

[54] SAFETY CLOSURE DEVICE

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[58] Field of Search 215/9, 99, 216, 317; 222/543

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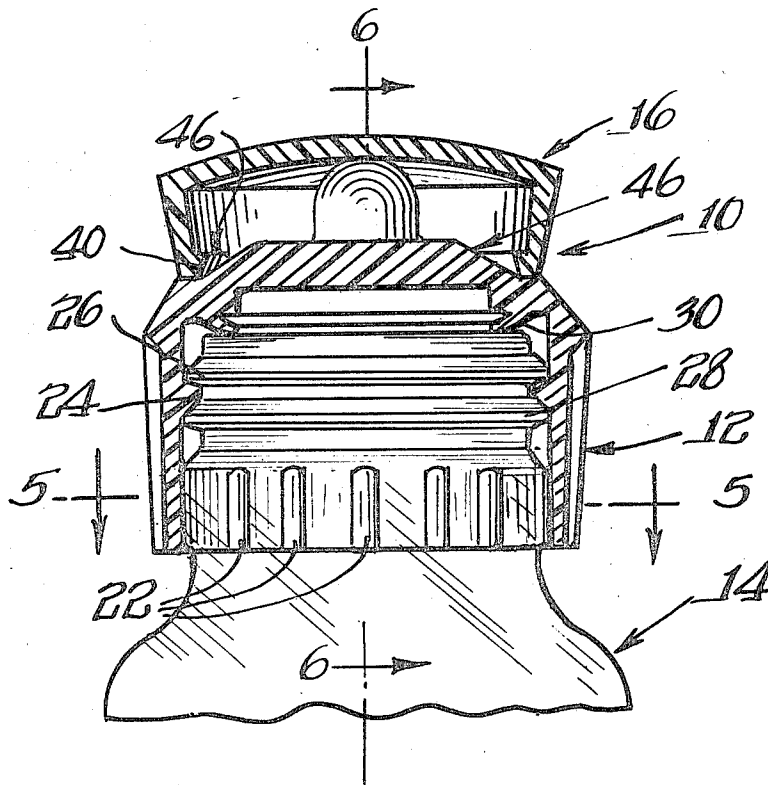
Primary Examiner—Herbert F. Ross

