Dec. 27, 1966 S. K. JOHNS 3,294,293

CLOSURE-ACTUATOR FOR CONTAINER WITH FLEXIBLE TUBULAR SPOUT

Filed Nov. 29, 1965 2 Sheets-Sheet 1

Fig. 1.

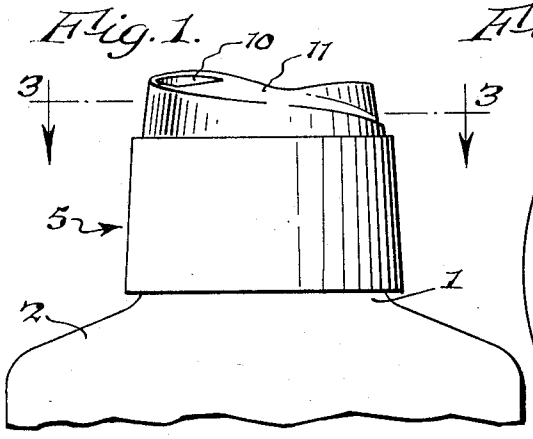


Fig. 2.

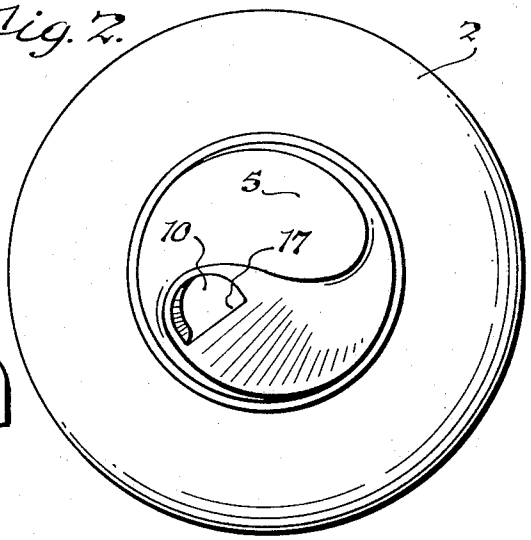


Fig. 4.

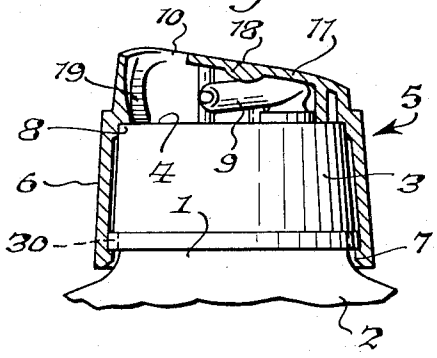


Fig. 3.

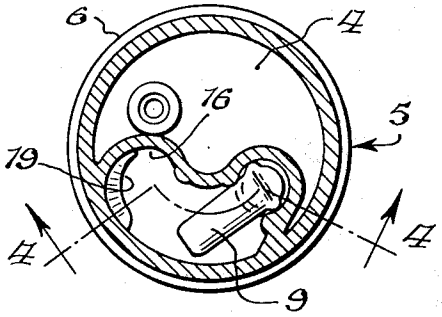


Fig. 6.

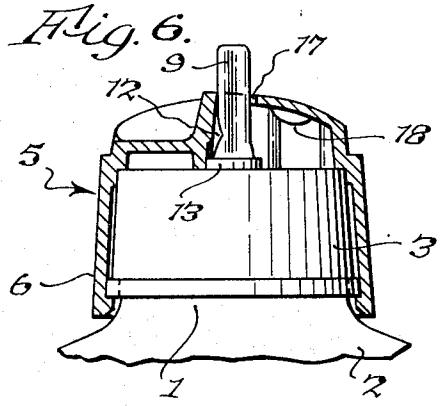
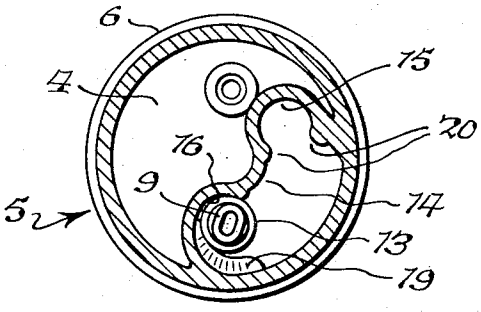


Fig. 5.



