United States Patent

Turner

[15] **3,690,495**

[45] **Sept. 12, 1972**

[54] **SECURITY CLOSURE FOR A SCREW TYPE CONTAINER**

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[52] **U.S. Cl.** ..... **215/9,** 215/43 A
[51] **Int. Cl.** **B65d 55/02**
[58] **Field of Search** ..... 215/9, 43 A

[56] **References Cited**

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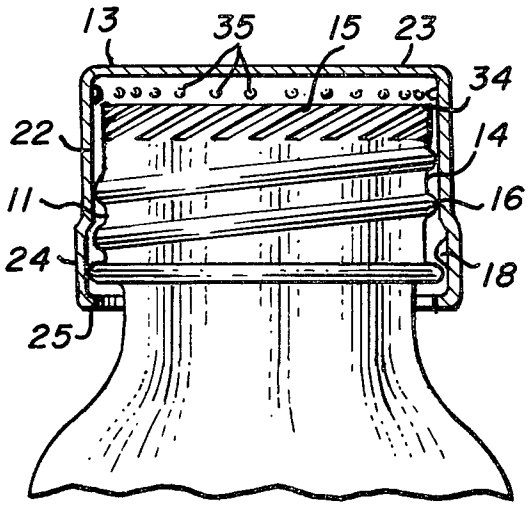
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Primary Examiner—Joseph R. Leclair
Assistant Examiner—Stephen P. Garbe

[57] **ABSTRACT**

A common twist or screw on cap for a bottle or like container is converted to a security closure by the addition of a rigid cover member, which may be moved up and down between two axial positions. In one position, the closure is secured because the cover member will rotate freely in either direction without turning the cap. In the other position, closure is non-secured because a band of parallel knurling on the side of the cap is aligned with and engaged by a complementary band of knurling on the inside surface of the sidewall of the cover member such that rotation of the cover member will be transmitted to rotate the cap. The cover member may be snapped axially from the non-secured position to the secured position and vice versa. Alternatively, the knurling may extend diagonally within the bands whereby the cover member will be automatically cammed into the engaged position when turned in one direction, and into the disengaged position when turned in the opposite direction. In this embodiment, the closure may be removed by both twisting and pressing the cover member axially downwardly at the same time.

