



Aug. 2, 1938.

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2,125,790

NONREFILLABLE BOTTLE AND LIKE CONTAINERS

Filed Sept. 11, 1935

2 Sheets-Sheet 2

Fig. 7

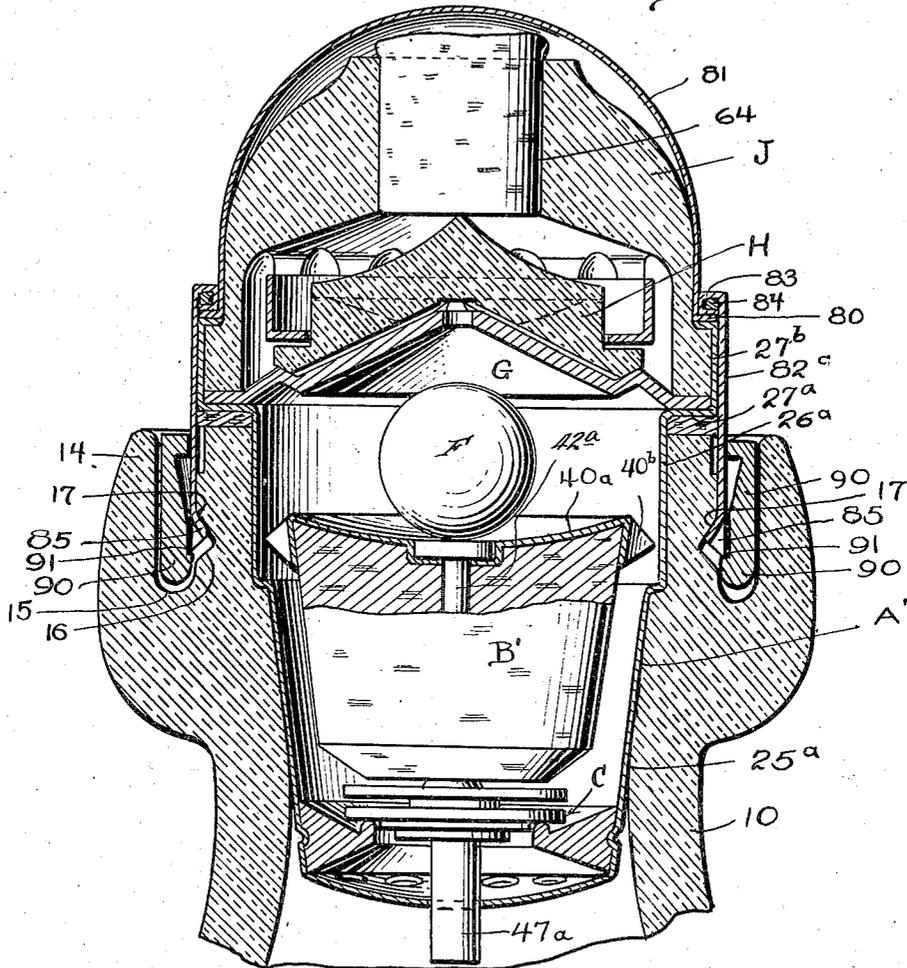


Fig. 6

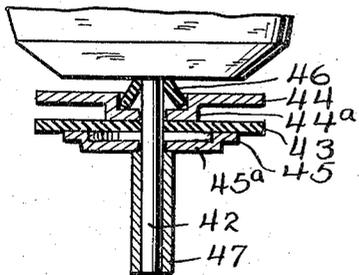
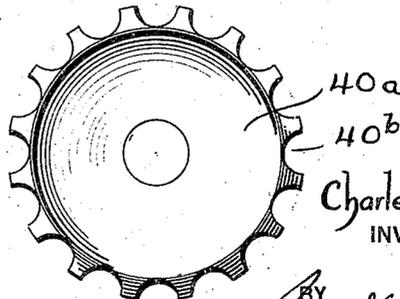


Fig. 8



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# UNITED STATES PATENT OFFICE

2,125,790

## NONREFILLABLE BOTTLE AND LIKE CONTAINERS

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Application September 11, 1935, Serial No. 40,137

8 Claims. (Cl. 215—22)

This invention relates to improvements in non-refillable bottles and like containers.

