Aug. 22, 1967 S. K. JOHNS 3,337,098

CLOSURE FOR FLEXIBLE SPOUT ON CONTAINER

Filed Oct. 10, 1966

Fig. 1.

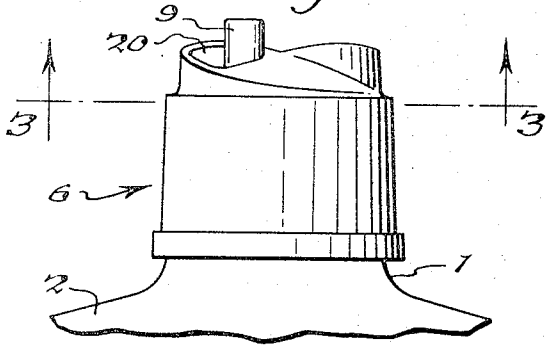


Fig. 2.

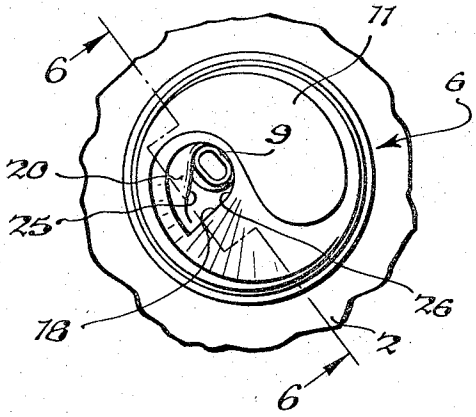


Fig. 3.

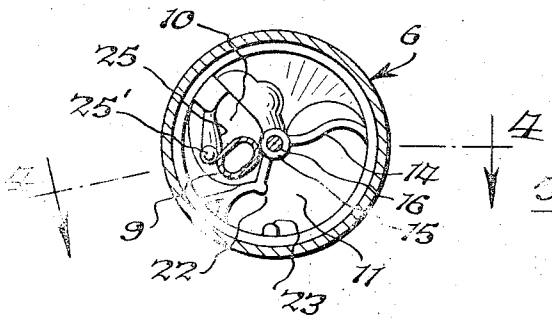


Fig. 4.

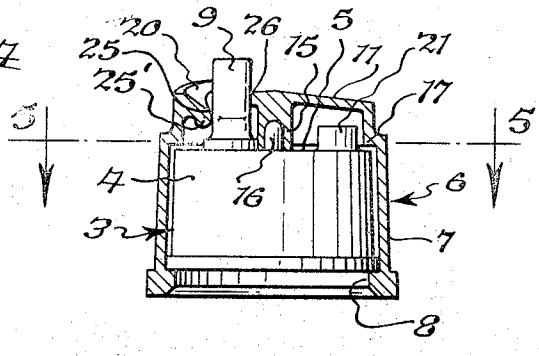


Fig. 5.

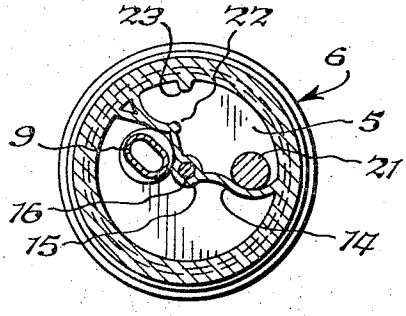


Fig. 6.

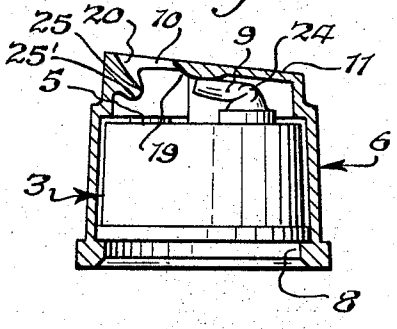


Fig. 7.

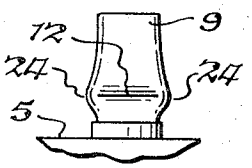
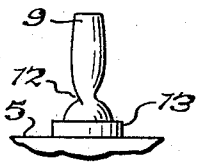


Fig. 8.



