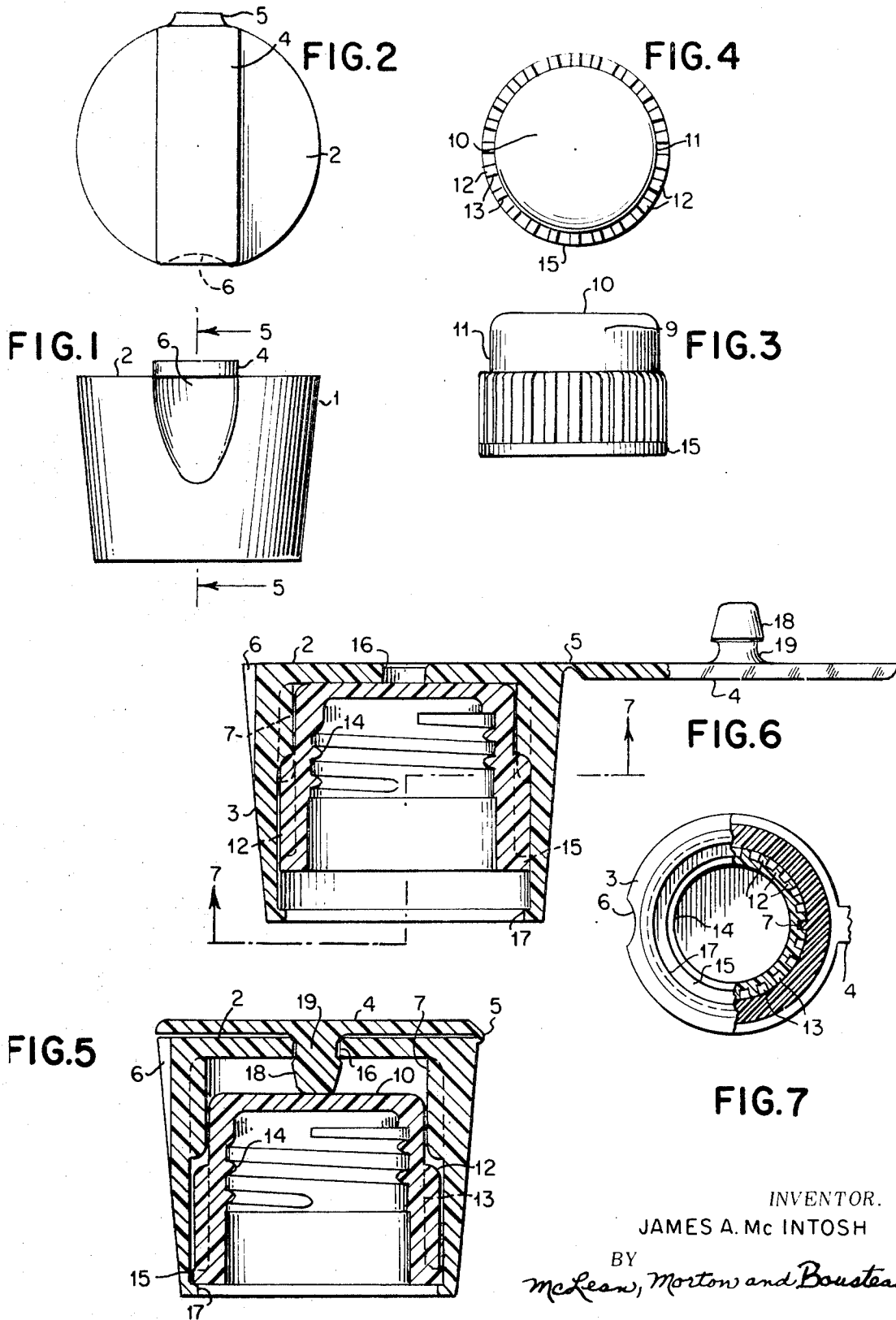


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J. A. McINTOSH
PLASTIC SAFETY CLOSURE
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PLASTIC SAFETY CLOSURE

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1 Claim

ABSTRACT OF THE DISCLOSURE

A plastic safety closure for threaded neck containers is described having an inner cap and an encompassing outer cap, each cap having engaging means, the engaging means being engaged for simultaneous rotation of the caps when the cap tops are in juxtaposition, and a plug associated with the outer cap capable of extending through the top of the outer cap to contact the top of the inner cap, thereby to maintain the cap tops separated and the engaging means in non-engaging relationship.

