

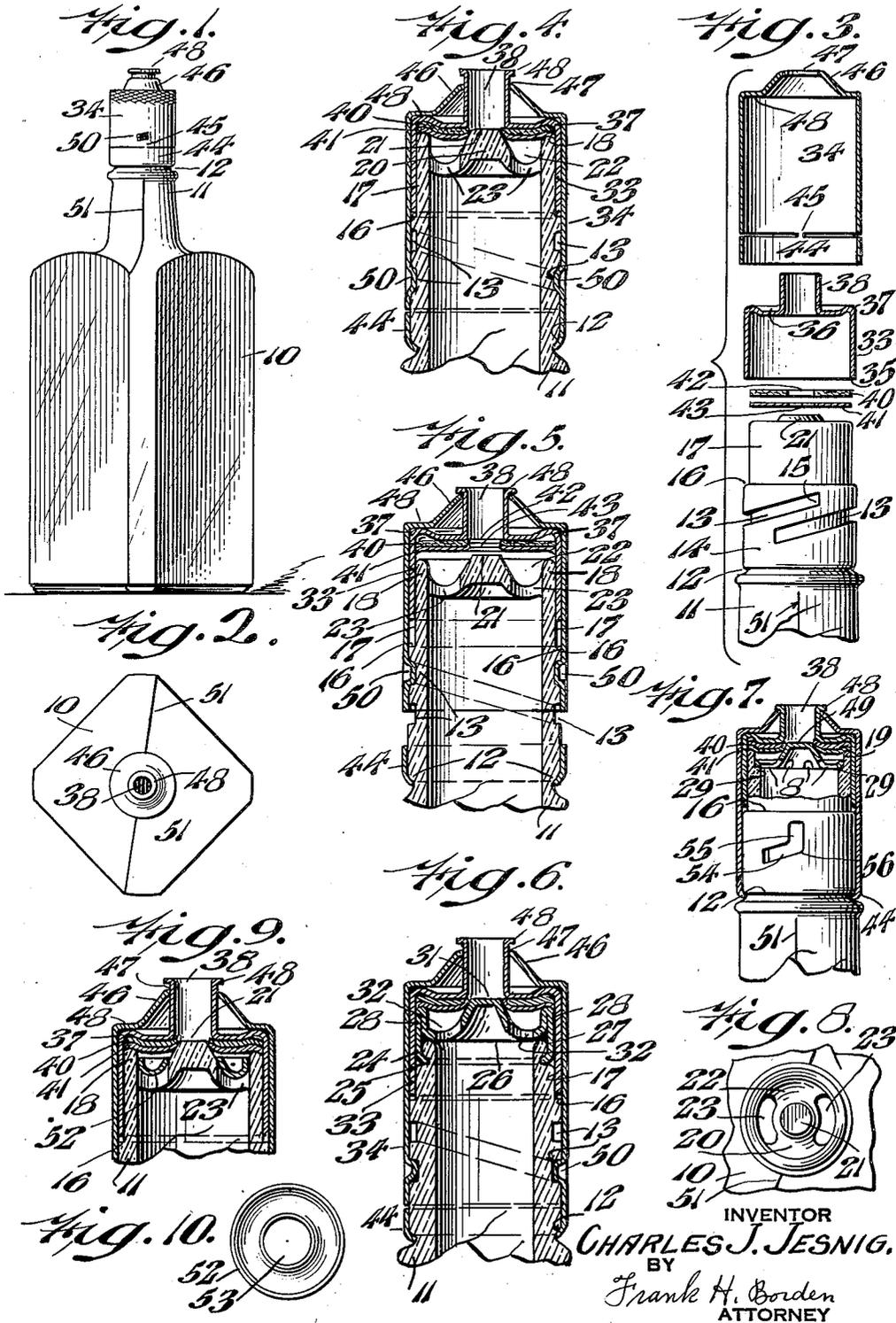
June 22, 1937.

