Jan. 5, 1965 O. W. READING 3,164,277

SAFETY BOTTLE CAP

Filed Aug. 20, 1963

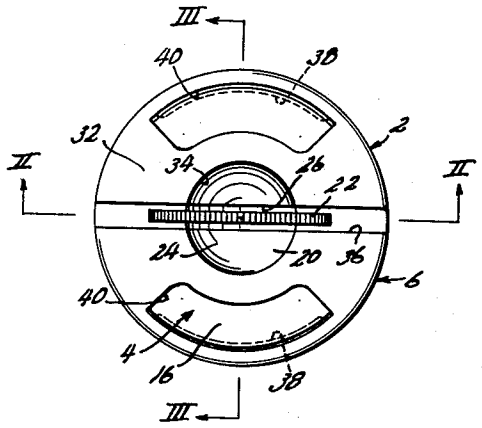


Fig. 1

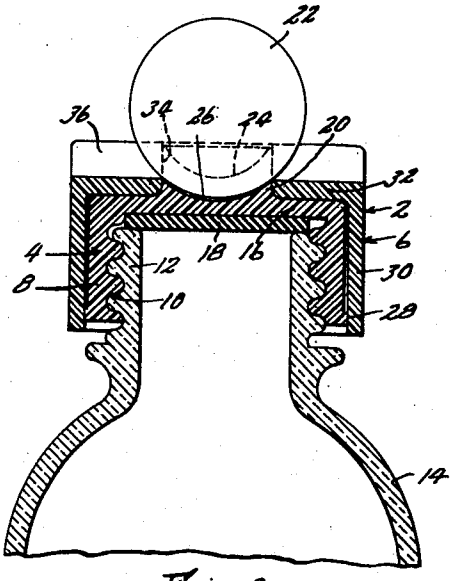


Fig. 2

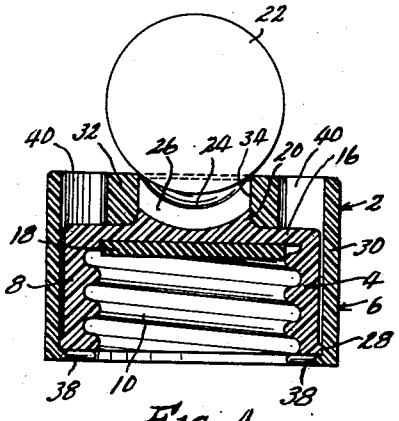


Fig. 4

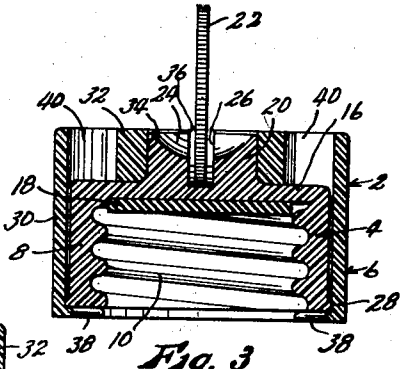


Fig. 3

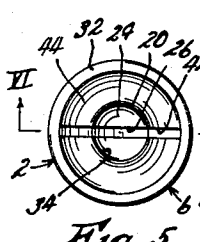


Fig. 5

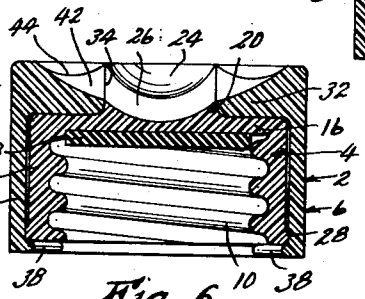


Fig. 6

INVENTOR.
Oscar W. Reading
BY
John A. Hamilton
Attorney.

United States Patent Office 3,164,277 Patented Jan. 5, 1965

3,164,277

SAFETY BOTTLE CAP

Oscar W. Reading, 126 E. Linwood Blvd., Kansas City, Mo.

Filed Aug. 20, 1963, Ser. No. 303,236
2 Claims. (Cl. 215—9)

This invention relates to new and useful improvements in bottle caps, and has particular reference to a bottle cap for use on bottles containing poisons or otherwise dangerous materials, such as certain pharmaceutical products, and has as its principal object the provision of a cap adapted to prevent accidental removal thereof and subsequent accidental usage or ingestion of the contents thereof.