1 Claim, 5 Drawing Figures



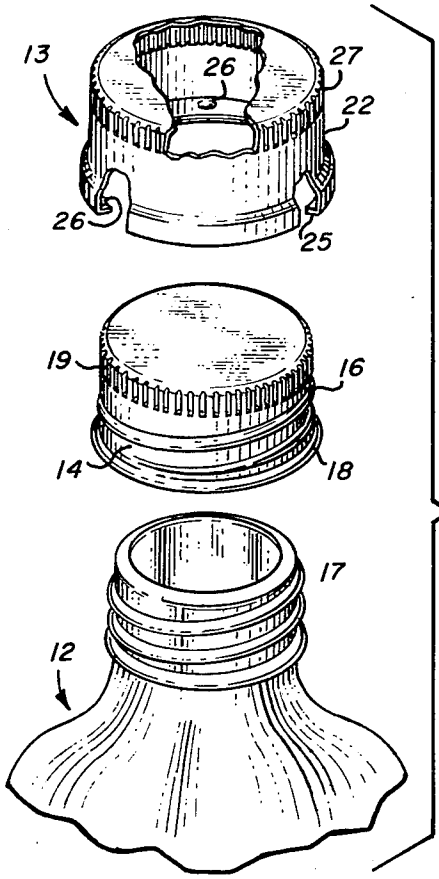


Fig_1

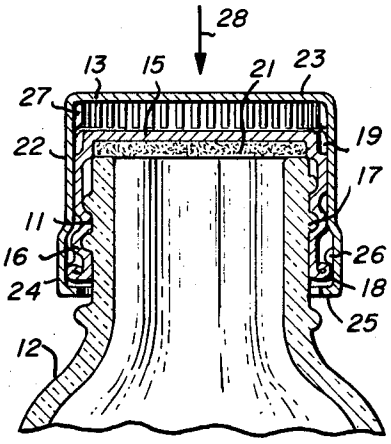


Fig_2

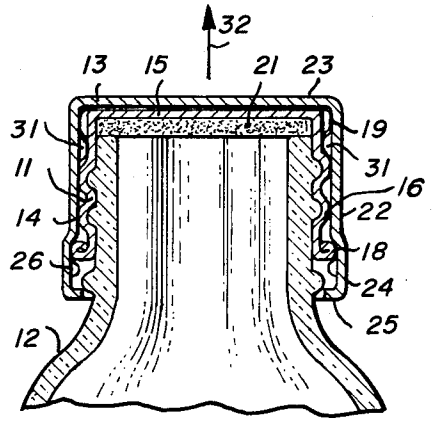


Fig_3

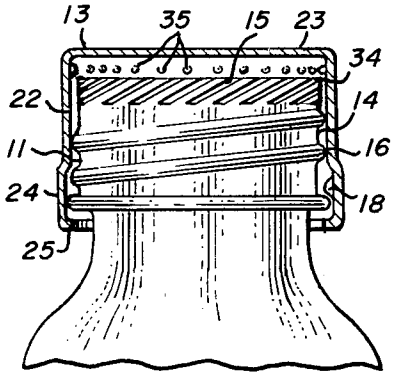


Fig_4

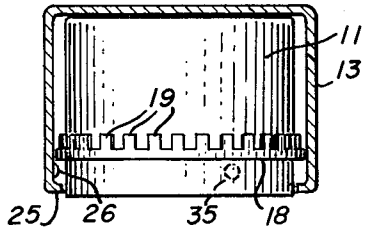


Fig_5

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SECURITY CLOSURE FOR A SCREW TYPE CONTAINER

BACKGROUND OF THE INVENTION

This invention relates to security or safety closures for bottles or other containers for the storage of drugs, medicines and other potentially dangerous substances.

In households having small children, the storage of certain hazardous substances may present a problem. Drugs, medicines and other toxic household products are usually placed out of the normal reach of children. However, children have been known to gain access to the containers one way or another; and therefore, it is desirable to provide further protection for preventing the contents of such containers from actually coming into the hands of small children.

Presently, twist off or screw type closures are molded of plastic or are formed from sheet metal which may be stamped into a cup shape with generally cylindrical side walls and with one end closed. Threads are formed in the cylindrical side walls for engagement with complementary threads on the container. The lower end of a metal cap is sometimes rolled or otherwise formed into a bead having a somewhat enlarged diameter; and a band of knurling is pressed into the cap around the upper part of the cylindrical side walls.

It is an object of this invention to provide an improved safety or security closure for a standard screw type container which may be easily removed by an adult, but which will inhibit removal by small children who might gain access to the container.

It is a further object to provide an improved security closure wherein the present day screw off or twist type caps may be used with little or no modification thereto; and more particularly, it is an object to provide a cover member that may be combined with such a cap to provide a complete security system.

It is another object to provide an improved closure for a container which may be optionally used as a security closure or as an ordinary non-security closure according to the wishes of the user.

It is a still further object to provide an improved security closure for a screw type container that will automatically assume a secured condition, and that will require a special axial pressure to be exerted when the closure is unscrewed from the container.

SUMMARY OF THE INVENTION

According to this invention, a security closure includes a bottle cap of conventional design and a cover member surrounding the cap. When secured, the cover member will rotate freely about the cap such that the cap cannot be unscrewed. If moved axially to a non-secured position, the cover member engages knurling on the side of the cap whereby the cap may be unscrewed by rotation of the cover member. Conventional bottle caps have knurling consisting of parallel ridges and grooves extending axially or vertically as the container stand upright with the cap thereon. If the knurling includes ridges and grooves extending diagonally, a cam action will cause the cover member to move automatically to the secured position when an attempt is made to unscrew the closure from the container in the usual manner.

