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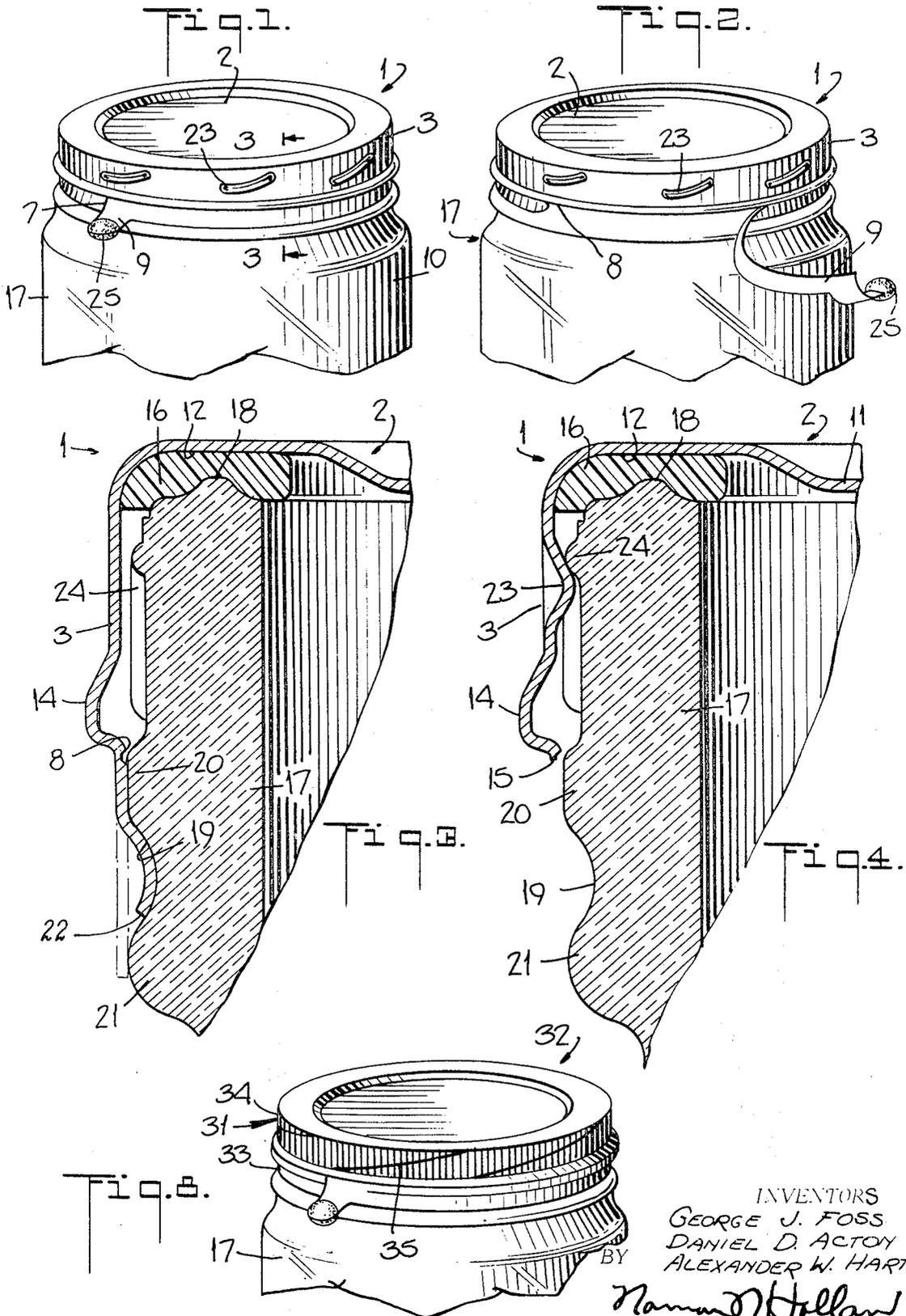
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3,519,159