C. J. JESNIG

2,084,344

BOTTLE CLOSURE

Filed Oct. 9, 1934



INVENTOR  
CHARLES J. JESNIG.  
BY  
Frank H. Borden  
ATTORNEY

# UNITED STATES PATENT OFFICE

2,084,344

## BOTTLE CLOSURE

Charles J. Jesnig, Philadelphia, Pa., assignor to  
Positive Seal Closure Company, Philadelphia,  
Pa., a corporation of Delaware

Application October 9, 1934, Serial No. 747,551

16 Claims. (Cl. 215-74)

This invention relates to bottle closures, and particularly to tamper-proof closures for bottles, and constitutes an improvement upon the bottle and closure disclosed in my application Ser. No. 720,961.

It is among the objects of this invention; to provide an improved bottle closure; to provide an improved bottle; to provide a bottle with a cooperating closure such as to effect a substantially tamper-proof assembly; to provide a bottle with a permanently attached closure; to provide a bottle neck and closure of such distinction as to be readily identified; to provide a closure of a substantially smooth outer contour such as to facilitate printing, embossing or marking; to provide a bottle closure such as to eliminate "back lash" at the termination of pouring from the bottle; to provide a bottle pouring opening facilitating smooth pouring with exact termination of pouring to prevent dripping and waste; to provide a substantially non-refillable bottle; to provide an adapter for correcting an ordinary or open-mouthed bottle into a simulation of the improved bottle of this invention; to provide a bottle and closure such as to conduce toward machine filling by authorized persons, while militating against unauthorized machine filling; and many other objects and advantages will become more apparent as the description proceeds.

In the accompanying drawing:

Fig. 1 represents a side elevation of an assembled bottle and closure according to a preferred form thereof,

Fig. 2 represents a plan of the assembly of Fig. 1,

Fig. 3 represents a detached or separated fragmentary section and elevation of a bottle neck and the respective closure elements according to a preferred embodiment thereof,

Fig. 4 represents a fragmentary vertical section of the neck and mouth of a bottle with the closure sealed against egress,

Fig. 5 represents a vertical section similar to that of Fig. 4, with the closure moved to unsealed, opened, pouring position,

Fig. 6 represents a fragmentary vertical section of an open-mouthed bottle with an adapter for converting it into a bottle like that of Fig. 3,

Fig. 7 represents a fragmentary elevation of a modified form of bottle, showing in section a modified form of adapter associated with the bottle neck to simulate the bottle of Fig. 3,

Fig. 8 represents a fragmentary plan of the mouth of the bottle according to one form thereof,

Fig. 9 represents a fragmentary vertical section through a bottle and closure with an inserted valve forming the unit into a substantially non-refillable bottle, and

Fig. 10 represents a plan of the sealing, non-refillable valve element.

Referring to Figs. 3 and 4, it will be observed that in the preferred embodiment of the invention, the bottle 10 has a neck 11 provided with a peripheral shoulder 12, suitably spaced from the free end of the neck, forming an abutment over which the "tear-off" strip, to be described, is to be clinched. Cast into the neck above the tearing shoulder 12 is a relatively deep and angular helical groove, or pair of grooves, forming threads 13. Note that the groove threads 13 are formed in a portion 14, the exposed outer area of which is cylindrical so that the cylindrical outer cap, to be described, can slide freely thereon. The threads 13 terminate at their upper portions at least, in an abrupt or square end 15, which forms a positive stop for the lug to be described. The cylindrical portion 14 of the neck 11 has a shoulder 16 at its upper end, and the free end of the neck extends upwardly from the shoulder 16 in a slightly reduced end 17, of such outer diameter as to slidably receive the inner cap of the closure to be described.

The free end or mouth of the bottle comprises an annular wall or rim 18 having a depressed integral outwardly directed concentric frusto-conical web 20, having the plane end 21, preferably extended slightly beyond the upper level of the rim 18. The web 20 joins rim 18 inwardly of the outer end so as to form an annular groove, gutter or recess 22. Communication of the inside of the bottle 10 with the space surrounding the outer area of the symmetrical conical web is formed preferably by the provision in the web of at least two openings 23, which may each comprise round or other shaped openings, as the arcuately disposed oval openings shown in Fig. 8. The openings are each eccentric to the longitudinal axis of the bottle, and preferably are disposed diametrically opposite to each other.