Among the objects of the invention may be noted the provision of an improved non-refillable bottle or like container; the provision of an improved stopper for a bottle or like container; the provision of a stopper assembly for association with a bottle mouth, of such character as to permit free flowing of the original contents from the bottle while preventing refilling of the bottle after the original contents has been removed; the provision of a bottle stopper of the non-refillable type and improved means of associating the stopper with a bottle neck; the provision of a bottle stopper and seal for sealing the stopper to the bottle, which are so cooperated that the condition of the seal will be indicative of the originality of the contents of the container; the provision of an improved bottle, bottle stopper, and seal assembly in which the stopper renders refilling of the bottle impossible, with the seal being capable of preventing re-use of the bottle, thus to insure the originality of the contents of the bottle; the provision of a stopper and stopper seal for bottles, jars, and like containers which may be applied to such containers without substantial modification thereof and which thus permits the use of bottles and like containers of conventional shape and design; and the provision of structure as above set forth which is well adapted to fulfill the ends for which it is intended.

Other objects will be in part obvious from the annexed drawings and in part indicated from the following analysis of the invention, in which reference is made to the accompanying drawings illustrative of one or more embodiments of my idea, in which

Fig. 1 is a transverse section taken through a bottle, stopper, and stopper seal in accordance with one form of the present invention;

Fig. 2 is a section taken along lines 2—2 of Fig. 1;

Fig. 3 is a section taken generally along lines 3—3 of Fig. 1, to illustrate the under face of the guard disc to be hereinafter described;

Fig. 4 is a section along lines 4—4 of Fig. 1, with the float weighting element being shown in full lines;

Fig. 5 is an exploded view of the stopper assembly illustrated in Figs. 1—4;

Fig. 6 is a detail of the float-carried valve;

Fig. 7 is a transverse section through a modified form of stopper; and

Fig. 8 is a plan view of the float embodied in the Fig. 7 modification.

While the stopper and sealing means of the present invention is applicable to containers generally, the invention will be described in relation to bottles such as are used to merchandise spirituous liquors, wines, medicines, and the like, and generally goods of the class where it is desirable to insure that the purchaser receive the original contents intended to be purchased. However, the stopper and seal arrangement to be described in relation to a stoppering device for bottles is equally effective when applied as a jar closure and as a container closure generally, and all such adaptations are intended to be included within the scope of the present invention.

Referring to the drawings, and particularly to Fig. 1, reference character 10 designates the neck portion of a bottle adapted to deliver its contents through a mouth 13. The exterior wall of the bottle neck 10 has formed integrally therewith an annular guard flange 14 which extends outwardly from the neck and then upwardly in spaced relation to the said neck adjacent the bottle mouth, the flange terminating short of the mouth edge. The flange thus forms with the exterior neck surface of the bottle an annular sealing cup pocket 15 which opens upwardly. Disposed in the outer neck surface of the bottle is a circular groove or indentation 16 which is arranged within the sealing pocket 15 and well below the top edge of the guard flange 14, one face of the indentation 16 providing an undercut shoulder 17 for the purpose to be hereinafter described.

Associated with the bottle mouth to act as a non-refillable stopper therefor is a stopper assembly whose parts are all illustrated in the exploded view designated Fig. 5. Such stopper assembly is preferably constituted by a pressed metal cup generally designated at A and adapted to house a float generally indicated at B, a float-carried valve generally indicated at C, a valve seating ring D, a float guide ring generally indicated at E, a float weighting element consisting of a ball F, a ball track G, a guard disc H, and a pouring top J.

As will be apparent from Fig. 1, wherein the aforesaid parts are shown in assembled relation, float B and valve C carried thereby is arranged for limited vertical movement in the pressed cup A, the float being guided therein in part by the float guide ring E. Ball F constituting a weight is adapted to be cooperatively related between the float B and the ball track G and by its weight 55

normally functions to urge the float and valve carried thereby to its lowermost position. The guard disc H is arranged above the ball track G and functions to prevent access to the ball F or float B for the purpose of forcing, urging, or otherwise moving such parts to a position in which the bottle may be refilled.

