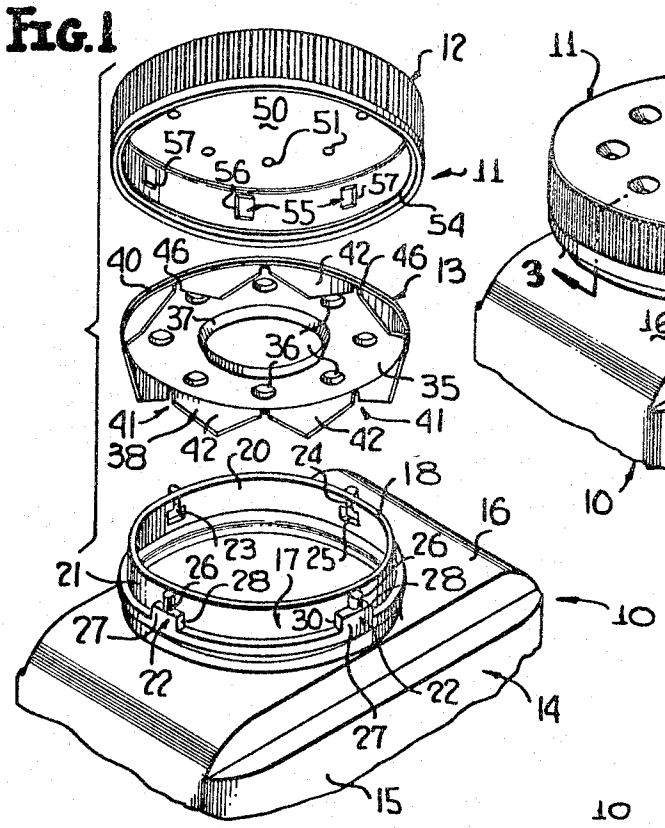
Oct. 4, 1966 M. J. KLYGIS 3,276,643

DISPENSER HAVING A ROTARY FLOW CONTROLLER

Original Filed March 10, 1964 2 Sheets-Sheet 1

FIG. 1



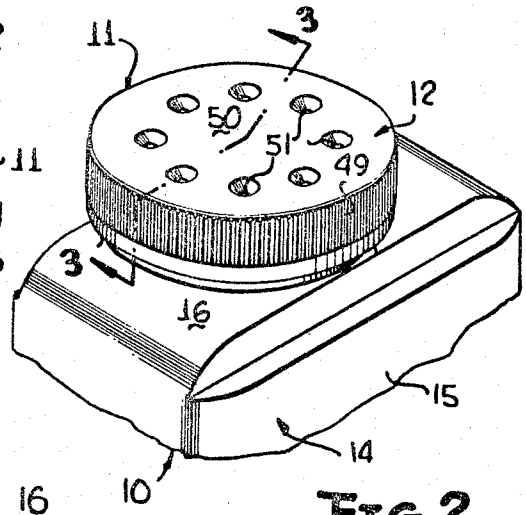
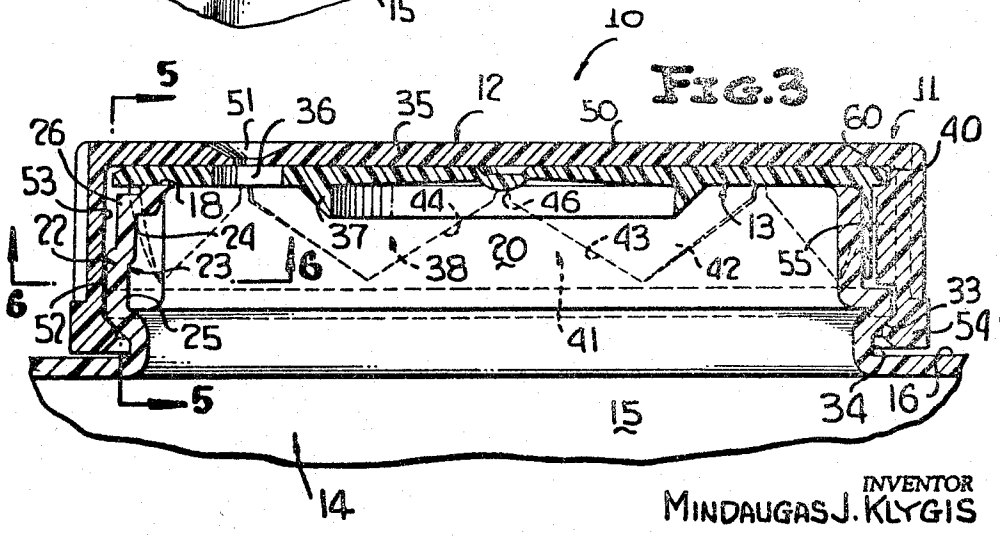


