

Oct. 11, 1966

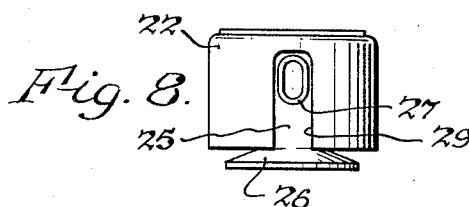
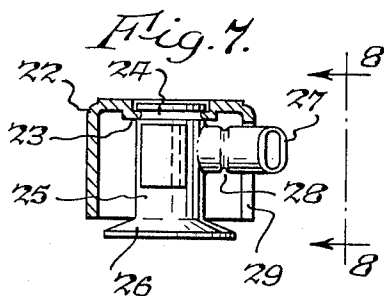
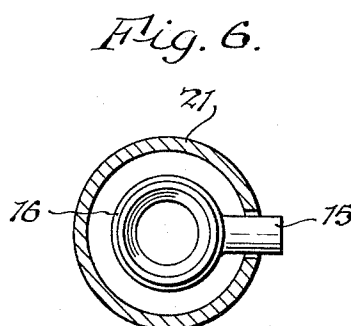
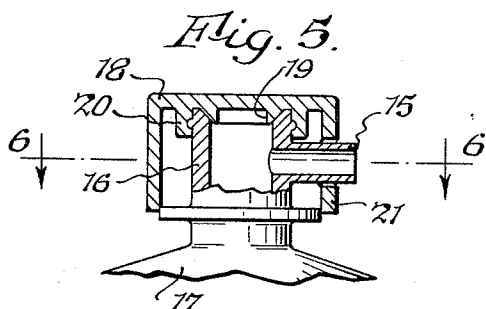
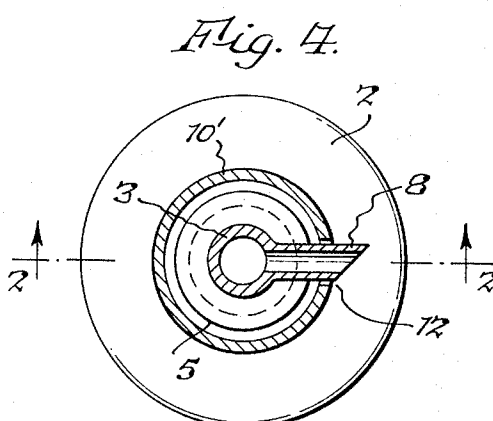
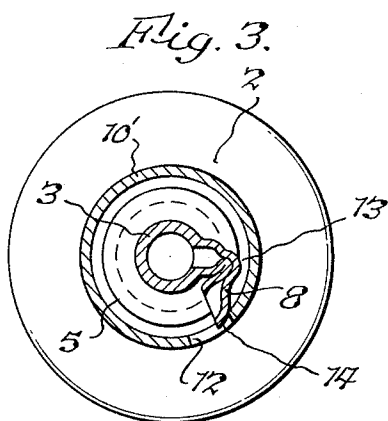
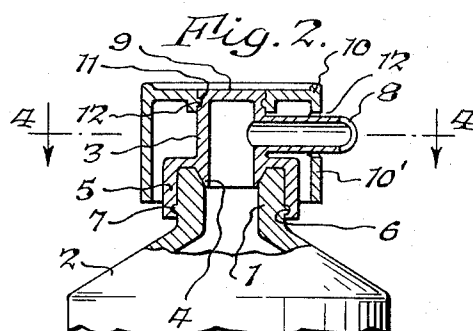
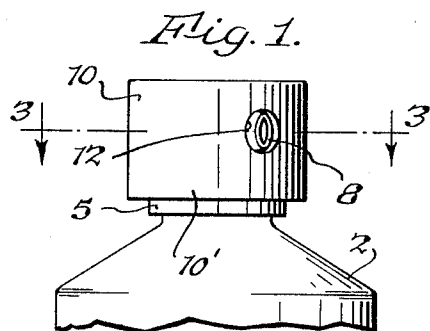
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3,278,095

CLOSURE FOR BENDABLE SPOUT ON CONTAINER

Filed Feb. 21, 1964

4 Sheets-Sheet 1



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Fig. 9.

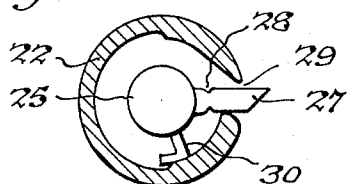


Fig. 10.