Considering now the pressed cup A in greater detail, such comprises a lower cylindrical portion 25 of relatively lesser diameter than the top cylindrical portion 26, such portions being connected by the radially extending flange or shoulder 27. The exterior diameter of the cup portion 25 is such that the cup can be readily inserted in the bottle mouth 13, and the diameter of the upper cylindrical portion 26 is substantially that of the exterior diameter of the bottle neck adjacent its mouth portion 13. A gasket 28 is adapted to be laid on the top edge of the bottle mouth and cooperates between said edge and the annular flange 27 of the cup A when the latter is associated with the bottle as in Fig. 1, to prevent leakage of the liquid contained in the bottle past the joining surfaces. The bottom cylindrical portion 25 of the cup may have an integrally formed and upwardly concave bottom wall 30 provided with a central opening 31 and with a circular series of openings 32.

Adjacent the bottom wall 30 of the cup and preferably resting thereon, I arrange the valve seating ring D which may be made of porcelain, such ring having a central opening, and the lower surface 35 of which is preferably upwardly inclined, the upper surface 36 being inclined downwardly. In order to insure proper seating of the valve to be described, I provide a seating bead or rim 37 about the central opening of the ring D. Preferably, the valve seating ring is secured within the cup portion 25 as by the provision of an annular groove 38, into which the metal of the cup A may be deformed as by spinning, as designated at 39. It will be understood that the aforesaid arrangement is susceptible to some modification as, for example, by striking up the bottom wall 30 of the cup to form a circular seat in such manner that the ring D need not be embodied.

The float B may be constituted by a mass or cork or like buoyant material, the outer diameter of the lower portion of the float being less than the inner diameter of the bottom portion 25 of cup A so that the float may move freely as required into the cup portion 25. The upper surface of the float is preferably sheathed with a metal cap 40 which is slightly convex upwardly to permit the ball F to roll freely thereon, the cap 40 having an edge flange 41. Preferably the cap 40 is secured to the cork, as by a stem 42 having a head 43 which seats in a counter-sunk depression in the cap 40. The stem 42 extends downwardly through the cork body and carries below the lower edge of the float the valve assembly C illustrated in detail in Fig. 6 which will now be considered.

The valve element proper may be comprised by an apertured disc 43 of rubber or equivalent material, which disc is arranged between upper washer 44 and lower washer 45, both washers being suitably apertured, with the upper washer having a circular depression 44a of lesser transverse diameter than the circular depression 45a of the washer 45. The disc 43 thus acts as a bridge which prevents seating of depression 44a in depression 45a, with the result that the free outer edge of valve disc 43 is capable of ready flexure,

and at the same time the edge is maintained against distortion. Disposed within the depression 44a and arranged between the washer 44 and the bottom of the float is a rubber washer 46 which assumes a frustro-conical shape when disposed about stem 42 in the manner illustrated. It will be understood that the said stem 42 passes through the valve disc 43 and washers 44, 45, 46, the disc 43 and the rubber washer 46 having a tight fit and the cupped washers 44, 45 having a loose fit on the stem, such parts being held thereon by an end bushing 47 having a slip fit on the stem. The diameter of valve disc 43 is such that the peripheral portion of the disc seats on the seating bead 37 of ring D, and the arrangement of the valve assembly with respect to the float B is such that the valve assembly may tilt about the axis of stem 42 and relative to the float, by reason of the frustro-conical washer 46. Thus, seating of the valve disc 43 on said bead 37 is assured even when for one reason or another the float is in out-of-vertical position. The stem 42 and bushing 47 extend sufficiently through the opening 31 of the cup A that the float and valve assembly are guided thereby during vertical movement of said assembly.

Within the relatively larger diameter portion 26 of cup A is arranged the float guide E, such comprising a ring of porcelain or like material, whose outer diameter is such that it fits snugly within the portion 26 of the pressed cup A. The float guide E is provided along its inner wall with a plurality of vertically disposed serrations or grooves 50, the high points of which define an opening slightly in excess of the diameter of the cap 40 of float B, whereby the float is guided in its vertical movement by said guide ring, it being understood that the serrations 50 provide passages for the flow of liquid from the bottle, all as will be hereinafter set forth.