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Fig. 7.

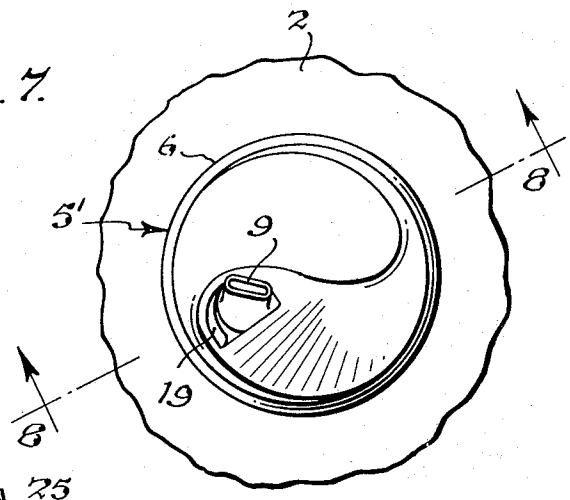


Fig. 8.

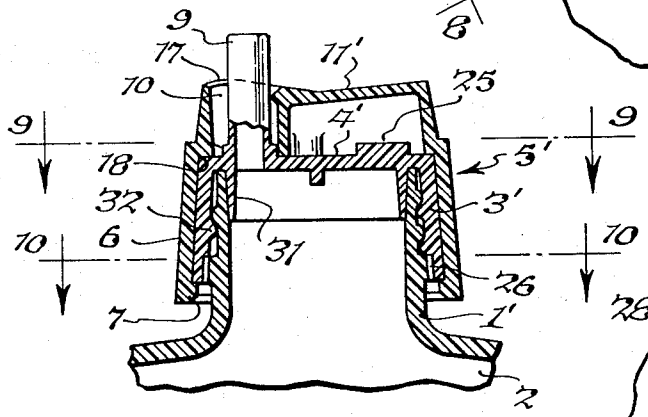


Fig. 9.

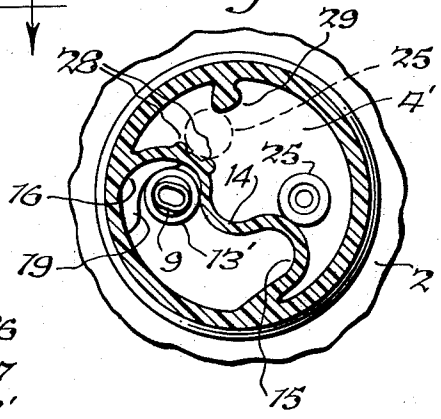
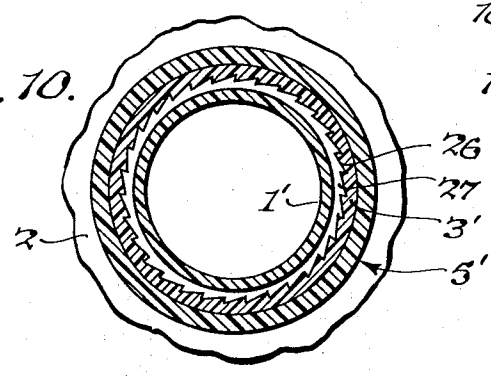


Fig. 10.



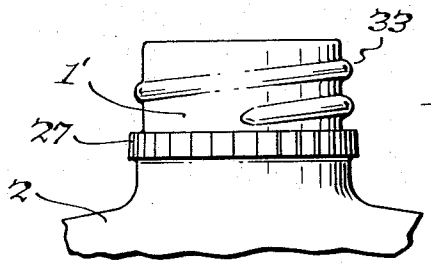


Fig. 11.