Before describing the closure assembly, mention should be made of the modification of Figs. 6 and 7. It is easier to make an ordinary open-ended conventional bottle with conventional equipment as an element in a two piece bottle, and this is more available to large members of bottle manufacturers, than to go to the trouble and expense of equipment and training necessary to provide the preferred form of unitary bottle according to the instant invention. Re-

ferring first to Fig. 6, a bottle neck 24, provided with the tearing shoulder 12, and recessed or grooved thread 13, shoulder 16 and reduced outer portion 17 as in the disclosures of Figs. 3, 4 and 5 is provided, and there is also provided a reduced bead 11 and recess 25 as an anchor for the independent adapter 26. The adapter 26 may be of any material such as molded glass, in which case it may be cemented to the bottle, or even fused thereto if desired, or it may, and preferably does, comprise a stamping of sheet metal as shown.

The adapter 26 of Fig. 6 comprises a skirt 27, the outer diameter of which is substantially identical with that of the reduced end 17 of the bottle neck, and has its lower edge crimped or bent over the bead 24 and into recess 25, whereby the adapter is immovably secured substantially permanently to the bottle neck 24. The skirt 27 of the adapter is bent over upon itself to define the annular rim 28 and is stamped to form the web 30 having the frusto-conical closed coaxial end 31, and is provided with the eccentric apertures 32 in as large number as desired. Obviously the adapter thus described can be stamped, molded, swaged, or otherwise formed. When the adapter is anchored to the bottle the effect is similar to that of the integral one piece bottle.

While the adapter of Fig. 6 is thoroughly practical and usable, it is relatively expensive to produce and apply, and is therefore not the preferred form, which, however, is shown in Fig. 7. In this form of invention the bottle neck has the same reduced external portion 17 terminating in the shoulder 16, and the same cylindrical surface 14 and tearing shoulder 12, as in the forms described previously, although as will be later explained, the thread in the cylindrical portion is modified. The mouth of the glass bottle is formed by annular rim 19 having the internal shoulder 29. The adapter comprises essentially the closed frusto-conical axial web 49, suitably apertured as at 8 below the closed end, and suitably disposed within the rim 19 upon the shoulder 29 thereof. The adapter may comprise a mere spider, the radial legs of which frictionally engage the shoulder 29, although preferably the adapter includes an annular outer concentric rim having a resilient edge to frictionally engage the inner surface of rim 19. The apertures 8 obviously may be as great in number as desired and need not be disposed so that a line parallel with the axis can pass substantially concentrically through them, as is desirable where the bottle must be filled through such apertures. Obviously the adapter of Fig. 7 may be axially inserted to frictional seating after the bottle has been suitably filled. Of course it is contemplated that the adapter of Fig. 7 may be permanently and positively engaged with the bottle in any desired manner if this should be found expedient, although the frictional engagement is satisfactory for most purposes.

It is to be observed that the bottle of Fig. 7 provides a gutter as in the other form but which is comprised on one side by the glass or other material rim 19, while on the other side and at the bottom, it is comprised of the metallic or composition adapter 49, and has apertures 8 forming communication between the bottle interior and the gutter.

The closure element of this invention comprises preferably two elements, to wit, an inner cap 33 which forms the sealing element, and the

outer cap 34, comprising the seal actuator. The inner cap 33, preferably drawn from a sheet of metal, comprises a larger cylindrical portion 35 arranged to tightly but slidably engage the reduced end 17, of the bottle end, and has a transverse web 36 merging into the cylindrical extent by a recessed or annularly concave portion 37 aligned substantially with the rim 18, or 28, of the bottle, and having a smaller or reduced cylindrical portion 38, concentric with the cylindrical skirt 35, the inner diameter of which cylinder 38 is slightly greater, preferably, than the diameter of the plane end 21 of the conical web 20. The inner cap 33 has preferably sealing elements associated with it, and comprised for instance of a sheet of relatively soft sealing material 40 such as composition cork or the like, with a facing layer 41 of metal foil to protect the seal if this should be desired and for general purposes it is preferred. The sealing elements have registering coaxial openings 42 and 43 respectively, arranged for substantial registration with the reduced cylindrical shank 38 of the inner cap.

