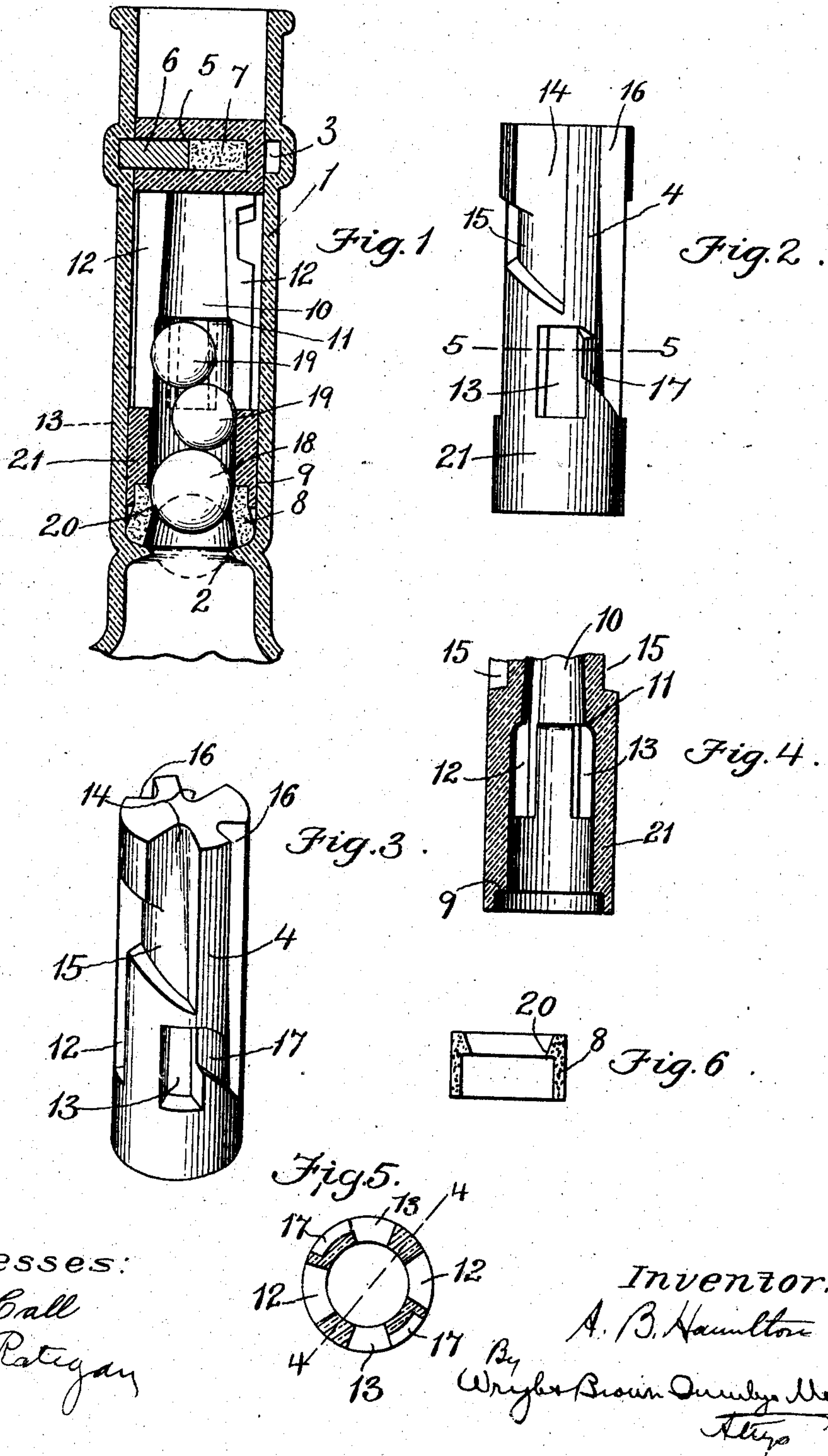


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A. B. HAMILTON.  
BOTTLE STOPPER.

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# UNITED STATES PATENT OFFICE.

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## BOTTLE-STOPPER.

No. 846,467.

Specification of Letters Patent.

Patented March 12, 1907.

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*To all whom it may concern:*

Be it known that I, ADDINGTON B. HAMILTON, of Roslindale, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Bottle-Stoppers, of which the following is a specification.

This invention relates to means for preventing the fraudulent second use of a bottle and is so constructed as to permit free outflow of the contents of the bottle, while obstructing and preventing under ordinary conditions inflow of liquid thereto.

This device differs from previous non-refilling attachments for bottles in that it does not absolutely prevent a second filling of the bottle, for under certain conditions it may be possible to force liquid into a bottle equipped with my device and at least partially fill the same, but it is impossible to pour out again the liquid so introduced.