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CLOSURE-ACTUATOR FOR CONTAINER WITH FLEXIBLE TUBULAR SPOUT

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Filed Nov. 29, 1965, Ser. No. 510,170
7 Claims. (Cl. 222—507)

This application is a continuation-in-part of my pending application Serial No. 346,558, filed February 21, 1964, and entitled Closure.

This invention relates generally to the closure art, and more specifically to a new and useful captive dispensing closure for containers and the like.

In my application Serial No. 346,558 there is disclosed a dispensing closure having a tubular dispensing spout foldable upon itself to close the dispensing route therethrough and a cap movable in one direction to fold the spout upon itself, thereby closing the dispensing route, and in the opposite direction to unfold the spout for dispensing. While friction between the relatively movable parts can be used to hold the cap in closed position, it is sometimes desired to positively lock the closure against inadvertent and accidental opening during handling and transport.

Accordingly, a primary object of my invention is to provide a dispensing closure having a tubular dispensing spout bendable upon itself to close the dispensing route therethrough and a captive cap movable to so bend the spout, with means releasably retaining the cap in its closed position.

Furthermore, in applying such a closure to a container it is desirable to be able to thread the closure onto the container, utilizing high speed capping machinery available for this purpose. However, such provision for relative rotation between the closure and the container poses a problem in preventing unthreading of the closure from the container when relative rotation of the closure parts is used to open or close the dispensing route.

Accordingly, another object of the present invention is to provide a dispensing closure naving an overcap rotatable on an undercap to open and close a dispensing route therethrough, the undercap being threaded on a container neck together with means holding the overcap against rotation relative to the neck in a direction unthreading the undercap from the neck.

A further object of this invention is to provide a dispensing closure having the foregoing characteristics and wherein the retaining and holding means are concealed when the closure is threaded into position on the container neck, and do not detract from the appearance of the closure-container combination.

The foregoing and other objects, advantages and characterizing features of a captive dispensing closure of my invention will become apparent from the ensuing detailed description of certain illustrative embodiments thereof, considered in conjunction with the accompanying drawings depicting the same, wherein like reference numerals denote like parts throughout the various views and wherein:

FIG. 1 is a fragmentary side elevational view of a container having a captive closure of my invention in place thereon, the closure being shown in its closed position;

FIG. 2 is a top plan view thereof, on an enlarged scale;

FIG. 3 is a transverse sectional view through the closure, taken about on line 3—3 of FIG. 1;

FIG. 4 is a view thereof partly in side elevation and partly in vertical section, taken about on line 4—4 of FIG. 3;

FIG. 5 is a view corresponding to that of FIG. 3, but

with the closure in its open position to dispense the container contents;

FIG. 6 is a view similar to that of FIG. 4, but with the closure in the open, dispensing position shown in FIG. 5;

FIG. 7 is a fragmentary plan view of another embodiment of the closure, shown in its open position;

FIG. 8 is a vertical sectional view thereof taken about on line 8—8 of FIG. 7;

FIG. 9 is a transverse sectional view thereof, taken about on line 9—9 of FIG. 8, the locking action of this embodiment when in closed position being indicated in phantom;

FIG. 10 is a transverse sectional view thereof taken about on line 10—10 of FIG. 8; and

FIG. 11 is an elevational view of a container neck adapted for use with the closure of FIGS. 7–10.

Referring now in detail to the illustrative embodiment depicted in FIGS. 1–6 of the accompanying drawing, there is shown a two-piece captive closure of my invention mounted on the upstanding neck 1 of a container 2. The closure comprises an undercap 3 having a side wall encircling the neck 1 of the container, and having an end wall 4 across the open mouth or outlet of the container neck. The lower edge of the skirt of undercap 3 can have an internal annular bead snap fitting over an annular shoulder around container neck 1, as indicated at 30 in FIG. 4.