The outer cap 34 has a cylindrical band of such internal diameter as to have substantially slidable engagement over the cylindrical portion 14 of the bottle neck, and also over the outer diameter of the inner cap 33. At its lower edge the outer cap is provided with a band 44, an integral portion preferably of cap 34, but detached therefrom throughout the periphery of the cap except for one or more slender weakened attaching tongues 45, so arranged as to permit easy manual manipulation to sever the cap 33 from band 44, after the latter has been anchored to the bottle neck by clinching about the shoulder 12 as will be readily understood. The cap 33 at its outer end has a conical portion 46 having an axial opening 47, of diameter sufficient to have slidable engagement over the reduced cylindrical end 38 of the inner cap, and includes a transverse substantially plane web portion 48 to engage the convex side of ring 37 of the inner cap to apply sealing pressure thereto.

The inner cap, with its associated sealing element frictionally or adhesively secured in place therein is assembled in the outer cap 34 with the reduced cylindrical shank 38 extending through the axial opening 47, then the end of the tubular shank is spun over as at 48 in such way as to permit a slight axial as well as rotative relative motion of the inner and outer caps.

The bottle having been properly filled, as by the insertion of filling tubes through the appropriate openings 23 or 32, an assembled closure is pushed over the end of the bottle neck until the sealing elements 40 and 41 engage yieldingly but sealingly both the upper edge surface of the rim 18, 19 or 28, as well as the tapered surface of the cone below the plane end 21 thereof, so as to seal the gutter, and, of course, the openings 23 or 8, etc. While the caps are thus firmly held, or after abutments 50 are formed and the caps rotated on their threads to force them axially downward, the lower edge of tearing strip 44 is spun or otherwise bent about the shoulder 12 of the neck. While the cap or closure is firmly held downwardly on the neck, and either before, during, or after the spinning of the tearing strip 44 on the shoulder, a pair of plungers are brought to bear radially of the cylindrical closure element in proper relation to the threads 13 so as to form at least one, and preferably a pair of diametrically disposed, inwardly extend-

ing locking lugs or abutments 50, arranged to fit tightly within the square thread recess 13, and of such size and shape as to positively engage the end shoulder 15 thereof when the cap is ultimately rotated. The threads 13 and bottle are so disposed that the median molding line 51 or other indicator has predetermined angular relation to the ends of threads 13 so as to facilitate the positioning of the bottle so as to cause the indentation of the walls of the outer cap characterizing the lug or abutment 50, to be exactly and positively disposed in threads 13, without breaking the bottle.

Referring to Fig. 9 there is disclosed the same arrangement of parts as to bottle neck and closure assembly as in the preferred forms shown in Figs. 3 and 4 for instance, and the parts are all the same and have the same reference characters, although it may be preferred to form a rather deeper gutter than usual when the gravity valve element about to be described, is to be used, in order to secure such clearances to insure free and untrammelled gravity actuation of the valve in each direction. Seated loosely and gravitationally in the annular gutter or recess 22 of the bottle, and between the surface of the gutter and the surface of the sealing elements 40 and 41 is the valve disc 52 having the central aperture 53. The disc is concave in radial section, and the upwardly inclined portions are short enough, preferably, as to just cover the apertures 23, or 32, without extending up the side walls of the gutter a distance sufficient as to cause it to be in the way of or in contact with the sealing elements as this is undesirable. A deeper gutter facilitates this. Obviously, tilting the bottle after twisting the closure on its threads and raising the sealing device, permits the valve element to fall away from the mouths of the apertures in the gutter, while still axially anchored and confined by engagement of the central axial bore of the valve disc over the truncated cone of the central web. This action permits the free flow of the fluid from the bottle. Obviously as soon as the bottle is moved to upright position again, the apertures are again closed by the valve element 52. Clearly, if desired, the valve element might have any desired sort of facing or backing to facilitate its functioning. It is not necessary that there be a ground seal between the valve disc 52 and the bottle gutter, as the mere closing of the apertures is sufficient to make the bottle and apertures so airbound that but slight amounts of liquid, if any at all, can be caused to enter when the permanently attached closure is in place.