CLOSURE CAP WITH RIP-TAB RELEASE AND CAM-OFF MEANS

Filed Aug. 1, 1968

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

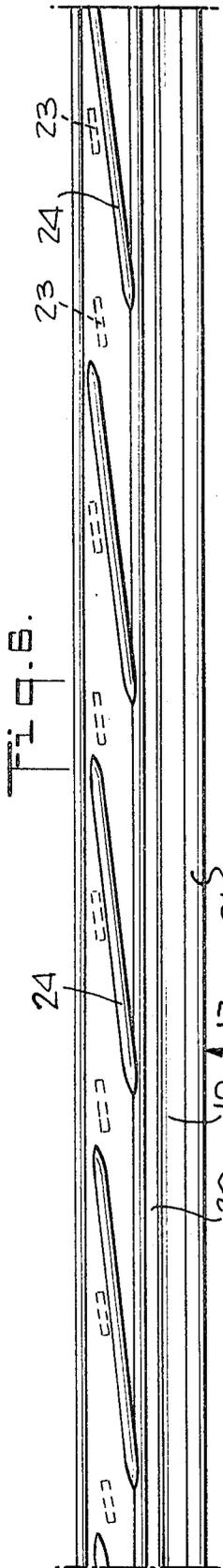


FIG. 10.

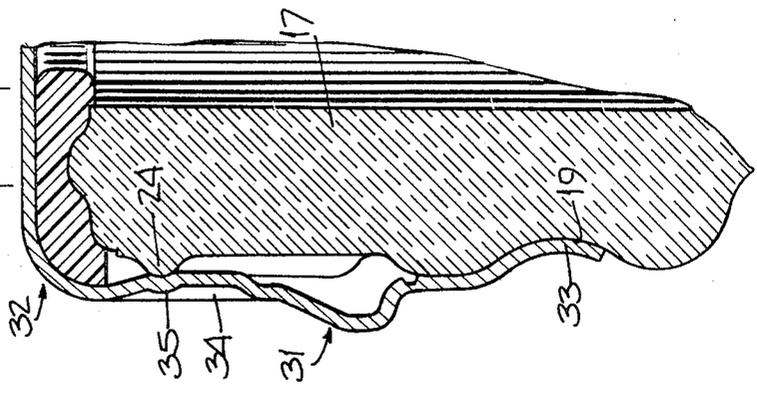


FIG. 9.

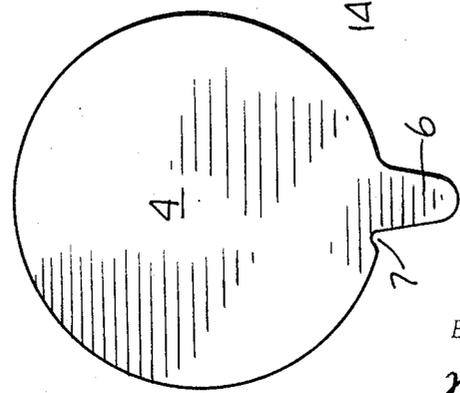
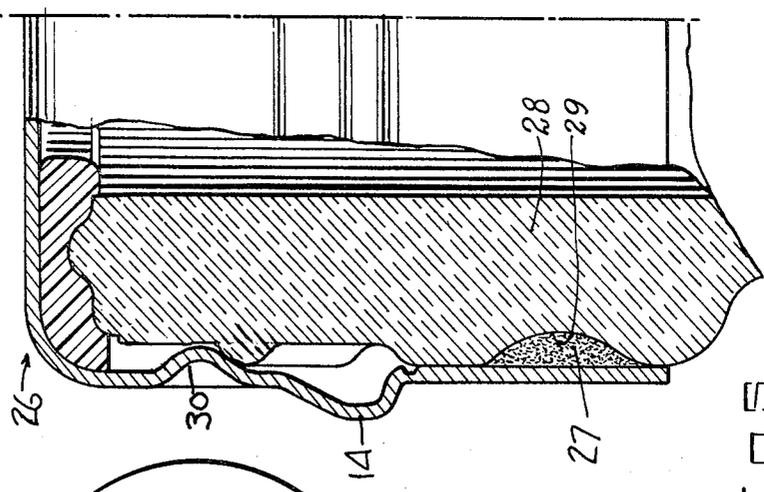
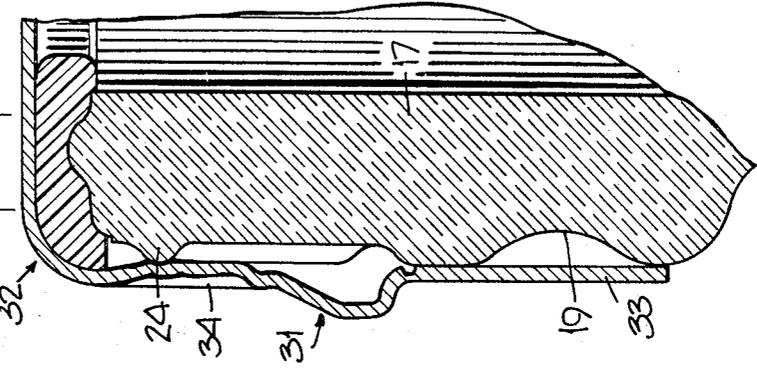