The depth of the float guide ring E is substantially less than the depth of the enlarged portion 26 of the cup A, and seating on the top edge of the guide ring E and within the portion 26 of the cup A is disposed the ball track designated G. By reference to Fig. 5, such may be fabricated from metal disc stock and is provided with a horizontal rim 55 engaging on the top edge of the guide ring E, a central conical portion 56, and an intermediate inverted V-shaped ridge 57. Along its circular apex line, the V-shaped ridge 57 is provided with a plurality of openings 58. The under face of the cone-shaped portion 56 forms a track along which ball E is adapted to roll as the bottle is tipped or inverted as will hereinafter appear.

The pouring cap J, which is substantially bell-shaped and which may be made of porcelain or equivalent material, is provided at its lower edge with a thickened and shouldered edge rim 60 which is adapted to be contained within the larger diameter portion 26 of the cup A, the lower edge of the pouring cap J being adapted to seat on the rim 55 of the ball track F. The inner cylindrical cavity portion of the bell-shaped pouring cap J is provided with vertically extending serrations or grooves 62, the intermediate ridges between the serrations or grooves being reduced to provide a shoulder 63 located below the upper ends of said grooves. The pouring cap J is provided with a pouring mouth or opening 64 disposed centrally thereof which may be closed by a stopper of cork or like material.

Mounted within the pouring cap or top J and supported on the ball track G is the guard disc H, shown in under face view in Fig. 3 and in per-

spective in Fig. 5. Such disc has a substantially conical upper surface 66 which extends in spaced relation to the upper or roof surface of the cavity of the pouring top J whereby a liquid passage is provided therebetween. The lower circular edge of surface 66 is inscribed on a radius which is substantially less than the radius of the ridges between grooves 62, with the cylindrical body of the disc extending downwardly from said edge as at 67 and terminating in a substantially horizontal shoulder 68, the exterior diameter of which may be slightly in excess of the diameter of the circle formed by the apex of ridge 57 of the ball track G. From the shoulder edge, the disc is formed to extend downwardly a short distance as at 70 to intersect the upwardly inclined surface 71, whose inclination is substantially that of the inner inclined surface of the ridge 57 of the ball track, on which latter surface the disc may rest. The under surface 72 of the disc H is conical, its inclination being substantially that of the upper surface of the conical portion 56 of the ball track, although the surface 72 of the guard disc is spaced a slight distance from said inclined surface 56, so that the disc is adapted to properly seat itself despite possible irregularities in its surface 72.

By reference to Figs. 3 and 5, the disc is provided with radial channels 75, which channels extend through the cylindrical body portion 67, the horizontal shoulder 68 and the inclined surfaces 71, 72 of the disc, the upper wall of the channels being inclined inwardly and downwardly. A series of diametral horizontal drain grooves 76 are also provided, such grooves cutting through the material of the disc which lies between the inclined under face 72 thereof and the inclined upper wall of the channels 75. The function of said channels 75 and the drain grooves 76 is to break up the liquid flowing through the stopper and to prevent the formation of bubbles, whereby free flow of liquid is obtained.

In order to position the guard disc H within the pouring ring J, I provide a ring 77 which fits snugly into the cavity of the top J and engages at its top edge against the shoulder 53 previously described. Said ring has a bottom flange 78 which extends radially inwardly and the relatively under surface of the flange is adapted for engagement by the horizontal shoulder 68 of the guard disc H. The depth of the ring 77 is so proportioned that a loose positioning of the guard disc H is provided for between the flange 78 of the ring and with the ridge surface of the ball track G.

By reference to Fig. 3 it will be seen that the exterior surface of the ring 77 is well spaced from the bottom of the vertical grooves 62 in the pouring top J, so that the liquid may flow past ring 77 without interference therefrom. It is advisable that the lower inside edge portion of the pouring top J be inclined upwardly as at 79 whereby the liquid may be directed to the grooves 62 for passage therethrough.