FIG. 2

FIG. 3



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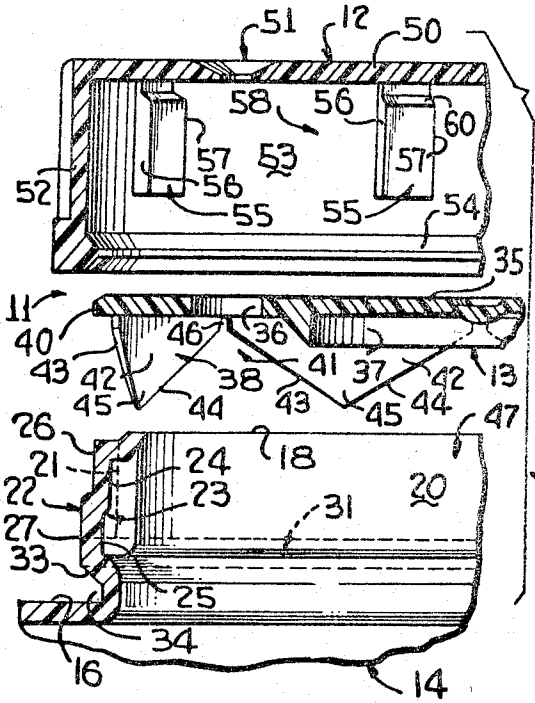