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CLOSURE FOR FLEXIBLE SPOUT ON CONTAINER

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Filed Oct. 10, 1966, Ser. No. 585,692
8 Claims. (Cl. 222—505)

This application is a continuation-in-part of my pending application Ser. No. 346,558, filed Feb. 21, 1964, now Patent No. 3,278,095 of Oct. 11, 1966, and entitled, Closure for Bendable Spout on Container.

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

In my application Ser. No. 346,558 there is disclosed a dispensing closure having a tubular dispensing spout foldable upon itself to close the dispensing route therethrough. The closure also has a cap movable in one direction to fold the spout upon itself, thereby closing the dispensing route, and in the opposite direction for unfolding of the spout to dispense the container contents.

As the spout is folded upon itself, it is laterally distorted at opposite sides thereof, along the line of folding. When the spout is unfolded, it tends to restore itself to its undistorted condition. However, I have discovered that such self-restoring action often is incomplete, with the result that the dispensing route through the spout is restricted. This can be troublesome, particularly with materials which are relatively viscous. In such cases the resulting restriction sometimes interferes with product flow to an objectionable degree.

Therefore, a primary object of this invention is to provide a dispensing closure having a tubular dispensing spout foldable upon itself to close the dispensing route therethrough, with means operable to restore the spout to its intended passage form upon unfolding of the spout to dispense the container contents.

Another object of this 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 relative thereto, wherein the cap is mounted on the closure in a manner facilitating the desired ease of relative movement while securely retaining the cap in position upon the closure.

In one aspect thereof, a dispensing closure of my invention is characterized by the combination with a container part having projecting therefrom a flexible tubular dispensing spout providing a dispensing route therethrough, the spout being foldable upon itself transversely of its longitudinal axis to form a seal on the line of fold and thereby close the dispensing route therethrough, of a cap carried by the container part and having an opening through which the spout projects for dispensing from the container, the cap being movable relative to the part and to the spout to engage the spout and fold it upon itself, thereby closing the dispensing route, the spout being laterally distorted along the line of fold by such folding, the cap also being movable relative to the part and to the spout to enable the latter to unfold and project through the opening, wherein the cap engages the spout on opposite sides thereof adjacent the line of fold, during unfolding of the spout, to restore the dispensing route to its intended passage form.

The foregoing and other objects, advantages and characterizing features of this invention will become apparent from the ensuing detailed description of an illustrative embodiment thereof, considered in conjunction with the accompanying drawing depicting the same wherein like

reference numerals denote like parts throughout the various views and wherein:

FIG. 1 is a side elevational view of a dispensing closure of this invention, mounted on a container and shown in dispensing position, the container being broken away for convenience in illustration;

FIG. 2 is a top plan view thereof;

FIG. 3 is a transverse sectional view thereof taken about on line 3—3 of FIG. 1;

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

FIG. 5 is a transverse sectional view thereof, taken about on line 5—5 of FIG. 4;

FIG. 6 is a view thereof partly in section and partly in side elevation taken about one line 6—6 of FIG. 2 showing the closure in its closed position; and

FIGS. 7 and 8 are fragmentary, front and side elevational views, respectively, of the dispensing spout in dispensing position, FIG. 7 showing the same in unrestored, distorted condition.

Referring now in detail to the illustrative embodiment depicted in 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 4 encircling the container neck 1, and having an end wall 5 across the open mouth or outlet of the container neck. An overcap 6 is provided, having a side wall skirt 7 formed with an internal bead 8 at its lower edge snap-fitting beneath the side wall skirt 4 of undercap 3.

An elongated, tubular dispensing spout 9 formed of resiliently flexible material projects from end wall 5 of undercap 3 through an opening 10 in the end wall 11 of overcap 5, when the latter is in open position, for dispensing the container contents as shown in FIGS. 1–5.

