

[54] **SAFETY CLOSURE FOR MEDICINE BOTTLES OR THE LIKE**

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[22] Filed: **Mar. 22, 1972**

[21] Appl. No.: **237,054**

[52] U.S. Cl. **215/9, 215/43 A**

[51] Int. Cl. **B65d 55/02**

[58] Field of Search **215/9, 32, 42, 43 A**

[56] **References Cited**

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Primary Examiner—Herbert F. Ross

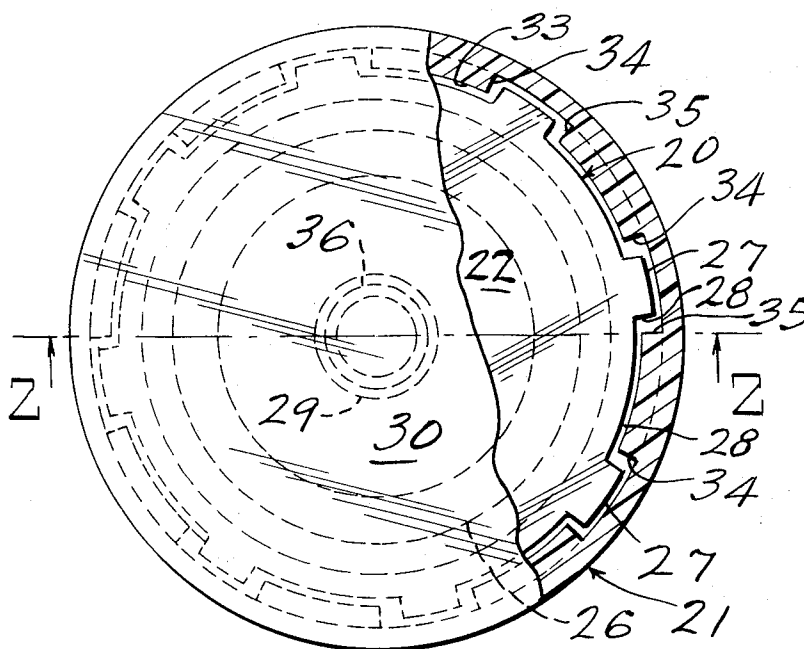
Attorney, Agent, or Firm—Henry K. Leonard

[57] **ABSTRACT**

A safety closure for a container having a threaded neck. The closure consists of a relatively stiff, inner

threaded cap and a relatively resilient outer driver. The inner cap has a circular top and cylindrical skirt. There are a plurality of ribs on the outer side of the cap skirt at the periphery of the top. The driver has a cylindrical skirt and a top and is telescopically fitted over the cap. There is a series of inwardly and downwardly extending lugs at the inner side of the junction of the top and skirt of the driver. A spacer at the center top of the cap holds the driver in normal, vertically spaced position. The lugs have vertical front edges which extend downwardly a distance sufficient to extend between and engage the ribs for driving the cap onto the container neck. The lugs also have vertical back edges which do not extend downwardly such distance when the driver is in normal position. The cap is removed from the container by flexing the periphery of the driver downwardly to engage the back edges of the lugs with the ribs on the cap. In another embodiment, the spacer is annular and holds the rim of the driver up, the lugs and ribs are at inner annular areas, the overcap and driver, respectively, and the central portion of the top of the overcap is flexed downwardly to engage the back edges of the lugs with the ribs for unscrewing the cap.