FIG. 4

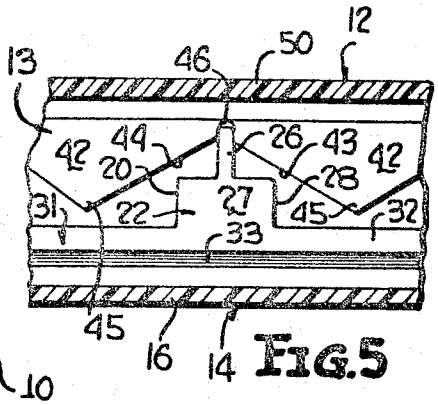


FIG. 5

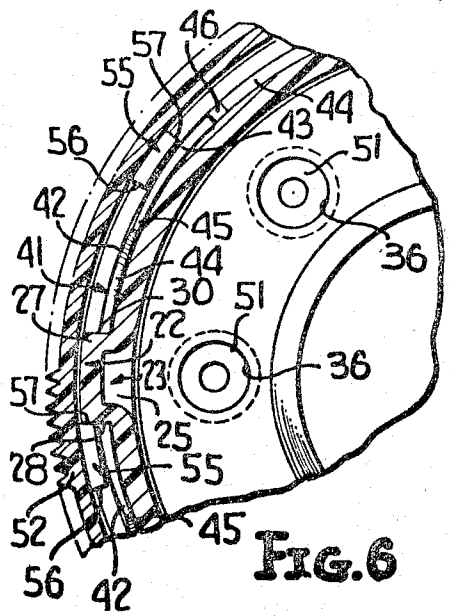


FIG. 6

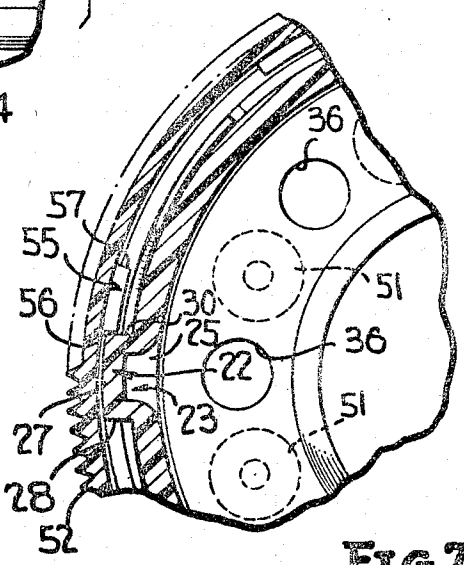


FIG. 7

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DISPENSER HAVING A ROTARY FLOW CONTROLLER

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Original application Mar. 10, 1964, Ser. No. 350,708, now Patent No. 3,206,085, dated Sept. 14, 1965. Divided and this application Sept. 14, 1965, Ser. No. 487,183

2 Claims. (Cl. 222—545)

This application constitutes a division of my copending commonly assigned application for U.S. Letters Patent, Serial No. 350,708, filed March 10, 1964 and now Patent No. 3,206,085.

This invention relates to a novel container and dispensing closure combination in which single means are provided for performing the combined functions of preventing the rotation of one of a pair of caps of the closure relative to the container and limiting the relative rotation of the other of the pair of caps relative to the first cap beween a position in which dispensing openings of the caps are in registration and another position in which the dispensing openings are not in registration.

It is conventional to form dispensing closures which include a pair of caps telescoped relative to each other and to secure such closures to the necks or finish of containers. One of the caps, generally an innermost cap, is secured to the neck of a container to prevent rotation of the inner cap with respect to the container. The second of the caps, generally an outermost cap, is telescoped externally of the innermost cap and the neck, and is mounted for rotation relative to both the innermost cap and the neck of the container.

The inner cap or sifter cap is secured to the neck of the container in a variety of different ways, such as internal ribs in the container neck received in grooves in a peripheral skirt of the sifter cap. It is also conventional to frictionally lock the sifter cap to the neck of the container by a press-fit construction, or to threadably secure the sifter cap to the neck of the container. In dispensing closures of the type in which the sifter cap does not include a peripheral skirt, the sifter cap can be adhesively secured to the lip of a conventional container and it is common to provide such a lip with projections received in recesses of the sifter cap to prevent the rotation thereof relative to the neck of the container.

The outermost or snap cap of conventional dispensing closures generally include a peripheral skirt provided with a plurality of inwardly directed radial projections which cooperate with external radially outwardly directed projections on the finish or neck of conventional containers to limit the rotation of the snap cap between dispensing and nondispensing positions of the closure. In all known conventional dispensing closures, these projections of the snap cap and container neck perform the sole function of limiting the rotation of the snap cap relative to the container neck and no cooperative relationship exists between the projections of either the snap cap or the container neck and the above-mentioned conventional means which secure the sifter cap to the container. That is, the sole purpose of the projections is to limit the rotation of conventional snap caps and the sole function of conventional sifter cap interlocking means is to interlock or secure conventional sifter caps to the necks of containers.

It is highly desirable, from both a practical and economical standpoint, to construct a dispensing closure and container which includes a single element for performing the combined functions of securing the sifter cap to the neck of the container and limiting the relative rotation of the snap cap and the container. This is particularly true when the dispensing closures and containers are constructed from plastic material by conventional molding processes, such as injection molding or blow molding. For example, in the case of a blow molded container, it is extremely difficult and economically unfeasible to provide axial indentations or projections in the uppermost peripheral edge of the container neck which would cooperate with axial projections or indentations respectively in a sifter cap to lock the sifter cap to the neck of the container.

