Feb. 11, 1969 W. R. ROUSE 3,426,932

TAMPER-PROOF POISON BOTTLE CLOSURE

Filed July 17, 1967

Fig. 1

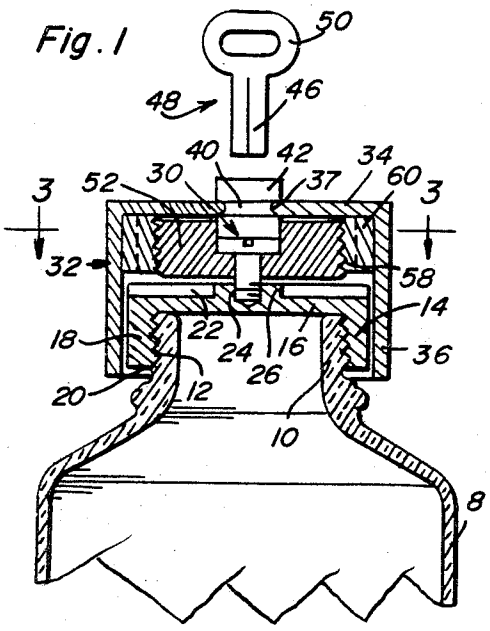


Fig. 2

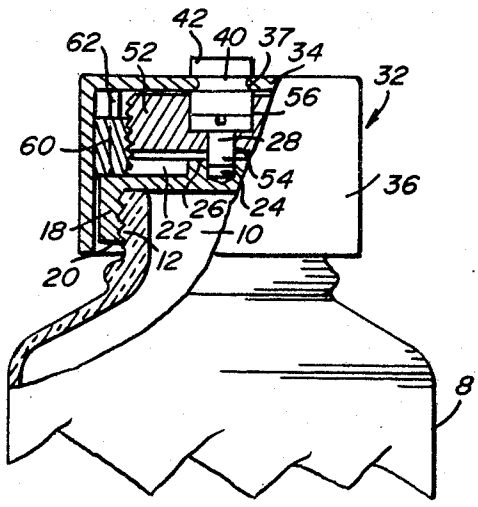


Fig. 4

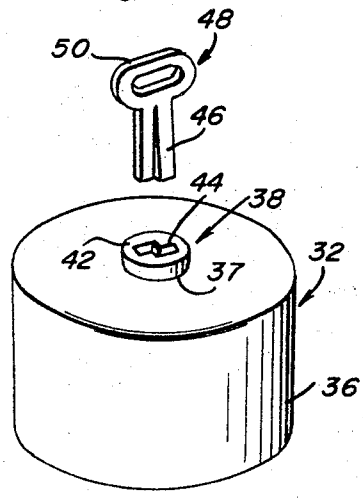


Fig. 3

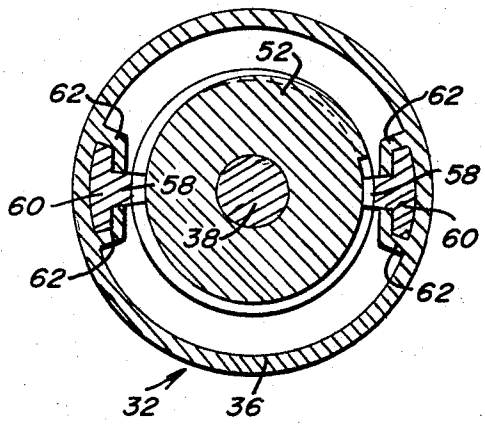
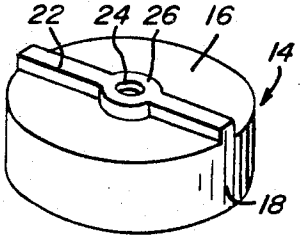


Fig. 5



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TAMPER-PROOF POISON BOTTLE CLOSURE

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Int. Cl. B65d 55/14; E05b 65/52

ABSTRACT OF THE DISCLOSURE

The safety closure shown is adapted for use on a bottle containing poisonous drugs. An inner screw cap is shielded within the confines of a larger outer protective cap and is swivelly mounted on a journal to guard against unauthorized use. This journal has a keyhole slot for a key in the hands of an authorized user. The journal not only couples the caps, it operates concealed means between the caps and converts rotary into reciprocatory motion imparted to an unscrewing rib atop the inner cap.