FIG. 7.

FIG. 5.

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**CLOSURE CAP WITH RIP-TAB RELEASE AND CAM-OFF MEANS**

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10 Claims

**ABSTRACT OF THE DISCLOSURE**

A metal closure cap for sealing glass containers and having a cover and depending skirt. The lower portion of the skirt is rolled into engagement with a cap retaining bead on the glass jar finish and a score line is provided on the cap skirt to define a rip-tab which is torn from the skirt to release the closure when the package is opened. Threads are provided on the glass finish above the cap retaining bead which cooperate with threads or indents formed in the cap skirt to cam the cap off as it is twisted after the rip-tab is removed. The cam-off threads or indents are also positioned to refasten the closure cap to the container for resealing it.

The present invention relates to a metal closure cap of the type used to seal glass containers and more particularly to a rip-tab type of closure which may be used to form vacuum seals. The cap has a rip-tab to release the cap from the container and threaded means for both camming the cap off and for resealing the cap after it is initially removed.

The closure cap of the present invention is of the general type formed with a cup-shaped metal shell having a cap cover and a depending skirt. A preferred beaded finish is provided for the glass container which permits the lower portion of the cap skirt to be rolled into locking engagement with the glass container. The lower portion of the cap skirt is encircled by a score line and has a rip-tab to permit removal of the cap by the removal of the rip-tab at the score line. A variety of prior caps utilize such rip-tabs, particularly where the containers are a one-use type and where the closure is removed and thrown away with no resealing being required. The closure cap of the present invention incorporates such a rip-tab design in a cap combining this easy removal means with a cam-off feature which adapts the cap for easy release after vacuum sealing and which additionally provides a convenient resealing means.

A further feature of the cap is the provision of an infestation resistant package as the lower edge of the cap skirt is moved against the glass finish during the sealing operation so that an insect barrier is formed at the lower edge of the cap skirt. The overall result provides an attractive and relatively simple closure cap which is easily applied to form an initial seal including a vacuum seal and which has infestation resistance prior to being opened and which then provides easy removal and excellent resealing properties.

Accordingly, an object of the present invention is to provide an improved easily applied and removed closure cap particularly adapted for vacuum seals.

Another object of the present invention is to provide an improved insect infestation resistant closure cap.

Another object of the present invention is to provide a rip-tab closure cap having improved cam-off means.

Another object of the present invention is to provide an improved rip-tab closure cap including resealing means.