In conventional dispensing closures of the type which include a sifter cap having a peripheral skirt which interlocks with a plurality of internal ribs in the neck of a container it is difficult, if not impossible, to form such ribs on the interior of a container neck by a blow molding process. As a result, conventional dispensing closures of the type heretofore described were generally provided with intricately molded sifter caps which cooperate with the exterior finish of blow molded containers and the rotation of the snap cap and sifter cap was usually limited by providing projections on the exterior of the sifter cap and the interior of the rotatable snap cap. Thus, with relatively few exceptions such sifter caps and snap caps as well as the blown containers with which these caps are associated, were of intricate configurations and relatively expensive to manufacture.

It is, therefore, an object of this invention to provide a novel container and dispensing closure combination which eliminates the above and many other disadvantages inherent in prior art structures by the provision of novel means for performing the combined functions of both securing a sifter cap to the neck of a container, and limiting the relative rotation of a snap cap with respect to both the sifter cap and the neck of the container.

A further object of this invention is to provide a novel dispensing closure and container of the type immediately above described which is particularly adapted to be constructed from plastic material without the necessity of intricate dispensing closure or container configurations, and equally applicable to both conventional blow molding and injection molding processes.

A further object of this invention is to provide a novel dispensing closure and container in which the dispensing closure includes first and second relatively rotatable dispensing caps carried by the container, each of the caps including end walls having dispensing openings and peripheral skirts, the container having a body terminating in a neck, the skirts being telescoped relative to the neck, and at least a single projection on the neck of the container, the projection having a first portion which interlockingly engages a relief portion of one of the caps to secure the cap to the neck of the container and a second portion of each of the projections being positioned for abutment by projections of the other of the caps thereby performing the combined functions of preventing the rotation of the first cap relative to the container and limiting the relative rotation of the second cap with respect to both the first cap and the container.

Still another object of this invention is to provide a novel dispensing closure and container constructed in the manner just described in which each of the projections includes a narrow portion and a relatively wider portion with the narrow portion of each projection being positioned more closely adjacent to an opening defined by an uppermost peripheral edge of the container neck than the distance between the relatively wider portion and the peripheral edge of the container neck.

Another object of this invention is to provide a novel dispensing closure and container of the type immediately above-described in which the plurality of projections are each of a generally inverted T-shaped configuration in elevation.

A further object of this invention is to provide a novel container of the type described in which the relatively wider portions of the projections project radially outwardly beyond the narrower portions of each of the projections and cooperate with radially inwardly directed projections on the skirt of an outermost one of the caps of the dispensing closure.

Another object of this invention is to provide a novel container particularly adapted for use with a dispensing closure composed of a sifter cap and a snap cap, the container including a body terminating in a neck, a plurality of external projections on the neck, each of the projections having a narrow portion and a relatively wider portion to define a generally inverted T-shaped configuration in elevation with the narrow portion being adapted to secure the sifter cap to the container neck and the wider portion being adapted to limit the relative rotation between the snap cap and the container neck.

With the above, and other objects in view that will hereinafter appear the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claims and the several views illustrated in the accompanying drawings:

In the drawings:

FIGURE 1 is a fragmentary exploded perspective view of a novel container and dispensing closure combination constructed in accordance with this invention, and illustrates the relationship of a pair of caps forming the closure prior to being assembled and secured to a neck of the container.

FIGURE 2 is a fragmentary top perspective view of the container and dispensing closure combination shown in FIGURE 1, and illustrates the assembled dispensing closure secured to the neck of the container.

FIGURE 3 is an enlarged fragmentary sectional view taken along line 3—3 of FIGURE 2, and more clearly illustrates the assembled condition of the caps and the securement thereof to the neck of the container.

FIGURE 4 is a fragmentary exploded sectional view taken through the longitudinal axis of the closure and container, and more clearly illustrates the relationship of the caps prior to being secured to the neck of the container.

FIGURE 5 is a fragmentary sectional view taken substantially along line 5—5 of FIGURE 3, and shows means interlocking one of the caps to the neck of the container.

FIGURE 6 is a fragmentary sectional view taken substantially along line 6—6 of FIGURE 3, and illustrates the means of FIGURE 5 performing the additional function of limiting the rotation of an outermost one of the caps with respect to the container.