4 Claims, 12 Drawing Figures



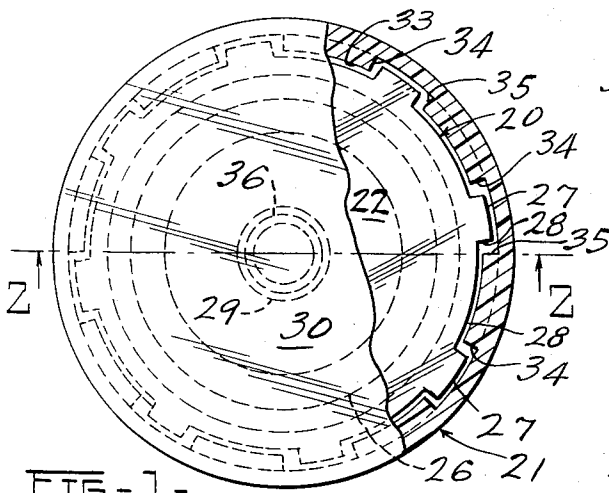


FIG-1-

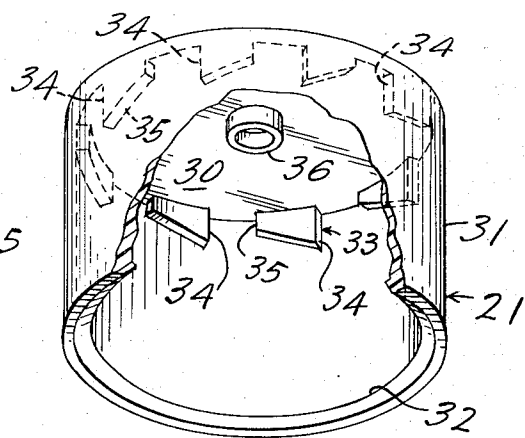


FIG-3-

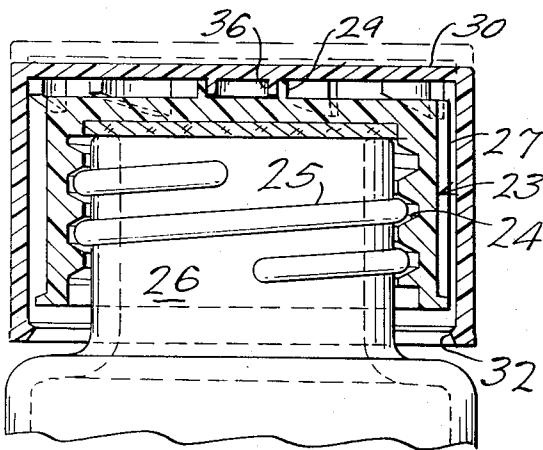


FIG-2-

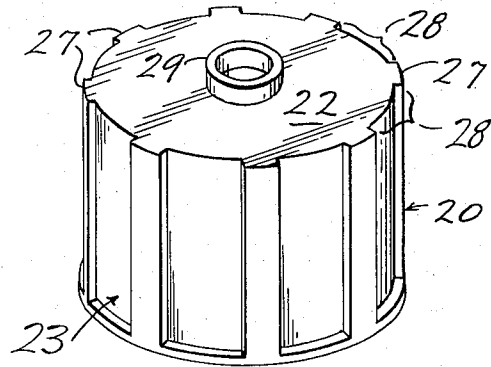


FIG-4-

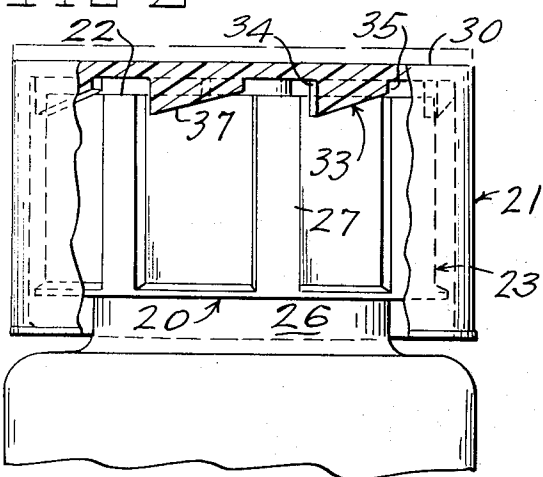


FIG-5

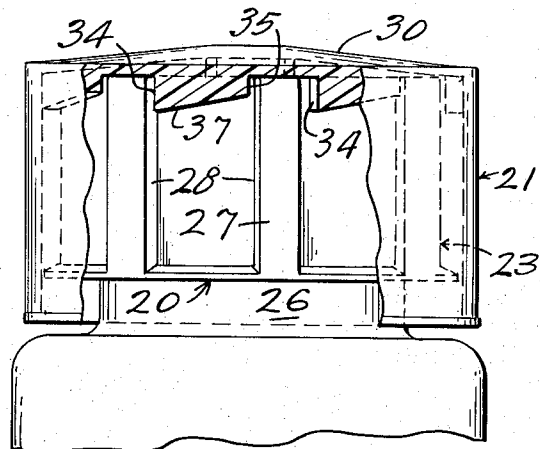


FIG-6-

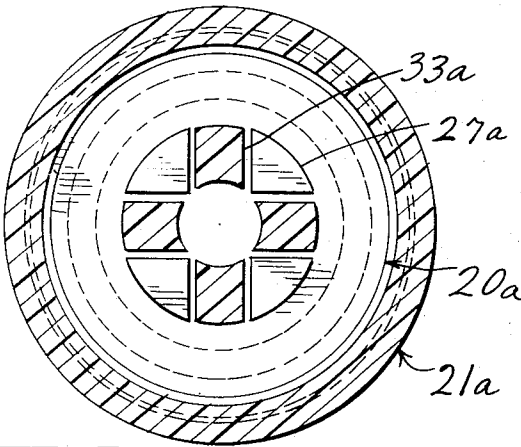


FIG-8-

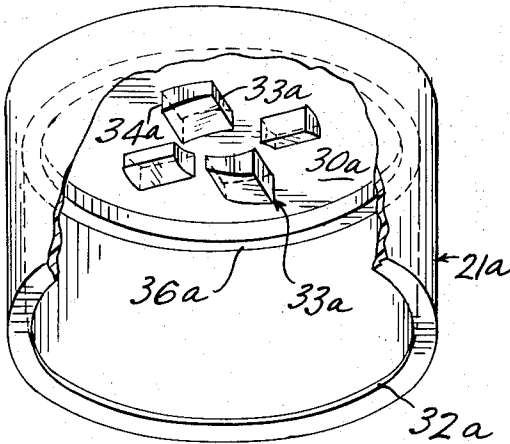


FIG-9-

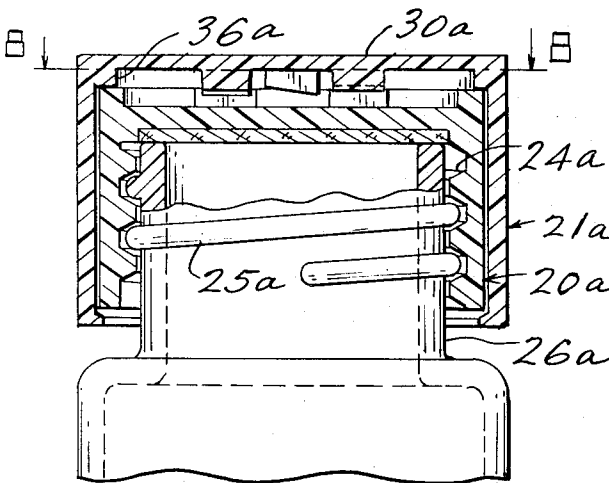


FIG-7-

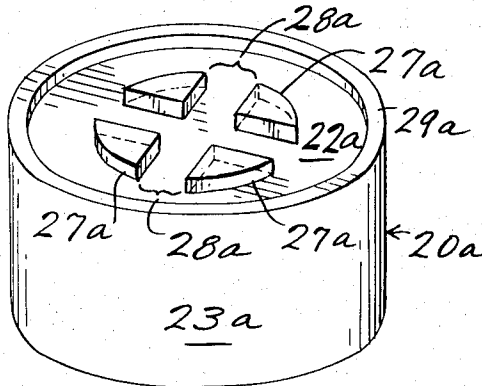


FIG-10-

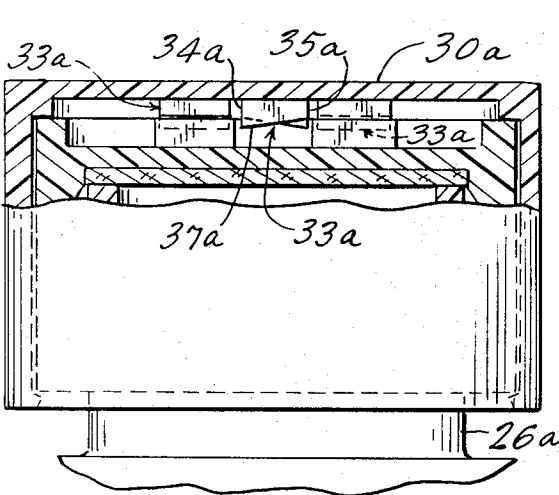


FIG-11-

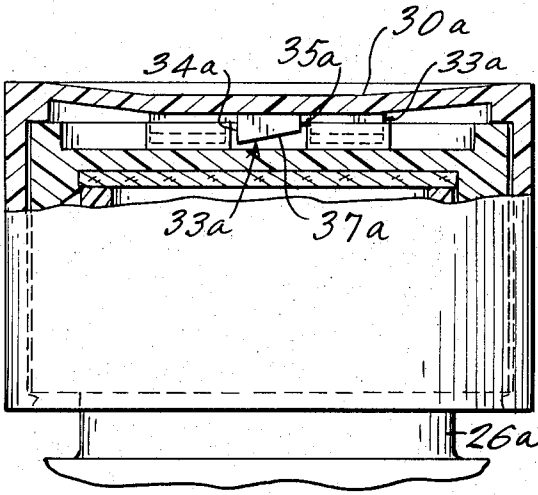


FIG-12-

SAFETY CLOSURE FOR MEDICINE BOTTLES OR THE LIKE

BACKGROUND OF THE INVENTION

Because of the emphasis being placed upon the danger of packaged medicines, even such simple remedies as aspirin, great efforts are being made to design safety closures for medicine bottles which readily can be removed by adults or older children but which are significantly difficult of removal by younger children, say, of the age of 5 or 6 years.

Many such safety closures comprise a number of cooperating parts, some even including rotating discs which must be placed in certain "combinations," and the like, and, as a result, many of them are far too expensive to manufacture for them to be adapted in commercial use.

Certain objectives underlie the design of successful safety closures for medicine bottles and the like. They should be so designed as to be capable of being placed on conventional bottle necks by commercial capping machinery. They should comprise as few parts as possible. The parts should be readily assembled with a minimum of manual or mechanical operations. The parts should be of such shape and structure that they can be fabricated at high speed in modern plastic injection machinery, sheet metal forming machinery, or the like.