An overcap 5 has a side wall skirt 6 formed with an internal bead 7 at its lower edge, snap fitting beneath the sidewall skirt of undercap 3. Overcap 5 also is provided with an internal annular shoulder 8 seating on end wall 4 of undercap 3.

An elongated, tubular dispensing spout 9 formed of resiliently flexible material projects from end wall 4 of undercap 3 through an opening 10 in the end wall 11 of the overcap 5 when the latter is in open position, as shown in FIGS. 5 and 6. Spout 9 and opening 10 are positioned in eccentric relation to the axis of rotation of overcap 5 and spout 9 can have a pre-formed hinge line defined by a notch 12 in its side wall. To facilitate bending about hinge notch 12 tube 9 is flat sided, being laterally elongated as clearly shown for example in FIG. 5, notch 12 being in one of the flat sides.

At its base, below hinge notch 12, spout 9 is surrounded by a larger diameter circular base 13 providing a stop and lock part, as will become apparent. End wall 11 of overcap 5 is provided with a depending internal flange 14 defining generally semi-circular recesses 15 and 16 adapted to receive circular base 13 in the closed and open positions, respectively, of the closure.

With the parts in the position shown in FIGS. 5 and 6, dispensing spout 9 is unfolded and projects through opening 10 beyond overcap 5 for dispensing the container contents. When it is desired to close the container overcap 5 is rotated relative to undercap 3, in a clock-wise direction as viewed in FIG. 5, until these parts are in the relative position shown in FIG. 3. As overcap 5 is rotated out of its open position, spout 9 is engaged and bent, first by the edge 17 of opening 10 and then by a folding or bending cam 18 formed on the undersurface of overcap end wall 11. This folds spout 9 about hinge notch 12, effectively pinching the spout upon itself, in a manner closing and sealing the dispensing route through the spout, without capping or otherwise closing the outer end of the spout. Also, the spout is completely confined within the overcap.

When it is desired to dispense the container contents, overcap 5 is rotated counter clockwise from the position of FIG. 3 to that shown in FIG. 5. The natural resiliency of the spout material causes it to unfold, and this un-

folding action is assisted by a riser cam **19** formed on overcap **5** adjacent the opening **10**. Riser cam **19** extends from a point closely adjacent undercap wall **4** to the top of opening **10**, and has an upwardly spiraling cam surface engaging beneath the folded spout to unfold it and direct the end of the spout upwardly through the opening **10** as overcap **5** is rotated into open position.

Thus, opening and closing of the dispensing closure is readily accomplished by rotation of overcap **5** in opposite directions relative to the undercap, in the manner described in my pending application Serial No. 346,558. It is a particular feature of this invention that means are provided for releasably retaining the closure in closed position. In the embodiment of FIGS. 1–6 this is accomplished by providing socket **15** with a restricted inlet opening. To this end, the entrance to socket **15** is formed by a pair of ribs **20** which are spaced apart a distance slightly less than the external diameter of spout base **13**. The material of flange **14** is resiliently flexible, whereby as base **13** moves into socket **15** upon completing closing movement of overcap **5** it snaps past ribs **20** into the recess provided by socket **15**. Overcap **5** is thereby releasably locked in closed position relative to undercap **3**, requiring a positive effort to release overcap **5** for movement into open, dispensing position. This effectively precludes inadvertent or accidental opening of the closure and ensures that it will remain closed until it is deliberately opened.

Engagement of spout base **13** in sockets **15** and **16** also acts as a stop, positively defining the open and closed positions of overcap **5** and preventing relative rotation thereof past those positions. The snap action of base **13** past ribs **20** and into socket **15** also indicates to the person manipulating the closure that it is in closed position, whereby persons familiar with the closure will instinctively fully close it and will not inadvertently leave it only partially closed.