FIGURE 7 is a fragmentary sectional view taken substantially along line 6—6 of FIGURE 3 after the outermost cap has been rotated relative to the container and illustrates a second position of the means limiting the rotation of the outer cap.

A novel dispensing closure and container combination constructed in accordance with this invention is shown in the drawings and is generally designated by the reference numeral **10**. The dispensing closure and container combination **10** comprises a dispensing closure **11**, including an outermost snap cap **12** and an innermost sifter cap **13**, and a container **14**. The caps **12** and **13** and the container **14** are preferably constructed from plastic material, such as linear polyethylene or similar thermoplastic material. The snap cap **12** and the sifter cap **13** are each preferably constructed by a conventional injection molding process, and the container **14** is preferably blow molded in a conventional manner.

The container **14** comprises a container body **15** which is substantially rectangular in transverse section. The container body **15** is joined by an integral shoulder **16** to an upstanding neck or finish **17**. The neck **17** terminates in an uppermost edge **18** (FIGURE 1) defining an opening (unnumbered) of the container **14**.

The neck **17** of the container **14** includes an inner circumferential surface **20** and an outer circumferential surface **21**. A plurality of identical means or projections **22** are equally spaced about the exterior of the neck **17** and each projection **22** is directed radially outwardly beyond the exterior circumferential surface **21** of the neck **17**, as is best illustrated in FIGURES 1 and 4 of the drawings. Because the container, as well as the neck **17** thereof, is preferably conventionally blow molded, each of the projections **22** is formed from the material of the neck **17** which is forced radially outwardly in a known manner to define an identical internal recess **23** (FIGURES 3 and 4) in each of the projections **22**. Each recess **23** is of a generally inverted T-shaped configuration in elevation, and includes an axially extending narrow recess portion **24** and a relatively radially deeper and circumferentially wider recess portion **25**, as is best shown in FIGURES 1, 3, 4, and 6 of the drawings. The narrow recess portion **24** of each of the recesses **23** terminates short of the uppermost edge **18** of the neck **17** (FIGURES 3 and 4).

Each of the projections **22** similarly includes an axially extending narrow portion **26** and a relatively circumferentially wider portion **27** (FIGURE 5). The portions **26** and **27** thus form projections **22** which are generally inverted T-shaped in elevation, as is best illustrated in FIGURES 1 and 5 of the drawings. The relatively wider portion **27** of each of the projections **22** projects radially outwardly beyond the narrower portions **26** of the projections **22** (FIGURE 4). Each of the projections **22** further includes oppositely directed abutment surfaces or faces **28** and **30**.

A circumferential bead **31** surrounds the exterior of the neck **17**, and the wider portion **27** of each of the projections **22** blends into the bead **31** to define a generally smooth unbroken circumferential surface **32** (FIGURE 5). A radially inwardly and downwardly directed annular surface **33** of the bead **31** opposes the shoulder **16** of the container body **15** and defines therewith an outwardly opening circumferential groove **34** (FIGURES 3 and 4).

The sifter cap **13** of the dispensing closure **11** comprises an end wall **35** having a plurality of identically circumferentially spaced dispensing openings **36**. There are eight such dispensing openings **36** in the end wall **35** of the sifter cap **13** and each dispensing opening **36** is spaced an identical distance from the axis of the sifter cap **13**. More or less than the number of dispensing openings can, of course, be provided in the sifter cap **13** in accordance with this invention.