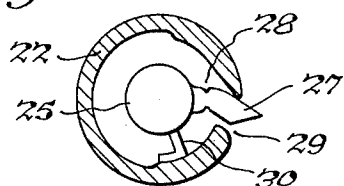


Fig. 11.

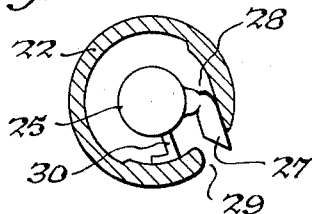


Fig. 12.

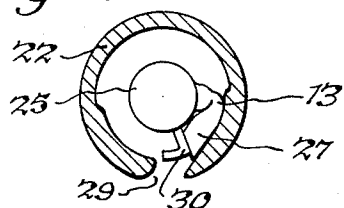


Fig. 13.

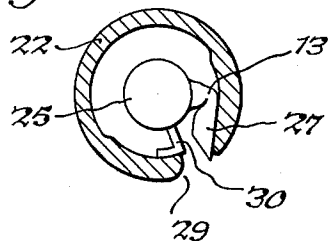


Fig. 14.

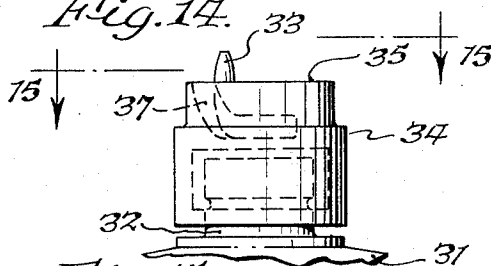


Fig. 15.

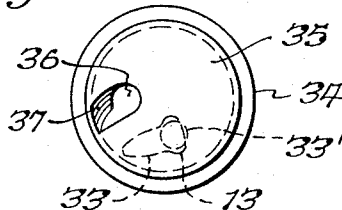


Fig. 16.

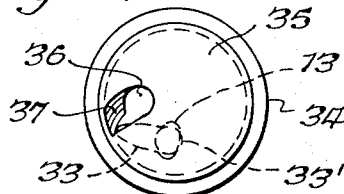


Fig. 17.

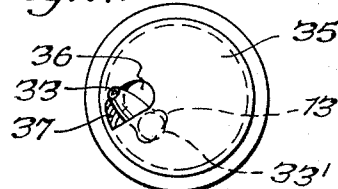
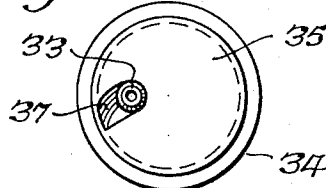


Fig. 18.



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Fig. 19.

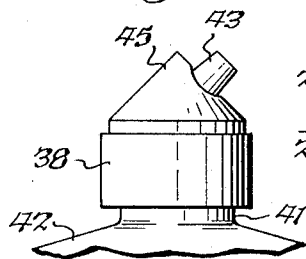


Fig. 21.

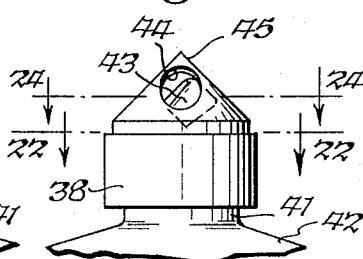


Fig. 23.

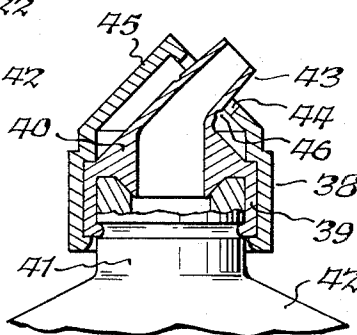


Fig. 20.

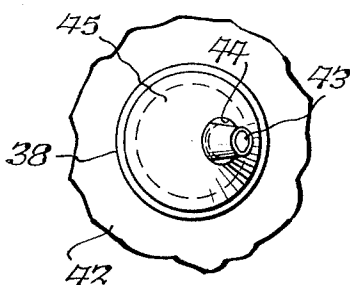


Fig. 22.

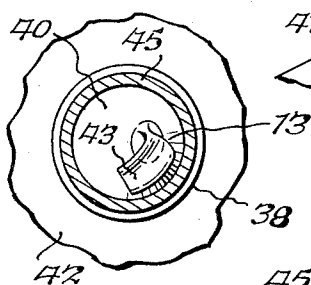


Fig. 24.

