No. 615,208.

Patented Nov. 29, 1898.

G. J. BARNES.

NON-REFILLABLE BOTTLE.

(No Model.)

(Application filed Dec. 15, 1896.)

2 Sheets—Sheet 1.

Fig. I.

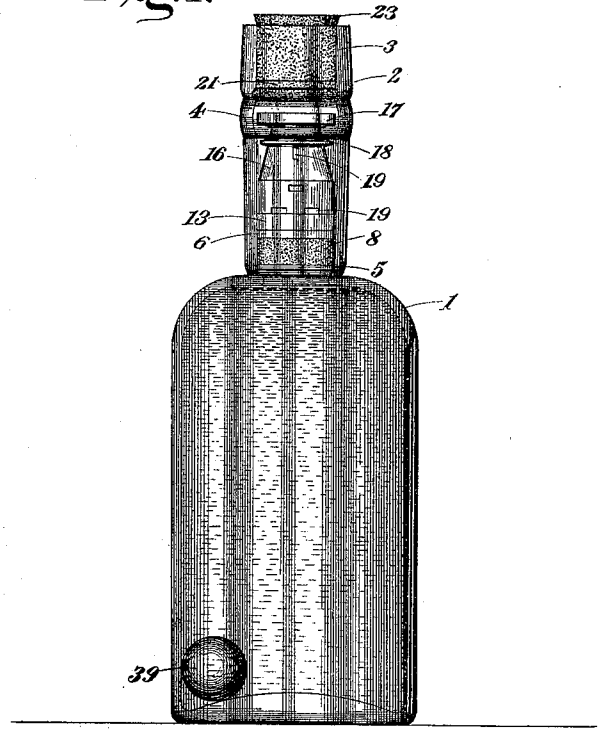
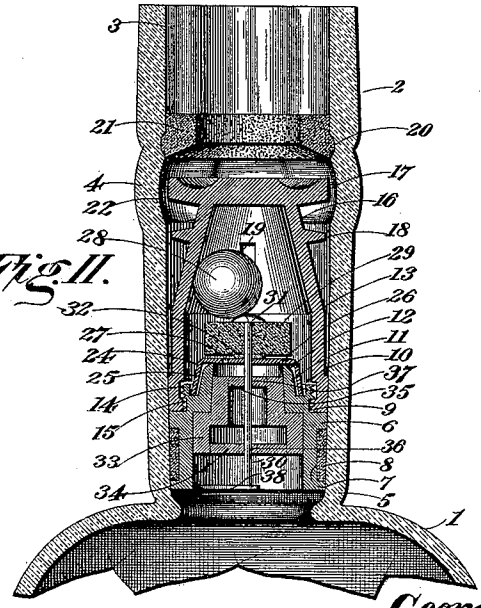


Fig. II.



Witnesses

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2 Sheets—Sheet 2.

Fig. III.

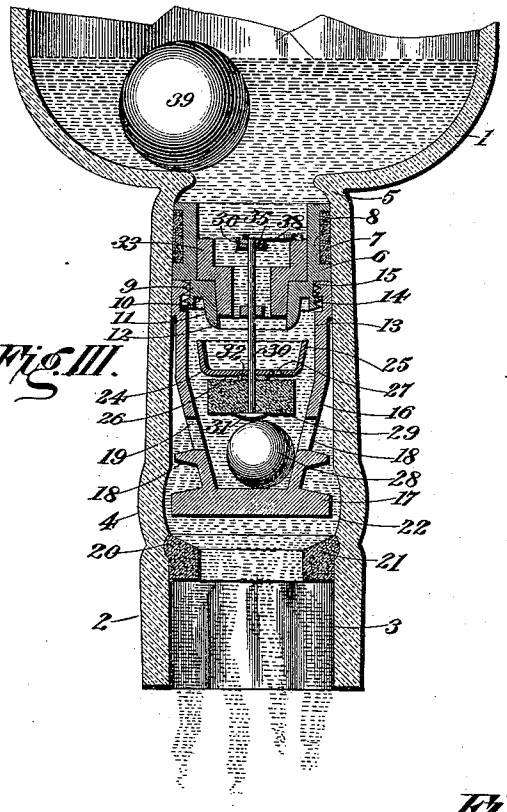


Fig. V.