The essential features which constitute my invention and the details thereof are hereinafter described and claimed and are illustrated in the accompanying drawings, in which—

Figure 1 represents a longitudinal section of the neck of a bottle with the preferred form of my attachment applied thereto. Fig. 2 represents an elevation of the attachment. Fig. 3 represents a perspective view thereof. Fig. 4 represents a section of the lower end of my attachment, taken on line 4 4 of Fig. 5. Fig. 5 represents a cross-section on line 5 5 of Fig. 2. Fig. 6 represents a longitudinal section of a modified form of valve-seat.

The same reference characters indicate the same parts in all the figures.

Referring to the drawings, 1 represents the neck of a bottle, which is formed at its base near the point where it merges into the body of the bottle with an internal flange 2, which forms a shoulder for supporting the attachment. In its upper portion the neck is formed with an internal annular groove 3, by which the attachment may be locked in place. The attachment itself consists of a substantially cylindrical plug 4 of such a size as to be easily inserted into the neck 1 and having in its upper end a cavity 5, within which is contained a locking-pin 6. At the bottom of the cavity I place a spring 7, which is preferably

a resilient mass or plug of cork which allows the end of the pin 6 to be pressed inward flush with the circumference of the plug while being inserted into the neck, and forces the pin out when the latter is adjacent the groove 3. The pin then enters the groove and locks the plug in place, and the latter is made of a diameter so nearly the same as the interior of the bottle-neck that insertion of an instrument to retract the locking-pin is prevented. When in place; the top of the plug is a sufficient distance below the mouth of the bottle to permit insertion of a cork.

Resting upon the shoulder 2, between the latter and the lower end of the plug, is a ring or sleeve 8, of yielding resilient material, preferably cork, which enters a bore in the lower end of the plug and bears against a shoulder 9 therein. The height of the cork ring is such that when the plug is in place and locked the latter bears with sufficient pressure on the ring to form a tight joint and prevent leakage of liquid around the plug. It will be seen that the cork ring thus serves as a packing and avoids the necessity of making the plug so as to fit liquid-tight within the neck of the bottle. As it is very difficult and almost impossible to make the interior of a bottle-neck perfectly cylindrical, it will be seen that by avoiding the necessity of a true fit between the same and the plug I have greatly reduced the expense incident to the manufacture of bottles equipped with my improvement.

Within the interior of the plug is an axial cavity or bore 10, which extends through the lower end of the plug and terminates near the upper end, being closed thereby. The lower portion of the bore is cylindrical, while the upper portion tapers conically to a smaller diameter at its closed end, these portions meeting at a point 11, where there is formed an abrupt shoulder. Slots 12 are formed in the sides of the plug, extending from the closed end of the bore to a point between the ends of the latter, while at intermediate points between the slots 12 are shorter slots 13, of which each end terminates between the ends of the bore 10. Externally of the plug are formed grooves or passages 14, which extend longitudinally of the plug and connect by transverse passages 15 with the slots 12. The slots 12 and grooves 14 lie somewhat beside



each other, and the connecting-passages make acute angles therewith, so as to prevent the insertion of a wire into the bore of the plug. The grooves extend entirely to the upper end of the plug, but terminate short of the lower end, so that the course of outflowing liquid from a bottle containing the plug must be through the bore, one of the slots, and one of the grooves.

Parallel with the grooves 14 and lying intermediate them are longer grooves 16, which extend as far as, but beside, the slots 13 and connect with them by similarly acutely inclined transverse passages 16. In the form shown there are two of each of the described slots and grooves arranged, respectively, diametrically opposite each other; but it is to be understood that the number is not limited except by the size of the plug and that one, two, three, or more of each of the slots and grooves may be employed. Preferably the lower limits of all the slots are on the same transverse plane, which is some distance from the lower end of the plug.

Within the plug is seated a ball 18, forming a valve, and one or more locking-balls 19. The diameter of the ball 18 is substantially that of the cylindrical part of bore 10, being only sufficiently less to permit free movement of the ball, but large enough to restrict in great measure flow of liquid past the same. The cork ring 8 is formed with an internal protuberance 20, which forms a narrow zone of less diameter than that of the ball 18 and is tapered to a larger diameter both above and below the same. This protuberance or shoulder 20 serves as a seat for the ball, against which the latter rests to close the liquid-passage. When sufficient pressure is applied to the ball, the latter is enabled to force the valve-seat outward by compressing the yielding cork, whereupon the ball slips through the ring and rests upon the flange 2, as shown in dotted lines in Fig. 1, the internal diameter of the latter being less than that of the ball.

