be disengaged except by turning the outer one. The outer cap turns freely on the inner one unless and until they are operatively interconnected by a locking pin. A freely rotatable ring mounted between the inner and outer caps ordinarily separates the registering openings therein so that the locking pin must interconnect before the caps can be turned as a unit. The pin also functions as the means for moving the ring into the proper position.

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

A second object is the provision of a device of the type described which is most difficult for a child to operate but which presents no problem whatsoever to an adult.

Another object of the instant invention is to provide a locking closure that can be molded from any one of several inexpensive plastic materials at a nominal additional cost over the ordinary bottle cap.

Still another objective is the provision of a closure which is reusable and can be adapted to fit nearly all standard containers having either a screw, bayonet-type or integral threaded neck.

An additional object of the invention herein disclosed is to provide a closure device that can be used on either liquid or dry material containers interchangeably.

Further objects are the provision of a cap-type bottle closure that is compact, rugged, foolproof, versatile and decorative in appearance.

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

FIGURE 1 is a vertical diametrical section, portions of which have been broken away to conserve space, showing the locking closure of the present invention attached in place on the threaded neck of a bottle, provided with a simple pin-receiving notch in its periphery, the significant function of which will be outlined presently. In the preferred embodiment of the invention illustrated herein, 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 a 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 radial flange, the latter being hidden from view through said window by the rest of the outer cap.

All of the figures of the drawing with the exception of FIGURE 2 show the ring 18 which rests on the step-cut upper surface of radial flange 28 of the inner cap. Ring 18 is broken at 42 and is, therefore, of the non-continuous
or so-called "split" type. The width of the opening 42 in the ring is preferably somewhat wider than that of notch 28 as shown most clearly in FIGURES 4, 5, and 6.

One of the terminal ends 44 of the ring is bent downwardly forming a pawl adapted to engage the step-cut 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 in FIGURES 3 and 4. The other terminal end of the ring is beveled to a feathered edge 48 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 48 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, 5 and 6 to which reference will now be made. The transparent window 49 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 to the lower margin of the latter thereby completely covering the latter and preventing it from being grasp by the user in a way 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 a step 58 formed therein adapted to receive the radial flange 28 of the inner cap along with ring 18 when the latter is resting on the former. A continuous ring 60 preferably formed of the same material as the skirt 54 of the outer cap is permanently fastened inside the latter around the lower edge thereof in spaced relation below the step so that it cooperates therewith to define a radially-extending annular groove 62 which receives both the radial flange of the inner cap and split ring 18 permanently holding these elements together as assembled.

The opposed faces of the continuous ring 60 and the step 58 of the outer cap are provided with vertically-aligned and vertically-extending pin sockets 64 and 65 which loosely receive locking pin 16 for movement between the retracted or unlocked position of FIGURE 5 and the extended or locked position of FIGURE 6. The depth of pin socket 64 in the skirt-forming portion 54 of the outer cap is substantially equivalent to the length of the locking pin 16 and the length of the latter element is sufficient to bridge the annular groove 62 while the opposite end portions remain within both pin sockets 64 and 66 as shown in FIGURE 6.

Before setting forth the manner in which the device operates, it would be well to mention how it is assembled. The outer cap is inverted and the locking pin 16 dropped into place in pin socket 64 in step 58 of the circumferential skirt 54. Next, the split ring 18 is laid upper face down on the step 58. The inner cap is then inverted and dropped into place within recess 56 in the outer cap. Finally, continuous ring 60 is inserted into the outer cap, rotated until pin socket 65 is aligned with pin socket 64 and connected permanently into place completing the assembly.

Now, the normal or random position of the assembly is that shown in FIGURE 3 where the split ring 18 occupies a rotational position where it covers the notch 32 in the edge of the radial flange 28 of the inner cap. The locking pin 16 drops down out of socket 64 in the skirt of the outer cap and rests on top of the split ring as shown in FIGURES 1 and 5 in all rotational positions except when it is placed in register with the gap 42 of the split ring whereupon it drops down further onto the step-cap surface of the radial flange on the outer 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 32, in the radial flange 28, the outer cap together with the pin 16 and continuous ring 60 can be rotated freely in a clockwise direction as viewed in FIGURES 2, 3, and 4 relative to both the inner cap and split ring. Note 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 radial 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, therefore, be turned any further 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 must be separated from each other in the relationship shown in FIGURE 6 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 3 with the gap 42 thereof out of alignment with the notch 32 and radial flange 28, the outer cap must first be turned counterclockwise until the pin 16 engages the step 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 radial 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 ad-joining inclined face of the downwardly turned 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 68 (FIGURE 2) on the transparent window 49 is located opposite the number or other indication on the inner cap. The user then knows that the gap 42 in the split ring is in registry with the notch 32 in the radial flange 28, this position being the one shown in FIGURES 4, 5 and 6. 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 bottle label in coded form. As illustrated, when the index arrow lies opposite the numeral "2" on the scale 38, gap 42 and notch 32 are in registry with one another.

