

[54] SAFETY CLOSURE CAP AND CONTAINER
FOR DRY AND LIQUID CONTENTS

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[51] Int. Cl. B65d 55/02

[58] Field of Search 215/9, 46 R, 41

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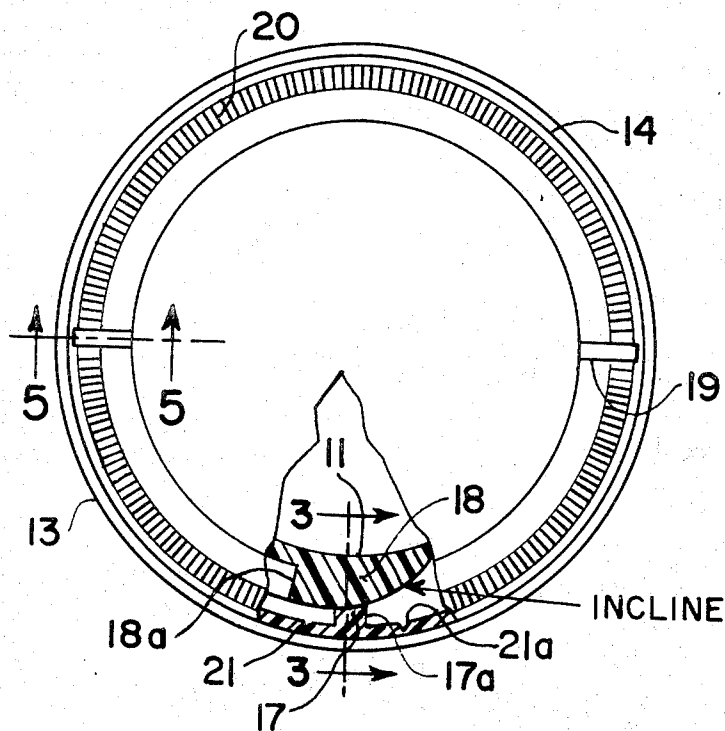
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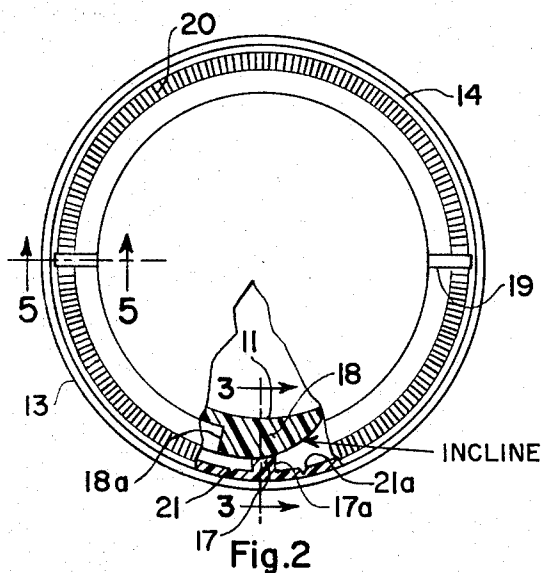
