

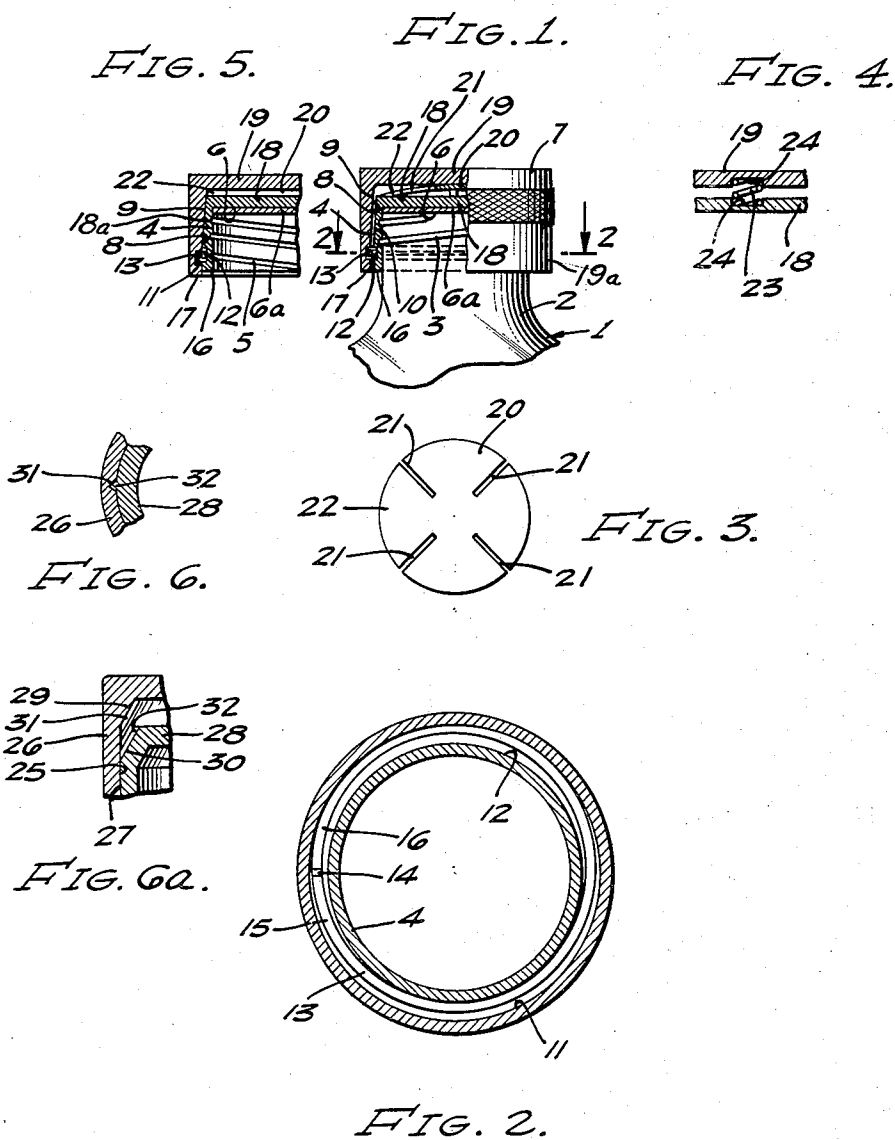
June 27, 1961

G. L. RHODES
SAFETY CAP FOR CONTAINERS

2,990,075

Filed May 27, 1955

2 Sheets-Sheet 1



INVENTOR.
GILBERT L. RHODES
BY
Francis D. Akman
ATTORNEY

June 27, 1961

G. L. RHODES

2,990,075

SAFETY CAP FOR CONTAINERS

Filed May 27, 1955

2 Sheets-Sheet 2

FIG. 7.

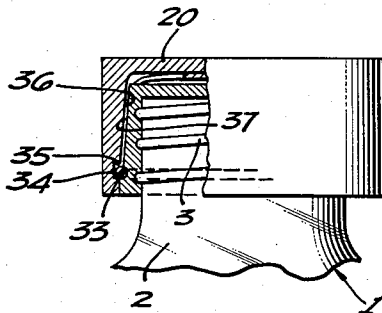


FIG. 8.

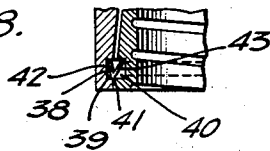


FIG. 9.



FIG. 10.