Spout 9 is adapted to fold upon itself, as illustrated for example in FIG. 6, thereby to close the dispensing route therethrough. To this end, spout 9 can have a preformed hinge line defined by a notch 12 in its side wall. Also, to facilitate bending about the hinge notch 12, spout 9 is of flat-sided form, being laterally elongated as clearly shown for example in FIGS. 2, 3 and 5, and as clearly evident from a comparison of FIGS. 7 and 8. At its base, below hinge notch 12, spout 9 is surrounded by a larger diameter, circular base 13.

End wall 11 of overcap 6 has a depending flange 14 formed with a socket 15 receiving an upstanding pivot pin 16 formed centrally on end wall 5 of undercap 3. Overcap 6 is thereby mounted for rotation relative to undercap 3, and spout 9 and opening 10 are correspondingly positioned in eccentric relation to the axis of rotation defined by pivot pin 16. It is a feature of this arrangement that overcap 6 bears on end wall 5 of undercap 3 only at the pivot socket 15, which latter projects below the web of flange 14. The skirts 4 and 7 are spaced, and the shoulder 17 on the overcap end wall 11 is held spaced from the end wall 5 of undercap 3. Thus, there is relatively little bearing contact area between the relatively rotating parts, for ease of rotation therebetween. At the same time, overcap 6 is securely retained on undercap 3 by engagement of bead 8 with the underside of skirt 4.

With the closure parts in the position shown in FIGS. 1–5, dispensing spout 9 is unfolded and projects through opening 10 beyond overcap 6 for dispensing the container contents. When it is desired to close the container, overcap 6 is rotated relative to undercap 3, in a clockwise direction as viewed in FIG. 2, until these parts are in the relative position shown in FIG. 6. As overcap 6 is rotated out of its open position, spout 9 is engaged and

bent, first by the edge **18** of opening **10** and then by a folding or bending cam **19** formed on the undersurface of the overcap end wall **11**. This folds spout **9** about hinge notch **12**, effectively pinching spout **9** upon itself in a manner closing and sealing the dispensing route through the spout. There is no need for capping or otherwise closing the outer end of the spout, and the spout is completely confined within overcap **6**.

When it is desired to dispense the container contents, overcap **6** is rotated in the opposite direction from the position of FIG. 6 to that shown in FIGS. 1–5. The natural resiliency of the spout material causes it to unfold, and this unfolding is assisted by a riser cam **20** formed on overcap **6** adjacent opening **10**. Riser cam **20** extends from a point closely adjacent the undercap end wall **5** 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 opening **10** as overcap **6** is rotated into open position.

Thus, opening and closing of the dispensing closure is readily accomplished by rotation of overcap **6** in opposite direction relative to undercap **3**, in the manner described in my pending application Ser. No. 346,558. Also, it will be appreciated that undercap **3** can be formed as an integral part of container **2**, or it can be screw-threaded or snap-fitted in place on the container neck, all as depicted in my aforesaid application Ser. No. 346,558. Also, where the undercap is threaded on the container neck, a ratchet arrangement can be provided between overcap **6** and container **2** to prevent unthreading of the closure from the container upon relative rotation of the closure parts, as set forth in my pending application Ser. No. 510,170 filed Nov. 29, 1965, for Closure, now Patent No. 3,249,293 dated Dec. 27, 1966.

As overcap **6** rotates from the open position depicted in FIGS. 1–5 to its closed position, a boss **21** projecting upwardly from undercap end wall **5** snaps past a rib formed on flange **14** and a resiliently yieldable finger **23** formed on the sidewall of overcap **6**. Boss **21** is thereby releasably confined in the pocket provided behind rib **22** and finger **23**, thereby releasably locking overcap **6** against inadvertent or accidental opening movement. A positive force sufficient to snap boss **21** past rib **22** and finger **23** is required to rotate overcap **6** from its closed to its open position.