This invention relates to certain new and useful improvements in a tamper-proof closure which is expressly designed and effectually adapted for use on the screw-threaded neck of a bottle which when in use contains poisonous medicines, dangerous drugs and the like and has to do, more particularly, with a screw-type inner cap protectively housed or sheated in a proportionally enlarged outer cap and wherein key controlled means between the caps reliably prevents unauthorized removal of the closure.

Countless accidents, many of which are fatal, are repeatedly traceable to unwary children who get hold of easy-to-open drug and medicine bottles and swallow the contents. It is true, of course, that in addition to warnings and care exercised by parents and others, many patented inventions, which have to do with safety closures, have been devised with a view toward preventing unauthorized use of poisons. Despite such precautious efforts it appears that prior art safeguarding closures have not met with widespread adaptation and use. Accordingly, the principal objective in the instant matter is to provide a closure which constitutes a unique self-contained adaptation and well serves the purposes for which it has been devised particularly in that it requires the use of a key before the screw cap can be turned and detached.

Briefly, the innovation herein offered with a view toward coping with and better solving this perplexing problem comprises two basically similar caps, the smaller one of which is the inner main cap and is similar, generally speaking, to an ordinary screw cap except that the top surface of the lid portion has an integral upstanding cap turning rib and, in addition, a nut at the central portion of the rib for the stem of a screw-threaded headed fastener. This fastener serves to swivelly mount a marginally threaded collar which provides a rotary gear-like pinion. This pinion transmits rotary motion to diametrically opposite rack-equipped reciprocable slides which are shiftably keyed in paired track-like guides which are properly located and fixed on the interior of the rim of the larger outer cap. This outer cap shields and conceals the inner cap as well as the pinion and paired uniquely performing rack-equipped slides which, in turn, actuate the rib-equipped inner cap and serve to twist, unscrew and remove the same. Novel key-controlled means regulates the predetermined function of (1) the outer cap and (2) the pinion.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIG. 1 is a view showing a fragmentary portion of a so-called poison container in bottle form having a screw-threaded neck and showing the improved self-contained tamper-proof closure with the key and other components appearing in elevation.

FIG. 2 is a view similar to FIG. 1 with the bottle appearing partly in elevation and which differs in that the key operated means (key not shown) shows the inner cap rib engaging and actuating slides or abutments engaging the rib.

FIG. 3 is a horizontal section taken on the plane of the section line 3—3 of FIG. 1 looking in the direction of the arrows.

FIG. 4 is a view in perspective of the outer cap with the key included.

And FIG. 5 is a view in perspective of the improved inner cap.

Referring first to FIGS. 1 and 2 the container is illustrated in the form of a bottle such as is commonly used to contain poisonous compounds and dangerous drugs. The bottle is shown at **8** and is provided with a neck **10** having external screw-threads **12**.

The inner cap is denoted by the numeral **14** and comprises, as usual, a disk-like lid portion **16** and a depending annular rim portion **18** which as shown in FIGS. 1 and 2 is provided with screw-threads **20** engageable with the threads **12**. This cap is distinct and different in that the top surface of the lid portion **16** is provided with a cap turning rib **22** which extends across the surface and is provided at its center with a component part which is internally screw-threaded at **24** and is conveniently designated as a nut **26**. This nut serves to accommodate the threaded end portion of the shank **28** of the screw-threaded headed fastener **30**. This fastener **30** serves in a manner to be more specifically set forth.