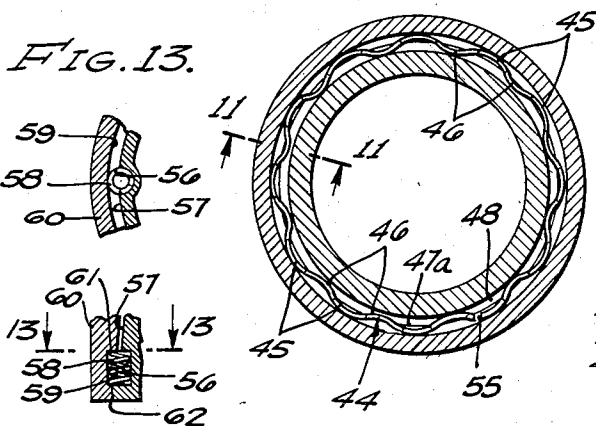


FIG. 12.

FIG. 11.

INVENTOR.
GILBERT L. RHODES

BY
Francis D. Amman

ATTORNEY

1

2,990,075
SAFETY CAP FOR CONTAINERS
Gilbert L. Rhodes, 8988 Haley Drive,
Castro Valley, Calif.
Filed May 27, 1955, Ser. No. 511,711
2 Claims. (Cl. 215—9)

This invention relates to safety means for preventing a child, or aged infirm or blind person, from gaining access to the contents of a container; or any unauthorized person, who is unacquainted with the procedure necessary to remove the container cap.

While this improvement can obviously be applied in many instances to safeguard the contents of a container of any kind, in practice it is expected to have its greatest utility when applied to a bottle cap for a medicine bottle containing a substance dangerous for a child, or a poisonous substance which should not be accessible to a child or an irresponsible person. Much publicity is given to reports of accidents to children who swallow medicine, pesticides or other toxic substances used in a household.

In other words, an object of this invention is to provide a container cap or bottle cap with features of construction which will operate so that an unusual procedure must be followed in order to effect the removal of the closure of the bottle.

Another object of the invention is to construct such a cap in such a way that it will conceal the working parts of the cap. Then there is no hint or suggestion that will be evident as to the procedure that must be followed in order to remove the cap; also to provide a device that will require strength greater than a child could use to effect the removal of the cap.

Such a device operates as a warning also, for example, if in the dark a person should grasp a bottle having this cap, because such a person will immediately become apprised of the dangerous nature of the contents of the bottle. This will be indicated by the cap being freely rotatable in either direction without effecting the opening of the bottle.

Further objects of the invention will be evident from a careful reading of this specification, and a study of the accompanying drawing.

The invention consists in the novel parts and combination of parts to be described hereinafter, all of which contribute to produce an efficient safety cap for containers.

A preferred embodiment of the invention is described in the following specification, while the broad scope of the invention is pointed out in the appended claims.

In the drawing:

FIGURE 1 is a side elevation and partial section of the upper portion of a bottle or container illustrating an embodiment of this invention.

FIGURE 2 is a horizontal cross-section taken in the plane of the line 2—2 of FIGURE 1. This view is upon a larger scale than FIGURE 1 and further illustrates the details of the connection I may employ for attaching the outer cap to the inner cap that functions as the closure for the bottle neck. This figure also illustrates the means for maintaining the outer cap of this device in a constrained position, that is, in a position in which it can be rotated freely, but will not unscrew the inner cap.

FIGURE 3 is a plan of the means illustrated in FIGURE 1 for normally holding the outer cap in the position in which it cannot move the inner cap to open it.

FIGURE 4 is a fragmentary cross-section in a vertical plane through the upper ends of the inner and outer caps, and illustrating another embodiment of resilient

2

means that I may employ for holding the outer cap in its free-rotating position.

FIGURE 5 is a fragmentary section through the side-walls of the inner, and the outer cap and showing the outer cap as though pressed down forcibly onto the inner cap to effect a frictional connection from the outer cap to the inner cap to enable it to rotate the inner cap.

FIGURE 6 is a fragmentary horizontal section through the side walls of the two caps and illustrating related means on their walls in engagement for effecting a positive driving connection between them.

FIGURE 6a is a fragmentary vertical section illustrating this positive connection means in the unengaged relation.

FIGURE 7 is a view similar to FIGURE 1 but illustrating an embodiment of the invention in which I dispense with the means shown in FIGURES 1 and 4 for maintaining the outer cap in its raised inactive position, but construct the means in the form of an elastic ring that permits limited relative longitudinal shifting movement of the outer cap so that it enables downward pressure on the outer cap, to establish a frictional connection from the outer cap to the inner cap.