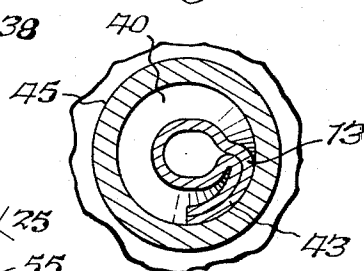


Fig. 25.

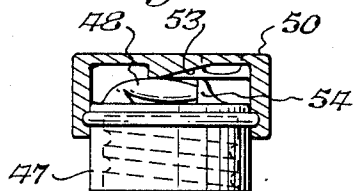


Fig. 26.

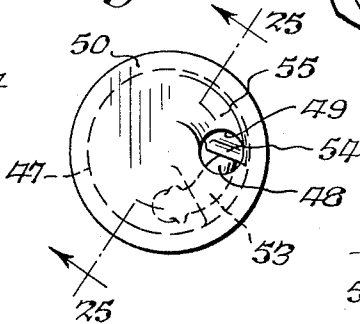


Fig. 28.

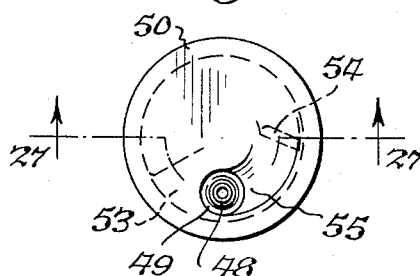
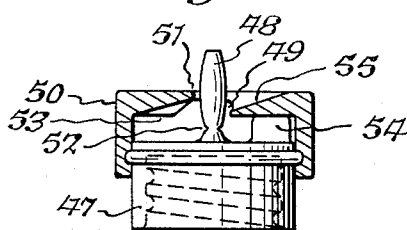


Fig. 27.



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Fig. 29.

Fig. 30.

Fig. 31.

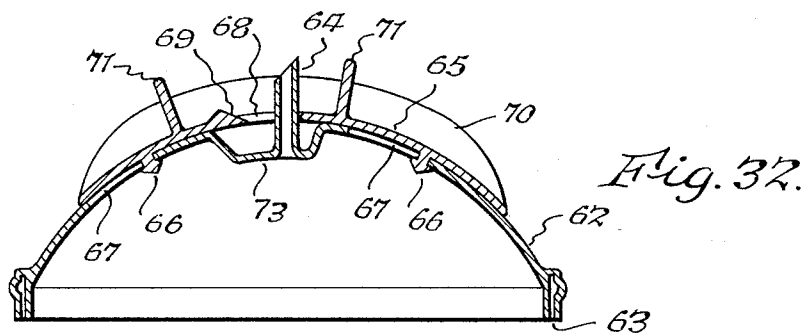
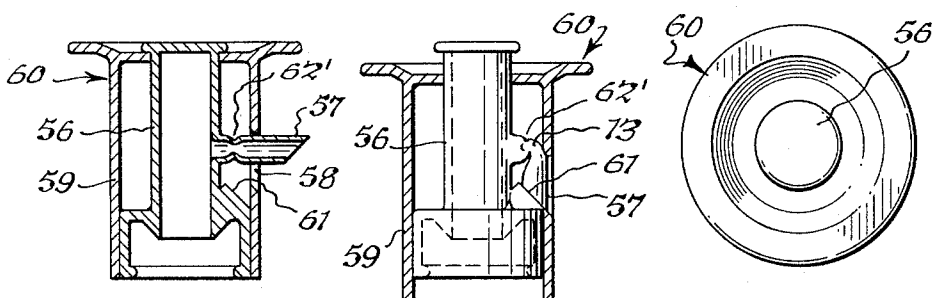


Fig. 32.

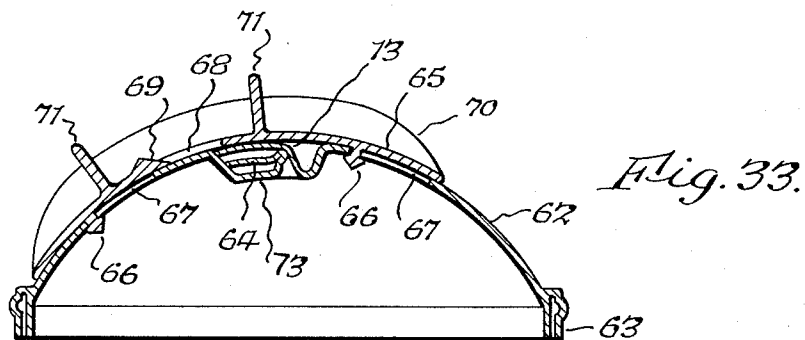


Fig. 33.