Another object of the present invention is to provide an improved tamperproof sealed package having a rip-

tab closure and combining easy sealing and release, infestation resistance, and resealing means.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

A preferred embodiment of the invention has been chosen for purposes of illustration and description and is shown in the accompanying drawings, forming a part of the specification, wherein:

FIG. 1 is a perspective view of a preferred embodiment of the closure cap and package of the present invention;

FIG. 2 is a perspective view corresponding to FIG. 1 illustrating a cap with a rip-tab partially removed;

FIG. 3 is an enlarged fragmentary vertical sectional view of the closure cap and glass finish in accordance with the present invention taken along line 3—3 on FIG. 1;

FIG. 4 is a vertical sectional view corresponding to FIG. 3 but showing a cap reapplied to a container after being removed by removal of the rip-tab;

FIG. 5 is a side elevational view partially in section of another embodiment of the closure cap;

FIG. 6 is a developed view of a preferred embodiment of the glass finish;

FIG. 7 is a top plan view of a preferred embodiment of the cap blank;

FIG. 8 is a perspective view of an alternate embodiment having another form of cam-off and resealing means; and

FIGS. 9 and 10 are enlarged fragmentary vertical sectional views of the cap and container finish showing the cap before and after the cap skirt is forced into engagement with the container finish.

A preferred embodiment of the closure cap 1 includes a cover 2 and a depending skirt 3 formed from a single metal blank 4. FIG. 7 illustrates the preferred form of a blank 4 from which the cup-shaped cap shell is formed. The blank 4 is generally circular and includes a projecting tab 6 for providing a gripping portion on a rip-tab to be further described below. In addition, a notch 7 is also preferably formed at one edge of the rip-tab 6 on the side from which the rip action will be initiated. This notch 7 is provided for two reasons. In the first place, the notch 7 is reduced to a relatively narrow slit as seen at 7 in FIG. 1 and which acts to initiate the ripping action of the rip-tab and to initiate a tear line in the skirt material which meets the score line 8 which encircles the skirt 3 when the rip-tab 9 is removed from the sealed package 10. In order to prevent premature removal of the cap 1, it is preferable that the upper edge of this slit be spaced slightly from the adjacent portion of the score line 8.

In addition to forming the above described slit, the notch 7 also functions to relieve stress in the cap metal during the drawing of the closure shell when the flat blank 4 is drawn into its cup shape during the cap formation. Where a relatively sharp corner is left at the intersection of the rip-tab 6 side with the circular blank edge, unrelieved stress results during the drawing operation which weakens the metal in the area of the tab 6 which may cause a premature tear of a separation of the tab 6 from the rip-tab 9 as the rib-tab 9 is being torn from the cap. The provision of a relatively small notch of the general form and size illustrated prevents the buildup of this undesirable stress.

The blank 4 is first drawn into a cup-shaped shell to form the cap cover 2 and the depending skirt 3 and during this drawing operation the dies may be suitably shaped to provide a recessed stacking panel 11 in the cap cover 2 and a surrounding gasket receiving channel 12 at the outer edge of the cap cover 2.

FIGS. 3 and 4 illustrate a preferred embodiment of the cap skirt and the glass finish. After the shell drawing step the skirt 3 is straight extending generally at right angles to the plane of the cap cover. Preferably an outwardly directed bead 14 is formed at about the midportion of the cap skirt 3 by a rolling operation. The score line 8 around the skirt 3 and below the bead 14 is thereafter formed for defining the rip-tab 9. The bead 14 functions to hide the raw edge of the cap skirt 3 after the rib-tab 9 has been removed as seen in FIG. 4 by placing the raw edge 15 at a position remote from the user's finger tips. The bead 14 also strengthens the cap skirt 3 by making its central portion more rigid. The provision of this strengthening feature in the cap skirt 3 is particularly advantageous where the caps 1 are made of a relatively light metal plate such as a thin steel or aluminum plate.

A gasket 16 such as the usual flowed-in gasket or alternatively a resilient cut-ring gasket is positioned in the gasket channel 12 at any convenient time after the cap shell has been drawn. The gasket 16 may be conveniently applied after the rolling operation.