From a safety standpoint, a closure should require a movement which is simple to an adult in order to be removed from the bottle but which requires simultaneous manipulation of at least two different types in order to be beyond the comprehension of a small child. In addition, it is desirable that at least one of the manipulations shall require more force than a small child is able to exert.

It is therefore the principal object of the instant invention to provide a relatively simple, two-part safety closure for a medicine bottle or the like comprising a threaded cap which is adapted to fit onto the conventional threaded neck of a medicine bottle and a driver for the cap which overlies the cap and is readily operable to screw the cap onto the bottle neck but requires specific manipulation in order to engage the driver with the cap for unscrewing the cap off of the bottle neck.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view with parts broken away of a safety closure embodying the invention, being shown on an enlarged scale;

FIG. 2 is a fragmentary, vertical, sectional view taken along the line 2—2 of FIG. 1;

FIG. 3 is a view in bottom perspective with parts broken away of the driver element of a closure embodying the invention;

FIG. 4 is a top perspective view of a cap element of a closure embodying the invention;

FIG. 5 is a fragmentary view partly in elevation and partly in section showing the closure of the invention in "normal" nested position wherein the cap can be screwed onto the bottle neck;

FIG. 6 is a view similar to FIG. 5 but showing the closure of the invention in deformed position to provide for removing the cap from the bottle;

FIG. 7 is a view similar to FIG. 2 but illustrating a second embodiment of the invention;

FIG. 8 is a horizontal, sectional view taken along the line 8—8 of FIG. 7;

FIG. 9 is a bottom perspective view with parts broken away of the driver element of the embodiment of the invention illustrated in FIGS. 7 and 8;

FIG. 10 is a top perspective view of the cap element of the embodiment of the invention illustrated in FIGS. 7 and 8;

FIG. 11 is a view similar to FIG. 5 but illustrating the embodiment of the invention of FIGS. 7 and 8 in its "normal" position for screwing the cap onto a bottle neck; and

FIG. 12 is a view similar to FIG. 11 but illustrating this embodiment of the invention in its deformed position for removing the cap from the bottle neck.

DESCRIPTION OF PREFERRED EMBODIMENTS

In the embodiment of the invention illustrated in FIGS. 1—6, inclusive, a closure embodying the invention consists of two parts viz. a cap 20 and a driver 21. The cap 20 has a flat, circular top 22 and a cylindrical skirt 23. The inner side of the skirt 23 is formed with a series of helical threads 24 adapted to mate with threads 25 on a conventional bottle neck 26.

An annularly arranged series of ribs 27 is formed on the outer side of the cap skirt 23 and extends upwardly to the level of the top 22, the upper ends of the ribs 27 defining therebetween an annularly extending series of recesses 28. A collar 29 extends upwardly at the center of the cap top 22.