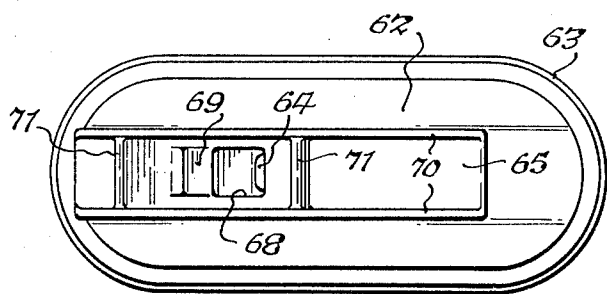


Fig. 34.

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CLOSURE FOR BENDABLE SPOUT ON
CONTAINER

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Filed Feb. 21, 1964, Ser. No. 346,558
19 Claims. (Cl. 222—507)

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

A primary object of my invention is to provide a captive dispensing closure operable to effectively seal the container, when desired, repeatedly and without reliance upon removable end caps, coacting valve parts or the like.

Another object of my invention is to provide a captive dispensing closure operable to close and seal a container without reliance upon capping or otherwise closing the outer end of the dispensing route.

Still another object of my invention is to provide the foregoing in a captive closure for dispensing either fluids, pastes or powders.

It is also an object of my invention to provide a dispensing closure having the foregoing characteristics, and providing a tubular dispensing spout bendable upon itself to close the dispensing route therethrough, together with a captive cap, the spout projecting through and beyond the cap when in its dispensing position, and the cap being movable to bend the spout upon itself, the spout thereupon being confined within the cap.

Still another object of my invention is to provide the foregoing in a closure which is relatively simple in construction, easily manipulated, dependable and durable in use, and relatively inexpensive, thereupon being practical and suitable for the intended purpose.

A captive closure constructed in accordance with my invention is characterized in one aspect thereof by the provision, in combination with a container part having a tubular dispensing spout bendable upon itself to close the dispensing route through the spout, a cap carried by the container part, the cap being movable relative to the part thereby to bend the spout upon itself and close the dispensing route.

In another aspect thereof, a captive closure constructed in accordance with my invention is characterized by the combination of a container having an elongated dispensing tube foldable upon itself, and a cap carried by the container and having an opening through which the tube projects for dispensing from the container, the cap being movable relative to the container to fold the tube upon itself and thereby seal the container.

The foregoing and other objects, advantages and characterizing features of a captive dispensing closure of my invention will become clearly 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 the dispensing end of a container having a captive closure of my invention in place thereon, showing the dispensing spout in closed position;

FIG. 2 is a longitudinal sectional view through the closure of FIG. 1, with the spout in dispensing position, being taken about on line 2—2 of FIG. 4;

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

FIG. 4 is a transverse sectional view thereof, being taken about on line 4—4 of FIG. 2;

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FIG. 5 is a longitudinal sectional view through another form of captive closure of my invention, in which the dispensing spout is formed as an integral part of the container;

FIG. 6 is a transverse sectional view thereof, taken about on line 6—6 of FIG. 5, the container shoulder below the neck being omitted for ease of illustration;

FIG. 7 is a view similar to that of FIG. 5, but showing a further modification including a seat for closing the outer end of the dispensing spout;

FIG. 8 is a side elevational view thereof, taken about on line 8—8 of FIG. 7;

FIGS. 9 through 13 are somewhat schematic, transverse sectional views through a dispensing closure of the type shown in FIGS. 7 and 8, illustrating the operation thereof;

FIG. 14 is a fragmentary, side elevational view of a container having another form of captive closure of my invention thereon, the dispensing spout being shown in dispensing position;

FIG. 15 is a plan view of the captive dispensing closure of FIG. 14, taken about on line 15—15 of FIG. 14, but showing the same in its fully closed position;

FIGS. 16, 17 and 18 are corresponding views thereof, illustrating the operation of the closure in restoring the spout to its dispensing position;

FIG. 19 is a fragmentary side elevational view of a container having still another form of captive dispensing closure of my invention thereon;

FIG. 20 is a plan view thereof;

FIG. 21 is a front elevational view thereof, taken about a right angle to the view shown in FIG. 19;