FIGURE 8 is a fragmentary vertical section illustrating another embodiment in which I employ a resilient ring that yieldingly holds the outer cap in its normal elevated position but also permits the outer cap to be forced down to effect the frictional driving connection from the outer cap to the inner cap. In this case the ring has a cross-section resembling the letter V.

FIGURE 9 is a view illustrating a cross-section for the ring that may be substituted for the V-type of ring shown in FIGURE 8. In this case the cross-section of the ring has characteristics of the letter N.

FIGURE 10 is a horizontal section taken through the lower ends of the two caps at two grooves such as illustrated in FIGURE 7 and at which the two caps are shiftably interlocked together. This view illustrates the use of an interlocking ring of wavy form.

FIGURE 11 is a fragmentary view, and is a section on the line 11—11 of FIGURE 10, further illustrating the form of the locking ring illustrated in FIGURE 10.

FIGURE 12 is a view similar to FIGURE 11 illustrating another type of interlocking element that may be employed for attaching the outer cap to the inner, so that it can function to permit effecting a working connection between the outer cap and the inner cap.

FIGURE 13 is a horizontal cross-section on the line 13—13 of FIGURE 12.

Referring more particularly to the parts, and especially to FIGURE 1, in accordance with my invention the container, such as the container 1, illustrated here, should be provided with a neck 2 which is also preferably provided with a screw thread 3 to enable a closure or cap with a corresponding thread to be screwed onto it.

In this present instance the complete cap includes an inner cap 4 having a cylindrical socket provided with thread 5 to match the thread 3, and to enable the cap 4 to be screwed onto the neck, thereby enabling it to function as a closure. In the present instance the transverse face 6 of the socket seats upon the upper end of the neck 2. At this point, if desired, a gasket, 6a, illustrated, may be employed to insure a water-tight or gas-tight connection.

The complete cap includes also an outer cap 7 having a bore 8 that extends into the same from below; and this bore is of slightly larger diameter than the outer diameter of the inner cap 4. That is to say, the diameter measured over the perimeter surfaces 9 and 10 (see FIGURE 1) is small enough to enable the cap 7 to be

3

telescoped by a downward movement over the inner cap. The faces 9 and 10 are slightly tapered.

Co-ordinated means are provided between the annular apron of the outer cap and the periphery of the corresponding portion of the inner cap, functioning in such a way as to permit free rotation of the outer cap member 7 with respect to the inner cap 4. This is preferably accomplished by providing an annular groove 12 extending around the periphery of the inner cap 4.

The head 18 of the inner cap has an integral apron or skirt 18a, and the head 19 of the outer cap has a similar skirt or apron 19a.

In order to provide a connection between the two caps normally telescoped, and one that will permit free rotation of the outer cap on the inner cap, without effecting a frictional connection enabling the outer cap to unscrew the inner cap, I provide near the lower edges of the two caps, two grooves 11 and 12 respectively, as shown in FIGURES 1 and 5. In these grooves a resilient ring 13 is placed.

To facilitate assembling this ring into the grooves, 11 and 12, it is split as at 14 so that when assembling it into its position in the grooves it can be slid down over the tapered face of the inner cap and expanded slightly as it is worked downwardly by hand until it reaches the groove 12. In this operation the end portions 15 and 16 at the gap will be spread apart slightly. After which it will resume its normal diameter; after seating the ring 13 in the groove 12 then the outer cap will be telescoped down over the inner cap, and its lower end slipped down over the ring until its lower end face 16 lies substantially in the plane of the lower end face 17 of the outer cap.

But before telescoping the caps in this manner, I place resilient means between the transverse head 18 of the inner cap and the transverse disc or head 19 of the outer cap 1. This resilient means is illustrated in FIGURE 1, and preferably consists of a concavo-convex disc 20 (see FIGURE 3) which is preferably provided with radial slots 21 to permit it to flex more readily from pressure. Its outer edge 22 lies near the face of the bore 8 when the caps are in their normal relation, as shown in FIGURE 1. Before slipping the cap 1 into position as just described, this resilient disc 20 is laid on the upper face of the inner cap 4.

In the normal position of the two caps the disc 20 may hold the upper cap in a position in which the two grooves 12 and 13 are at substantially the same level at their upper faces as shown in FIGURE 1.