After the formation of the bead 14 and the score line 8, the cap is now ready for application to the container 17 in a sealing operation. The cap is applied by cap sealing machinery adapted to place it over the mouth of the jar 17 and to press it downwardly with its gasket 16 in engagement with the container rim 18. The sealing operation is completed by rolling or crimping the lower portion of the cap skirt 3 into engagement with the finish of the container 17 as illustrated in FIG. 3. The lower portion of the cap skirt 3 may be forced inwardly against the jar finish by a rolling operation where relative rotational movement is provided between the cap and suitably shaped rollers or other tools or by a crimping head which crimps or squeezes the lower portion of the cap skirt 3 into engagement with the jar finish.

A preferred cross-section of the glass finish as illustrated in FIGS. 3 and 4, comprises a shallow groove 19 defined by vertically spaced beads 20 and 21. The groove 19 provides vertical locking zone to hold the sealed cap 1 on the container and also acts to form a recessed zone for shielding the edge 22 of the sealed cap and the edge 15 of a reapplied cap.

In the embodiments illustrated in FIGS. 1-5, a group of indented lugs 23 is provided in the cap skirt 3 between the bead 14 and the cap top 2. These lugs 23 are formed during the rolling operation in which the skirt bead 14 is formed. The number of these lugs 23 and their position is arranged to insure that an effective number of lugs 23 are formed in areas spaced from the glass lugs 24 when the container is first sealed. In the preferred embodiment illustrated, for example, eight equally spaced lugs 23 are formed in the cap skirt 3 and the glass finish has four equally spaced cooperating lugs 24. With this arrangement, as least four of the cap lugs 23 are spaced from the glass lugs 24 regardless of the particular position of the cap 1 on the container 17 finish. If any portions of four of the cap lugs 23 engage a glass lug 24, the four intermediate cap lugs 23 will be spaced from all other portions of the glass lugs 24. The relative positions of the cap lugs 23 and glass lugs 24 giving this result are indicated in FIG. 6 which illustrates a preferred glass finish having four lugs 24 which shows typical positions of eight cap lugs 23 on the finish for a sealed cap position. It will be seen from FIG. 6 also that rotation of the cap 1 after the rib-tab 9 has been removed will cause the cap lugs 23 to engage and slide upwardly on the glass lugs 24 thereby camming or lifting the cap 1 from the container 17 and facilitating the release of the package 10 vacuum. FIG. 6 also illustrates the resealing capability of these lugs 23 and 24 as a relative motion of the lugs 23 corresponding to a clockwise twisting of the cap during resealing will be seen to move some of the cap lugs 23 under-

neath and into gripping engagement with the underside of the glass lugs.

A plastic or other finger grip 25 is preferably provided on the rip-tab 9 gripping tab 6. This grip 25 may be formed in the cap skirt 3 and the glass finish has four plastic such as a plastisol and by then curing the plastisol.

FIG. 5 illustrates another embodiment of the closure cap 26 and the container finish wherein the lower portion of the cap has a resilient and relatively high friction coating 27 applied to at least the lower portion of the inside of the cap skirt. This coating 27 replaces the rolling or crimping operation in holding the cap onto the container 28 as the cap is tightly attached to the container as the coated skirt is pressed onto the grooved bead 29 on the container 28. A sufficient grip as well as an insect barrier is provided by this friction coating 27. The coating 27 may be a plastisol or a similar plastic and may be conveniently applied to the inside of the cap skirt as the cap is rotated and subsequently cured.

Where this embodiment of the cap is used, the cam-off threads 30 in the cap 26 may be pre-formed as during the cap skirt rolling step or they may be formed by a rolling or crimping operation after the cap is applied to the container 28.

FIGS. 8, 9, and 10 illustrate another embodiment of the cap using a differing form of cam-off thread in the cap skirt. For this embodiment of the cap, a container 17 with the above described glass finish may be utilized, however, the upper portion of the cap skirt 31 preferably is initially knurled during the cap rolling step. As this embodiment of the cap 32 is having its lower skirt portion 33 rolled or crimped into engagement with the anchoring groove 19 in the glass finish, the upper portion 34 of the skirt 31 whether knurled or not is simultaneously crimped or rolled so that the upper skirt portion is embossed or slightly shaped forming threads 35 corresponding to the glass cam-off threads 24 on the glass finish.