FIG. 22 is a transverse sectional view thereof, taken about on line 22—22 of FIG. 21;

FIG. 23 is a longitudinal sectional view thereof, with the dispensing spout in dispensing position;

FIG. 24 is a transverse sectional view thereof taken about on line 24—24 of FIG. 21;

FIG. 25 is a view, partly in elevation and partly in longitudinal section of still another form of captive dispensing closure of my invention, being taken about on line 25—25 of FIG. 26, the spout being shown in closed position;

FIG. 26 is a plan view thereof;

FIG. 27 is a view corresponding to that of FIG. 25, but with the spout shown in dispensing position, being taken about on line 27—27 of FIG. 28;

FIG. 28 is a plan view thereof;

FIG. 29 is a longitudinal sectional view through still another form of captive closure of my invention, the spout being shown in dispensing position;

FIG. 30 is a corresponding view, partly in side elevation and partly in longitudinal section, showing the spout in closed position;

FIG. 31 is a plan view thereof;

FIG. 32 is a longitudinal sectional view of still another form of captive closure of my invention, the spout being shown in dispensing position;

FIG. 33 is a corresponding view thereof, showing the spout in closed position; and

FIG. 34 is a plan view thereof.

Referring now in detail to the illustrative embodiments depicted in the accompanying drawings, there is shown in FIGS 1-4 a captive dispensing closure of my invention, mounted on the upstanding neck 1 of a container 2. The closure comprises an adaptor part 3 having a tubular sleeve 4 seated in the mouth of neck 1, and an annular skirt 5 having a groove 6 snap-fitting over an annular bead 7 around the container neck 1. In this way, adaptor 3 is secured to the container neck 1.

A tubular dispensing spout 8 projects laterally from adaptor 3, above skirt 5 thereof, and the upper end of

adaptor 3 is closed, as shown at 9, whereby the container contents will be dispensed through spout 8.

A captive cap 10 is mounted on adaptor 3. In the embodiment of FIGS. 1-4, cap 10 has a bead 11 snap-fitting in an annular groove 12 around the upper end of adaptor 3, whereby the cap 10 is retained on adaptor 3 while being rotatable relative thereto. Cap 10 has a skirt 10' encircling adaptor 3 and formed with an opening 12 through which spout 8 projects for dispensing the contents of container 2.

Container 2 can be formed of glass, plastic, metal or any other desired material, and can be of virtually any construction. Adaptor 3 and cap 10 preferably are formed of a synthetic plastic material, such as polypropylene, the spout 8 being formed integrally with adaptor 3 by molding the same as a unit. Spout 8 is foldable or bendable upon itself transversely of its axis, for pinching spout 8 between its ends to form a seal along the line of fold and thereby close the dispensing route there-through. Spout 8 can have a preformed hinge, as will appear hereafter, or it can simply fold about its natural hinge axis. In this respect, polypropylene has the advantage of increasing in strength as it is flexed. Also, its natural memory tends to restore the spout to its dispensing position.

With the parts shown in the position of FIG. 2, the dispensing spout 8 projects outwardly beyond the closure, and is open to dispense the container contents. Spout 8 provides directional dispensing, and the projection of spout 8 beyond cap 10 keeps the closure free of product accumulation. When it is desired to close and seal the container, cap 10 is rotated on part 3, in a clockwise direction as viewed in FIG. 4, whereby the edge of opening 12, provided by skirt 10', engages the side wall of spout 8 and cams the spout over, bending or folding the spout upon itself as shown at 13 in FIG. 3. In this position, it will be seen that the dispensing route through spout 8 is effectively sealed, and the spout is confined within the closure cap.

Upon reverse rotation of cap 10, the natural resiliency of the spout will restore it to the dispensing position of FIG. 2. Should there be any reluctance on the part of the spout to return itself to its fully open position, the opposite edge of opening 12, provided by skirt 10', will engage the outer end 14 of the spout and move it toward dispensing position.

It will be seen that adaptor 3 comprises a continuation of the container neck 1 and functions as a part thereof. A separate adaptor is not necessary. In FIGS. 5 and 6, for example, the bendable tubular dispensing spout 15 is formed integrally with the neck 16 of container 17. Cap 18 has an annular sleeve 19 engaged in the mouth of container neck 16, and an annularly grooved portion 20 snap-fitting around an annular bead on neck 16. The cap skirt 21 has an opening through which spout 15 projects in its dispensing position. Cap 18 is rotatable on container neck 16, in the same manner as cap 10 on adaptor 3 to move the spout between open and closed positions as shown in FIGS. 3 and 4.