DESCRIPTION OF THE DRAWINGS

The various features and advantages of the security closure of this invention will become apparent upon consideration of the following description taken in connection with the accompanying drawings of certain exemplary embodiments of this invention. The views of the drawings are as follows:

FIG. 1 is an exploded view of a container with the security closure of this invention thereover; the individual parts are shown in perspective, and the cover member is shown partially broken away to reveal the structure of the interior;

FIG. 2 is a vertical sectional view of the security closure shown in FIG. 1;

FIG. 3 is a vertical sectional view of another embodiment of this invention; and

FIG. 4 is a vertical view of yet another embodiment of this invention wherein the outer cover member is shown in section, and the underlying cap and container are shown in full face; and

FIG. 5 is a vertical view of a further embodiment of this invention wherein the cover member is in section and the cap is in full face.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

As shown in the drawings, the security closure of this invention includes a twist cap **11** which screws onto a container **12**, and which is surrounded by a cover member **13**. For purposes of this patent application, it will be assumed that the container **12** is standing upright with the cap **11** and the cover member **13** thereover. Thus the cap **11** and the cover member **13** will have respective top and bottom parts as related to the upright positioning thereof; and the cover member may be said to move "up" or "down" to designate opposite axial movements as the assembly stands in the normal upright position.

The cap **11** as shown in FIGS. **1** and **2** may be essentially the same as present day non-security screw-on type caps. This cap **11** is cup shaped and may be formed from a plastic or sheet metal with generally cylindrical side walls **14** and a top panel or endwall **15**. Threads **16** are formed in the cap **11** to be complementary to and mate with threads **17** formed on the container **12**. In most standard metal caps, a bead of enlarged diameter **18** is normally formed by rolling back the bottom of the side wall **14**. A band of knurling **19** is also normally formed around the side wall **14** below the corner or point where the side wall **14** joins the top panel **15**. The knurling **19** comprises parallel ridges and grooves extending vertically or axially. A pad **21** of yieldable material such as cork, paper or plastic is inserted into the cap **11** to form a gasket or liner between the top panel **15** of the cap **11** and the upper edge or lip of the container **12** (see FIG. **2**). It will be appreciated that the cap **11** and the container **12** may be similar in all respects to present day twist type or screw on caps and containers. The addition of the cover member **13** converts this assembly into a complete security system.

The cover member **13** may be cup shaped and formed of rigid plastic or sheet metal similar to the cap **11** and will include generally cylindrical side walls **22** and a top panel **23**. The lower part of the side walls **22**

is formed to a larger diameter 24; and the bottom 25 of the cover member 13 is curled inwardly over the enlarged bead 18 of the cap 11. This curled in bottom 25 limits the vertical or axial movement of the cover member 13, and prevents the cover member from being removed over the enlarged bead 18 of the cap 11. The height of the enlargement 24 provides the limits of vertical movement of the cover member 13. This enlargement 24 encloses the enlarged diameter bead 18 of the cap 11, such that the cover member 13 may move upwardly and downwardly over the cap 11 to the extent that the bead 18 may move within the enlargement 14. Obviously, the parts may be reversed whereby a bead may extend inwardly from the cover member 13 into a space of reduced diameter on the side walls 14 of the cap 11.

Inward protrusions or indentations 26 are pressed into or otherwise formed on the side walls 22 of the cover member 13. There may be one continuous protrusion or three or four small protrusions spaced about the inside surface of the enlarged diameter side walls 24. The protrusions 26 will contact the bead 18, and will tend to hold the cover member 13 from moving either upwardly or downwardly. However, this holding action of the protrusions 26 will be impositive such that the cover member 13 may be forced into axial movement, but will then snap to a new position. Therefore, the indentations or protrusions 26 actually provide a snap action as the cover member 13 is moved from one vertical position to the other. The cover member 13 will snap from the upper position to the lower position, and likewise will snap from the lower position to the upper position. In each case, the protrusions 26 will move over the bead 18 and will settle quickly and with a snap on the other side thereof.