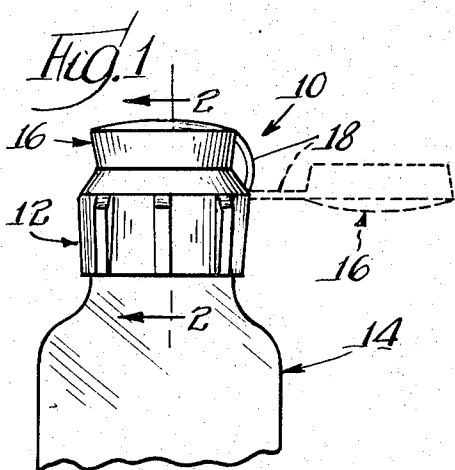
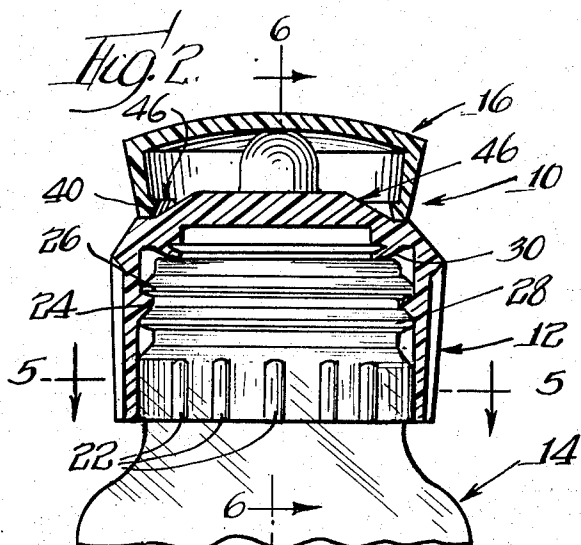
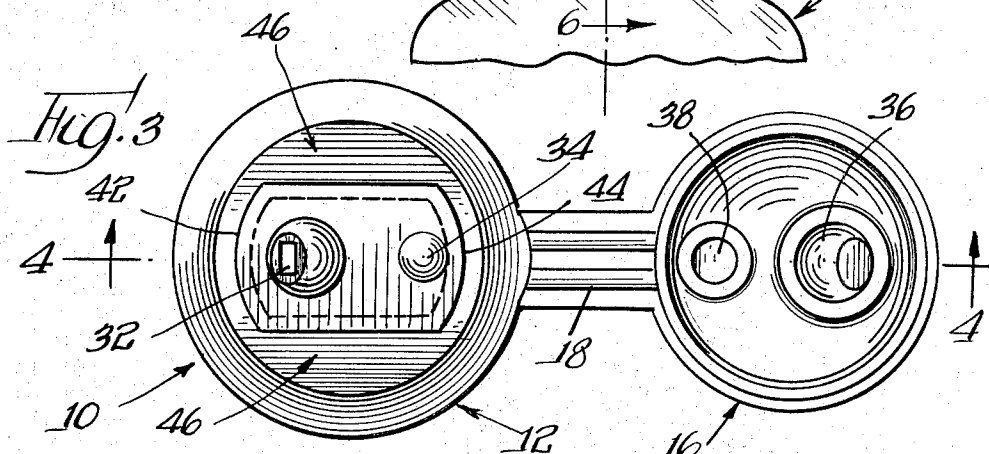
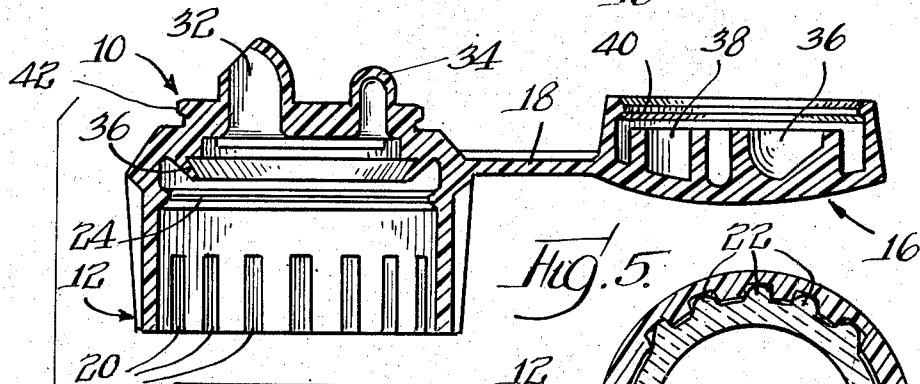
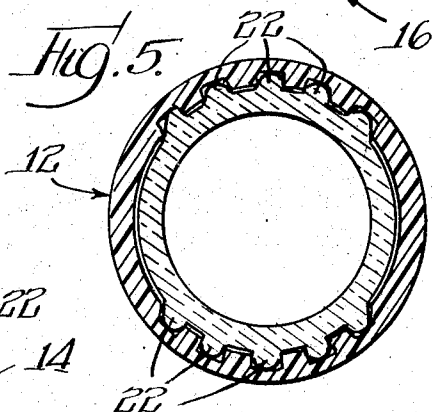
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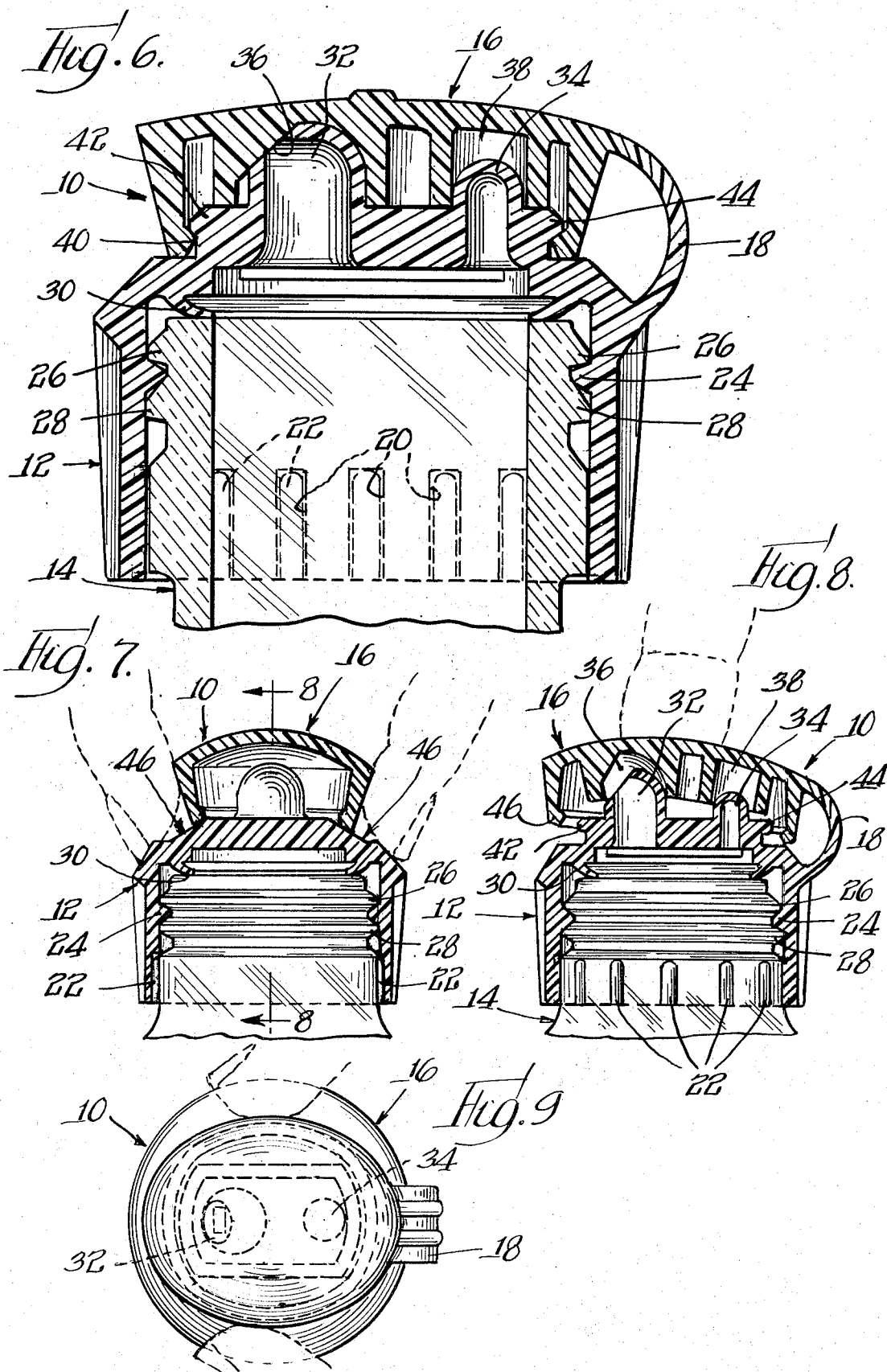
[57] ABSTRACT