A bottle which has never previously been used is filled before inserting the stopper. The latter is then inserted in the manner described and as shown in Fig. 1, the ball 18 being then above the valve-seat 20. In pouring the contents from the bottle the latter must be inclined with its mouth below the horizontal, whereupon the ball or balls 19 roll into the tapered part of the bore and the valve 18 separates as far from the seat as it is permitted by the balls 19 or shoulder 11. This is sufficient to carry it somewhat beyond the lower or inner limits of the slots 12 and 13. Thereby the liquid is enabled to flow out through the lowermost slot 12 and passages 14 15, while the air flows in through the uppermost groove 16, passage 17, and short slot 13. The position of the latter enables the air to be carried back into the bottle a

considerable distance before meeting the outflowing liquid, so that the passage of the air and liquid by each other takes place in the widest part of the stopper-bore and not in one of the narrower passages. Thereby a flow is obtained which is as free as could be given by a bottle having its neck the size of the internal flange 2—that is, the flow with the plug in place is as free in a bottle constructed as described as without the plug.

Whenever the bottle is held with its axis horizontal or even with its mouth a little below the horizontal, the inclination of the tapered sides of the bore 10 causes the locking-balls to roll back and carry the ball-valve into the part 21 of the plug. It fits this portion of the plug so closely that while it can roll freely therein it will prevent leakage of liquid therethrough except when a comparatively high pressure is used. Thus it is impossible to fill the bottle by simply immersing it in a quantity of liquid, for the reason that when the bottle is near enough the horizontal to allow any appreciable quantity of liquid to flow in the ball-valve will move itself or be pushed into position to close the passage. The only other way to force liquid in is by using pressure; but any force appreciably greater than that of the atmosphere on the outer side of the ball will push it directly against the valve-seat, against which it is held with a force proportional to that of the pressure in the liquid attempting to enter. In case a sufficiently strong pressure is employed to cause liquid to flow between the ball and the seat 20 the latter will yield and allow the ball to slip by into the space between this seat and the flange 2. Thereafter if an attempt is made to pour liquid out which may have flowed in past the valve the latter will close against the rear side of the seat 20 and effectually prevent any outflow. The parts are so proportioned that only a much greater force than can be secured by shaking the bottle or by any pressure possible to be obtained inside the bottle is necessary to make the ball slip by its seat. Therefore, even though liquid under certain circumstances may be put into the bottle after it has been emptied once, the bottle cannot under any circumstances be used a second time.

In Fig. 6 is shown a modification of the cork ring, wherein the valve-seat 20 is made with a tapered bevel above a square shoulder below the most restricted portion. Other modifications of a similar character may be made and are contemplated as being within the scope of my invention.

In order to get the greatest possible inclination of taper on the upper part of the bore 10, as well as to obtain the maximum weight of the locking-balls 19, I make the diameter of the latter as nearly as possible the same as the diameter of the bore at its closed end. If



the bore were made larger at this point, the inclination would not be as great as possible, while if it were made smaller the ball 19 could not move far enough away to allow of the ball-valve 18 uncovering the slots 12 and 13—that is, without being made of so small a mass as to have insufficient weight. The diameters of the ball and bore being as described, therefore, it is necessary to carry the slots 12 entirely to the closed end of the latter in order to admit air above the locking-ball when the bottle is turned upright. If the slots were not carried thus far, a closed pocket would be formed in the plug, which when the latter is wet would hold the locking-ball 19 by reason of the vacuum therein and would prevent proper action of the locking-ball.

I claim—

1. In combination with a bottle, a valve, and a seat against which the valve closes in obstructing inflow of liquid to the bottle; said seat being yieldable to permit displacement of the valve under pressure and adapted to prevent subsequent opening of the valve, whereby escape of liquid which may enter the bottle under such pressure is prevented.

2. In combination with a bottle, a valve-seat and a valve within the neck of the bottle; the valve-seat being yieldable to permit inward movement of the valve and inflow of liquid past the same, under pressure; and adapted to grip the valve to prevent outflow of the liquid.

3. In combination with a bottle, a ball-valve, and an elastic valve-seat slightly less in diameter at its most restricted point than the ball and enlarged below such point; whereby the valve-seat is adapted to yield when external pressure is applied and permit displacement of the valve into a position below the seat to prevent discharge of liquid in the bottle.

4. In combination with a bottle, an elastic ring located within the neck of the bottle, formed with a narrow internal shoulder constituting a valve-seat, and enlarged below such shoulder; and a ball-valve having a greater diameter than said valve-seat, normally adapted to lie above the same, but adapted to be crowded by pressure past the seat, and by bearing against the inner side of the latter, to prevent discharge of liquid from the bottle.