Taking up now the complemental outer cap this is denoted generally by the numeral **32** and is larger than and complemental to the inner main cap **14** and is differentiated as the protective auxiliary cap. It also comprises a disk-like lid portion **34** provided with a suitable depending skirt-like rim **36** which is amply deep to house and enclose the inner main cap **14** when the two caps are interrelated or assembled as shown in FIGS. 1 to 3. The central or axial portion of the lid portion is provided with a hole of a prescribed diameter and whose lip or edge portion is convexly rounded as denoted at **37**. This hole serves to accommodate a component part which is conveniently designated here as a key actuated and assembling journal **38**. The journal constitutes a cylindrical hub-like member which is provided between its upper and lower ends with an encircling groove **40** to accommodate the lip **37** and to provide a free swivelling connection between the outer cap **32** and the complemental assembling journal **38**. The projecting upper end portion **42** is provided with a keyhole slot **44** which is of a shape to accommodate the shank **46** of the special purpose key **48**. The key is also provided with an appropriate fingergrip **50**. It will be understood in this connection that the key **48** is designed and adapted for use only by an authorized person usually an adult who should keep the key in an available place and know how to use it.

The mechanism or means within the confines of the available space between the lid portions **16** and **34** of the caps is shown in detail in FIGS. 1 to 3. A first component part is here designated as a disk-like collar **52**. This collar is of the cross-sectional thickness and diameter shown in FIG. 1 in particular and has an axial bore **54** and also a counterbore **56**. The bore **54** serves to accommodate the shank **28** of the headed fastener and the head of the fastener is seated in the counterbore. It

should be noted that the threaded shank of the fastener bottoms in the screw-threaded socket **24** of the nut before the head binds on the shoulder at the bottom of the counterbore thereby connecting the collar **52** to the inner cap while at the same time permitting it to swivel freely. The lower cylindrical portion of the journal is fitted telescopingly and retentively in the counterbore so that when the key **48** is inserted and the journal is turned a turning motion is imparted to the collar. The peripheral portion of the collar is provided with threads and therefore the collar, for sake of distinction, is referred to as a rotary motion-transmitting pinion. The threads on the pinion are meshed with companion threads or teeth **58** which are provided on the ribs carried by the block-like slides **60**. The ribs are designated as racks and thus a simple rack and pinion action is attained. The block-like slides **60** also constitute actuators or abutments and are reciprocable in paired tracks **62** (FIG. 3) which are carried by the interior surface of the outer cap and provide guideways for the blocks. These blocks are also referred to as projectable and retractable and are shown in their released retracted positions in FIG. 1 and in their projected inner cap unscrewing positions in FIG. 2.

In use and as is evident, the inner and outer caps **14** and **32**, respectively, are shown in normal relation in FIG. 1 at which time the projectable and retractable rib-abutting inner cap actuating slides **60** are retracted. It follows too that the outer cap **32** is free to swivel around the grooved journal **38** and rotating the same has no effect on the motion transmitting means between the two caps. Any effort by an unauthorized person (a child or an unwary elderly person for example) would result in a waste of time and energy. An authorized person having the key **48** in hand need only to insert the key in the keyhole **42**, hold the outer cap **32** against rotation, and turn the key in the proper direction. Having done so, the rack and pinion means (**58** and **52**) comes into play. Accordingly, the actuating abutments ride down and assume the position shown in FIG. 2, whereby the inner ribbed cap **14** can be unscrewed and removed. Whoever possesses the key and knows what to do can achieve the end result desired. On the other hand, the closure in the hands of an unauthorized person stays put.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A tamper-proof closure for a poison or dangerous drug container, a neck-equipped bottle for example, said closure being openable only by an authorized person provided with a prescribed key and comprising, in combination, an inner screw-type main cap capable of being screwed on said neck in a customary manner, said cap being structurally unique in that the lid portion thereof is spanned by an upstanding cross-rib by way of which the cap can be twisted and thus unscrewed, an outer auxiliary companion cap also embodying a lid portion having a deep depending annular rim encompassing the rim of said main cap, said lid portion being spaced vertically above and being parallel to the lid portion of said main cap, key controlled means assembling and connecting the respective lid portions together and permitting the outer auxiliary cap to swivel freely without turning the main cap, and reciprocable means confined in the space between said caps capable of transmitting rotary motion to said inner cap, said reciprocable means embodying normally retracted projectable and retractable cap-turning abutments which when cooperatively projected in a predetermined manner serve to abut said cross-rib, said abutments being capable of turning through an orbital path, whereby to act on the rib and unscrew said inner cap.