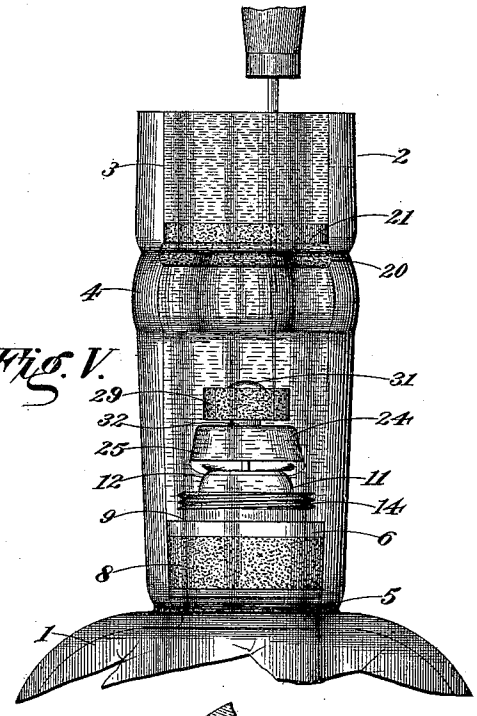
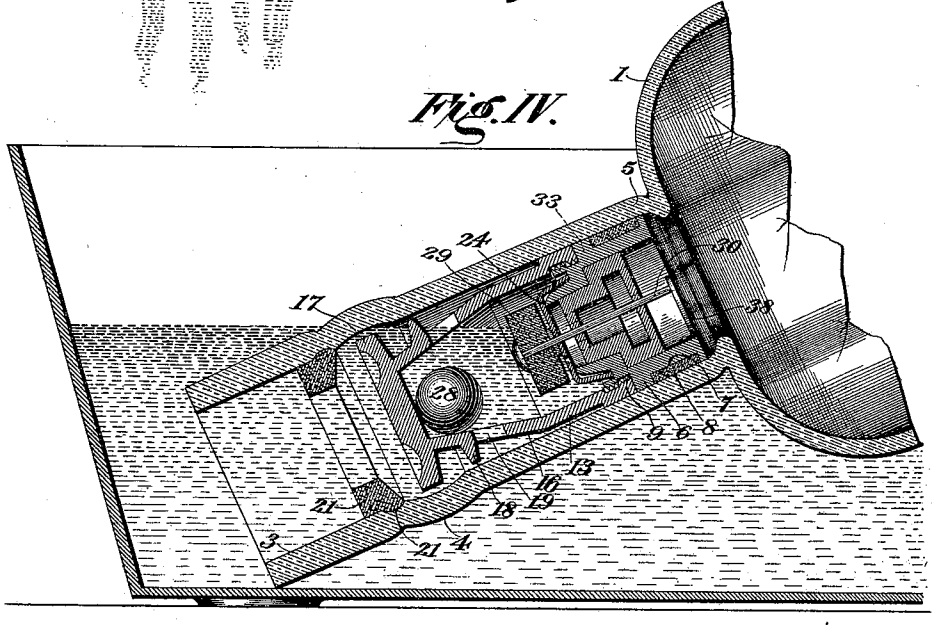


Fig. IV.



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UNITED STATES PATENT OFFICE.

GEORGE J. BARNES, OF MARION, INDIANA, ASSIGNOR OF ONE-HALF TO JOSEPH C. STOEBE, OF SAME PLACE.

NON-REFILLABLE BOTTLE.

SPECIFICATION forming part of Letters Patent No. 615,208, dated November 29, 1898.

Application filed December 15, 1896. Serial No. 615,764. (No model.)

To all whom it may concern:

Be it known that I, GEORGE J. BARNES, of Marion, in the county of Grant, State of Indiana, have invented certain new and useful Improvements in Non-Refillable Bottles, of which the following is a complete specification, reference being had to the accompanying drawings.

The object of my invention is to produce improvements in non-refillable bottles which will practically prevent all attempts to refill the bottle, either by the employment of a picking-tool, by submersion of the bottle, or by any of the methods usually employed to fraudulently refill bottles of this class.

The object in view in producing non-refillable bottles is perfectly well understood in the art and does not require to be specified here.

In the accompanying drawings, Figure I is a side elevation of my bottle complete. Fig. II is a central vertical section of the neck of the same with the temporary stopper removed and showing the neck in the vertical position. Fig. III is a similar view showing the bottle in the inverted position and as if filled with a liquid. Fig. IV shows the bottle-neck tilted, the lower end immersed in a liquid, and is designed to illustrate the operation of the excluding mechanism if an attempt were made to refill the bottle by immersing it in the tilted position. Fig. V is a view similar to Fig. I, showing the guard-cap removed, the neck filled with liquid, and the valve-cup manually lifted to the limit to which it may be raised from the valve-seat without admitting liquid into the interior of the bottle. In this view an air-blubber, which excludes the liquid from the interior of the bottle, is illustrated between the valve-cup and the valve-seat.