The present invention relates generally to safety closure devices for open-ended containers, and more particularly to closure devices designed to counteract unauthorized removal thereof, as for example the removal of a bottle cap by a child. The embodiment disclosed herein includes a first closure section for permanent attachment to the open end of a container and a second closure section or cap hingedly coupled and thus shiftable with respect to the first section. Said second section is adapted in one shifted position to cover, and in another position to uncover the first closure section. The second closure section is sufficiently flexible laterally so as to become distorted in shape when opposed pressures are manually applied to the cap periphery. Means is provided for detachably interlocking first and second sections, the functioning of said means being controllable as an incident to the flexing of the second section.

8 Claims, 9 Drawing Figures







SAFETY CLOSURE DEVICE

SUMMARY OF THE INVENTION

Closure devices have heretofore been developed with the view of rendering such devices difficult for manipulation by children. This is particularly true in instances where a closure or cap is used in association with open-ended containers such as medicine bottles and the like. It is therefore an important object of the present invention to provide an improved, practical closure device which may be readily manipulated by an adult but which, because of its unique design, may not be readily opened by a child.

It is normal for anyone endeavoring to remove a closure member such as the removal of a cap from a medicine bottle, to apply retrograde rotation to the cap. It is therefore an object of the present invention to provide a closure member or cap which cannot be removed by simply applying retrograde rotation thereto. To this end the invention contemplates a new and improved one-piece closure device in which one section thereof may be permanently affixed to the open end of a container and another section integrally connected therewith which to a casual observer appears to be a conventional cap, but which cannot be removed either by unscrewing or by axial withdrawal.