According to the present invention I propose to assemble the aforesaid parts in such manner as to provide a stopper assembly which may be readily applied as a unit to a bottle of the character described. In assembling the stopper parts, the valve seating ring D is first secured within the lower portion 25 of cup A, and the guide ring E is suitably positioned and secured in the upper portion 26 of the said cup. The float and valve assembly B, C, is thereupon disposed within the cup in such manner that the stem 42 and

sleeve 47 project through opening 31 of the cup A. The parts G, H, and J are next cooperated and upon placement of the ball F on top of the float B, such latter parts are inserted into the upper portion of the cup A in the manner indicated in Fig. 1. Thereupon the top edge portion of cup A is turned inwardly as at 80 to clinch over the top edge of rim 60 whereby all of the parts are securely held to or within the cup A, and the stopper assembly may be handled as a unit.

The so assembled stopper unit may thereupon be inserted into the bottle mouth 13 after the bottle has been filled, and the next operation according to the present invention is the combined sealing and securing of the stopper to the bottle. As will be apparent from Fig. 1, sealing cap 81 is disposed over the pouring top J, such cap being preferably of metal foil and having a fitted skirt portion which extends downwardly to at least the clinched edge 80 of the pressed cup A. In order to permanently secure the lower edge of the foil cap 81 to the stopper in such manner that the substitution of a new cap is rendered impossible, a tubular element, hereinafter called the crimp ring, and designated 82, is slipped over the stopper and foil cup thereon, the internal diameter of the crimp ring being such that it may just clear the stopper. The upper circular edge of the crimp ring 82 is inwardly rolled or beaded as at 83 and within the roll or bead 83 may be disposed a steel ring 84 whereby the bead 83 is substantially rigid and inflexible. The diameter of the intumed or beaded upper edge of the crimp ring is such that the bead 83 is adapted to grip the lower skirt portion of the foil cup and clamp such portion permanently against the flange 80 of the cup A. The depth of the crimp ring 82 is such that it extends downwardly into the sealing pocket 15 of the bottle and the ring has formed on its lower edge portion a series of normally outwardly directed crimps 85 which are disposed adjacent the circular groove 16 formed in the exterior surface of the bottle neck as previously described. Thereupon, a locking ring 90 of inner diameter to clear the sleeve 82 and of outer diameter to fit into the pocket 15 with slight clearance is slipped over the crimp ring and, as the ring is forced into the sealing cup 15, its lower edge engages the crimps 85 and forces them radially inwardly to clinch against the undercut shoulder 17 of the groove 16 whereby the crimp ring secures and retains the stopper on the bottle. Locking ring 90 is provided with an inwardly extending bead or shoulder 91 which rides over the crimps 85, with the inherent resiliency of the metal of the crimps thereupon causing portions of the crimps to swing outwardly above the locking bead 91, thus to lock the ring 90 within the sealing pocket 15. Thus, after the ring 90 has been once inserted into the pocket, it is to all intents and purposes locked therein for all time, because the ring can be removed only by breaking off or melting down the glass flange 14 which, in effect, destroys the bottle. Consequently, re-use of a bottle after the ring 90 has been finally set is impossible without detection. Final setting of the locking ring 90 also locks the crimp ring 82 permanently to the stopper and thus locks the stopper to the bottle, as the stopper can be removed from the bottle only by breaking or cutting away the ring 82 with visible effect.

It will further be evident that, upon breaking

or tearing the foil cap 81, the substitution of a new foil cap for the purpose of simulating the original foil is substantially impossible by reason of the fact that it is impossible to insert a new foil cap beneath the foil holding head 83 of crimp ring 82.

A brief description of the operation of the non-refillable stopper will now be given. Upon the bottle being maintained in upright condition, the weight of ball F operative against float B causes the float to assume its lowermost position and, in this position, valve disc 43 is seated against seating ring 37. When it is desired to pour some of the liquid from the bottle, it being assumed that the seal has been properly broken, the bottle is inverted and the ball F rides upwardly along the conical under surface of the ball track G. Consequently the float B may rise due to its buoyancy and during such movement the float stem 42 is journaled in opening 31 of the bottom wall 30 of cup A, with the upper portion of the float being guided in the float guide ring E. Liquid may now pass into cup A through openings 32 and flows between the body of the float and the inner wall of the lower cup portion 25, through the length of the serrations 50 of the float guide ring E, through openings 58 of the ball track G, through serrations 62 of the pouring top, and, finally, through the mouth 64 thereof. As soon as the bottle is returned to its upright position, ball E by its weight forces float B downwardly to seat valve disc 43, and the bottle is automatically closed.