The cap as contemplated by the present invention includes an inner cap adapted to be threaded tightly on a bottle neck in the manner of an ordinary cap, and an outer cap which substantially encloses and is freely rotatable on the inner cap. Thus the user cannot, by grasping the outer cap, exert sufficient torsional force on the inner cap to remove the latter from the bottle neck. The inner cap is provided with a slot for receiving the edge of a coin, whereby said coin serves as a wrench for turning the inner cap. The obtaining of the coin and its usage are of course conscious actions of the user requiring a degree of alertness and concentration, and thus serve as an effective reminder to the user that the bottle contains a dangerous substance, and that its use should first be carefully checked and verified.

As a further safety precaution, the outer cap shields the inner cap coin slot, and the adjacent parts of the inner and outer caps are so shaped, that no coin can be engaged in the slot of the inner cap until a corresponding slot of the outer cap is aligned therewith. This is a visual operation which cannot easily be performed in the dark. Since the user must therefore work in the light, this provision further reduces the possibility that the user might be deceived, for example, when removing a bottle from a medicine cabinet at night.

Still another object is the provision of a safety bottle cap of the character described in which the inner cap may be utilized as an ordinary cap when so desired, and the outer cap simply snapped over the inner cap when the contents of the bottle are such as to indicate the use of a safety cap.

Other objects are simplicity and economy of construction, efficiency and dependability of operation, and adaptability for use in a wide variety of applications.

With these objects in view, as well as other objects which will appear in the course of the specification, reference will be had to the accompanying drawing, wherein:

FIG. 1 is a top plan view of a safety bottle cap embodying the present invention, with a coin shown in operative relationship thereto,

FIG. 2 is a sectional view taken on line II—II of FIG. 1, showing the cap mounted on the neck portion of a bottle,

FIG. 3 is a sectional view taken on line III—III of FIG. 1,

FIG. 4 is a view similar to FIG. 2, but with the outer cap rotated about 90 degrees from the position shown in FIG. 2,

FIG. 5 is a reduced view similar to FIG. 1, but showing a slightly modified form of construction, and

FIG. 6 is an enlarged sectional view taken on line VI—VI of FIG. 5.

Like reference numerals apply to similar parts throughout the several views, and in FIGS. 1–4, the numeral 2 applies generally to a safety bottle cap forming the subject matter of the present invention, said cap including an inner cap 4 and an outer cap 6, both formed of molded plastic or other suitable material. Inner cap 4 has a cylindrical side wall 8 which is internally threaded as at 10 for engagement with the correspondingly externally threaded neck portion 12 of a bottle 14, and an integral end wall 16 which overlies the bottle mouth, said end wall being provided with a liner 18 of rubber, cork or the like which seals the mouth of the bottle when the inner cap is screwed on the bottle neck, as shown in FIG. 2.

A cylindrical post 20 is formed integrally with end wall 16, being concentric with said end wall and projecting outwardly therefrom so as to be coaxial with side wall 8. For reasons which will presently appear, the diameter of said post is substantially smaller than the diameter of the smallest U.S. coin in circulation, namely the dime. A dime is indicated by the numeral 22. The outer end of the post is spherically recessed as indicated at 24, said recess extending over the entire end area of said post, and the radius of curvature of said recess being less than the radius of a dime. Said post also has a slot 26 formed diametrically in the outer end thereof, said slot extending to a substantially greater depth than recess 24, and having a thickness sufficient not only to admit a dime, but also to admit the edge of the thickest U.S. coin in circulation, namely a silver dollar. Side wall 8 is provided with a narrow peripheral rib 28 at the lower edge thereof.