The end wall **35** of the sifter cap **13** is reinforced at a central portion thereof by a depending annular reinforcing rib **37**. A depending peripheral skirt **38** (FIGURES 1 and 4) forms an integral portion of the end wall **35** adjacent to but slightly inwardly of a peripheral edge **40** of the end wall **35**. The peripheral skirt **38** of the sifter cap **13** is interrupted along the circumference thereof by a plurality of identical, equally spaced, generally inverted V-shaped relieved areas or slots **41**. In the preferred embodiment of this invention, there are eight such slots **41** and adjacent ones of the slots **41** set off identical V-shaped webs or skirt portions **42** having oppositely directed guiding edges **43** and **44** (FIGURES 4 and 5) terminating at an apex **45**. Each of the inverted V-shaped slots **41** terminates adjacent the end wall **35** of the sifter cap **13** in a relatively narrow and axially short slotted portion **46**. As is best illustrated in FIGURE 5 of the drawings, the width of the slotted portion **46** of each of the slots **41** is slightly greater than the width of the narrow portion **26** of each of the projections **22** of the container **14**. This permits selected ones of the narrow portions **26** of the projections **22** to be received in selected ones of the slot portions **46** as is best illustrated in FIGURE 5 to secure the sifter cap **13** to the neck **17** of the container

14 and prevent relative rotation therebetween in a manner to be described more fully hereafter.

The snap cap 12 of the dispensing closure 11 includes an end wall 50 having a plurality of equally spaced dispensing openings 51. There are eight such dispensing openings 51 in the end wall 50 and each dispensing opening 51 is spaced from the axis of the snap cap 12 a distance identical to the spacing of the dispensing openings 36 from the axis of the sifter cap 13. The end wall 50 is integrally joined to a depending peripheral skirt 52 having an exteriorly ribbed gripping portion 49 (FIGURE 2) and an interior surface or wall 53. The skirt 52 terminates in an inwardly directed circumferential locking rib 54 (FIGURE 4) which is adapted to be received in the groove 34 of the container body 15 to secure the dispensing closure 11 to the neck 17 of the container 14 in a conventional manner.

A plurality of radially inwardly directed identical projections 55 form an integral portion of the skirt 52 and project beyond the internal surface 53 thereof, as is best illustrated in FIGURE 4 of the drawings. There are eight such projections or lugs 55 and on each projection is included oppositely directed abutment surfaces or faces 56 and 57 between which lies a keyway 58. A top wall or surface 60 of each of the projections 55 slopes gradually radially inwardly and downwardly and is spaced from the end wall 50 of the snap cap 12 (FIGURES 3 and 4). The distance between the bottom surface (unnumbered) of the end wall 50 and the bottom surface (unnumbered) of each of the projections 55 is substantially equal to or slightly less than the distance between the edge 18 of the neck 17 and the upper surface (unnumbered) of the external bead 31 of the neck 17. The projections 55 are also annularly offset from adjacent ones of the dispensing openings 51 in the end wall 50 of the snap cap 12.

The dispensing closure 11 is assembled by telescoping the snap cap 12 and the sifter cap 13 relative to each other. During this telescoping of the caps 12 and 13 the end wall 35 of the sifter cap 13 bends slightly into a very shallow downwardly facing concave configuration as the peripheral edge portion 40 of the end wall 35 bears against the radially innermost surfaces (unnumbered) of the projections 55. After the edge 40 of the end wall 35 passes these faces, the end wall 35 rebounds to the normal configuration thereof and the edge 40 is held movably captive between the lowermost surface (unnumbered) of the snap cap end wall 50 and the surfaces 60 of each of the projections 55, as is best illustrated in FIGURE 3 of the drawings. There is thus established a limited amount of axial play between the end walls 35 and 50 of the respective caps 13 and 12 prior to joining these caps to the container 14.