Referring now in detail to the illustrative embodiment depicted in FIGS. 7 through 11, there is shown an undercap **3'** having an internally threaded skirt encircling and threadably received on an externally threaded neck **1'** of a container **2**. Undercap **3'** has an end wall **4'** across the open mouth of container neck **1'**, and a resiliently flexible tubular dispensing spout **9** projects therefrom. Undercap **3'** also has an internal skirt **31** fitting within neck **1'**.

An overcap **5'** of generally the same configuration as overcap **5** of FIGS. 1–6 has a sidewall skirt **6** with an internal bead **7** at its lower edge snap fitting beneath the skirt of undercap **3'**. Overcap **5'** also has an internal annular shoulder **8** seating on end wall **4'** of undercap **3'**. End wall **11'** of overcap **5'** is provided with a depending internal flange **14** defining sockets **15** and **16** adapted to receive the circular base **13** of spout **9**, as before. However, in this embodiment ribs **20** are omitted. Spout **9** projects from end wall **4'** of undercap **3'** through opening **10** in end wall **11'** of overcap **5'** and is positioned in eccentric relation to the axis of rotation of overcap **5'** as in the previous embodiment. Overcap **5'** can have a hold down cam corresponding to cam **18** of FIGS. 1–6 on the undersurface of wall **11'**, and has a riser cam **19** adjacent opening **10**.

The closure of FIGS. 7–11 operates in essentially the same manner as the embodiment of FIGS. 1–6. To close the dispensing route, overcap **5'** is rotated clockwise as viewed in FIG. 9, and spout **9** is engaged and bent upon itself first by edge **17** of opening **10** and then by the undersurface of wall **11'** through a bending cam, not shown, corresponding to cam **18** of the previous embodiment. This folds and pinches spout **9** upon itself in a manner closing and sealing the dispening route therethrough and confining spout **9** within overcap **5'**. To open the dispensing route, overcap **5'** is rotated in the opposite direction, thereby freeing spout **9** for unfolding

under the action of its natural resiliency and with the assistance of upwardly spiraling riser cam **19** which directs the spout through opening **10**.

Undercap **3'** is threaded onto container neck **1'** by relative rotation therebetween in one direction. It is an important feature of my invention that the closure is not unthreaded from container neck **1'** upon relative rotation between overcap **5'** and undercap **3'** in the opposite direction.

To this end, the skirt of undercap **3'** is provided with an annular internal toothed ratchet **26** positioned adjacent the outer end of its threaded portion **32** for engagement with a mating annular external toothed ratchet **27** on neck **1'** adjacent the inner end of its threaded portion **33**. The mating ratchet teeth are brought into slipping engagement when undercap **3'** is rotated onto neck **1'** for threaded engagement therewith and operate to prevent rotation of undercap **3'** in an unthreading direction on neck **1'**. In other words, the teeth of ratchets **26** and **27** are so oriented relative to threaded portions **32** and **33** as to permit rotation of undercap **3'** on neck **1'** in a direction permitting threading of the closure onto the neck while preventing unthreading thereof once the closure has a predetermined threaded engagement on the neck.

In the illustrated embodiment, the orientation of ratchets **26** and **27** is so correlated with the direction of rotation of overcap **5'** relative to undercap **3'** between closed and open positions that undercap **3'** is urged into tighter threaded relationship with neck **1'** during rotation of overcap **5'** to closed position, and is held against rotation relative to neck **1'** by ratchets **26** and **27** during rotation of overcap **5'** to open position.

Thus, undercap **3'** is held against unthreading from neck **1'**, and the desired seal therebetween is maintained at all times notwithstanding rotation of overcap **5'** in opposite directions for opening or closing the closure.

It is apparent that the threaded, ratchet engagement between the closure undercap and the container neck may also be adapted to the embodiment shown in FIGS. 1–6.