In order to unscrew the inner cap 6 it is merely necessary to press the outer cap 7 downwardly with sufficient force to compress and flatten the disc 20 sufficiently to enable the conical bore 9 to engage the periphery 10 of the cone portion of the inner cap. This effects a frictional driving connection between the two caps so that when the outer cap is rotated in the proper direction the inner cap can be unscrewed on the thread of the neck.

The split ring is preferably elliptical as indicated in FIGURE 2, so that when in place it lies partly in the groove 12 and partly in the groove 13 and it operates to prevent the two caps from being disconnected from each other; but by reason of the fact that the diameter of the wire of which the ring is composed is less than the vertical width of the grooves (which should have the same width) the ring will permit enough downward movement of the outer cap 4 to give sufficient frictional contact.

Instead of employing a disc-form member to provide resistance to be overcome when pressing the outer cap 4 downwardly, if desired, I may employ a short helical spring 23 located on the axis of the two caps. In this case it is desirable to form one or more sockets 24 in the adjacent faces of the caps to hold the spring in its axial position in the caps.

If desired, the invention can be practiced by providing

4

means for effecting a positive interlocking connection between the two caps. Such means is illustrated in FIGURES 6 and 6a. This may be effected by providing a cylindrical bore 25 for the outer cap 26, in which case the outer surface 27 of the inner cap 28 is cylindrical. Adjacent the heads of the two caps conical surfaces 29 and 30 are provided. The ones shown here have the same taper. In the conical surface 29 a V-shaped groove is provided and on the surface 30 a V-shaped tooth 32 is provided that can fit into the groove 29. With this construction it is obvious that when the cap 26 is forced downward and rotated, when the groove 29 arrives at the tooth 32 the tooth will drop into it. Of course, either surface can have the groove.

It is preferable to have only one groove and only one tooth. This will give a possibility of a continuous rotation through almost 360 degrees without the person rotating the outer cap sufficiently to effect the connection.

In other words, with this single contact means for effecting a positive connection it will probably require considerable rotation of the outer cap to effect the closing of this connection, and if the rotation is not in the right direction, it will not be a step towards the unscrewing of the inner cap. So, if the threads on the neck of the bottle are left-handed threads the rotation of the outer cap in the anticlockwise direction would merely tighten the inner cap on the neck. Right hand thread is so common, a person attempting to open the bottle would naturally assume that an anti-clockwise rotation would be the one to use in order to open the bottle.

Referring now to FIGURE 7; in this embodiment of the invention the inner cap is provided with a half-round groove 33 which extends partly around its outer surface and the groove receives a tight ring 34 of elastic material such as rubber, neoprene or the like. The outer cap is formed with an annular groove 35 in its inner surface, the vertical width of which is slightly greater than the diameter of the elastic ring 34. With this construction the ring 33 will lock the two caps together but will not prevent a relative downward movement of the outer cap sufficient to establish a satisfactory frictional alignment or contact between the two conical surfaces 36 and 37 of the outer cap and the inner cap. The elastic ring 34 will be put into place in its groove by shifting it downward over the small end of the surface of the inner cap.

In FIGURES 8 to 13 I illustrate means for effecting a connection between the inner and outer caps which avoids the necessity for using resilient means between the caps for holding the outer cap normally elevated. It interlocks the two caps so that they can be held together, but is constructed in such a way that the interlocking means will hold the outer cap normally raised, but permits sufficient relative movement of the caps longitudinally to effect any kind of a driving connection between the two caps, that is, a frictional drive as shown in FIGURES 1 to 7, or a positive drive of any kind, for example, such as shown in FIGURE 6.

In FIGURE 8 I illustrate an interlocking ring 38 to perform the double function referred to, which has a V-form cross-section. In this case the meeting point of the two cylindrical surfaces 39 and 40 should be on a small enough radius to insure that the vertex 41 of the V cross-section will lie on the bottom face of the outer groove 42, as shown in FIGURE 8. And when it is in that position the inner fork 43 of the resilient ring 38 should be located in the upper angle of the groove that is formed in the inner cap. That disposition of the ring will insure that the outer cap cannot be pulled up off of the inner cap.

In FIGURES 10 to 13 inclusive I illustrate forms of resilient connectors for use in the grooves, that not only lock the caps together but provide a yielding resistance to hold the outer cap so that it can be forced down onto the inner one.

5

In FIGURE 9 is illustrated another form of cross-section for the ring, which resembles the letter S lying on its side, or the letter N with the inclined bar of the N inclined oppositely to its usual inclination.

Of these two forms just described the letter S form is more advantageous on account of the presence of curves instead of sharp angles.