The driver 21 has a flat top 30 and a cylindrical skirt 31 of such size as to be adapted to fit telescopically over the cap 20. The vertical height of the skirt 31 of the driver 21 is greater than the skirt 23 of the cap 20 and, when the two are telescoped together, an inwardly directed lip 32 at the lower edge of the driver 21 extends inwardly a distance sufficient to engage the lower edge of the skirt 23 of the cap 20 for retaining the two in nested relationship.

A series of driving lugs 33 is located at the inner junction of the driver top 30 and skirt 31 occupying an annular area which overlies the recesses 28 in the cap 20 when the cap 20 and the driver 21 are telescoped or nested together. The arcuate extent of the lugs 33 (see particularly FIG. 1) is less than the arcuate extent of the recesses 28 so that the lugs 33 protrude downwardly into the recesses 28 when the cap 20 and driver 21 are nested.

Each of the lugs 33 has a front vertical edge 34 and a rear vertical edge 35. The front edges 34 of the lugs 33 extend downwardly beyond the upper edges of the ribs 27 and therefore of the recesses 28 when the cap 20 and driver 21 are in their "normal" position as illustrated in FIG. 5. The driver 21 is held in this spatial relationship by spacer means comprising the collar 29 and a similar smaller collar 36 at the center of the underside of the driver top 30 which telescopes into the collar 29 on the cap 20.

In order to screw the cap 20 onto a bottle having a threaded neck such as the bottle neck 26 the automatic capping machine or a user simply grasps the driver 21 and turns it downwardly, torque being delivered from the front vertical edges 34 of the lugs 33 to the adjacent edges of the ribs 27.

It will be observed by examination of FIG. 5, particularly, that in this "normal" position of the driver 21 and cap 20, the rear edges 35 of the lugs 33 extend down-

wardly to a level just above the upper edges of the recesses 28 or the ribs 27 so that if a person attempts to unscrew the cap 20 by rotating the driver 21 in the proper direction (counterclockwise in FIG. 1), the rear edges 35 of the lugs 33 simply pass over the upper edges of the ribs 27 or the recesses 28 and inclined bottom edges 37 of the lugs 33 engage the upper edges of the ribs 27 so that the driver 21 "ratchets" backwardly without applying torque to the cap 20.

When it is desired to remove the cap 20 from the bottle neck 26, an older child or an adult applies downward pressure to the annular portions of the driver top at the lugs 33, in this embodiment the peripheral portion of the top 30 of the driver 21, to deform the top 30 downwardly a distance sufficient to insert the rear edges 35 of the lugs 33 into the recesses 28. Upon reverse rotation of the driver 21 in this deformed position (FIG. 6) these rear edges 35 of the lugs 33 engage the upper edges of the ribs 27 or recesses 28 and torque can be applied through the driver 21 to the cap 20 to unscrew it off of the bottle neck.

In this embodiment of the invention, the lengths of the skirts 23 of the cap 20 and 31 of the driver 21 are such that if a person attempting to remove the closure pulls upwardly on the driver 21 until the lip 32 engages the bottom edge of the cap 20, the lugs 33 are completely removed from the spaces 28 between the ribs 27 and the driver 21 rotates freely without even "ratcheting" on the cap 20.

In order to provide for the operation just described, the cap 20 preferably is molded from a stiffer plastic material, for examples, a relatively stiff polystyrene or polypropylene, and the driver 21 is molded from a relatively flexible and resilient plastic material which, of course, may be the same material as that from which the cap 20 is molded but which contains a greater percentage of plasticizer to provide for its flexibility and resiliency. The cap 20 should be fabricated from a stiff material in order that it will remain tightly screwed onto a medicine bottle to prevent leakage or evaporation and the driver 21 must be molded from a more flexible and resilient material in order to provide for the deformation illustrated in FIG. 6 when it is desired to remove the closure and to result in the driver 21 automatically being snapped upwardly to the position illustrated in FIG. 5 when pressure is removed from its annular peripheral area.

The embodiment of the invention illustrated in FIGS. 7-12, functions in the same fashion as that described but the cooperating driving means and spacer means of the closure are located in a different annular area. In the embodiment of the invention illustrated in FIGS. 7-12, inclusive, the closure consists of a cap 20a and a driver 21a. The cap 20a and driver 21a have tops and skirts, threads and lips, substantially identical to those of the embodiment of the invention illustrated in FIGS. 1-6 and such parts are similarly numbered in FIGS. 7-12. In this second embodiment of the invention, an annularly extending series of rib-like formation 27a is formed in an annular zone nearer to the center of the cap top 22a and they define therebetween a series of recesses 28a. A cooperating annularly arranged series of lugs 33a is formed on the underside of the driver top 30a in an annular zone which overlies the recesses 28a in the cap top 22a when the cap 20a and driver 21a are nested one over the other. Spacer means in this embodiment of the invention consists of a rim 29a on the

cap 20a and a shoulder 36a on the underside of the driver top 30a.