After the snap cap 12 and the sifter cap 13 have been assembled in the manner just described, the dispensing closure 11 is telescoped upon the neck 17 of the container 14. If the narrow portions 26 of each of the projections 22 on the neck 17 are not in exact axial alignment with an associated slotted portion 46 of the sifter cap skirt 38, the narrow portions 26 will contact either of the edges 43 and 44. After such contact is established, the narrow portions 26 bear against the edge 43 or 44 as the snap cap 12 is urged downwardly and the camming action between these edges 43 or 44 and the narrow portions 26 of the projections 22 causes the sifter cap 13 to rotate either in a clockwise or a counterclockwise direction until each of the four narrow portions 26 is received in an associated one of the eight slotted portions 46 of the slots 41. The snap cap 12 is continually forced downwardly until the locking rib 54 "snaps" into the groove 34 of the container neck 17 (FIGURE 3) at which point the dispensing closure 11 is fully seated upon and secured to the neck 17 of the container 14. In this position of the dispensing closure 11, the relatively wider portions 27 of each of the projections 28 of the container neck 17 are positioned in an associated one of the eight keyways 58 between the projections 55 of the snap cap skirt 52. Because of the relative dimensioning between the bottom surface of the snap cap end wall 50 and the bottom of each of the projections 55, and the distance between the edge 18 of the container neck 17 and the bottom of the neck bead 31, the abutment surfaces 56 and 57 of the projections 55 are in position to abut or contact the respective abutment surfaces 30 and 28 of selected ones of the projections 22 on the container neck 17 to limit the rotation of the snap cap 12 with respect to the sifter cap 13 and the container 15 between a dispensing position of the dispensing closure 11 (FIGURE 6) in which the dispensing openings 36 and 51 are in axial alignment and a nondispensing position (FIGURE 7) in which the dispensing openings 36 and 51 are out of alignment or registration. In either the dispensing position of the dispensing closure 11 (FIGURE 6), the nondispensing position (FIGURE 7) or a position between the dispensing and nondispensing position shown in these figures, the wider portions 27 of the projections 22 project radially outwardly through an associated slot 41 between adjacent skirt portions 42 of the sifter cap skirt 38 (FIGURES 6 and 7). The skirt 38 of the sifter cap 13 is positioned between the external surface 21 of the container neck 17 and the radially innermost surface (unnumbered) of each of the projections 55 of the snap cap 12. Thus, the snap cap 12 is free to rotate in either a clockwise or a counterclockwise direction with respect to the sifter cap 13 and the container 15 without interference. The sifter cap 13 cannot, of course, rotate during the rotation of the snap cap 12 because of the interlocking engagement between the narrow portions 26 of the projections 22 and the slotted portion 46 in the sifter cap skirt 38, as is clearly illustrated in FIGURES 3 and 5 of the drawings.

The projections 22 thus cooperate with both the sifter cap 13 and the snap cap 12 to perform the combined functions of interlocking or securing the sifter cap 13 to the neck 17 of the container 14 while simultaneously limiting the rotation of the snap cap 12 relative to the sifter cap 13 and the container 14. The first of these functions, again, is performed by the interlocking between the slotted portions 46 of the sifter skirt 38 and the narrow portions 26 of the projections 22 while the latter function is performed by the wider portions 27 of the projections 22 positioned in alignment for abutment with the projections 55 of the snap cap 12 upon the rotation thereof.

From the foregoing, it will be seen that novel and advantageous provision has been made for carrying out the desired end. However, attention is directed to the fact that variations may be made in the example dispensing closure and container without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. A dispenser comprising a container terminating in a neck, an inner cap and an outer cap, means securing said caps to said container neck, each of said caps having end panels and depending peripheral skirts, said caps being in telescopic relationship, said inner cap peripheral skirt being in external telescopic relationship to said neck, said outer cap peripheral skirt being in external telescopic relationship to said inner cap peripheral skirt, dispensing openings in said end panels, said openings being aligned in a dispensing position of said caps and being misaligned in a nondispensing position thereof, first means on the exterior of said neck cooperative with means on said inner cap peripheral skirt for preventing rotation of said inner cap relative to said container neck, second means also on the exterior of said neck cooperative with means on said outer cap peripheral skirt for limiting the rotation of said outer cap relative to said inner cap and said container neck between said dis-

pensing and nondispensing positions, means maintaining said caps in assembled relationship prior to the securement thereof to said container whereby said caps are prevented from inadvertent or accidental separation, and said maintaining means being radially outwardly directed flange means located in the plane of the inner cap end panel.

2. The dispenser as defined in claim 1 wherein said radially outwardly directed flange means is a continuous and unbroken circumferential flange, and said flange includes an inclined upper circumferential surface for facilitating the insertion of said inner cap into said outer cap.

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