The embodiment of FIGS. 7 and 8 is closely similar to the embodiments of FIGS. 1-6, except that cap 22 has a simple, annular shoulder 23 engaged in the grooved end 24 of an adaptor part 25 having a flared end 26 for attachment to a container as by spin welding or swaging. A tubular dispensing spout 27 projects laterally from the neck of adaptor 25, and has a preformed hinge provided by a groove 28 in the wall of spout 27, for folding of the spout upon itself as illustrated in FIG. 3. Spout 27 projects through an opening 29 in the cap skirt, and in this instance the opening 29 comprises a slot open at its lower end, whereby the cap can be slip-fitted downwardly into place, over part 25 and spout 27.

In addition, the embodiment of FIGS. 7 and 8 provides a seat 30, carried by part 25 and adapted to receive the open outer end of spout 27 thereagainst, for closing

off the same. This is particularly desirable where paste and the like is being dispensed, and where exposure of the paste in the outer end of spout 27 to air would cause it to harden.

This is illustrated in FIGS. 9-13. FIG. 9 shows the parts in dispensing position. Rotation of cap 22 on part 25 in a clockwise direction, as viewed in FIGS. 9-13, causes the cap skirt to engage spout 27 and cam it over, about the axis of hinge 28. Continued rotation, through the position shown in FIG. 11, causes the spout to be completely closed by pinching, as shown at 13, with the normally open outer end of spout 27 seated against seat 30 (FIG. 12). This seating is not for the purpose of closing the dispensing route, which is accomplished at 13. Rather, it simply covers the end of spout 27, so that any material contained in the outer end portion of the spout will be shielded from attack by the surrounding atmosphere. Upon reverse rotation, counter clockwise as viewed in FIGS. 9-13, the inherent resiliency of the spout material will cause it to unfold and move toward open position, as shown in FIG. 13. If any assistance is required, it is provided by the opposite edge of slot 29 in the skirt of cap 22.

In the embodiment of FIGS. 14 through 18, there is shown a container 31 having a neck 32 with a tubular dispensing spout 33 projecting upwardly therefrom, generally lengthwise of the container. Spout 33 is formed as part of an adaptor 33' such as shown at 3 in FIG. 2, or at 40 in FIG. 23, and a cap 34 is mounted on the adaptor in much the same manner as in FIG. 2. However, spout 33 has a vertical dispensing position relative to its adaptor, and cap 34 is provided with a top wall 35 having an opening 36 through which spout 33 projects in its dispensing position. Relative rotation of cap 34 into the position shown in FIG. 15 (clockwise as viewed in these figures) cam spout 33 over upon itself, to pinch it closed at 13, as before. Reverse rotation of cap 34, counter clockwise as viewed in these figures, enables the spout 33 to move upwardly through opening 36. In these figures, the relative rotation has been produced by rotating the container (not shown) relative to the cap, for greater clarity. Further, cap 34 is provided with a generally helical cam surface 37, carried by top wall 35 and projecting downwardly into the path of spout 33 in its closed or folded position. Surface 37 engages beneath the outer end of spout 33, and cams its upwardly through opening 36, as shown in FIGS. 16-18.

FIGS. 19 through 24 illustrate still another embodiment, in which a captive cap 38 has a generally channel section side wall engaging about the skirt 39 of an adaptor 40. Adaptor 40 has snap-fit engagement over the mouth of neck 41 on a container 42, in a manner very similar to that shown in FIG. 2. In this form, the dispensing spout 43 projects obliquely from adaptor 40 and the container, through an opening 44 in the conical top wall 45 of cap 38.

Here again, spout 43 normally projects outwardly, beyond cap 38, for dispensing the contents of container 42. When it is desired to close the container, cap 38 is rotated on part 40, and the edge of opening 44, provided by top wall 45, engages the outer end portion of spout 43 and folds it about its preformed hinge axis 46 into the closed position shown in FIGS. 21, 22 and 24. The spout 43 is pinched, at 13, as before, thereby effectively closing the dispensing route and sealing the container, without any necessity for a removable closure over the outer end of the dispensing tube.

In the embodiments of FIGS. 25-28, the adaptor part 47 is arranged for threaded engagement on a threaded container neck, although obviously any of the other types of attachment might be used or it could be formed integrally with the container. The tubular dispensing spout 48 is arranged to project upwardly therefrom, through an opening 49 in the top wall of cap 50, which has a bead and groove engagement on part 47 for rotation thereon.

Rotation of cap 50 relative to part 47 in one direction (counter clockwise as viewed in FIG. 26) causes the edge 51 of the cap top wall to engage the outer end portion of spout 48, bending it about its preformed hinge axis 52. The cap wall is provided with a depending cam surface 53 which engages the spout 48 and continues camming it to its closed position, shown in FIG. 25. A seat 54 carried by part 47 is arranged to receive the outer end of spout 48 thereagainst, to close it off from the ambient atmosphere.

It is a feature of this embodiment, also applicable to the others, that the opposite side of opening 49 is beveled, to provide a surface 55 arranged to engage the outer end of spout 48 when the same is in a partially bent position, and restore it to its open, dispensing position, upon rotation of the cap in a clockwise direction, from the position of FIG. 26 to the position of FIG. 28.

In the embodiment of FIGS. 29-31, there is provided an adaptor part 56 adapted to snap-fit on the neck of a container in much the same manner as adaptor 40 of FIG. 23 and adaptor 3 of FIG. 2. A tubular dispensing spout 57 projects laterally from part 56, through an opening 58 in the annular side wall 59 of a plunger portion 60 encircling part 56 and slidable therealong. Upon sliding plunger 60 downwardly, relative to part 56, spout 57 is cammed against a seat 61, closing the outer end of the spout, and bending the spout about its hinge axis 62, thereby closing the dispensing route as before, as shown at 13. The lower edge of opening 58 is beveled, to cam the beveled outer end of spout 57 upwardly into dispensing position.

In the embodiment of FIGS. 32-34, there is shown an adaptor part in the form of a convex cap 62 having a slotted periphery 63 for attachment to a container body, although other forms of attachment could be used. Wall 62 has a recessed well 73 from which a tubular dispensing spout 64 projects. A cover 65 is provided with knobs 66 projecting through slots 67 in wall 62 and engaging therebeneath, whereby cover 65 can be slid across cap 62 between the positions shown in FIGS. 32 and 33.

With the parts in the position shown in FIG. 32, spout 64 projects through an opening 68 in cover 65. Upon sliding the cover to its other position, shown in FIG. 33, it cams spout 64 into the recessed well 73, bending it upon itself as shown at 13, thereby closing the dispensing route. At the same time, the outer end of the spout is brought against a seat 69, comprising an end wall of the well 73.

Cover 65 can have upstanding side flanges 70, and projecting fingers 71 for ease in manipulating the same.

Accordingly, it is seen that my invention fully accomplished its intended objects. While I have disclosed and described in detail only certain selected embodiments thereof, that has been done primarily 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 captive 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 through said spout, a cap carried by said container part and having an opening through which said spout projects in its dispensing position, 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.

2. A captive closure comprising, in combination, a container having projecting therefrom a flexible elongated dispensing tube, said tube being foldable upon itself transversely of its longitudinal axis to form a seal along the line of fold to close the dispensing route through said spout, and a cap carried by said container and having an

opening through which said tube projects for dispensing from said container, said cap being movable relative to said container and to said tube to engage said tube and fold said tube transversely upon itself within said cap and thereby seal said container.

3. A dispensing closure for containers comprising a dispensing adaptor for a container, a tubular flexible dispensing spout projecting from said adaptor, said spout being foldable upon itself transversely of its axis to form a seal along the line of fold to close the dispensing route therethrough, and a captive cap carried by said adaptor, said cap having an opening through which said spout projects in its dispensing position and being movable relative to said adaptor and to said spout to engage said spout and fold said spout transversely upon itself.

4. A captive closure comprising, in combination with a container having a tubular dispensing spout bendable upon itself to close the dispensing route through said spout, a seat adapted to receive the open outer end of said spout thereagainst to close the same, and a cap carried by said container and having an opening through which said spout projects for dispensing from said container, said cap being movable relative to said container to bend said spout upon itself in a direction seating the outer end of said spout against said seat.

5. A captive closure for containers comprising, in combination with a container having a tubular flexible dispensing spout projecting therefrom and foldable upon itself transversely of its axis to form a seal along the line of fold to close the dispensing route through said spout, a cap carried by said container and movable relative thereto, said cap having an opening therein through which said spout projects for dispensing from said container, movement of said cap in one direction causing said spout to fold upon itself, and means carried by said cap into engagement with said spout to unfold the same upon movement of said cap in the opposite direction.