The cover member 13 is formed with a band of parallel ridges and grooves 27 which are complementary to the band of parallel knurling 19 of the cap 11. As shown in FIGS. 1 and 2, the band of ridges and grooves 27 is at the upper part of the side walls 22. FIG. 2 shows the cover member 13 moved upwardly into a secured position. In this secured position, the band of ridges and grooves 27 is above and is disengaged from the knurling 19 of the cap 11. With the band of ridges and grooves 27 disengaged from the band of knurling 19, the cover member 13 may rotate freely with respect to the cap 11. Therefore, in the secured position, the cap 11 cannot be rotated or unscrewed, and the closure will remain intact upon the container 12 even though the cover member 13 is turned. As indicated by an arrow 28, the cover member 13 may be moved or snapped downwardly with respect to the cap 11, whereupon the band of ridges and grooves 27 will align with and engage the band of knurling 19, and the closure will be in the non-secured position. In the non-secured position, any rotation of the cover member 13 will be transmitted to rotate the cap 11; and therefore, the cap 11 may be unscrewed from the bottle or other container by turning the cover member 13.

The embodiment of FIG. 3 is similar in many respects to the embodiment described above in connection with FIGS. 1 and 2. The cover member is formed with an enlarged diameter 24 to accommodate the bead 18 of the cap 11 and to provide axial limits for the up and down movement of the cover member 13. Protrusions 26 will bear against the bead 18 to provide a snap action as the cover member 13 is moved axially from one position to the other. The difference in the security closure of FIG. 3 from that of FIGS. 1 and 2, resides in the relative vertical positioning of the bands of ridges and grooves 31 and knurling 19. In this embodiment, the band of ridges and grooves 31 extends circumferentially around the side walls 22 of the cover member 13, but is vertically positioned below the band of knurling 19.

As shown in FIG. 3, the cover member 13 is moved downwardly into the secured position, such that the band of ridges and grooves 31 is below and is disengaged from the band of knurling 19. As indicated by an arrow 32, the cover member 13 may be moved or snapped upwardly into the non-secured position wherein the ridges and grooves of the band 31 will engage the knurling of the band 19 to transmit rotational movement to unscrew the cap 11. It will therefore be appreciated that the embodiment of FIG. 3 is the opposite of the embodiment of FIGS. 1 and 2. In the first embodiment, the cover member 13 is moved upwardly to the secured position, while in the second embodiment the cover member is moved downwardly to the secured position. In the first embodiment the cover member 13 must be pressed down and turned to untwist the cap 11, while in the second embodiment the cover member 13 must be pulled up and turned to untwist the cap 11.

The security mode of the embodiments of this invention described above may be employed optionally or by choice of the user. In a household having small children, an adult may screw the cap 11 onto the container 12 after each use or opening thereof, and may then snap the cover member 13 axially into the secured position. In another household having no small children, the closure of these embodiments may be used continually in its engaged mode without any axial movement of the cover member 13. In that case, the closure will always remain in the non-secured position. Thus this invention provides a closure that may be secured, or remain unsecured at the option of the user.

Another embodiment of this invention is shown in FIG. 4, wherein the closure will automatically assume the secured position. As in the previous embodiments, cover member 13 surrounds a screw on a twist cap 11 shown in place on a bottle 12. The side walls 22 of the cover member 13 have a section of enlarged diameter 24 for containing the bead 18 of the cap 11, and for limiting the axial movement of the cover member 13. In this case, however, the cap 11 is formed with a band of diagonal knurling 34; and the cover member 13 is formed with a band of ridges 35 which may be small circular protrusions.