Outer cap 6 includes a cylindrical side wall 30 and an integral end wall 32. Side wall 30 is disposed loosely about side wall 8 of the inner cap, the internal diameter of said outer cap being such as to engage rib 28 of the inner cap with a light frictional contact, for a purpose which will presently be described. End wall 32 of the outer cap rests rotatably on end wall 16 of the inner cap, and has a circular hole 34 formed centrally therethrough for receiving post 20 of the inner cap rotatably therein. The thickness of end wall 32 is equal to or slightly greater than the axial length of post 20, so that the outer end of said post is flush with or slightly below the level of the outer surface of said end wall, as shown. A slot 36 is formed diametrically in the outer surface of end wall 32, so as to be movable into or out of registry with slot 26 of post 20 by rotating the outer cap on the inner cap. Slots 26 and 36 may both be about 0.1 inch thick, so as to admit any coin up to and including a silver dollar. Side wall 30 of the outer cap extends below the side wall 8 of the inner cap, and is provided in said extended portion with a pair of diametrically opposed lips 38, each of about 90 degrees angular extent. The internal diameter of lips 38 is less than the diameter of rib 28 of the inner cap, so as to hold the inner and outer caps in assembly with each other. However said lips are rounded, and the outer cap material is sufficiently elastic that the caps may be assembled by pressing the outer cap firmly down over the inner cap so that lips 38 are expanded and snapped over rib 28. The diametrically opposed annular slots 40 formed in end wall 32 of the outer cap, in

angularly offset relation from slot 36, are solely for the purpose of permitting withdrawal of die parts used to form the lips 38 of the outer cap during manufacture thereof, and have no function in the operation of the completed cap.

In the use of the cap, the light frictional engagement of the outer cap with rib 28 of the inner cap permits the inner cap to be turned by turning the outer cap, but only with a very small turning torque. Thus the cap may be applied to the bottle and turned till liner 18 lightly touches the bottle neck, without the use of a coin such as dime 22. Likewise, while the initial loosening of the cap requires use of a coin, the cap may thereafter be turned the rest of the way off of the bottle neck without the use of a coin. This is a substantial convenience, since the use of a coin to turn the cap through the entire plurality of turns required would be tedious and irksome to the user.

Since the post 20 is of smaller diameter than the smallest coin, a dime, and since the radius of curvature of recess 24 is smaller than that of a dime, it will be apparent that no coin can be engaged in slot 26 unless slot 36 is aligned therewith. If, as in FIG. 4, the coin is aligned with post slot 26 but not with outer cap slot 36, then the coin is supported by the edge of outer cap 6 which bounds hole 34 thereof, and is thereby prevented from engaging the post slot. If the coin is aligned with the outer cap slot but not with the post slot, the coin is supported by the lip of the post surrounding recess 24, and is thereby prevented from engaging the outer cap slot. This is also true with any larger coin, up to and including a silver dollar. Furthermore, for the reasons stated above, it will be seen that the coin actually enters both slots simultaneously and cannot engage the one before the other. For this reason, the slots cannot be aligned in the dark by the process, for example, of engaging the coin by touch in the slot 36, then using the coin to turn the outer cap till the coin could fall into slot 26. Thus the alignment of the slots is necessarily a visual process which must be done in the light. This is an additional safety feature, since the fact that the user must turn on a light and exercise a degree of visual concentration greatly reduces any possible chance that he might confuse one bottle with another, even if both were equipped with safety caps.

Finally, it will be seen that a valuable economy is effected by the fact that inner cap 4 may be utilized as an ordinary cap in the absence of outer cap 6. Thus a pharmacist or pharmaceutical manufacturer, who would be among the principal users of a safety cap of the type disclosed, could use simply the inner cap if the contents of the bottle were such as not to require the protection of a safety cap, but could snap an outer cap over the inner cap if the bottle contents did require such protection. This could be done after the inner cap was screwed tightly onto the bottle neck.

With the structure shown in FIGS. 1–4, there is the possibility, though perhaps remote, that a user might operate the cap in the dark by first inserting a coin in one end portion of outer cap slot 36, entirely to one side of post 20, then using the coin to turn the outer cap until the coin could fall into post slot 26. While this is a somewhat meticulous operation and probably could not be performed without the desired warning being impressed on the user's consciousness, it is prevented by the modified structure shown in FIGS. 5 and 6.