This invention relates to an improvement in plastic safety closures for containers having threaded necks. More particularly, this invention provides an improved safety closure which in fixed closed position has a freely rotatable outer cap but which closure upon manipulation causes the outer cap to engage with an inner cap to remove the closure.

In the modern household, there are many products in daily use which can be harmful or dangerous when taken internally. These products include household detergents, pesticides, pharmaceutical preparations, solvents, and the like. Although hazardous substances are required to bear warning labels, these products are a continual source of danger to small children. Recently interest has been focussed on this problem by committees formed with representatives from government, industry and the professions to develop and promulgate standards for safety closures. The plastic safety closure of this invention is directed to providing a child-proof cap for use with hazardous products ordinarily marketed in threaded neck containers. The plastic safety cap of this invention is simple in construction and inexpensive to manufacture.

The plastic safety closure of this invention provides a closure for use on a threaded neck container having a threaded outer wall, an inner wall and an interconnecting rim. The closure member itself is composed of two separate parts, i.e. an inner cap and an outer cap, the inner cap being telescoped within the encompassing outer cap.

The inner cap includes a top wall, a tapered cylindrical skirt depending from the top wall for threaded engagement with the outer wall of the threaded neck container, and at least one engaging means positioned substantially vertically near the outside lower edge of the cylindrical skirt.

The outer cap includes a top wall, the top wall having a substantially centrally positioned opening therein, a cylindrical skirt depending from the top wall of sufficient inside diameter to encompass the inner cap, at least one engaging means positioned substantially vertically near the inside upper edge of the cylindrical skirt, and an annular bead positioned near the inside lower edge of the cylindrical skirt.

The outer cap is integrally molded with a crown and a relatively thin hinge connects the crown to the outer cap near the periphery of the outer cap. The crown has a substantially centrally positioned plug depending therefrom, adapted slidably to engage, close and extend through the substantially centrally positioned opening in

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the top wall of the outer cap, together with flexible means associated with the plug to maintain the crown and the outer cap in fixed closed position.

The plug is dimensioned longitudinally to contact the top wall of the inner cap when in fixed position to maintain the respective engaging means of the inner and outer caps in non-engaging relationship, and the annular bead on the inside lower edge of the outer cap cylindrical skirt is positioned to contact the bottom surface of the inner cap cylindrical skirt when the plug is in fixed position. Thus when the plug is in fixed position, the outer cap rotates freely with respect to the inner cap and the container is closed.

When the crown is raised, however, removing the plug, the outer cap descends toward the inner cap, the engaging means of the inner and outer caps engage, and the inner and outer caps rotate together so that the container can be opened or closed.

A preferred embodiment of the plastic safety cap of my invention is shown in the accompanying drawings wherein:

FIG. 1 is a side view of the outer cap showing the relatively thin hinged crown, in closed position, the main body of the outer cap, and an indentation in the outer surface of the outer cap positioned under the free end of the crown as a fingerhold.

FIG. 2 is a plan view of the outer cap of FIG. 1 showing the hinged crown and the fingerhold.

FIG. 3 is a side view of the inner cap showing an embodiment of the engaging means on the outer surface of the inner cap.

FIG. 4 is a plan view of the inner cap.

FIG. 5 is a cross-sectional view showing both the inner and outer cap with the plug in fixed position in the outer cap opening preventing engagement of the inner and outer cap engaging means.

FIG. 6 is a cross-sectional view similar to FIG. 5 but showing both the inner and the outer cap with the plug removed from the outer cap opening and engagement of the inner and outer cap engaging means.

FIG. 7 is a cross-sectional view along line 7—7 of FIG. 1.

Referring now to the drawings, the plastic safety closure consists of an outer cap generally designated as 1 and an inner cap generally designated as 8.

FIGS. 1, 2 and 7 show outer cap 1 composed of top wall 2 and skirt 3 depending therefrom. Outer cap 1 has integrally molded therewith crown 4, attached to outer cap 1 by hinge 5, fingerhold indentation 6 and lugs 7 on the inner surface of skirt 3.