It will be understood that in all forms of the invention, after the outer cap strip crimped or bent into attached relation and the wall indented as at 50, the inner cap having been slid simultaneously on its guide surface to sealing relation with the end of the neck, it is necessary to move the outer cap axially out of its clamping engagement with the inner cap before the latter can move or be moved to permit pouring. In the form shown in Figs. 3, 4, etc., the initial rotation of the outer cap causes it to turn on threads 13 through abutments 50 and to be moved axially away from the end of the bottle neck, or mouth, carrying the inner cap axially with it, to unseat the closure. During this movement it is preferred that the inner cap have axial movement only. This is secured by the tight fit of the inner cap about the reduced end of the bottle in the

normal and preferred case, but may be made more definite by the provision of a vertical rib or bead or the like on the neck (not shown), with which the inner cap may engage longitudinally, to form a cooperating crease or slight bend, or merely a frictional engagement tending to preclude rotation, although this affords a clearance through which liquids may seep. It is found that in some cases the reduced end of the bottle neck is not exactly round, but may be slightly oval by a minute degree. In this case it will require that the inner cap be slightly distorted to permit its sliding engagement with such reduced end, and this in turn tends to prevent rotation. Obviously rotation of the inner cap, if desired for any purpose, may be arranged or permitted, although it may conduce to more rapid wear of the sealing elements.

It is preferred, in any case, that the inner cap have a fit sufficiently tight about the reduced end of the bottle neck, as to minimize or preclude leakage of any of the liquid from the bottle, between the neck and the inner cap after pouring. This provision of the instant invention of a tight sleeve engaging the outer periphery of the bottle mouth as a seal, and the consequent elimination of "back lash" marks a feature of improvement of the instant invention over that shown in my earlier application Ser. No. 720,961.

It being recognized that the axial movement of the inner cap between sealed and unsealed relationship to the end of the bottle is the desired movement after disruption of the tearing strip and the outer cap, it will be recognized that any desired sort of thread arrangements may be used as may fit any required condition. Thus the external threads of the aforesaid application may be used with the instant closure, instead of the indented threads herein. Illustratively, it is recognized that it may be considered a little onerous to be required to twist the outer cap to the degree indicated by the pitch of the threads 13 of Fig. 3, to secure complete opening of the closure. The modification shown in Fig. 7 may be resorted to to secure release from locking pressure, or to secure locking pressure, with a minimum of rotational effort, but with possibly considerable manual sliding effort to effect the desired end. Thus a recessed thread groove 54 has a vertical portion 55, and a small inclined wedging or locking groove 56. The indentation or abutment 50 of the outer cap, being disposed in the groove 54, may engage the inclined portion 56 to apply sealing pressure or the unseating of the inner cap, according to the direction of relative travel or rotation. After the initial unsealing pressure resulting from relative movement of the abutment and inclined thread, the abutment reaches the vertical groove 55, and the outer and inner cap may then be moved together axially to complete unsealing and the establishment of pouring relation by manual pull. Conversely, to seal, the outer cap carrying the associated inner cap, is pushed axially toward sealing and thereafter, the abutment engages the inclined groove portion to force the closure toward sealing.