A relatively slight thread outline for threads 35 is sufficient to cam the cap 32 off after the rip-tab 33 has been removed and also to threadedly reattach the cap 32 to the container 17 in a resealing operation.

It will be seen that an improved rip-tab type closure has been provided which combines ease of application with ease of removal and which in addition is infestation resistant and tamper proof. The cap is also particularly suited for use in vacuum sealing as a simple and effective cam-off feature is included in the cap. This cam-off means also acts to provide an effective resealing means. The cap is also adapted for being formed from relatively thin plate such as light weight steel plate or light weight aluminum plate and its suitability for formation from this thin material combined with its relatively simple form results in an extremely effective yet inexpensive cap useful for a wide variety of packages and purposes.

As various changes may be made in the form, construction and arrangement of the parts herein without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in a limiting sense.

Having thus described our invention, we claim:

1. A sealed package comprising the combination of a cap having a cover portion, a depending skirt portion, a sealing gasket on the inner surface of at least one of said portions, a score line encircling at least a major portion of the cap skirt and spaced from the lower edge thereof for defining a rip-tab, a plurality of camming members formed on said cap skirt above said score line and positioned in a circumferentially spaced position, a container, a plurality of cooperating cam-off threads on the finish of said container, said camming members on said cap skirt being positioned above at least a portion of said cam-off threads on the container for cooperating therewith for lifting the closure cap from the container when the closure

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cap is turned thereon, and said camming members on said cap skirt being positioned below at least another portion of said cam-off threads on the container for engaging them to reseal the container when the closure cap is turned in an opposite direction.

2. The package as claimed in claim 1 which further comprises a channel encircling said container below said cam-off threads and interlocking with the cap skirt.

3. The package as claimed in claim 1 in which there are a greater number of camming members on said cap skirt than there are cam-off threads on said container.

4. In combination with a container, a closure cap for sealing the container comprising the combination of a cover portion, a depending skirt portion, a sealing gasket on the inner surface of at least one of said portions, a score line encircling at least a major portion of the cap skirt circumference and spaced from the lower edge thereof for defining a rip-tab, and a plurality of cap cam-off means on the container, the relative spacing of said cam-off means on the cap and the container being arranged so that at least a pair of the cam-off means on the cap are spaced from the container cam-off means independently of the position of the cap on the container.

5. The combination as claimed in claim 4 in which said cam-off means on said cap skirt comprises indented lugs.

6. The combination as claimed in claim 4 in which said cam-off means comprises spaced lugs and in which there are a greater number of said lugs on said cap skirt than there are of said cam-off means on the container.

7. A combination as claimed in claim 4 in which said cam-off means are equally spaced about the respective circumferences of the cap and the container and wherein there are twice as many of said cam-off means on said cap.

8. A combination as claimed in claim 4 in which said cap skirt has a relatively resilient and high friction coating applied to its inner surface for frictionally engaging the container finish.

9. A combination as claimed in claim 4 which further

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comprises a knurled portion on said cap skirt above said score line, and said cam-off means comprises threads formed in said knurled portion.

10. In combination with a container, a closure cap for sealing a container comprising the combination of a cover portion, a depending skirt portion, a sealing gasket on the inner surface of at least one of said portions, a score line encircling at least a major portion of the cap skirt circumference and spaced from the lower edge thereof for defining a rip-tab, a plurality of cam-off elements formed on said cap skirt above said score line and circumferentially spaced for engaging a lesser number of cooperating cam-off threads on the finish of said container, said cam-off elements being positioned above at least a portion of the cam-off threads on the container for cooperating therewith to aid in removing the closure cap from the container when the closure cap is turned thereon and being positioned below at least another portion of said cam-off threads for engaging them to reseal the container when the closure cap is turned in an opposite direction, and the cap skirt below said score line being in locking engagement with the container.

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U.S. Cl. X.R.

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