2. The closure defined in claim **1**, and wherein said key controlled means embodies a hub-like collar which is sandwiched between the respective lid portions of said inner and outer caps, said collar having means at its axial center separably and swivelly joined to an axial portion of the lid portion of said inner cap.

3. The closure defined in claim **1**, and wherein said key controlled means embodies a hub-like collar which is sandwiched between the respective lid portions of said inner and outer caps, said collar having means at its axial center separably and swivelly joined to an axial portion of the lid portion of said inner cap, said last-named means including an axially located upstanding multipurpose journal which is axially fixed to said collar and is provided in an upper exposed end with a keyhole designed to fittingly receive an authorized key, said journal having an encircling groove providing a headed neck, the central axial part of the lip portion of said outer cap having a journal accommodating hole having a convexly rounded edge conformingly seated in said groove in a manner to swivelly couple said outer cap to said collar and consequently to said inner cap.

4. The closure defined in and according to claim **3**, and wherein said collar is disk-like in plan and is of a diameter that its outer peripheral edge is spaced concentrically from the rim of said outer cap and is provided with encircling screw threads whereby to provide a rotary pinion, said abutments being slidingly mounted on the interior surface of the rim of said outer cap and being provided with toothed reciprocable ribs with which the threads on said collar are operatively engaged.

5. The closure defined in and according to claim **3**, and wherein said collar is disk-like in plan and is of a diameter that its outer peripheral edge is spaced concentrically from the rim of said outer cap and is provided with encircling screw threads whereby to provide a rotary pinion, said abutments being slidingly mounted on the interior surface of the rim of said outer cap and being provided with toothed reciprocable ribs with which the threads on said collar are operatively engaged, said interior surface being provided at diametrically opposite portions with spaced guides providing guideways, said abutments comprising shoe-like blocks defining slides which are keyed slidingly in their respective guideways, said ribs being integral component portions of said blocks and constituting toothed racks and said pinion serving to actuate the racks and, in so doing, sliding said blocks toward or from said cross-rib for engagement therewith or disengagement therefrom, as desired.

6. For use on a screw-thread neck of a poisonous medicine and drug bottle, a substantially tamper-proof safety-type self-contained closure comprising, in combination, a main inner screw cap designed and adapted to be screwed on said neck, said cap embodying a disk-like lid portion and a screw-threaded rim portion, the top of said lid portion having an upstanding cross-rib capable of imparting rotation to said cap, said rib being provided at its axial center with a screw-threaded socket providing a nut, a disk-like collar parallel with and spaced slightly above said rib, said collar having an axial bore and a complemental counterbore, a bolt having a head clampingly seated in said counterbore and a threaded shank passing through said bore and screwed into said nut and swivelly mounting said collar above said rib, the outer peripheral edge of said collar having encircling threads and constituting a rotatable pinion, an outer auxiliary cap complemental to said inner cap and likewise embodying a disk-like lid portion overlying the top of said collar and a relatively deep depending annular rim encompassing the rim of said inner cap, said rim being provided on its interior with paired guide tracks defining diametrically opposite guideways, shiftable abutments slidable in said guideways, said abutments being projectable and retractable, normally retracted within the confines of said outer cap and capable of being projected and operatively engaged with said cross-rib, said abutments having op-

posed parallel toothed ribs providing companion racks, the threads on said pinion being operatively in mesh with the teeth on said racks so that turning the pinion functions to project and retract the abutments, and assembling means operatively joining the lid portion of said outer cap with said collar.

7. The combination defined in and according to claim 6, and wherein said last-named means comprises an axially located upstanding hub-like journal having an inner end telescoping into and fixed in said counterbore, said journal having a circumferentially grooved outer end defining and providing a headed outer cap assembly neck, the lid portion of said outer cap having an axially located hole, said headed neck extending outwardly through and beyond said hole, the edge of said hole being convexly

rounded and cooperatively seated in said groove, whereby to swivelly retain said outer cap.

8. The combination defined in claim 7, and wherein the outer end portion of said journal is provided with a readily accessible keyhole slot.

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GEORGE T. HALL, *Primary Examiner.*

U.S. Cl. X.R.

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