The guard disc H will of course prevent access to the ball F, float B or valve C carried by the latter, for the purpose of manipulating any of such parts in an attempt to refill the bottle. To put further obstacles in the way of any such attempt, I propose to position the pouring top J with respect to the ball track G in such manner that the grooves 62 of the top are staggered in relation to the openings 58 of the ball track, as indicated in Fig. 2 wherein the grooves 62 are indicated in dotted lines. It will further be understood that any pressure on float B, as during an attempt to force substitute contents into the bottle, results in immediate seating of valve C on its seat 37.

I have found by actual test of the stopper assembly above described that the liquid pours relatively freely from a bottle to which the stopper is applied, and I ascribe this desirable condition to the fact that an adequate number of liquid and air passages, properly distributed, are provided whereby air may enter the bottle readily as the liquid empties from the same. Accordingly, there is small chance that a vacuum is formed within the bottle as would prevent its contents from flowing therefrom.

Considering now the modified construction illustrated in Figs. 7 and 8, such represents an arrangement quite similar to the Figs. 1-6 form of the invention but requiring a lesser number of parts, with the modified construction being characterized by a reduced height of the stopper assembly. Thus by eliminating the guide ring E of the Figs. 1-6 form of stopper, the cup A' (Fig. 7) can be set lower in the bottle neck and the overall height of the crimp ring 82 may thereupon be reduced with consequent economy in manufacture.

Proceeding with the description of the modified construction, the cup A' has a lower portion 25a, which may be slightly tapered, and an upper cylindrical portion 26a. Both portions

25a, 26a are disposed within the bottle neck which may be formed with a cylindrical portion of increased diameter adjacent the bottle mouth although such is not essential. The cylindrical portion 26a terminates in a horizontal flange 27a for seating against the bottle mouth edge and has an upwardly extending cylindrical part 27b similar to the portion 26 of the Figs. 1-6 construction although of lesser depth. A float B' is arranged for limited vertical movement within the cup A, the float B' being guided therein by stem and bushing 42a, 47a, respectively, and by the portion 26a of the cup, which portion serves the function of the guide ring E previously described in connection with the Figs. 1-6 construction.

In order to permit of ready flow of liquid past the float B', the float cap 40a, which is concave upwardly rather than convex, whereby the valve may open at a lesser angle, is provided with rolled or otherwise formed edge serrations or grooves 40b which form passages for the flow of liquid past the greatest diameter of the float. Alternatively, the serrations or grooves 40b could be eliminated and serrations or grooves provided instead in the wall of portion 26a of the cup A' through which the liquid may flow past the valve in manner similar to the flow of liquid through the grooves 59 of the guide ring E of the Figs. 1-6 construction. Otherwise the construction of the Fig. 7 modification is similar to that illustrated in Figs. 1-6 and embodies the valve C, ball F, ball track G, guard disc H, and pouring top J. The modified form of stopper is further secured to and sealed to the bottle in like manner, it being understood, however, that crimp ring 82a is of lesser depth than crimp ring 82, by reason of the fact that the modified stopper assembly sets lower in the bottle neck than in the Figs. 1-6 form of the invention.

Without further analysis the foregoing will so fully reveal the gist of this invention that others can, by applying current knowledge, readily adapt it for various applications without omitting certain features that, from the standpoint of the prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention, and therefore such adaptations should and are intended to be comprehended within the meaning and range of equivalency of the following claims.

I claim:

1. In a non-refillable bottle, in combination with a bottle having a neck flange forming with the exterior bottle neck surface an annular sealing pocket about the bottle mouth, and the bottle neck having an undercut shoulder disposed within said pocket, of a non-refillable stopper for said bottle provided with a shoulder, a foil cap for the stopper extending over said stopper shoulder, a crimp ring having a portion bearing on said stopper shoulder and being thereby operative to secure the foil cap to the stopper and having another portion extending into said pocket, and means, insertable into said pocket for permanent location therein, for crimping said extending portion of the crimp ring beneath the undercut shoulder of the bottle neck whereby to secure the stopper to the bottle.