As shown in FIG. 4, the closure is in a secured position with the cover member 13 moved upwardly such that the band of protrusions 35 of the cover member 13 is disengaged from the band of diagonal knurling 34. To remove the closure, the cover member 13 is continually pressed downwardly to keep the band of protrusions 35 in alignment with the band of knurling 34 as the cap 11 is simultaneously unscrewed by turning the cover member 13. When the closure of FIG. 4 is replaced on the bottle or other container 12, it is screwed on in the usual manner. As the closure is

screwed onto the container **12**, the band of protrusions **35** engage the band of diagonal knurling **34**, and a cam action therebetween tends to move the cover member **13** downwardly towards a limit which may be established by the width of the enlargement **24**, or which may be established by the lower terminations of the grooves of the band of diagonal knurling **34**. Thus, as the closure is rotated to screw the cap **11** onto the container **12**, the cam action of the bands of protrusions and of diagonal knurling will hold the cap **11** and the cover member **13** in firm engagement with each other until the cap **11** is twisted tightly upon the container **12**.

When the closure of FIG. **4** is turned in the opposite direction for removal thereof, the cam action of the bands **34** and **35** will raise the cover member **13** to disengage the bands **34** and **35** by lifting them out of axial alignment, whereupon the closure will automatically assume the secured position. As indicated above, removal of the closure must be accomplished by pressing downwardly to counteract the upward force of the cam action. While pressing downwardly, the cover member **13** must be simultaneously rotated to unscrew the cap **11**. If the cover member **13** is already in a raised and disengaged position, it may be well to turn the cover member **13** in the direction for closure or cap tightening to properly seat the band of protrusions **35** into engagement with the band of diagonal knurling **34** prior to pressing down and turning to unscrew the cap **11**. Therefore, the closure of FIG. **4** will be automatically secured upon the container **12** when it is screwed on in a normal manner without any further stop of axial movement.

It will be appreciated that the embodiment of FIG. **4** could be further modified such that the cam action of the band of diameter diagonal knurling **34** could move the cover member **13** downwardly to a secured position rather than upwardly as is shown in the drawing. In such a modification, the band of protrusions or indentations **35** would move downwardly to an axial position of disengagement from the band of diagonal knurling **34**. To remove the closure of this modification, the cover member **13** would have to be simultaneously pulled upwardly and rotated to unscrew the cap **11**. Thus the modified version of FIG. **4** would be opposite in action to the embodiment actually shown by FIG. **4** in a manner similar to the opposite actions of the previously described embodiments of FIGS. **1** and **2** and of FIG. **3**.

A principal advantage of this invention lies in its simplicity and economy. This security closure may use the same style of screw on or twist cap which is in present use in conventional non-security closures. Only a slight change in the design of the present day screw caps would be necessary to provide a knurling of diagonal ridges and grooves in the event that the embodiment of FIG. **4** is desired. The cover members **13** are also somewhat similar to the present day caps, and similar machinery could be used with very little modification in the manufacture of the cover members.

Another feature of this invention resides in the fact that all of the operating structure is in the side walls **14** and **22** of the cap **11** and the cover member **13**. The top panel **23** of the cover member **13** contains no parts for operation of the security closure; and therefore, the top panel **23** may be made of the same material from which the side walls are formed and without deformations of any kind. Indeed, the whole structure may be formed from a single circular disk of sheet metal which is stamped into a cup shape, and then formed with the indentations and the ridges and grooves that are required, and give every indication of an ordinary metal closure.