Referring to the figures on the drawings, 1 indicates the body part of an ordinary frangible bottle, which may be made of any suitable shape, dimensions, and ornamentation, that illustrated being shown merely for example. It is provided with a neck 2, which may be terminated in a cylindrical upper end 3, an intermediate round annular part 4, and an internally-constricted lower end 5.

6 indicates a cylindrical ring that is provided with an annular groove or depression 7, within which fits a gasket 8 of compressible material, preferably cork. The gasket 8 constitutes, in effect, a retentive packing between the ring 6 and the inner wall of the neck 2, serving at the same time to make an air-tight joint between the parts as well as to confine the ring 6 immovably in place within the neck after it is forced into the same.

The ring 6 is contracted at its upper end to form, first, an annular recess 9; second, an annular groove 10, and, finally, an annular valve-seat 11. The latter is preferably defined by an outwardly-curved wall 12. The recess 9 is designed to accommodate the lower edge of a cylindrical guard-cap 13, which in use is firmly secured within the neck of the bottle and is designed to exclude all access to the operative mechanism within the neck of the bottle. The cap may for that purpose be permanently secured to the ring 6 after the valve mechanism is assembled, and the ring and cap may be inserted together; but I prefer to employ upon the wall of the recess 9, above the bottom thereof, a zone of screw-threads 14 and upon the lower extremity of the cap 13 a zone of interior screw-threads 15. The width of the zone of screw-threads 14 and 15, respectively, is such that the threads 15 run off of the threads 14 and serve to secure the cap 13 to the ring 6, it being practically impossible under existing conditions to realine the threads after the cap is secured within the neck of the bottle.

The cap 13 terminates at its upper end in a tapered extremity 16 and carries upon its outer surface a disk head 17, that is located within the part 4 of the neck 2, but being of less diameter than the internal diameter of the neck at that part defines between it and the neck a narrow deflected passage for the exit of liquid from the interior of the bottle. The passage, though sufficient as an exit, serves to prevent the insertion of a picking-tool into the cap 13. In the office of excluding a picking-tool it is supplemented by an annular flange 18, located below the head 17 upon the tapered part 16 of the cap 13.

The cap 13 is provided with apertures 19,

all of which are arranged in suitable groups underneath the flange 18.

Above the part 4 of the neck 2 I prefer to provide an annular groove 20 within the neck to serve as a means for securing within the neck an annulus which forms, in effect, an interior annular flange 21. This flange may be made of any suitable material and is designed to be inserted into the neck after the ring 6 and the cap 13 are in place. Practically its office is to constrict the neck of the bottle above the cap, so as to cause a tool inserted between the head 17 and the neck to strike against the interior curved portion 22 of the neck and to compel it to deflect the tool against the flange 18.

In practice the upper extremity 3 of the neck is filled, as usual, with an ordinary cork 23, which when the bottle is to be used is extracted in the ordinary manner.

In the foregoing portion of this specification I have described that part of my invention which properly constitutes a casing or protective covering for the valve mechanism that remains to be described.

The valve mechanism consists of a cup 24 of resilient impermeable material, preferably waxed india-rubber, the latter being preferred as possessing suitable resiliency. The lower annular edge 25 of the cup 24 depends sufficiently to enter the groove 10 in the upper part of the ring 6, while the disk-shaped portion 26 of the cup extends across the valve-seat 11.

The cup-shaped valve 24 is designed to exclude under all conditions admission of a liquid into the interior of the bottle and to permit discharge of the liquid therefrom as often as required. It is therefore provided with a minute vent 27 for the admission of air into the bottle, so that when the bottle is tilted to discharge liquid the cap may separate from its seat.

For the purpose of controlling the operation of the cap I provide two elements possessing contradictory properties. The one is a ball 28 of ponderable material—as, for example, glass, block-tin, or some non-corrosive substance. The other is a disk 29 of buoyant material—as, for example, cork. The disk 29 is permanently united to the cup 24, for which purpose I prefer to employ a valve-stem 30, which extends through it and terminates in a round head 31, the latter being designed as a support for the ball 28 at such times as it may be operatively employed.