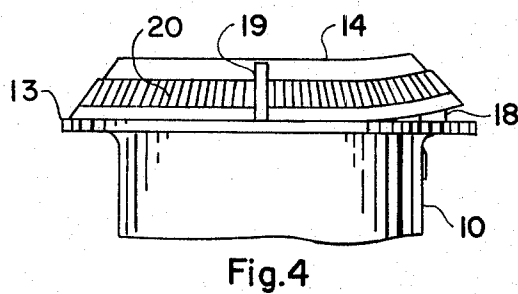
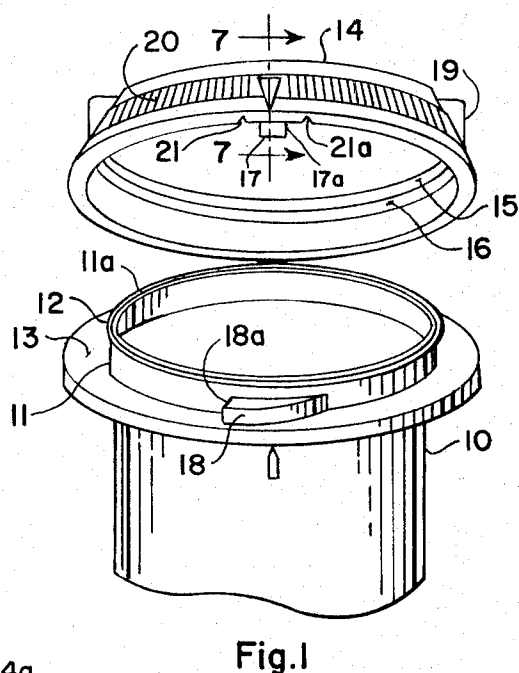
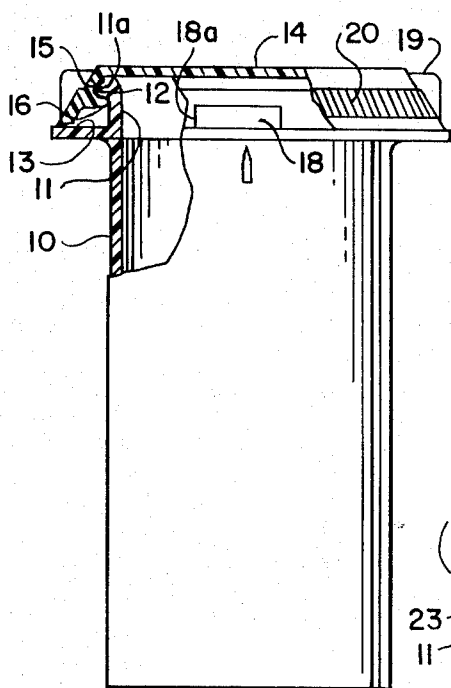
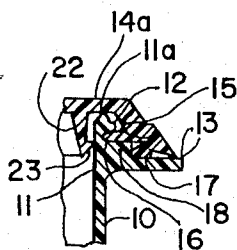
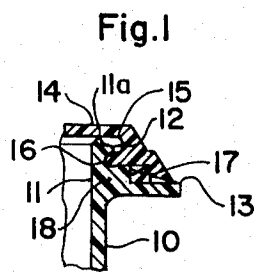
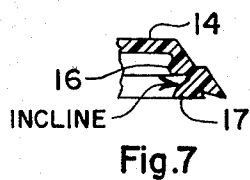
Primary Examiner—George T. Hall
Attorney—William R. Weight, Jr.