More specifically, the invention contemplates a relatively simple, integral two-section closure device as referred to above wherein the first-mentioned section provides the positive interlock between the closure and the container, and the second section or cap is sufficiently flexible to permit detachment thereof only after the initial application of opposed transverse pressures to the peripheral surface of the cap.

The present invention also contemplates an improved one-piece closure device of the type as set forth above which is so designed as to enable the production thereof by the practice of conventional molding methods, thereby assuring relatively low cost of manufacture.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other objects and advantages will be more apparent from the following detailed description, when considered in connection with the accompanying drawings wherein:

FIG. 1 is a side elevational view of a closure device constructed in accordance with the present invention, said device being shown in operative association with the open end of a fragmentarily disclosed container or bottle;

FIG. 2 is an enlarged central vertical sectional view of the closure device taken substantially along the line 2—2 of FIG. 1, the container being shown in elevation;

FIG. 3 is an enlarged plan view of the closure device of FIG. 1, when the cap section thereof occupies the position illustrated by the dotted lines in FIG. 1;

FIG. 4 is an exploded vertical sectional view taken substantially along the line 4—4 of FIG. 3, with the open-ended container based immediately beneath one section of the closure device;

FIG. 5 is a horizontal transverse sectional view taken substantially along the line 5—5 of FIG. 2 to disclose the splined interlock between the closure device and the container;

FIG. 6 is an enlarged, central vertical sectional view taken substantially along the line 6—6 of FIG. 2;

FIG. 7 is a vertical sectional view similar to FIG. 2 disclosing the manner in which opposed pressures may be applied manually to diametrically located peripheral surface areas of the cap section;

FIG. 8 is a vertical sectional view taken substantially along the line 8-8 of FIG. 7, more clearly to illustrate the manner in which distortion of the shape of the flexible cap section enables said section to be shifted to the position illustrated in FIG. 4; and

FIG. 9 is a plan view of the closure device shown in FIG. 8.

DESCRIPTION OF A PREFERRED EMBODIMENT OF THE INVENTION

Referring now to the drawings more in detail wherein like numerals have been employed to designate similar parts throughout the various views, it will be seen that one embodiment of a closure device of the type contemplated by the present invention is designated generally by the numeral 10. The device 10 comprises three integrally connected sections, namely the section 12 for permanent attachment to the periphery of the open end of a container or bottle 14, a cap section 16 integrally coupled with and shiftable with respect to the section 12 through the agency of a flexible hinge 18.

The inner periphery of the enclosure section 12 is provided with a plurality of longitudinal recesses 20 for accommodating complementary longitudinal ribs or splines 22 extending outwardly from the periphery of the neck of the container or bottle 14. As the closure section 12 is forced downwardly into telescopic association with the open end of the container 14, the resulting interlock between the recesses 20 and the protuberances 22 prevent rotation of the section 12 relative to the container. Also, as the section 12 is thus telescopically associated with the open end of the container, a yieldable annular member 24 becomes interlocked between a pair of axially spaced annular beads or protuberances 26 and 28 of the container 14. During the above-mentioned telescopic association, a flexible sealing lip 30 sealingly engages the upper extremity of the neck of the container or bottle 14. The particular closure section 12 disclosed herein has a relatively small opening 32 to permit egress of the material within the container and an upwardly extending cap positioning element 34 later to be described. At this point it should be understood that the invention contemplates closure sections such as the closure section 12, incorporating modified forms of egress openings.

Considering now the structure of the closure section or cap 16, it will be seen that this cap has a recess 36 on the underside thereof for telescopically accommodating and shielding the sleeve which defines the egress opening 32, and a recess 38 for telescopically accommodating the positioning protuberance 34. Particular attention is directed to an annular inwardly projecting lip or protuberance 40 provided along the lower inner margin of the cap 16. When the cap 16 occupies its covering position with respect to the section 12, the protuberance 40 engages the underside of a pair of complementary arcuate projections 42 and 44, formed integral with the upper portion of the closure section 12. The flexibility of the cap section 16 is such as to constantly urge the annular lip or projection 40 into locking engagement with the underside of the abutment 42 and the oppositely disposed abutment 44. This interlocking arrangement is such as to preclude the