The species of the cap shown in FIGS. 5 and 6 is identical to that shown in FIGS. 1–4, corresponding parts being indicated by corresponding numerals, except for the treatment of end wall 32 of outer cap 6. Firstly, the arcuate slots of said end wall as shown in FIGS. 1–4 are omitted. Lips 38 may be formed by some process other than the internal withdrawal dies utilizing said slots, as for example by adding said lips by some suitable process after the outer cap is otherwise completed. Secondly, the diametrical coin slot 42 of the outer cap in FIGS. 5 and 6, which corresponds to slot 36 of FIGS. 1–4, terminates at each end

short of the outer periphery of said outer cap. Thirdly, an annular recess 44 is formed concentrically in the outer surface of end wall 32. The inner diameter of recess 44 corresponds to the diameter of hole 34, and the outer diameter of the recess is at least as great as the total length of slot 42, so that said slot does not extend through the outer edges of the recess. In cross-sectional contour, recess 44 is arcuately concave, the radius of curvature thereof being less than that of a dime.

Thus in the FIG. 5–6 species, it will be apparent that in addition to the fact that no coin can engage post slot 26 unless slots 26 and 42 are aligned, for the same reasons as in the FIG. 1–4 species, it is also true that no coin can engage in either end portion of slot 42 unless the slots are aligned. Any attempt to do so would result in the fact that said coin would be supported at the inner and outer edges of recess 44, and could not reach the base of the recess to engage slot 42. Even if said coin were precisely aligned with slot 42, the coin would then be supported at the outer edge of recess 44 and by the lip of post 20, unless slot 26 were also aligned with slot 42. Thus it becomes doubly difficult to insert a coin without first aligning the slots visually, and hence even more necessary that the operation be performed in the light, and less likely that one bottle could be confused with another.

While I have shown and described certain specific embodiments of my invention, it will nevertheless be readily apparent that many minor changes of structure and operation could be made without departing from the spirit of the invention as defined by the scope of the appended claims.

What I claim as new and desire to protect by Letters Patent is:

1. A safety bottle cap comprising:
(*a*) a cup-shaped inner cap adapted to engage and seal the neck of a bottle and including:
(1) a cylindrical side wall,
(2) a generally planar end wall, and
(3) a cylindrical post attached to and extending outwardly from said end wall in coaxial relationship with said side wall, said post having a slot formed diametrically therein and opening through the outer end and sides thereof, the entire area of the outer end of said post being recessed, and
(*b*) a cup-shaped outer cap including:
(1) a cylindrical side wall encircling the side wall of said inner cap and being rotatable thereon, and
(2) a generally planar end wall overlying the outer surface of the end wall of said inner cap and being rotatable thereon, the end wall of said outer cap having a circular hole formed centrally therein in which said post rotates, said post extending generally flush with the outer surface of said outer cap end wall, said outer cap end wall having a slot formed diametrically in the outer surface thereof in intersecting relation with said hole, and adapted to be moved into and out of angular alignment with the slot in said post by relative rotation of said inner and outer caps.

2. A safety bottle cap comprising:
(*a*) a cup-shaped inner cap adapted to engage and seal the neck of a bottle and including:
(1) a cylindrical side wall,
(2) a generally planar end wall, and
(3) a cylindrical post attached to and extending outwardly from said end wall in coaxial relationship with said side wall, said post having a slot formed diametrically therein and opening through the outer end and sides thereof, and
(*b*) a cup-shaped outer cap including:
(1) a cylindrical side wall encircling the side wall of said inner cap and being rotatable thereon, and
(2) a generally planar end wall overlying the outer

surface of the end wall of said inner cap and being rotatable thereon, the end wall of said outer cap having a circular hole formed centrally therein in which said post rotates, said post extending generally flush with the outer surface of said outer cap end wall, said outer cap end wall having a slot formed diametrically in the outer surface thereof in intersecting relation with said hole, and adapted to be moved into and out of angular alignment with the slot in said post by relative rotation of said inner and outer caps, the slot in said outer cap terminating at both ends short of the peripheral edge of said outer cap end wall, said outer cap end wall having an annular

recess formed therein surrounding the hole thereof, the inner diameter of said annular recess corresponding to the diameter of said hole and the outer diameter thereof being at least as great as the length of said outer cap slot.

References Cited by the Examiner

UNITED STATES PATENTS

2,359,639	10/44	Hanahan	215—9
2,864,519	12/58	Crabbe	215—9
2,921,705	1/60	Dorsey	215—9
3,097,756	7/63	Dorsey	215—9

THERON E. CONDON, *Primary Examiner.*