Attention should be directed to the preferred form of closure element in that the reduced cylindrical extension 38 of the inner cap, is spun or turned over at 48 to form the pouring mouth of the closure bottle end itself, to prevent the insertion of any refilling tubes in either of the respective apertures, or for such like purpose. From the viewpoint of pouring, the reduced cylindrical spout thus provided enables the liquid

to emerge from that aperture 8, 23 or 32 having the lowest point from which it flows smoothly in a small stream through the spout 38. Simultaneously air entering the upper portion of the mouth of spout 38 passes down around the frusto-conical central element into the upper portion of the highest aperture 8, 23 or 32 to vent the bottle and permit free and but slightly restricted flow. When in tilting the bottle after pouring there are no straggling drops left on the edge of mouth 38, as the stoppage of pouring is practically instantaneous. Moreover, as explained, the liquid that remains in the pouring spout upon cessation of pouring does not pass around the inner edge of inner cap 33 to smear the sides of the bottle, but is caught and guided by the outer wall 18 or 28 back through the respective apertures into the bottle. In case the valve element 52 is used, that small portion of bottle liquid that is between the upper surface of the gutter and the spout at the time the valve element closes the apertures through the gutter into the bottle will remain in place, or, depending upon the degree of sealing, will slowly seep back into the bottle.

The many advantages of the bottle, and the closure, and the assembly provided by the combination, will be evident to those skilled in the art, as will the fact that many modifications may be made therein without departing from the spirit and scope of the invention.

I claim as my invention:

1. In bottle closures, a sealing cap arranged for axial movement between sealing and unsealing positions, rotatable means movable relative to and arranged for engaging a bottle neck for moving the sealing cap axially of the bottle having a portion engaging said cap, means permanently securing the means to such bottle neck, the cap and means being arranged for relative angular movement, the sealing cap having a concentric pouring opening.

2. In combination a bottle having a neck provided with an eccentric mouth and a concentric axially extending protuberance, a sealing element having a concentric pouring opening arranged to sealingly engage the protuberance, said sealing element having a tight engagement with the neck of the bottle adjacent the mouth to prevent back-lash, and independent rotatable means for engaging said element to move it axially.

3. In combination a bottle having a neck provided with a mouth and a concentric axially extending protuberance, a sealing element having a concentric pouring opening arranged to sealingly engage the protuberance, said sealing element having a tight engagement with the neck of the bottle adjacent the mouth to prevent back-lash, and independent movable means for forcing the element axially into sealing engagement.

4. In combination a bottle having a neck provided with a mouth and a concentric axially extending protuberance, a sealing element having a concentric pouring opening arranged to sealingly engage the protuberance, said sealing element having a tight engagement with the neck of the bottle adjacent the mouth to prevent back-lash, and means comprising a rotatable element housing the sealing element and said neck adjacent the mouth for forcing the sealing element into sealing engagement with the protuberance and said element arranged to seal said mouth when sealingly engaging the protuberance.

5. In bottles, a closure comprising a neck having an annular rim and a concentric web defining

between the web and the rim a gutter, an eccentric opening in the gutter, a sleeve engaging the neck of the bottle adjacent to said rim and having a transverse portion in alignment with the opening, said sleeve having a pouring opening concentric with the neck and web, means associated with the sleeve for sealing the gutter to seal the eccentric opening, and independent means for forcing the sleeve axially of the bottle to seal said gutter.

6. In bottles, a closure comprising a neck having an annular rim and a concentric web defining between the web and the rim a gutter, an eccentric opening in the gutter, a sleeve engaging the neck of the bottle and said rim and having a transverse portion in alignment with the opening, said sleeve having a pouring opening concentric with the neck and web, means associated with the sleeve for sealing the gutter to seal the eccentric opening, and means for forcing the sleeve axially of the bottle to seal said gutter, said means comprising a housing, thread means on the bottle and housing cooperating to effect axial movement of the housing in response to rotative housing movement, means operatively associating the housing and sleeve to permit limited relative axial movement of the housing and sleeve, so that axial movement of the housing moves the sleeve positively in each direction.

7. A bottle having a neck with an annular gutter defined by a rim and a central conical protuberance and having apertures in the gutter, movable sealing means for the gutter and apertures, and an annular valve element concentric with the protuberance and loosely disposed in the gutter.

8. In bottles, a neck having an annular rim, a substantially concentric axial protuberance inwardly of the rim and spaced from the rim by an annular gutter, an eccentric opening being formed in the gutter communicating with the interior of the neck, a sealing cap slidably embracing the neck adjacent to the rim and having a transverse portion arranged to seal the gutter in one axial position of the cap, a cylindrical pouring spout extending from the transverse portion, and separate means engaging the spout and engaging said neck to secure axial movement of said cap.