5. In combination with a bottle, an elastic ring located within the neck of the bottle, formed with a narrow internal shoulder constituting a valve-seat, and enlarged below such shoulder; and a ball-valve having a greater diameter than said valve-seat, normally adapted to lie above the same, but adapted to be crowded by pressure past the seat, and by bearing against the inner side of the latter, to prevent discharge of liquid from the bottle; the bottle-neck having an internal

flange of less diameter than the ball-valve, to support the valve when the latter is crowded past the seat.

6. In combination with a bottle having an internal flange or shoulder in its neck; a plug formed with an internal cavity, external passages, and slots opening from said cavity to the passages, adapted to reside within the bottle-neck; an elastic packing-ring between the inner end of the plug and said flange; and a ball within the cavity of the plug; said ring preventing leakage of liquid around the plug and serving as a seat for the ball whereby to close the passage through the bottle-neck.

7. In combination with a bottle having an internal flange or shoulder in its neck; a plug formed with an internal cavity, external passages, and slots opening from said cavity to the passages, adapted to reside within the bottle-neck; an elastic packing-ring between the inner end of the plug and said flange having a narrow internal zone of restricted diameter; and a ball within the cavity of the plug of slightly-greater diameter than said zone and shoulder; said ring preventing leakage of liquid around the plug and serving as a seat for the ball whereby to close the passage through the bottle-neck.

8. In combination with a bottle having an internal flange or shoulder in its neck adjacent the base thereof, and an internal groove near the mouth; a plug formed with an internal cavity, external passages, and slots opening from said cavity to the passages, adapted to reside within the bottle-neck; a pin contained in a recess in the outer end of said plug adapted to be projected into said groove to retain the plug in place; a compressible resilient medium in such recess for so projecting the pin; an elastic packing-ring between the inner end of the plug and said flange; and a ball within the cavity of the plug; said ring preventing leakage of liquid around the plug and serving as a seat for the ball whereby to close the passage through the bottle-neck.

9. A device for preventing a second use of a bottle, consisting of a plug adapted to reside in a bottle-neck, having slots in its sides and an internal cavity open at one end; the cavity being cylindrical adjacent the open end and tapered to a smaller diameter toward the closed end thereof; a ball adapted to enter the tapered portion, and a larger ball fitting closely and movably in the cylindrical portion of the cavity, forming a valve; and a yielding ring forming a valve-seat.

10. A device for preventing a second use of a bottle, consisting of a plug adapted to reside in a bottle-neck, having an axial bore open at one end and closed at the other end, a slot in its side extending to the closed end of the bore, a second slot intermediate the ends of the bore, and offset external grooves extending from one of its ends to the several



slots; and a ball adapted to reside within the bore to form a valve.

11. A device for preventing a second use of a bottle, consisting of a plug adapted to reside in a bottle-neck, having external longitudinal grooves in its sides and a central bore extending inward from one end toward the other end, and having also passages connecting alternate grooves with different portions of the length of said bore; one of said passages opening into the bore at the inner end to permit discharge of liquid, and another at a distance from the end thereof for inflow of air.

12. A device for preventing a second use of a bottle, consisting of a plug adapted to reside in a bottle-neck, having a bore extending axially into one end and closed at the other, said bore being cylindrical at its open end and tapered toward the closed end; having also longitudinal external grooves or passages of different lengths, and slots through its sides, each located at one side of, and connected with, one of the grooves by a transverse passage; the transverse passages being at different distances from the closed end of the bore; a ball-valve adapted to fit movably in the cylindrical portion of the bore and to uncover the slots when a bottle containing the plug is inclined with its mouth below the horizontal; and a smaller ball adapted to enter the tapered portion of the bore and to roll therefrom, moving the ball-valve into the cylindrical portion below the slots, when the bottle is horizontal.

13. A device for preventing a second use of a bottle, consisting of a yielding valve-seat within the neck of the bottle; a ball-valve cooperating therewith to close the passage therethrough; and a plug reliably secured in the bottle-neck, having a guiding-passage in line with the valve-seat, of substantially the same diameter as the ball, and outlets above said passage, adapted to guide the ball to the seat; the seat being adapted to yield when the ball is pressed against it, and to retain the ball.

14. A device for preventing a second use of a bottle, consisting of a yielding valve-seat bearing against an internal shoulder within the neck of the bottle and against the sides of the neck; a ball-valve cooperating therewith to close the passage therethrough; and a plug reliably secured in the bottle-neck, having a guiding-passage in line with the valve-seat, of substantially the same diameter as the ball and outlets above said passage, pressing at its end against the valve-seat to prevent leakage of liquid between its sides and the sides of the bottle-neck, the guiding-passage being adapted to guide the ball to the seat; and the seat being adapted to yield when the ball is pressed against it, and to retain the ball.

In testimony whereof I have affixed my signature in presence of two witnesses.

ADDINGTON B. HAMILTON.

Witnesses:

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