In order to separate the top 26 of the cup from the bottom of the disk 29, which is essential to the operativeness of the vent 27, I provide around the stem 30, between the disk and the cup, a washer 32. The resiliency of the cap serves through the intervention of the washer to compel its separation from the disk 29 except when the latter is depressed by the ball 28. Inasmuch, however, as such separation is requisite only to the discharge of liquid from the bottle the bottle is always at such times tilted and the ball 28 is at such times out of contact with the disk 29, or, more exactly, with the head 31 of the stem 30.

It is essential that the cup 24 should at all times approach the valve-seat 11 in a plane parallel to it and that any tendency of the cup to tilt should be suppressed. For this reason I prolong the stem 30 sufficiently to provide suitable guideways for compelling the true and proper movement of the cup and its disk 29. Such guideways may be provided in a skeleton frame 33, inserted and securely fastened within the interior of the ring 6. The frame 33 is provided with cross-pieces 34 and 35, within which in vertical alinement are provided apertures 36 and 37, which fit the stem 30 and serve to retain it at the same angle to the ring 6 and the valve-seat 11, with which the ring is provided.

Upon the lower end of the stem 30 I prefer to provide a dash-plate 38, secured at right angles to the stem.

Within the body 1 of the bottle I prefer to provide a comparatively heavy glass ball 39.

All of the above-described parts of my device, even to the stem 30, except the disk 29, the cup 24, and the gasket 8, may be made of glass, if preferred. Some of the parts, however, may be economically and advantageously constructed of non-corrosive metal.

The practical operation of my invention may be explained as follows: The bottle having been filled with the liquid it is designed to contain, the ring 6, gasket 8, frame 33, cup 24, disk 29, stem 30, and dash-plate 38, having been first assembled, are forced into the neck of the bottle until their further passage is resisted by the constricted portion 5 thereof. The movement of the ring 6 through the neck into the body of the bottle may be limited by making the exterior surface of the ring and the interior lower end of the neck slightly tapered; but this is a mere mechanical detail. As suggested in the body of the specification, the cap 13 may be secured to the ring 6 either before or after its insertion into the neck, previous to which, however, the ball 28 is inclosed within the cap and confined thereby above the disk 29. The diameter of the ball 28 is such with respect to the distance between the head 31 of the stem and the end of the internal cavity of the cap 13 as to prevent the too extensive movement of the disk 29 and its stem and the cup 24, that is secured to them. The annulus 21 is next inserted and finally the cork 23, when the bottle is ready for shipment.

When the contents of the bottle are to be withdrawn, the cork 23 is extracted. Afterward upon tilting the bottle the liquid therein will flow out through the neck. Before it begins to flow sufficient air must pass in through the vent 27 to allow the cup 24 to leave its seat. For this purpose I employ the dash-piece 38, which if the liquid is dashed

against it will move the valve-stem 30 longitudinally and forcibly separate the cup from its seat.

If after the whole or a portion of the liquid is exhausted from the bottle attempt be made to refill—for example, by filling the neck with an adulterating liquid—the ball 28 pressing against the head 31 of the valve-stem will press the disk 29 against the top 26 of the cup and force the latter against its seat. Access of air even to the vent 27 is prevented by this operation.

The only way by which liquid can be admitted while the bottle is in the vertical position is to lift the disk 29. It is impossible, however, to gain access to the interior of the cap 13 for accomplishing this. In the first place the introduction of a picking-tool is prevented by the head 17, flange 18, and the apertures of the cap 13; but if the tool could be inserted it is impractical by its aid to sufficiently elevate the disk 29 to permit liquid to enter the bottle. The air in the interior resists the entrance of the liquid, as is clearly illustrated in Fig. V of the drawings, where for the purpose of illustration the cap 13 is removed, and the cup 24 is shown as lifted, as by a sharp instrument thrust into the cork body of the disk 29.

After the cap 13 is once secured within the neck it is impossible, without breaking the bottle, to remove it.

The tapered end 16 of the cap 13 is such as to force the ball 28 against the head 31 of the valve-stem, even when the bottle is laid horizontally. Consequently the ball 28 serves to keep the valve closed in the manner just described in any position of the bottle from the vertical to the horizontal.

If the bottle is tilted beyond the horizontal, as shown in Fig. IV, and immersed in a liquid, the ball 28 no longer operates to close the valve, but, on the contrary, the buoyant disk 29 operates to close it.

With some bottles of the class to which my invention belongs it is practicable by shaking the bottle after submersion in a liquid to completely or partially fill it. While it is impracticable to fill one of my bottles in that manner so long as it is perfectly operative, yet to prevent the employment of this method of filling an occasionally slightly imperfect specimen, which might now and then be manufactured and sold through defective workmanship or insufficient test, I prefer to provide within the bottle a heavy ball 39 of sufficient weight to insure the breaking of the body 1 of the bottle should any attempt be made to refill the bottle by shaking it after submersion in a liquid.