Since the operating parts are in the side walls, the cover member could be formed in the shape of a collar or ring which would surround the side walls **14** of the cap **11**. In this case the top would be open with no panel **23** closed thereover. The open ended collar would serve well as the cover member **13** of this invention, and as such would be an alternative structure to be covered by this patent. It is to be noted that the cover member **13** is said to "surround" the cap **11**, rather than to "enclose" the cap. Thus a collar type cover member that covers only the side walls **14** of the cap **11** may "surround" the cap even though the top panel **15** of the cap remains uncovered. It is believed, however, that the top panel **23** of the cover member **13** performs a useful function in structurally reinforcing the side walls **22**. Without the panel **23** the side walls **22** could become so weakened that a person, or child, could pinch the side walls together from opposite sides to frictionally engage and untwist the cap, thereby circumventing the security features of this invention. In this invention, the side walls **22** of the cover member **13** must be restrained from being deformed to the point of frictional engagement with the cap **11**. Of course the ring or collar type cover member could be strengthened and stiffened by the use of a heavier wall thickness, but this would entail greater expense in manufacture. The collar or ring type cover member could also be strengthened and stiffened by turning a flange inwardly at the top thereof, but this structure would approach the preferred structure shown and described herein. The panel **23** could be considered to be a turned in flange of the side walls **22**. From the standpoint of economy in manufacture, it is better to keep the end wall or panel **23** than to punch it out or otherwise remove it; since the cover member will probably be formed from a disk of sheet material.

Furthermore, the panel **23** may be useful as space for a trade name and advertisement for the product enclosed by the container **12**; or for instructions of how to operate the security closure. It will be presumed that this security closure is intended to protect small preschool children who are not capable of reading and understanding the instructions which may be printed on the top panel or end wall **23**.

From the foregoing, it may be appreciated that the security closure of this invention is simple and economical to manufacture. Parts are used which are standard in present day non-security closures, and a further part is added which is inexpensive and easily mounted on the standard assembly.

FIG. **5** shows another version of this invention wherein the protrusions **26** perform dual functions of providing (1) a snap action and of (2) engaging a form of the knurling **19**. In this case, an outwardly extending bead **18** is formed circumferentially around the cap member **11**; and the knurling **19** is formed of a plurality of teeth extending upwardly from the bead **18**, and

spaced uniformly around the cap **11**. As shown in FIG. **5**, the closure is in the secured position with the protrusions **26** positioned axially below the bead **18**, and not in engagement with the teeth or knurling **19**. The closure may be placed in a non-secured position by moving the cover member **13** upwardly whereupon the protrusions **26** will settle in the spaces between the teeth or knurling **19** to lock the two members **11** and **13** together such that the combined parts may be unscrewed from a bottle or other container. The curled in bottom flange **25** will limit the upward movement of the cover member.

Obviously, the parts of the embodiment of FIG. **5** can be reversed. The knurling of teeth **19** could extend downwardly from the bead **18** in which case the upper position of the cover member **13** would be the secured position of disengagement; and the lower position of the cover member would be the non-secured position wherein the protrusions **26** engage the knurling teeth **19**. Furthermore, the bead **18** and knurling **19** could extend inwardly from the cover member **13** to engage outwardly extending protrusions from the cap **11**. The cap and cover member of FIG. **5** could be molded of a plastic material, in which case the alternative structures indicated above could be easily formed on the members **11** and **13**.

The invention is claimed as follows:

1. A security closure for a container comprising a screw cap member having generally cylindrical side walls and a cover member surrounding the cap, said screw cap having a band of knurling extending circumferentially around the side walls of the cap member, said band of knurling on the cap member comprising parallel ridges and grooves extending diagonally thereon, said cover member having a band of inwardly extending protrusions for engaging the knurling of said cap member, said band of inward protrusions on said cover member is complementary to the ridges and grooves of the knurling on said cap member, said cover member being movable axially from a non-secured position to a secured position, said band of inward protrusions being axially translated and disengaged from the band of knurling when the cover member is moved axially to the secured position whereby the cover member will rotate freely with respect to the cap member, said band of ridges and grooves being operable by cam action when said cover member is rotated about said cap member to move the cover member into the secured position wherein the band of protrusions is disengaged from the band of knurling, and wherein a simultaneous axial force and rotational force must be applied to the cover member to counteract the cam action and to unscrew the cap member from the container.

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