The overcap **5'** of FIGS. 7–11 also is releasably locked in closed position, but by means other than spout **9** and the boss comprising spout base **13**. In this instance, two laterally spaced ribs **28** are formed on the side of flange **14** opposite sockets **15** and **16** to provide a seat for an upstanding boss **25** on wall **4'**. A resiliently yieldable finger **29** extends inwardly from the side wall skirt of overcap **5'** toward ribs **28** for releasably confining boss **25** in seated engagement therewith.

Upon clockwise rotation of overcap **5'** from the open position depicted in FIG. 9 to its closed position, boss **25** resiliently snaps past finger **29** and the rib **28** into place between ribs **28**, and is held therebetween by the resilient urging of projection **29**. Overcap **5'** is thereby releasably locked against inadvertent or accidental movement out of closed position and can be rotated to open position only upon application of a positive face sufficient to snap boss **25** past ribs **28** and projection **29**.

Accordingly, it is seen that my invention fully accomplishes its intended objects. The closure is releasably locked against inadvertent or accidental opening, and can be threaded on containers by high speed capping machinery. The containers can be formed of any desired material and can be of virtually any construction. The closure overcap and undercap preferably are formed of a resiliently yieldable, synthetic plastic, such as polypropylene.

While I have disclosed and described in detail only certain embodiments of my invention, that has been done by way of illustration, it being intended to include all such modifications and variations as will naturally occur to those skilled in the art within the scope of the appended claims.

Having fully disclosed and completely described my invention and its mode of operation what I claim as new is:

1. A dispensing closure comprising, in combination with

a container part having projecting therefrom a flexible tubular dispensing spout, said spout being foldable upon itself transversely of its longitudinal axis to form a seal along the line of fold to close the dispensing route therethrough, a cap carried by said container part and having an opening through which said spout projects for dispensing from said container, said cap being movable relative to said part and to said spout to engage said spout and fold said spout upon itself to close said dispensing route, and lock means engaged upon movement of said cap into dispensing route closing position for releasably retaining said cap in said closing position.

2. A closure as set forth in claim 1 wherein said lock means includes a lock part on said cap carried into snap action engagement with a coacting lock part on said container part.

3. A closure as set forth in claim 1 wherein said lock means includes a boss projecting from said container part in spaced relation to said spout, and a socket on said cap receiving said boss with a snap action upon movement of said cap into said closed position.

4. A closure according to claim 1 wherein said cap is rotatively mounted with respect to the container part, said spout has a generally circular base, said locking means includes a semi-circular socket on said cap carried into engagement with said spout base upon movement of said cap into said closed position, and said socket has a restricted entrance through which said base passes with a snap action, thereby releasably retaining said cap in said closed position.

5. A captive closure comprising in combination with a container having a neck with an externally threaded portion, an undercap having a flexible tubular spout with a dispensing passage therethrough and being foldable upon itself to close said dispensing passage, an overcap mounted on the undercap for rotation in opposite directions relative thereto to fold and unfold said flexible tubular spout upon itself to close and open said dispensing passage, said spout extending through an opening in said overcap when in dispensing position, said undercap having a skirt with an internally threaded portion threadably engaging the externally threaded portion of said neck upon relative rotation of said undercap in one direction, and ratchet means for holding said undercap against rotation relative to said neck in the opposite direction.

6. The combination according to claim 5, including lock means engaged upon movement of said overcap into said closing position for releasably holding said overcap against rotation relative to said undercap out of said passage closing position.

7. The combination according to claim 5, said holding means comprising an annular internal ratchet said skirt outwardly of said threaded portion thereof, and an annular external ratchet on said neck inwardly of said threaded portion thereof.

References Cited by the Examiner

UNITED STATES PATENTS

859,898	7/1907	Wolf	222—498
2,095,042	10/1937	Thorn	222—507
2,138,992	12/1938	Baker	222—548 X
2,618,415	11/1952	Ellefson	222—499
2,974,835	3/1961	Herbrick	222—507
3,094,255	6/1963	Hunter	222—507
3,101,856	8/1963	Whiteman	215—9
3,227,332	1/1966	Gowdy et al.	222—498 X

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