What I claim is—

1. The combination of a bottle having a neck with an internal annulus forming in effect a flange near its outer end, and an outward-curved portion below such flange, a valve mechanism secured within the neck, and a cap surmounting the valve mechanism and provided with a head located in the outward-curved part of the neck, substantially as set forth.

2. The combination with a bottle provided with a neck, having a curved portion and an internal annular projection thereabove, of valve mechanism within the neck, a protective cap inclosing the valve mechanism and having a disk head located within the curved portion of the neck, an inferior flange below said curved portion, and apertures below the inferior flange, substantially as specified.

3. The combination with a bottle and its neck, of valve mechanism and its cap surmounting the same secured within the neck, a disk head and inferior flange upon the cap, a curved portion in the neck surrounding the head upon the cap, and an internal annulus forming in effect a flange provided within the neck above its curved portion, substantially as set forth.

4. In valve mechanism, adapted to be inserted into the neck of a bottle, the combination with a ring and an elevated valve-seat thereon, of a resilient cup-shaped valve inclosing the valve-seat and provided with a vent, a buoyant element connected to the valve and designed normally to leave the vent unobstructed, a weight designed to force the buoyant element against the valve to close the vent, and a cap carried by the ring and inclosing the valve, buoyant element and weight, substantially as specified.

5. In valve mechanism designed to be inserted into a bottle-neck, the combination with a ring provided with an elevated valve-seat of comparatively small diameter, of a cup-shaped resilient valve inclosing the valve-seat and provided with a vent, a buoyant element secured to the valve in a manner to leave the vent unobstructed, a protective cap detachably secured to the ring and inclosing the valve and buoyant element, exterior annular flanges upon the cap and a movable weight within the cap and designed to press the buoyant element against the valve, to obstruct the vent therein, substantially as specified.

6. In valve mechanism, designed to be inserted into a bottle-neck, the combination with a ring provided with an elevated valve-seat and with valve-stem guide mechanism, of a resilient cup-shaped valve inclosing the valve-seat, a valve-stem extending through the ring and valve, a buoyant element secured to the extremity of the valve-stem above the valve, and slightly separated from the last-named element, a dasher-plate carried at the opposite extremity of the valve-stem, a protective cap secured to the ring and inclosing the valve and buoyant element, and a weight within the cap and designed to press the buoyant element against the valve to close the vent therein, substantially as specified.

7. The combination with a bottle, the neck of which is provided with an enlarged portion and an internal annular projection immedi-

ately above said enlarged portion, of a ring designed to be secured within the neck adjacent to its base and provided with an elevated valve-seat, a resilient cup-shaped valve inclosing the valve-seat, a valve-stem passing through the ring and valve, a buoyant element secured to the valve-stem slightly above the valve, a dasher-plate secured to the opposite end of the valve-stem, a protective cap secured to the ring and inclosing the valve and buoyant element, said cap being provided with a disk head located within the enlarged portion of the neck, with an inferior flange below the head and with apertures below the inferior flange, and a loose weight within the cap designed to press the buoyant element against the valve to close the vent in the latter, substantially as specified.

8. The combination with a bottle, the neck of which is constricted at its base and is enlarged at a point intermediate its ends, of an internal annular projection within the neck above the enlarged portion, a ring secured within the neck immediately above the constriction and provided with an elevated valve-seat and with valve-stem guides, a valve-stem extending through and above the ring, a buoyant element secured at the upper end of the valve-stem, a dasher-plate secured to the lower end of the valve-stem, a resilient cup-shaped valve inclosing the valve-seat and provided with a vent, a protective cap secured to the ring and inclosing the valve and buoyant element, a weight within the cap, a disk head upon the upper extremity of the cap and located within the enlargement of the neck, an inferior flange below the head, and apertures below the inferior flange, substantially as specified.

9. In valve mechanism adapted to be inserted into the neck of a bottle, the combination with a ring, valve-seat, and cup surrounding the valve-seat, of a vent in the cup, a buoyant element secured to the cup, a washer between the buoyant element and the cup, a ponderable body, and a cap adapted to confine the parts within operative relations to each other, substantially as set forth.

In testimony of all which I have hereunto subscribed my name.

GEORGE J. BARNES.

Witnesses:

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MICHAEL J. MARVIN.