Having once attained the relationship shown in FIGURES 4, 5 and 6, the outer cap is then turned clockwise nearly one full turn until the pin sockets 64 and 66 of the outer cap are likewise aligned with the gap 42 and notch 32; whereasupon, the pin 16 drops through the gap and slot into recess 65 thereby completing the operative connection between all of the parts that has been shown in FIGURE 6. Finally, by gripping the outer cap and again rotating it counterclockwise, the inner cap unscrews from the threaded neck of the bottle. Once the desired contents of the bottle have been removed, the cap assembly is returned to the bottle and screwed on while the elements occupy this same interlocked relationship.
The last, but equally important step in the procedure is to return the elements to their disengaged or inoperative positions. This is accomplished by turning the bottle and attached closure upside down allowing the pin to retract from recess 60 in the continuous ring as well as the gap and notch. With the device still inverted, the outer cap can be turned in either direction to take the pin out of registry with the gap and notch. Then, by turning the bottle right-side-up once more and rotating the outer cap counterclockwise until the pin engages the stop 52 and moves the split ring around relative to the radial flange to a different relative position, the original unlocked “safe” condition is again achieved.

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. A detachable closure for bottles and the like which comprises, an inner generally cup-shaped cap rotatable between open and closed positions, said inner cap having an outwardly extending radial flange projecting therefrom spaced downwardly from the top, said flange having a notch in the periphery thereof, a split ring mounted on the flange of the inner cap for relative rotational movement into position whereby the gap between the ends of said said ring and notch in said flange are in registry with one another, means comprising a stop on the upper surface of the split ring, an outer generally cup-shaped cap adapted to fit over the inner cap and remain freely rotatable relative thereto, said outer cap including an annular groove located intermediate the top and bottom edge thereof positioned and adapted to receive the radial flange of the inner cap and the split ring, said cap also including a vertically-extending pin recess intersecting said annular groove and positioned in the path of the stop carried by the split ring, and a locking pin mounted within the pin recess in the outer cap for movement between an extended position passing through the gap in the split ring along with the notch in the radial flange when the latter are aligned and a retracted position supported on top of said split ring, said pin in retracted position cooperating with said stop to move the gap in the split ring into registry with the notch in the annular flange upon rotation of the outer cap in one direction, and said pin cooperating with said notch and gap to interlock the inner and outer caps together upon rotating of said outer cap in the opposite direction until said pin drops into extended position.

2. The closure as set forth in claim 1 in which the top of the outer cap is provided with a transparent window-forming portion and the top of the inner cap includes indicia cooperating with the window in the outer cap and visible through the latter indicating the registered position of the notch in the radial flange and the gap in the split ring.

3. The closure as set forth in claim 1 in which one of the adjacent contacting surfaces of the split ring and radial flange is provided with a series of ratchet-forming teeth while the other of said surfaces carries a detent-forming projection, said teeth and dent cooperating with one another to permit said split ring to be rotated relative to said annular flange in only one direction, said direction being that in which said ring is turned by the outer cap to place the gap in registry with the notch.

4. The closure as set forth in claim 1 in which the inner surface of the outer cap includes an annular cylinder enlargement adjacent the lower edge thereof, and means comprising a continuous ring is attached permanently in place within said annular enlargement in said outer cap cooperating therewith to define the annular groove, said ring including a vertically-extending pin recess vertically aligned with said pin recess in the outer cap.

5. The closure as set forth in claim 2 in which an index is provided on the window-forming portion of the outer cap, said index overlying the indicia on the top of the inner cap forming means adapted to indicate to the user the registered position of the gap and notch.

6. The closure as set forth in claim 3 in which the ratchet teeth are carried by the upper surface of the radial flange and the detent-forming projection is carried by the split ring.

7. The closure as set forth in claim 6 in which the detent-forming portion of the split ring comprises a downward end.

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