[57] ABSTRACT

A snap-on safety closure or cap is provided for containers of pills, liquids and the like which container cannot readily be opened by small children uninstructed in its use but can be easily opened by an adult. The cap snaps in place on the container and thereafter cannot be lifted off the container except by rotating the cap with respect to the container until a cam on the inside of the cap engages a cam on the rim of the container upon which action the rim of the cap becomes distorted, lifts up and allows the fingernail and part of the finger tip to be inserted under the cap's edge to lift the cap and snap it off.

2 Claims, 7 Drawing Figures





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SAFETY CLOSURE CAP AND CONTAINER FOR DRY AND LIQUID CONTENTS

OBJECTS OF THE INVENTION AND DISCUSSION

With the extensive home use today of numerous products of a nature harmful to small children such as various medicines and drugs, in particular, among other things, there has arisen a need for a container having a closure or cap which is easily removed by an adult but is too difficult for a small child to open unless the child has been shown specifically how to do so. A number of different devices have been presented in the art to meet this problem but they tend to be difficult and expensive to manufacture, awkward for an adult to use and too easy for a child to open. The present invention however, provides an easily and inexpensively manufactured closure cap and container combination which is easy and convenient for the adult to use but very difficult, if not impossible, for a child to use unless he has been told how to do so.

It is, accordingly, an object of the present invention to provide a closure or cap for a container containing material which may be harmful to children in which the cap cannot easily be removed by a small child un instructed in its use but can easily be removed and replaced by an adult.

It is also an object of the present invention to provide a closure or cap and a container therefor of the foregoing type which the closure or cap and container are simple and attractive yet inexpensive to manufacture, and which can be moulded of plastic material if desired.

It is also an object of the present invention to provide a closure or cap of the foregoing type and a container therefor which will effectively retain the contents of the container, is capable of repeated use without damage and is compatible with the container's contents.

It is also an object of the present invention to provide a cap and container wherein an effective seal is provided between the cap and the container specifically so that liquids can be kept in the container without leakage or spillage.

It is also an object of the present invention to provide a container and cap combination in which the container and the cap complement one another and cooperate to produce the aforementioned safety, non-leak and other features.

Other objects and advantages of the present invention will be apparent from the detailed description in the specification and drawings which follow.

IN THE DRAWINGS

FIG. 1 is a perspective view of the cap and container with the cap removed and ready to be placed on the container;

FIG. 2 is a top view of the cap and a part of the container with both shown in partial cross section to show the cooperating cams;

FIG. 3 is a cross sectional view taken along line 3—3 in FIG. 2 and looking in the direction of the arrows;

FIG. 4 is an exterior side view of the cap and container with the cap rotated until the cams are engaged and the cap is distorted;

FIG. 5 is a side view of the container and cap showing both the cap and container in partial cross section;

FIG. 6 is a cross sectional view taken through the section 3—3 of the cap and container in FIG. 2 and look-

ing in the direction of the arrows but showing a similar cap but including a lip seal;

FIG. 7 is a cross sectional view taken through the section 7—7 of the cap and looking in the direction of the arrows and showing the cross sectional profile of cam 17.

DESCRIPTION AND OPERATION OF THE INVENTION

With reference to the drawings, a container 10 is shown having an open annular neck 11 with an annular rim or lip 12 about its upper edge and extended outwardly therefrom in the manner shown. The top of neck 11 preferably is in the form of a sharp-edged annulus 11a with its sharp edge facing upward as shown in FIGS. 3, 5 and 6. At the lower end of necked opening 11, the container 10 broadens into an annular shoulder or tooth ring 13 extended outwardly from neck 11 and terminating in the annular wall of the container 10. A cap or closure 14 is provided to close the open neck 11 and is provided with an internal annular groove 15 between the inside of the top of cap 14 and inwardly projecting annular rim or lip 16 which receives rim 12 of neck 11 in a close fit. Cap 14 is made of a tough yet resilient plastic material which allows lip 16 to pass over rim 12 as cap 14 is pushed in place but also returns the cap and lip to their original shape and dimension as the cap snaps into place on neck 11 and after it is removed from it. With cap 14 in place on neck 11, the sharp annular edge 11a pushes up against and slightly into the inside surface of cap 14 and affords a substantially air and vaportight seal at this point.