As can best be seen by reference to FIGS. 11 and 12, each of the lugs 27a has a front edge 34a and a rear edge 35a. As in the embodiment of the invention illustrated in FIGS. 1-6, inclusive, the front edges 34a of the lugs 33a extend downwardly a distance sufficient so that they are beyond the upper edges of the recesses 28a in the "normal" position illustrated in FIG. 11 so that the cap 20a may be rotated onto the bottle neck 26a by rotating the driver 21a.

In this "normal" position, however, the rear edges 35a of the lugs 33a extend downwardly only to a level just above the upper edges of the recesses 28a. Therefore if a user attempts to remove the closure, again, the driver 21a merely "ratchets" backwardly with the edges of the rib-like formations 27a striking inclined lower surfaces or bottom edges 37a of the lugs 33a.

When an older person desires to remove the closure embodying the modification of the invention illustrated in FIGS. 7-12, inclusive, he applies pressure to the central area of the driver top 30a to depress the central annular area where the lugs 33a are located, a sufficient distance to insert the lugs 33a into the recesses 28a to engage their shorter rear edges 35a with the edges of the recesses 28a so that torque can be applied from the driver 21a to the cap 20a for unscrewing the closure.

As in the earlier described embodiment of the invention, the cap 20a preferably is fabricated from a relatively stiff material and the driver 21a from a more flexible and resilient material so as to provide for its deformation in order to remove the closure and for its automatic restoration to the safety or "normal" position illustrated in FIG. 11.

Having described my invention, I claim:

1. A safety closure for the threaded neck of a container, said closure consisting of an inverted cup-shaped cap having a disc-like top and an annular skirt that has threads on its interior surface, and an inverted cup-shaped driver having a disc-like top and an annular skirt, said driver being telescopically nested over said cap,

a. a first annular zone on each of the upper surface of the top of said cap and the undersurface of the top of said driver,

b. opposed interengaging lugs and recesses on said cap top, said driver top and said cap top, respectively, extending therearound in such first annular zone and each having spaced axially extending engagement surfaces that are alternately engageable for transferring torque from said driver to said cap, said recesses and lugs being located, respectively, at the periphery of the cap top and inner junction of the top and skirt of the driver, said recesses being axially extending grooves in the periphery of said cap skirt,

c. a second annular zone on each of the upper surfaces of said cap top and the undersurface of said driver top,

d. said first and second zones being radially spaced from each other,

e. opposed cooperating spacers on said cap top and said driver top in such second zone for holding said tops in normal spaced position,

f. the first axial surfaces of said lugs and recesses in said first zones overlapping axially at the sides

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thereof engageable for rotating said cap onto said neck when said tops are in normal spaced position,

- g. that portion of said driver top in such first annular zone being resiliently deformable axially relative to said spacers for moving said lugs and recesses axially relative to each other and axially overlapping the second axial surfaces of said lugs and recesses at the sides thereof engageable for rotating said cap off of said neck, and
- h. means on said driver and cap for retaining said driver and cap in nested relationship,
- i. whereby said lugs and recesses are normally engaged for screwing said cap onto said container neck by forward rotation of said driver and are engageable during retrograde rotation of said driver

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for unscrewing said cap only after axial deformation of said driver cap in such first annular zone.

2. A safety closure according to claim 1 in which the resiliently deformable portion of said driver top is at the outer margin thereof and said spacers are at the center of said cap and closure tops.

3. A safety closure according to claim 1 in which the skirt of the driver is longer than the skirt of the cap and there is an inwardly directed lip at the bottom of said skirt of the driver for retaining said cap and said driver in nested circumjacency.

4. A safety closure according to claim 2 in which the spacers are mated circular elements on and at the centers of the undersurface of the driver top and the upper surface of the cap top.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,830,390

Dated August 20, 1974

Inventor(s) Peter P. Gach

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

Column 4, line 55 should read -- junction of the top and skirt of the driver, said recesses. --.

Signed and sealed this 4th day of March 1975.

(SEAL)

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents
and Trademarks