2. In a non-refillable bottle, in combination with a bottle having a neck flange forming with the exterior bottle neck surface an annular sealing pocket about the bottle mouth, and the bottle neck having an undercut shoulder disposed within said pocket, of a non-refillable stopper for said bottle provided with a shoulder, a foil cap

for the stopper extending over said stopper shoulder, a crimp ring having a portion bearing on said stopper shoulder and being thereby operative to secure the foil cap to the stopper and having another portion extending into said pocket, and a locking ring, insertable into said pocket for permanent location therein, for crimping said extending portion of the crimp ring beneath the undercut shoulder of the bottle neck, said crimped portion being thereupon operative to secure permanently the locking ring within the pocket.

3. A non-refillable stopper comprising, in combination, a cup element having an inlet passage thereto, a float disposed in said cup, a valve carried by said float and disposed in controlling relation to said inlet passage, a ball, a track in said cup on which the ball is adapted to roll, the ball track having a circular series of apertures therein, a guard disc disposed above said ball track, and a bell-shaped pouring top extending into said cup and having formed in its inner wall portion a plurality of grooves and being provided with a central discharge passage with which said grooves communicate.

4. A non-refillable stopper comprising, in combination, a cup element having an inlet passage thereto, a float disposed in said cup, a valve carried by said float and disposed in controlling relation to said inlet passage, a ball, a track in said cup on which the ball is adapted to roll, the ball track having a circular series of apertures therein, a guard disc disposed above said ball track, the guard disc having radially disposed liquid passages therein, and a bell-shaped pouring top extending into said cup and having formed in its inner wall portion a plurality of grooves and being provided with a central discharge passage with which said grooves communicate.

5. A non-refillable stopper comprising, in combination, a cup element having an inlet passage thereto, a float disposed in said cup, a valve carried by said float and disposed in controlling relation to said inlet passage, a ball, a track in said cup on which the ball is adapted to roll, the ball track having a circular series of openings therein, a guard disc disposed above said ball track, a bell-shaped pouring top extending into said cup and having formed in its inner wall portion a plurality of grooves and being provided with a central discharge passage with which said grooves communicate, and the openings of the ball track being staggered with relation to the grooves of said pouring top.

6. A non-refillable stopper comprising, in combination, a cup element having an inlet passage thereto, a float disposed in said cup, a valve carried by said float and disposed in controlling relation to said inlet passage, a ball, a track in said cup on which the ball is adapted to roll, the ball track having a circular series of apertures therein, a guard disc disposed above said ball track, the guard disc having radially disposed liquid passages therein, a bell-shaped pouring top extending into said cup and having formed in its inner wall portion a plurality of grooves and being provided with a central discharge passage with which said grooves communicate, and the openings of the ball track being staggered with relation to the grooves of said pouring top.

7. A non-refillable stopper comprising, in combination, a cup element having an inlet passage thereto, a float disposed in said cup, a valve carried by said float and disposed in controlling relation to said inlet passage, a ball, a track in said cup on which the ball is adapted to roll, the ball track having a circular series of apertures therein, a guard disc disposed above said ball track, a bell-shaped pouring top extending into said cup and having formed in its inner wall portion a plurality of grooves and being provided with a central discharge passage with which said grooves communicate, and means for positioning the guard disc between the pouring top and the ball track.

8. A non-refillable stopper comprising, in combination, a cup element having an inlet passage thereto, a float disposed in said cup, a valve carried by said float and disposed in controlling relation to said inlet passage, means for so mounting the valve with respect to the float that the valve may tilt on the axis of the float, a ball, a track in said cup on which the ball is adapted to roll, the ball track having a circular series of openings therein, a guard disc disposed above said ball track and having radial liquid passages extending therethrough, a bell-shaped pouring top extending into said cup and provided in its inner wall surface with a plurality of vertically extending grooves, and having a central discharge passage communicating with said grooves, means for mounting the guard disc between the pouring top and the ball track, the openings of the ball track being staggered with relation to the grooves of the pouring top, and the upper edge of the cup being secured to the pouring top.

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