At one or more locations on the inner periphery of cap 14, as will be seen in FIGS. 1 and 2, in particular, is located a cam 17 which has substantially the form shown particularly in the drawings in FIG. 7 and is preferably moulded directly into the cap 14. Also, on the exterior of neck 11 of container 10, and preferably moulded directly into it, is a cam or cam incline 18 which preferably has its incline facing to the right in FIGS. 1 and 2. Both are of such dimension, particularly in depth, that as the cap 14 is put in place over neck 11 as shown in FIGS. 2 and 5 and rotated, the cams 17, 18 will be in each other's path and will interfere with one another as seen in FIGS. 2, 3 and 4 and will, therefore, when the rotation of cap 14 is clockwise in the drawings, contact each other on their respective inclines or inclined faces. Further clockwise rotation, with force applied easily by an adult but difficult for a child, forces cam 17 up on cam incline 18 and distorts cap 14 in the manner shown in FIG. 4 until its edge or skirt lifts sufficiently for a fingernail and possibly part of a finger tip to be inserted under its edge to lift it and thus to snap cap 14 up and over rim 12 and off neck 11 and container 10. The inside of the skirt is provided with notches 21, 21a, (see FIGS. 1 and 2) preferably one on either side of cam 17 and adjacent thereto, for the purpose of allowing the skirt to flex more easily in the vicinity of the cams. The notches may be vee-shaped or rounded but in any event they reduce the cross-sectional area at their location and permit the desired flexure of the skirt. The cap 14 can be replaced on the container and removed from it repeatedly without harm or damage to either it or container 10.

The exterior of cap 14 is formed in the shape of a truncated cone with its annular side slanted substantially as shown and has one or more lugs or projections

19 located on its slanted side, preferably with one lug near the cam 17 but not necessarily so. These lugs 19 aid the user in rotating the cap 14 particularly after cams 17, 18 are in contact. Serrations 20 such as grooves or the like in the slanted side of cap 14 may also be used instead of or in addition to these if deemed desirable but they must provide a good rotary gripping or pushing surface without providing anything which might be gripped sufficiently to allow the cap to be pulled off neck 11. For this reason it is desirable that the serrations 20 not extend all the way to the lower rim of cap 14. Also, a smooth annular portion or space is provided above the serrations for use as a space for applying advertising messages.

The lower rim of cap 14 is chamfered upward or relieved on its underside as shown most clearly in FIG. 7 in order that clearance between it and tooth ring 13 will be assured. Its extreme outer edge does not contact shoulder 13 but a clearance of about 0.002 inch to 0.005 inch is maintained throughout the entire periphery of cap 14 to eliminate drag during rotation. This clearance is insufficient to allow a child's fingernail or tooth to be placed under the edge of cap 14 to pry it off. Cap 14 is dimensioned to fit in this manner and it will do so after it is snapped in place on neck 11 of container 10.

It will now be seen that cap 14 cannot be removed from container 10 without great difficulty even for an adult unless cap 14 is rotated with respect to container 10 in a clockwise direction in FIG. 2 until contact of cams 17, 18 occurs and the cap becomes distorted sufficiently to lift the edge of the cap 14 and to allow prying it off with the fingernail and finger tip. Rotating cap 14 in the opposite direction (counter clockwise in FIG. 2) as a person would be most likely to do in an attempt to unscrew it from the container, results only in bringing the flat sides or abutments 17a, 18a into contact without any easy cam action to distort the cap 14 and provide a finger hold under it. It is highly unlikely that a small child would conceive of the motions necessary nor would he or she be likely to have the strength necessary to execute them to remove cap 14. Also, the child cannot get a fingernail under the rim of cap 14 when it is in place and undistorted because the rim of cap 14 is of smaller diameter than the shoulder flange or tooth ring 13 of container 10 and because the slanted sides of cap 14 and the close clearance of the cap 14 from tooth ring 13 of the container 10 make this very difficult. In addition, the slanted sides of the cap 14 and the tooth ring 13 make it impossible for a child to achieve a tooth hold on cap 14 in order to remove it in that manner. The child would thus be spared any dire effects resulting from either internal or external contact with the container's contents.