9. In bottles, a neck having an annular rim, a substantially concentric axial protuberance inwardly of the rim and spaced from the rim by an annular gutter, an eccentric opening being formed in the gutter communicating with the interior of the neck, a valve disc having an axial opening to surround said protuberance and having a surface arranged to conform with the gutter surface to close said opening, and a sealing closure arranged to movably engage said protuberance and said rim to supplementally seal said opening.

10. In bottles, a neck having an annular rim, a substantially concentric axial protuberance inwardly of the rim and spaced from the rim by an annular gutter, an opening being formed in the gutter communicating with the interior of the neck, a closure having an axial spout and arranged to engage the surface of said protuberance, said closure having a surface concentric with the spout arranged to engage the rim when the closure engages the protuberance, and substantially cylindrical means on said closure arranged to slidably engage the neck adjacent to said rim to minimize seepage, and supplemental means engaging said spout and operatively mounted

on said neck to move said closure axially to seating and unseating relation.

11. In bottles, a closure comprising an outer cylinder having a tapered end with an axial opening, an inner cylinder slidably disposed in the outer cylinder, the inner cylinder having a transverse web and a reduced integral axial spout with the latter disposed slidably in the opening of the tapered end of the outer cylinder, and means on the spout preventing retraction of the spout from the opening.

12. In bottles, a closure comprising an outer cylinder having a tapered end with an axial opening, an inner cylinder slidably disposed in the outer cylinder, the inner cylinder having a transverse web and a reduced integral axial spout with the latter disposed slidably in the opening of the tapered end of the outer cylinder, and means on the spout preventing retraction of the spout from the opening, and a tearing strip at the lower edge of the outer cylinder.

13. In bottles, a closure comprising an outer cylinder having a tapered end with an axial opening, an inner cylinder slidably disposed in the outer cylinder, the inner cylinder having a transverse web and a reduced integral axial spout with the latter disposed slidably in the opening of the tapered end of the outer cylinder, and means on the spout preventing retraction of the spout from the opening, a bottle having a neck with a reduced end to receive the inner cylinder, said neck having an axial protuberance and an annular rim spaced by an apertured gutter and arranged to be sealingly engaged by the web of the inner cylinder, said neck having a cylindrical portion to slidably receive the outer cylinder and a thread groove, and an integral extension of the outer cylinder seated in said groove.

14. A closure for bottles comprising an outer

and an inner relatively rotatable cap, the inner cap arranged to axially slidably engage the outer surface of a bottle adjacent the rim of its neck, and having a transverse portion merging into a pouring spout of reduced substantially cylindrical section, the outer cap having a portion engaging said spout and having a skirt portion arranged to directly engage the outer surface of a bottle.

15. In a closure element for bottles, an inner cap having a substantially cylindrical portion arranged to axially slidably engage the exterior of a bottle neck adjacent its rim, the inner cap having a transverse portion extending inwardly of the cylindrical portion substantially perpendicular to the axis thereof, and merging into a reduced substantially cylindrical pouring spout substantially concentric to such axis, the whole arranged to engage a bottle neck having a rim and a concentric axial protuberance, the contact portion of which is in a substantial plane containing the rim, so as to seal the rim and protuberance by such transverse portion while engaging the bottle adjacent the rim to prevent back-lash.

16. A bottle closure comprising a bottle neck having an inclined peripheral groove disposed and effectively terminating in a substantially cylindrical surface, a closure element comprising a cylindrical sleeve slidably disposed relative to the substantially cylindrical surface of the bottle neck, an indentation of said sleeve being seated in said inclined groove to secure threaded operative association with an anchoring of the sleeved closure to the bottle neck, and an inner cap comprising a neck engaging cylindrical portion, a transverse portion and a reduced substantially cylindrical extension, and means coupling the sleeve and inner cap for axial movement together.

CHARLES J. JESNIG.