When spout **9** is folded upon itself, it is laterally distorted along the line of folding as defined by notch **12**. This is apparent from FIG. 6, showing the folded spout with the lateral distortion **24** on one side thereof. Upon unfolding the spout material tends to restore itself to its intended passage form. However, such self-restoring action usually is incomplete, whereby the unfolded spout remains laterally distorted as depicted in FIG. 7. It will be appreciated that the showing of such distortion in FIG. 7 is somewhat exaggerated, for purposes of illustration. However, the fact remains that with such lateral distortion the dispensing route through the spout is restricted, to a greater or lesser degree depending upon the spout material and dimensions.

Such restriction of the dispensing passage can interfere with product flow therethrough, and can be objectionable, particularly when dispensing paste and other viscous materials. Therefore, it is a particular feature of my invention that means are provided for restoring the distorted spout to its intended passage form upon unfolding.

To this end, riser cam **20** is formed with a laterally projecting enlargement in the form of a lobe **25**. Lobe **25** projects toward the opposite side **26** of opening **10** a distance just sufficient to pinch spout **9** at its opposite sides adjacent fold line **12**, as spout **9** passes between lobe **25** and side wall **26** during and just prior to completion of the opening movement of overcap **6**. The pinching action thus produced on spout **9** by reason of this restriction in the overcap opening **10** is selected so as to be sufficient

to substantially eliminate the lateral distortion **24** of spout **9**, and restore spout **9** and the dispensing route therethrough to their intended passage form. Lobe **25** can be extended downwardly, as shown at **25'**, to provide a spout engaging bearing surface of greater depth.

Accordingly, it is seen that my invention fully accomplishes its intended object. The dispensing spout is restored to its undistorted, intended passage form each time that overcap **6** is rotated to open position. This is accomplished in a simple and relatively inexpensive manner. It will be appreciated that the closure of my invention can be used with containers formed of any desired material and of virtually any construction. The closure overcap and undercap preferably are formed of a resiliently yieldable, synthetic plastic material, such as polypropylene.

While I have disclosed and described in detail only one embodiment 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 providing a dispensing route therethrough having an intended passage form and being foldable upon itself transversely of its longitudinal axis to form a seal along the line of fold and thereby 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, said spout being laterally distorted along said line of fold by such folding, said cap also being movable relative to said part and to said spout to enable said spout to unfold and project through said opening, said cap having means engaging said spout on opposite sides thereof adjacent said line of fold during unfolding of said spout to restore said dispensing route to said intended passage form.

2. A dispensing closure as set forth in claim **1**, wherein said engaging means comprise a restricted portion of said cap opening through which the portion of said spout adjacent said line of fold passes as said spout unfolds.

3. A dispensing closure as set forth in claim **2**, together with means carried by said cap into engagement with said spout to unfold said spout and guide the same through said restricted portion of said opening.

4. A dispensing closure as set forth in claim **3**, wherein said unfolding means comprises a riser cam, and said restricted portion is defined in part by a lateral enlargement on said cam.

5. A dispensing closure as set forth in claim **1**, wherein said cap is movable in one direction relative to said part to fold said spout and in the opposite direction relative to said part for unfolding of said spout, cam means carried by said cap into engagement with said spout to unfold the same upon movement of said cap in such opposite direction, and a lateral enlargement on said cam means, said spout being pinched adjacent said line of fold between said enlargement and the opposite side of said opening to restore the intended passage form of said dispensing route.

6. A dispensing closure as set forth in claim **1**, wherein said cap is centrally pivoted on said part for rotation in opposite directions relative thereto.

7. A dispensing closure as set forth in claim **1**, wherein said container part comprises an undercap having a top wall and means providing an external shoulder in spaced relation thereto, said cap comprising an overcap having a top wall for rotation relative thereto about the pivot

axis, said overcap also including a skirt encircling said undercap in spaced relation thereto and an internal shoulder engaging said external shoulder of said undercap for maintaining said overcap on said undercap.

8. A dispensing closure as set forth in claim 7, wherein said spout projects from said top wall of said undercap in eccentric relation to said pivot axis, and wherein said opening is correspondingly eccentrically located in said top wall of said overcap.

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