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possibility of disengaging the cap section 16 with respect to the section 12 by merely applying axial force to the cap. However, if the cap is compressed or flexed by manually forcing diametrically positioned areas of the cap periphery as shown in FIG. 7, said cap will assume the noncircular or elliptical shape illustrated in FIG. 9. Such compression causes the portions of the annular cap projection 40 in the vicinity of the oppositely disposed fixed abutments 42 and 44 to become disengaged as clearly shown in FIG. 8, thereby permitting the cap section 16 to be ultimately shifted to its uncovering position shown in FIGS. 3 and 4.

Disengagement of the above-mentioned annular protuberance 40 from the fixed abutments 42 and 44 is facilitated by oppositely disposed inclined surfaces 46, see FIGS. 2, 3 and 7. As the flexible cap 16 becomes distorted due to the exertion of pressure against diametrically positioned peripheral surface areas, the lower margin of the cap moves along the upwardly inclined surfaces 46 thereby causing elevation of the cap to the position shown in FIG. 8. In this position the cap 16 is completely disengaged from the section 12 as previously described. The projection 34 cooperates with the companion recess 38 on the underside of the cap section 16 in properly positioning the cap in covering the fixed closure section 12. The integral flexible hinge member 18 also facilitates the direction of movement of the cap as it moves from one position to another.

From the foregoing it will be apparent that the present invention contemplates a safety closure device of relatively simple construction which may be produced at minimum cost by practicing conventional plastic molding methods. The closure device disclosed herein may be used with a wide variety of open-end containers such as bottles. The cap locking annular protuberances and longitudinal splines on the container periphery may readily be substituted for the conventional thread convolutions. When the closure device is in fixed position upon a container, the necessity for squeezing the cap section to open the container is not readily apparent. This is particularly true with respect to children whose initial inclination would be to attempt to unscrew or lift the cap. To distort the cap section into elliptical shape requires a force which may readily be applied by an adult but not by a child. As previously stated, the section of the closure device telescopically applied and fixed to the container may have egress openings of varied sizes depending upon the nature of the material within the container.

I claim:

1. A safety closure device for an open-ended container including a first section for telescopic association with a container in the vicinity of the open end thereof, means for securing said section against unauthorized axial separation with respect to a container, a second shiftable section in the form of a closure member

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hingedly coupled with said first section and adapted in one shifted position to cover and in another position to uncover said first section, and means providing an interference fit for detachably interlocking said first and second sections in closed position, said second section being sufficiently flexible to become distorted in shape independently of said first section in response to opposed pressures applied manually to opposite areas of the periphery thereof for releasing the interference fit between the first and second sections permitting the latter to be moved to open position, and the means for detachably interlocking said first and second sections comprising interlocking protuberances, the first section having oppositely disposed inclined surfaces adapted to be engaged by adjacent peripheral portions of the second section to cause elevation of said second section upon distortion thereof.

2. A safety closure device for an open-ended container as set forth in claim 1, wherein means for securing the first section against axial separation includes means associated with the inner periphery of said first section for interlocking with complementary means associated with the outer periphery of a companion container.

3. A safety closure device for an open-ended container as set forth in claim 1, wherein said second section is normally circular in shape, and upon the manual application of opposed pressures will become distorted and assume an elliptical shape.

4. A safety closure device for an open-ended container as set forth in claim 1, wherein means is provided for securing the first section against rotation with respect to a container, said means includes longitudinal recess means associated with the inner periphery of said first closure section.

5. A safety closure device for an open-ended container as set forth in claim 1, wherein the means for securing said first section against axial separation with respect to a container, includes an annular rib projecting radially inwardly from the inner periphery of said first section.

6. A safety closure device for an open-ended container as set forth in claim 1, wherein said means for detachably interlocking said first and second section includes arcuate protuberance means on one section for interlocking with complementary arcuate protuberance means on the other section.

7. A safety closure device for an open-ended container as set forth in claim 6, wherein one of said arcuate protuberance means is of greater arcuate extent than the other protuberance means.

8. A safety closure device for an open-ended container as set forth in claim 1, wherein said first and second closure sections are hingedly coupled and comprise a one piece plastic structure.

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