The cap 14 is preferably made of a moulded plastic material of a resilient nature such as polyethylene, polyfluoroethylene, polytetrafluoroethylene, rubber or synthetic rubber, but could be moulded of any mouldable material which is compatible with container 10 and its contents, which allows no vapor transmission and which is resilient enough to allow deformation as the cams engage yet firm enough to be difficult to deform with the fingers or fingernails yet has a memory which will return it to substantially its original shape after deformation. The container 10, on the other hand must be rigid enough to resist any appreciable deformation by hand at least in the area near the cap 14 so that no

prying gaps can be created between cap 14 and the tooth ring 13. Material such as glass, polystyrene, hard rubber, hard wood, aluminum, steel, nickel, brass and the like can all be used if their vapor transmission substantially is nil and their compatibility with the contents, the cap 14, and the expected environment is acceptable. It is necessary, however, in the case of each material that the container's cross-sections and other dimensions be sufficient to prevent collapse or buckling under the force of the pressure of either children's or adults fingers or hands at least in the vicinity of the cap 14.

It is to be noted that the word container as used in this specification includes a variety of types of containers such as vials, blown bottles, boxes and the like and in various decorative shapes provided they all have an upper portion as shown in the drawings extending from, and including, the tooth ring 13 and upward and are made of the proper materials as discussed earlier in this specification.

While the cap 14 is ordinarily rotated with the fingers, it is also possible to rotate it by grasping the container in one hand and placing the top flat against the other hand. This "palming" action results in relative rotation between the cap and container and permits the cap 14 to be pried off as described previously. This palming method of cap removal is of particular benefit to persons afflicted with an arthritic condition or other problem concerning use of the fingers.

In FIG. 6, a portion of another form of cap 14a is shown in which the cap includes an annular lip or lip seal 22 which is an integral part of cap 14a and extends downwardly into the neck 11 of container 10. The wall of lip 22 is preferably tapered in cross section as shown in the figure and a substantially sharp edged lip or rim 23 is provided about its outer periphery as shown. The outside diameter of lip 23 at the "sharp" edge is slightly greater than the inside diameter of neck 11 so that as the cap 14a is snapped in place on container 10, lip seal 22 enters neck 11 and lip 23 presses firmly against neck 11 in a continuous line of contact throughout its periphery. The tapered wall of lip seal 22 provides strength at its root or thicker portion so that buckling or collapse cannot occur but yet, provides the flexibility needed at its rim portion to correct for irregularities in neck 11 as rim 23 seats on it. Thus, a liquid tight seal is formed at this line of contact and liquids can be stored in the container 10 without danger of leakage or spillage.

The caps 14 and 14a can each also be generally described as a hollow body having a closed top and an open bottom and including the various features described previously in this specification.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to a preferred embodiment, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art, without departing from the spirit of the invention. It is the intention, therefore to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. In combination with a container having an annular necked opening and an annular shoulder extended outward therefrom, a resilient snap on cap covering said necked opening, means retaining said cap thereon after

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5 snap on but permitting it to be moved thereon in a rotary manner, an annular skirt on said cap adapted to just clear said annular shoulder throughout the skirt's periphery and with said shoulder being of larger diameter than said skirt, a cam located on the inside of said skirt, and a cam located on said container and in the path of said cam on the cap as the cap is rotated with each cam having an abutment and the cam on the container also having an incline with the incline faced in that direction to receive the cap's cam upon rotation of the cap in one rotary direction, whereby upon rotation of said cap by hand said cams come into contact and said cam on the cap rides up on the cam as the con-

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tainer distorting said resilient cap enough to raise the skirt in the vicinity of the cams and thus to allow the cap to be lifted by its skirt and snapped off of the container and upon rotation of the cap in one rotary direction its cam meets the incline of the cam on the container and in the other direction the cams abut one another to prevent further rotation.

2. The invention set forth in claim 1 with the cams abutting one another when the top is rotated with respect to the container in a counter-clockwise direction when viewed from above the cap and looking down thereon.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,759,411 Dated September 18, 1973

Inventor(s) William Horvath

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Immediately preceding the ABSTRACT: change the attorney's name from "William R. Weight, Jr." to --William R. Wright, Jr.--.

Column 5, line 13, after "cam" (second occurrence) change "as" to --on--.

Signed and sealed this 29th day of October 1974.

(SEAL)
Attest:

McCOY M. GIBSON JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents