Jan. 30, 1962 E. D. UNGER 3,018,910

NON-REFILLABLE POURING DEVICE FOR BOTTLES

Filed March 10, 1958

Fig. 1

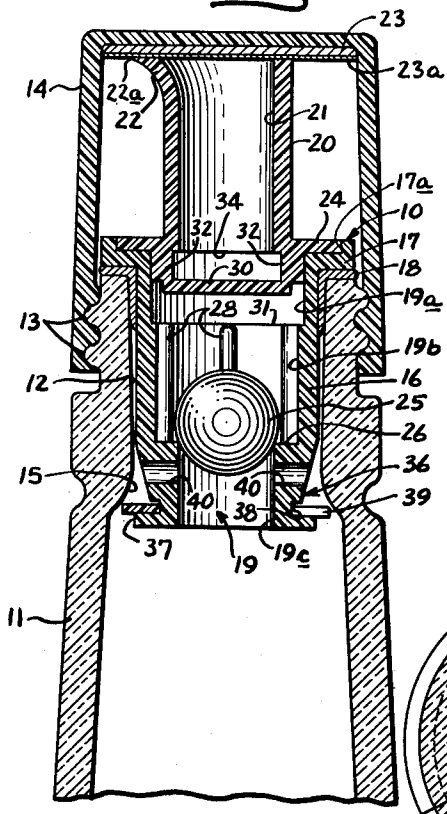


Fig. 2

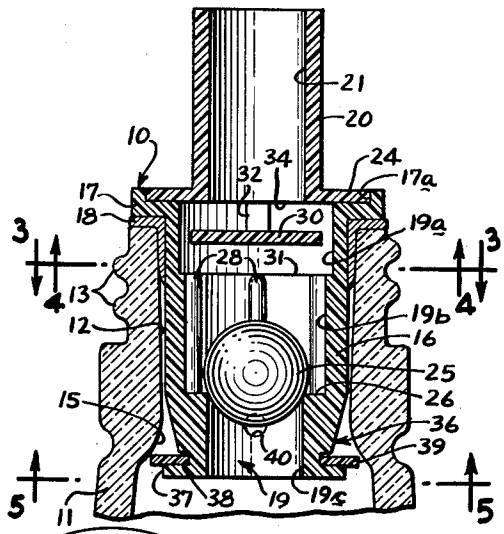


Fig. 3

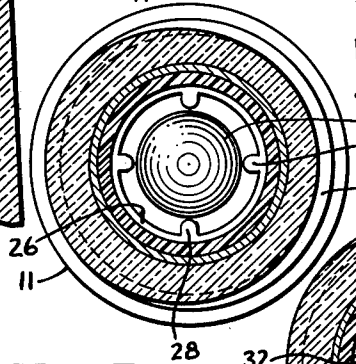


Fig. 4

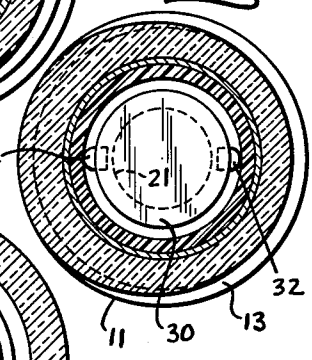


Fig. 6

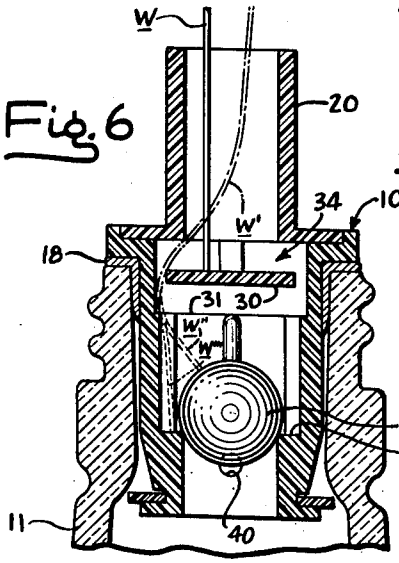
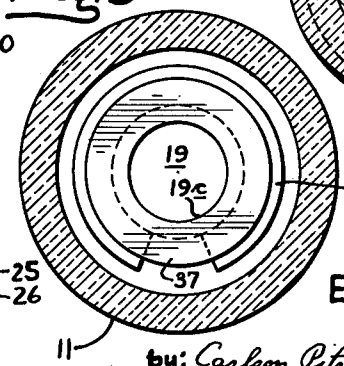


Fig. 5



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United States Patent Office 3,018,910 Patented Jan. 30, 1962

3,018,910
NON-REFILLABLE POURING DEVICE FOR BOTTLES

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Filed Mar. 10, 1958, Ser. No. 720,116
5 Claims. (Cl. 215—22)

The present invention relates generally to non-refillable containers for liquids and more particularly to a bottle closure of the type intended to prevent refilling of a bottle to which it is applied.

It is a general object of the present invention to provide an improved bottle closure which facilitates dispensing of liquid contents, which is operative to close the bottle to which it is applied when the bottle is in upright position, and which effectively prevents refilling.

Another and related object of the invention is to provide a bottle closure constructed and arranged for permanent attachment to the neck of a bottle and which is operative to permit pouring of the contents from the bottle without dribbling and without undue impairment of flow rate, to permit the entire contents to be dispensed and to inhibit tampering so as to prevent refilling regardless of bottle position.

It is a further object to provide an improved bottle closure embodying the foregoing features which is of exceedingly simple construction involving few parts, which permits of economical manufacture from readily available materials, and which is not likely to fail in operation.

The objects of the invention thus generally set forth, together with other objects and ancillary advantages are attained by the construction and arrangement shown by way of illustration in the accompanying drawing, in which:

FIGURES 1 and 2 are vertical sections, taken at right angles to each other, through a bottle closure embodying the features of the present invention and showing the same in place upon the neck of a bottle.

FIGS. 3 and 4 are transverse sections taken in a common plane but looking in opposite directions as indicated by the lines 3—3 and 4—4, respectively, in FIG. 2.

FIG. 5 is a transverse section taken substantially in the plane of line 5—5 in FIG. 2.

FIG. 6 is a vertical section like FIG. 2, but which has been somewhat simplified, illustrating various positions that might be assumed by a tampering wire.

While the invention is susceptible of various modifications and alternative constructions there is shown in the drawing and will herein be described in considerable detail a preferred embodiment. It is to be understood, however, that it is not thereby intended to limit the invention to the specific form shown and described. On the contrary it is intended to cover all modifications and alternative constructions coming within the spirit and scope of the invention as expressed in the appended claims.

Referring more particularly to the drawing, there shown for purposes of illustration is a bottle closure generally designated **10** applied to the neck **11** of a bottle. The bottle neck **11** terminates in a constricted throat **12** which, as shown, is fashioned to provide external screw threads **13** for accommodating a complementally threaded cap **14**. The throat portion **12** merges with the remainder of the neck **11** in a manner providing an internal shoulder **15**.

The bottle closure **10** includes a body **16** of generally cylindrical form having an external diameter slightly less than the internal diameter of the throat **12** of the bottle neck **11** so as to permit of insertion therein. At its upper end the body **16** is provided with an external or circumferential shoulder **17** which is adapted to overlie the outer end of the bottle neck **11** and thus limit inward movement

of the bottle closure with respect thereto. Desirably the body **16** is provided with a gasket **18** of compressible material and preferably of inverted L-shaped half-section. The gasket **18** is disposed about the upper end of the body **16** adjacent and beneath the shoulder **17**. Upon insertion of the body **16** within the throat **12** the gasket **18** is compressed into fluid-tight sealing relation between the bottle throat and the wall of the body, and between the underside of the body flange **17** and the outer end of the bottle neck. The body **16** has a stepped bore **19** therethrough. Thus the bore has an enlarged outer end portion **19***a*, an intermediate portion **19***b* of lesser diameter than that of portion **19***a*, and a lower end portion **19***c* of a still smaller diameter.

To facilitate dispensing liquid contents from the bottle the closure **10** is equipped with a spout **20**. The spout is preferably of generally cylindrical shape having a bore **21** therethrough. To assist in directing the stream of liquid during pouring and to prevent dribbling when a pouring operation has been completed, the spout **20** has a lip **22** formed at one side of its upper end. The lip terminates in an outwardly-projecting, sharp cutoff edge **22***a* for the purpose not only of directing fluid being poured therefrom but also for the purpose of breaking the stream of poured liquid upon completion of a pouring operation. The inner surface of the spout is smoothly rounded in a downward direction to direct droplets of the liquid contents back down the spout **20** when the bottle is returned to an upright position.

The bottle and the closure device are sealed against leakage during shipment and when not in use by a liner **23** within the cap **14**. The liner, as shown, is formed of slightly compressible material such as paper, cork or the like. Preferably the liner is coated with a liquid resistant film **23***a*. Thus when the cap **14** is applied to the neck of the bottle the liner is drawn into seating engagement with the outer end of the spout **20**, and leakage is thereby precluded even if the bottle should be maintained in an inverted position.

The lower end of the spout **20** is adapted for intimate engagement with the body **16**. For this purpose its lower end is conformed to the upper end of the body, being complementally dimensioned to be snugly received therein. Thus adjacent its lower end the spout has a peripheral flange **24** thereon which fits into an annular recess **17***a* formed in the body shoulder **17**. While the parts can be cemented or otherwise fastened together, desirably the body and the spout are formed of thermoplastic material, and a permanent union can be effected simply by the application of heat.

In order to close the bottle when it is in an upright position and to prevent refilling, the instant closure incorporates valve means. Preferably the valve means is of the ball-check type which readily performs the foregoing functions and at the same time minimizes impairment of dispensing flow rate. Also this valve form substantially precludes failure in operation. The illustrative device includes a valving element or ball **25** which is disposed within a chamber defined by the intermediate portion **19***b* of the valve body **19**. The lower end portion **19***c* of the body bore **19**, as hereinbefore noted, is of a smaller diameter than that of the intermediate portion **19***b* thereby forming at the junction between them a transverse annular shoulder **26**. The ball **25** is is a diameter slightly greater than that of the lower end portion **19***c* of the body bore **19**, and thus the inner edge of the shoulder **26** defines a circular seat for the ball. Preferably the diameter of the lower bore portion **19***c* is only slightly less than that of the ball **25** so that the ball, when seated, rests deeply therein to the end that there is provided an effective seal against refilling. Thus the lower bore portion **19***c* possesses a cross-sectional

area which is just slightly less than one-half of the cross-sectional area of the interior of the valve chamber or intermediate bore portion 19*b*, and so the cross-sectional area of the lower bore portion 19*c* very closely approximates the annular area between the ball 25 and the wall of the bore portion 19*b*.

To maintain the ball centrally within the chamber 19*b*, and thus limit lateral movement of the ball within the chamber, yet permit longitudinal movement therein, the illustrative device has four circumferentially-spaced, longitudinal ribs 23 rigid with the inner surface of the chamber 19*b*. The ribs project inwardly of the chamber 19*b* and while they are so sized that the ball 25 rolls freely between them, yet the clearance between the ball and the ribs is made as small as practicable. In this way the ball is permitted to roll freely away from its seat 26 when a bottle equipped with the instant device is inverted for pouring, and it can quickly return to the seat 26 when the bottle is returned to an upright position.

To maintain the ball valving element 25 captive within the chamber 19*b* a stop 30 is provided. The stop 30 is preferably in the form of a flat circular disc, of a diameter larger than that of the spout bore 21. It is transversely disposed in the upper end portion 19*a* of the body bore 19 substantially above the ledge 31 which marks the juncture of the intermediate portion 19*b* with the upper end portion 19*a* of the body bore. Preferably the stop disc 30 is mounted upon the lower or inner end of the spout 20 by a pair of diametrically disposed posts 32. These posts depend from the spout flange 24 into the outer end portion 19*a* of the body bore 19.

It will be observed that the foregoing construction not only places the stop disc 30 concentrically within the chamber 19*a* and in position to limit outward longitudinal movement of the ball 25, but it also defines a pair of wide, semi-cylindrical openings 34, between the posts 32 and between the disc 30 and the flange 24, for the passage of the liquid contents therethrough substantially unimpaired.

Means is provided to permanently retain the instant bottle closure in place upon the bottle neck once it has been installed therein. As shown, the body 16 is made of a length substantially longer than the length of the bottle throat 12. As indicated generally at 36, adjacent its lower end the outer surface of the body 16 of the instant device is tapered inwardly, and at its outer end it terminates in a peripheral flange 37. The flange 37 is, of course, of a diameter to pass through the throat 12. Between the tapered body portion 36 and the flange 37, there is provided a circumferential groove 38 for the reception of a washer 39. Preferably the washer is normally flat and generally circular but of split or C configuration. It is formed of a material which is relatively hard and tough, yet resilient in nature. Materials such as copper, brass, stainless steel, and certain forms of plastics such as nylon, Teflon and polyethylene may be used for this purpose.

As the instant bottle closure 10, with the washer 39 in place thereon, is pushed into the constricted throat 12 of the neck 11 of the bottle, the circular split washer 39 is free to fold backward against the tapered outer surface 36 of the body 16. When the body has been pushed far enough so that the washer 39 passes beyond the internal neck shoulder 15 into the bottle neck the washer returns to its normal flat position as shown. Thus the device is permanently locked in place upon the bottle neck. Any attempt to withdraw the device from the bottle neck causes the washer to be urged against the flange 37 thereby resisting outward movement of the device with respect to the bottle neck. If an even greater outward force is applied in an attempt to withdraw the device, the washer 39 tends to fold back over the flange 37. This imparts a greater cross-sectional area to the lower or inner end of the device than that of the constricted throat 12, thereby positively preventing removal of the device from the bottle neck without either destroying the device or breaking the bottle.

Desirably, the body 16 is provided with a pair of passages 40 adjacent the inner end thereof to permit draining of any of the bottle's contents that might be caught between the body 16 and the wall of the throat 12. As shown the passages 40 extend transversely through the body wall at the tapered portion 36 thereof and open into the lower portion 19*c* of the bore 19.

It will be observed that the construction and arrangement as illustrated and described not only facilitates pouring and effectively closes the bottle upon completion of a pouring operation, but in addition it precludes tampering with the closure so as to prevent refilling. Thus it effectively insures against the introduction of adulterants, diluents, and unauthorized reuse of the bottle. The engagement of the ball 25 with its seat 26 prevents entry of liquid through the device into the bottle. Further the construction and arrangement is such that tampering to unseat the ball is precluded. The transverse disc 30, which is of a larger diameter than that of the spout bore 21 prevents the straight insertion of any tampering device, such for example as a wire W as shown in solid lines in FIG. 6. If a wire or other similarly thin article was to be used, and it was manipulated through one of the openings 34 past the disc 30, its progress into the body bore 19 would be impeded by its engagement with the annular ledge 31. This is indicated as W' by the dot-dash lines in FIG. 6.

But assuming a tampering wire was to be manipulated off the ledge 31, the tampering wire would necessarily curve inwardly. Thus it would engage the ball 25 as indicated by a wire W'' in broken lines in FIG. 6. Because the ball 25 is of a diameter but slightly greater than that of the body bore portion 19*c* and thus rests deeply in its seat, and because of the provision of the longitudinal ribs 28, lateral movement of the ball from its seat is precluded. Even if a bottle equipped with the device were to be inverted so that the ball 25 would leave its seat, and if a wire or similar tampering article, such as indicated at W''' in dotted lines, was to be manipulated between the ball and the bore wall 19*b*, its further movement into the bore 19*c* would be blocked by the annular ledge 26. Thus insertion of a wire through the device for the purpose of preventing reseating of the ball when the bottle is again brought into an upright position is precluded.

It is to be noted, too, that the length of the device, particularly that of the spout 20, contributes to its securiy because is length makes any manipulation of a tampering article substantially more difficult by limiting the article's effective lateral movement.

From the foregoing, therefore, it will be seen that a non-refillable closure and pouring device for bottles constructed in accordance with the teachings of the present invention facilities dispensing of the liquid contents of a bottle to which it is applied. It is operative to close the bottle when it is in an upright position, and it is not likely to fail in operation. As illustrated and described, the insertion of a tampering device to unseat or to hold the ball valving element off its seat is effectively precluded.

Further, the device is of exceedingly simple construction consisting of but five parts, namely, the body, the spout, the sealing gasket, the ball valving element, and the retaining washer. Each of these parts can be easily fashioned of plastic materials as by injection molding or casting in large numbers, and final assembly can be readily accomplished. Thus it will be appreciated that the device permits of exceedingly economical manufacture.

I claim as my invention:

1. A closure device for a bottle having a neck terminating at its outer end in a constricted throat presenting a shoulder at its lower end, said device comprising, in combination, a generally cylindrical body received within

and extending through the throat and having stepped bore therethrough defining longitudinally spaced internal annular ledges, a ball valving element received in said bore and of a diameter to seat within the opening defined by the inner one of said ledges to close said bore against entry of liquid into the bottle, an elongated spout having a bore therethrough fixed to the outer end of said body and mounting a disc on its inner end of a diameter larger than that of the spout bore, said spout having lateral openings therein adjacent said disc for dispensing of liquid from the bottle about the disc and through the spout bore, said disc limiting outward movement of said ball valving element in said body bore, circumferentially spaced ribs rigid with the body bore wall for guiding longitudinal ball movement to and from its seat and precluding lateral movement thereof within the body bore, and means on said body contacting the shoulder to prevent removal from the neck.

2. A closure device for a bottle having a neck terminating at its outer end in a constricted throat terminating in a shoulder, said device comprising, in combination, a generally cylindrical body received within and extending through the throat and having a stepped bore therethrough defining longitudinally spaced internal annular ledges, said body having a portion of its outer surface inwardly tapered and means carried by said body adjacent said tapered surface portion and engageable therewith during insertion of the device within the bottle throat and engageable with the shoulder after insertion for preventing withdrawal of said body therefrom, a ball valving element received in said bore and of a diameter to seat within the opening defined by the inner one of said ledges to close said bore against entry of liquid into the bottle, an elongated spout having a bore therethrough fixed to the outer end of said body and mounting a disc on its inner end of a diameter larger than that of the spout bore, said spout having lateral openings therein adjacent said disc for dispensing of liquid from the bottle about the disc and through said spout bore, said disc being disposed in outwardly spaced relation in respect to the outer one of said ledges for retaining said ball captive within the intermediate bore portion and for directing a tampering wire or the like toward the outer ledge.

3. A closure device for a bottle having a neck terminating in a constricted throat, said device comprising, in combination, a generally cylindrical body of a diameter adapted to be received within the constricted throat and of a length to extend through the throat, a flange rigid with the body and adapted to engage the outer end of the neck to limit inward movement of the device with respect thereto, said body having a stepped bore therethrough defining longitudinally spaced internal annular ledges, a ball valving element received in said bore and of a diameter to seat within the opening defined by the inner one of said ledges to close said bore against the entry of liquid into the bottle, a spout having a bore therethrough and having an external flange fixed to said body flange and mounting a disc in spaced relation to its inner end to define laterally opening passages for fluid flow about said disc, said disc being disposed within the outer end of said body bore and of a diameter larger than that of said spout bore, said disc being disposed in outwardly spaced relation to the outer one of said ledges for directing a tampering wire or the like toward said ledge to impede its entry, the outer surface of said body having an inwardly tapered portion adjacent its inner end and terminating at its inner end in a peripheral flange, and a washer of a diameter larger than that of the bottle throat disposed about the inner end of the tapered body portion and abutting said peripheral flange, said washer being deformable to lie against the tapered body portion for passage through the throat upon installation of the device on the bottle, and said washer being engageable with the inner end of the throat with said peripheral flange preventing dislocation and sufficient deformation to permit removal of the device from the bottle neck, whereby to prevent the addition of adulterants, diluents and reuse of the bottle to which the device is affixed.

4. A closure device for a bottle having a neck terminating in a constricted throat, said device comprising, in combination, a generally cylindrical body of a diameter adapted to be received within the constricted throat and of a length to extend through the throat, a flange rigid with the body and adapted to engage the outer end of the neck to limit inward movement of the device with respect thereto, the outer surface of said body being necked down to provide an inwardly tapered portion adjacent its inner end and terminating at its inner end in a peripheral flange, and a resilient washer of a diameter larger than that of the bottle throat disposed about the inner end of the tapered body portion and abutting said peripheral flange, said washer being deformable to lie against the tapered body portion for passage through the throat upon installation of the device on the bottle, and said washer being engageable with the inner end of the throat with said peripheral flange preventing dislocation and sufficient deformation to permit removal of the device from the bottle neck.

5. A closure device for a bottle having a neck terminating at its outer end in a constricted throat, said device comprising, in combination, a generally cylindrical body adapted to be received within and to extend through the bottle throat and having a stepped bore therethrough defining longitudinally spaced internal annular ledges, said body having a portion of its outer surface inwardly tapered, means carried by said body adjacent said tapered surface portion and engageable therewith upon insertion of the device within the bottle throat, said means being engageable with the inner end of the bottle throat after insertion for preventing withdrawal of the device, said body further having transverse passages therein extending from said tapered surface portion and opening into said bore for draining the space between said tapered surface portion and the juxtaposed surface of the bottle, a valving element received in said bore for seating engagement with the opening defined by the inner one of said ledges to close said bore against entry of liquid into the bottle, a spout having a bore therethrough rigid with the outer end of said body and mounting a disc on its inner end of a diameter larger than that of said spout bore, said spout having lateral openings therein adjacent said disc for dispensing liquid from the bottle about the disc and through said spout bore and for directing a tapering wire or the like toward the outer one of said annular ledges, said disc being disposed for engagement by said valving element to limit outward movement thereof within said body bore.

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