6. A captive closure for containers comprising, in combination, a container having a neck part and a tubular dispensing spout projecting laterally therefrom in its dispensing position, said spout being bendable upon itself to close the dispensing route through said spout, and a cap mounted on said neck part for rotation relative thereto, said cap having a depending skirt provided with an opening through which said spout projects when in said dispensing position, said spout being bent upon itself by rotation of said cap on said neck part.

7. A captive closure as set forth in claim 6, wherein said skirt opening comprises a slot open at its lower end for slip-fitting said cap over said neck part and said spout.

8. A captive closure for containers comprising, in combination, a container having a neck part and a tubular dispensing spout projecting obliquely therefrom in its dispensing position, said spout being foldable upon itself to close the dispensing route therethrough, and a cap carried by said neck part and rotatable relative thereto, said cap including a generally conical top wall having an opening through which said spout projects when in said dispensing position, said spout being folded upon itself by rotation of said cap on said neck part.

9. A captive closure for containers comprising, in combination, a dispensing cap portion for a container, said cap portion having a recess therein, a tubular dispensing spout projecting from said recess beyond said cap portion in its dispensing position, said spout being foldable into said recess and upon itself to close the dispensing route through said spout, and a cover mounted on said cap portion, said cover being movable along said cap portion and over said recess to fold said spout into said recess and upon itself.

10. A captive closure for containers comprising, in combination with a container having a neck part and a tubular dispensing spout projecting therefrom generally lengthwise of the container when in its dispensing position, a cap carried by said neck part, said cap having a top wall with an opening, located eccentrically of its axis of rota-

tion, through which said spout projects in its dispensing position, said spout being bendable upon itself to close the dispensing route therethrough, and said cap being rotatable relative to said neck part to so bend said spout.

11. In combination, a container and a closure therefor, said container having an outlet portion and said closure including a member rotatably attached to said outlet portion, said outlet portion having a flexible tubular dispensing spout disposed in eccentric relation to the axis of rotation of said closure member, an opening in said closure member similarly eccentric to said axis and adapted in one position to register with said spout whereby the latter projects through said opening for dispensing the container contents, said closure member being adapted upon rotation thereof to reflect and fold said spout thereby to seal the container contents.

12. The combination of claim 11, wherein said folded spout is confined within said closure member.

13. In combination, a container, a resiliently flexible tubular dispensing spout carried by said container, said spout being foldable upon itself to close the dispensing route therethrough, a cap carried by said container for rotation relative thereto, said cap having an opening through which said spout projects for dispensing from said container, and said spout being folded upon itself within cap upon rotation of said cap relative to said container.

14. A captive closure for containers comprising, in combination with a container having a neck, a cap carried by said container neck for rotation relative thereto about an axis, a flexible tubular dispensing spout projecting from said container neck in eccentric relation to said axis, said cap having an end wall through which said spout projects to dispense the container contents, said spout being bendable upon itself to a folded position pinching and closing the dispensing route therethrough, said cap having a first cam surface engaging said spout upon relative rotation of said cap in one direction to cam said spout into said folded position, and said cap having a second cam surface engaging said spout upon relative rotation of said cap in the opposite direction to cam said spout into its dispensing position.

15. A captive closure comprising in combination with a container part having an elongated tubular dis-

5 dispensing tube transversely bendable upon itself intermediate its ends to close the dispensing route through the tube, a cap carried by said container part and confining said tube in non-dispensing position, said cap having an opening with opposed sides between which said tube projects in dispensing position, said cap being movable relative to said container part in one direction, whereby a side of said opening engages the projecting tube and folds said tube upon itself, thereby closing 10 the dispensing route and confining said tube in said cap, and said cap being movable in the opposite direction whereby the confined tube may unbend and project through said opening thereby opening the dispensing route.

15 16. A captive closure as claimed in claim 15 in which when said cap is moved in said opposite direction, the opposite side of said opening engages the confined tube and unbends it and causes it to project through said opening.

20 17. A captive closure as claimed in claim 15 in which the sides of the opening and the side walls of the tube form inter-engaging cam surfaces to guide the tube out of and in to dispensing position.

25 18. A captive closure as claimed in claim 15 in which said tube is resilient and normally tends to return to said dispensing position.

30 19. A captive closure as set forth in claim 16, together with means carried by said container part providing a seat adapted to receive the outer end of said tube thereagainst to cover the same when said tube is in said non-dispensing position.

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