FIGS. 3 and 4 show inner cap 9 composed of top wall 10 and skirt 11 depending therefrom. Inner cap 9 has integrally molded therewith lugs 12 forming grooves 13 on the outer surface of skirt 11. Also, inner cap 9 has an annular bead 15 at the base of its outside surface, bead 15 having a diameter such that its periphery is approximately coextensive with the outer surface of lugs 11.

FIGS. 5 and 6 show inner cap 9 encompassed by outer cap 1 and details of both caps. For example, these figures show that the cylindrical skirt 11 of inner cap 9 is tapped to provide threads 14 which mate with the threads on the threaded neck container (not shown).

These figures further show that outer cap 1 has an opening 16 in top wall 2, and an annular bead 17 at the base of its inside surface. Also, crown 4 has plug 18 integrally molded therewith. Plug 18 has a neck 19 of reduced cross-section such that its diameter approximates that of opening 16.

The operation of the plastic safety cap of this invention is shown with reference to FIGS. 5 and 6. FIG. 5

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shows the safety cap in closed position with plug 18 extending through opening 16, plug 18 being held in place by bearing of the rim of opening 16 on the under surface of the head of plug 18, plug 18 contacting top wall 10 of inner cap 9, and annular bead 15 of inner cap 9 contacting annular bead 17 of outer cap 1. In this closed position, it can be seen that lugs 7 and 12 on outer cap 1 and inner cap 9 respectively are vertically separated such that outer cap 1 is freely rotatable with respect to inner cap 9, and inner cap 9 remains threadedly engaged in closed relationship with the threaded neck container.

FIG. 6 shows the safety cap in open position with plug 18 removed and outer cap 1 in lowered position with respect to inner cap 9 such that lugs 7 mate with grooves 13 and rotation of outer cap 1 will cause rotation of inner cap 9 and removal of the safety cap from the threaded neck container.

As will be apparent to one skilled in the art, the inner cap of the safety closure of this invention can be constructed of any material normally employed in the manufacture of bottle caps, i.e. any of the common metals, or a semi-rigid plastic such as Bakelite or polystyrene. The outer cap, however, should be formed from any of the well known resilient plastic materials such as polyethylene or polypropylene. Preferably the entire closure, including the inner and outer caps, is molded as separate units employing a semi-flexible, semi-rigid plastic such as polypropylene.

Where the threaded neck container is used to store moisture sensitive dry products or where tight sealing is necessary during storage of liquid products, advantageously the inner cap incorporates the features of the cap described and claimed in U.S. Letters Patent No. 3,286,866. Where such products are volatile, advantageously the inner cap incorporates the features of the cap described and claimed in U.S. Letters Patent No. 3,398,818.

I claim:

1. A plastic safety closure for use on a threaded neck container having a threaded outer wall, an inner wall and an interconnecting rim, said closure comprising an inner cap and an outer cap, the inner cap being telescoped within the encompassing outer cap;

(a) the inner cap including a top wall, a tapered cylindrical skirt depending from the top wall for threaded engagement with the outer wall of the threaded neck

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container, at least one engaging means positioned substantially vertically near the outside lower edge of the cylindrical skirt;

- (b) the outer cap including a top wall, the top wall having a substantially centrally positioned opening therein, a cylindrical skirt depending from the top wall of sufficient inside diameter to encompass the inner cap, at least one engaging means positioned substantially vertically near the inside upper edge of the cylindrical skirt, and an annular bead positioned near the inside lower edge of the cylindrical skirt, the outer cap being integrally molded with a crown;
- (c) the crown having a substantially centrally positioned plug depending therefrom adapted slidably to engage, close and extend through the substantially centrally positioned opening in the top wall of the outer cap, and a relatively thin hinge connecting the crown to the outer cap near the periphery of the outer cap, flexible means associated with the plug to maintain the crown and the outer cap in fixed closed position;
- (d) the plug being dimensioned longitudinally to contact the top wall of the inner cap when in fixed closed position to maintain the respective engaging means of the inner and outer caps in non-engaging relationship, and the annular bead on the inside lower edge of the outer cap cylindrical skirt being positioned to contact the bottom surface of the inner cap cylindrical skirt when the plug is in fixed position, thereby permitting free rotation of the outer cap with respect to the inner cap but such that when the crown is raised, removing the plug, the outer cap descends toward the inner cap, the engaging means of the inner and outer caps engage, and the inner and outer caps rotate together.

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