In FIGURES 10 and 11 I illustrate a ring 44 of wavy form with outer loops 45 connected in a set or series between an inwardly extending set of loops 46. As shown in FIGURE 11 the wire (resilient) which forms this ring has the inside loops 46 resting on the bottom face 47 of the inner groove 48 that is formed in the outer face of the inner cap 49. At each end of the loop 46 the wire connects to an outside loop 45 and this loop lies on the bottom face 50 of the outer groove 51 in the outer cap 52, and at each end of the outer loop the wire is carried up by a more or less vertical extension 53 to connect with another inner loop 46 that is at a higher level, resting against the upper face of the outer groove that is in the inside face of the cap 52. At this point the ends of this loop 45 connect to two inside loops 46 at this higher level which is resting against the upper face of the groove 48. In other words, lower loops 45 alternate with higher loops 45; and the inner loops 46 that are located at a lower level alternate with loops 46 that are at a higher level.

In this way, the connections between the loops 45 and the loops 46 cross the circumferential dividing line at 47a between the two caps. This crossing occurs alternately at a higher level and at a lower level.

By pressing down on the upper end of the outer cap 52 the wire of the ring 44 will be distorted sufficiently to enable the conical faces of the two caps at 54 to come into frictional contact with each other; or to approach near enough to effect an interlocking of a V-shaped tooth 32 to engage a groove such as 29. The resiliency of the outwardly off-set portions of the ring 44 that overhang into the outer groove will permit this necessary relative movement of the cap.

In order to facilitate placing this ring 44 into position between the two caps, the ring is split, that is to say, it is formed with a gap as indicated at the point 55 in FIGURE 10.

If desired, instead of using a ring member as described heretofore, I may provide a half round pocket 56 having a vertical axis, located substantially at the outer face 57 of the inner cap. This pocket operates as a socket for a short helical spring 58, the outer half of which projects into a continuous groove 59 that passes all around the inner circumference of the outer cap 60.

As a considerable portion of the outer half of the coil 58 lies under the upper face 61 of the groove 59 it will be evident that by pressing down on the outer cap 60 the spring will become slightly compressed, sufficiently at least, to enable the two conical faces of the caps at 57 to effect a substantial frictional contact with

6

each other to enable the outer cap to rotate the inner cap.

If desired, there may be more than one of these springs 58, in their respective sockets. A slight advantage would result from using two or three springs because they would help to center the outer cap on the inner cap if it should happen that the contact faces at 62 have become worn.

When the outer cap is being rotated, the springs 58 can rotate on their outward axes in their pockets, like rollers, which will reduce resistance to the rotation.

Many other embodiments of this invention may be resorted to without departing from the spirit of the invention.

I claim and desire to secure by Letters Patent:

1. In a safety container cap to prevent an unauthorized person from removing the cap from a container or the like, the combination of a skirted inner cap having a threaded socket to engage a threaded neck on the container, a skirted outer cap telescoped over the inner cap and rotatably freely on the same, coordinated means on said caps to limit longitudinal movements of the outer cap relative to the inner cap, and for yieldingly holding the outer cap in a normal position from which it can shift with relation to the inner cap, said means comprising at least one pair of juxtaposed sockets in the adjacent surfaces of the skirts of the inner and outer caps, and a coil spring axially arranged in each pair of sockets, coordinated juxtaposed inclined contacting surfaces on the inner cap and the outer cap respectively, capable of being forcefully pressed together by an adult only when applying sufficient force to the outer cap to shift it downwardly on the inner cap, said contacting inclined faces then functioning to interlock frictionally the outer cap to the inner cap through and by means solely of the said frictional resistance and thereby enabling a torque force not possible to be applied through the outer cap by an infant to the inner cap to effect a rotation of the inner cap on said threaded neck and the consequent removal of the inner cap from the said neck.

2. A safety container cap according to claim 1, in which the coordinated juxtaposed means on the caps includes two substantially conical zones, one of which is convex and the other of which is concave, and capable of engaging each other frictionally when the zone on the outer cap is moved against the coordinated zone on the inner cap to enable the outer cap to unscrew the inner cap.

References Cited in the file of this patent

UNITED STATES PATENTS

1,771,012	Schwartz	July 22, 1930
2,009,216	Anibal	July 23, 1935
2,061,214	Sentman	Nov. 17, 1936
2,116,966	Barlow	May 10, 1938
2,179,147	Genei	Nov. 7, 1939
2,359,639	Hanahan	Oct. 3, 1944