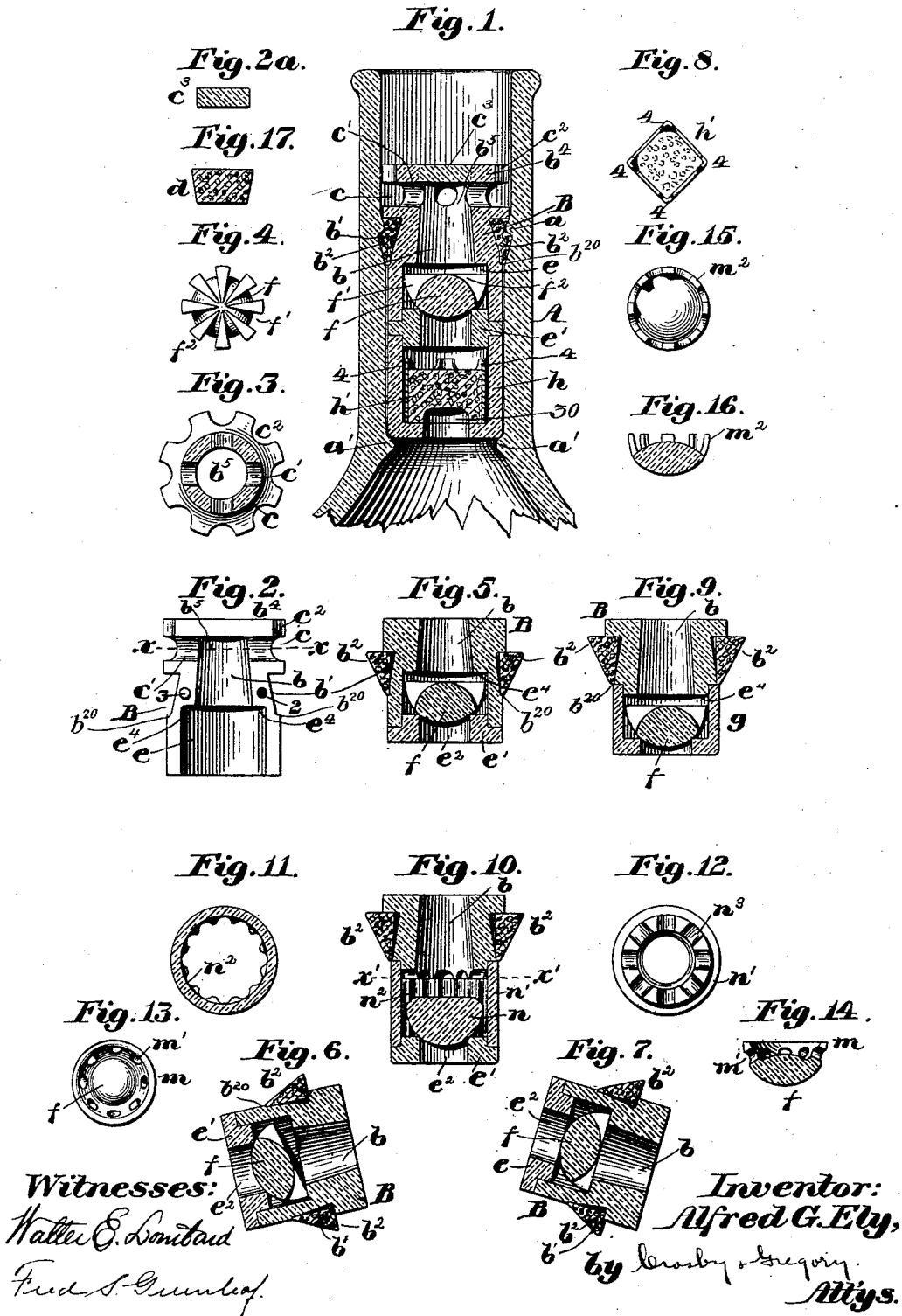


A. G. ELY.
NON-REFILLABLE BOTTLE.

(Application filed Jan. 9, 1897.)

(No Model.)



UNITED STATES PATENT OFFICE.

ALFRED G. ELY, OF NEW YORK, N. Y.

NON-REFILLABLE BOTTLE.

SPECIFICATION forming part of Letters Patent No. 632,453, dated September 5, 1899.

Application filed January 9, 1897. Serial No. 618,509. (No model.)

To all whom it may concern:

Be it known that I, ALFRED G. ELY, of New York, in the county of New York and State of New York, have invented an Improvement in Non-Refillable Bottles, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention has for its object to provide a bottle with a stopper which will prevent the bottle from being refilled after its contents have been once exhausted.

My invention is shown as it will preferably be embodied in a stopper composed of an outer case or shell containing one or more valves of peculiar construction, the said case or shell being so constructed that it may be forced into the bottle-neck, but cannot be removed therefrom.

My valve, which I chiefly depend upon to close the liquid-passage or valve-seat communicating with the interior of the bottle, is a tumbling valve so shaped and proportioned as to its weight that it will remain on said seat when the bottle is right side up, and preferably it will not leave said seat until the delivery end of the bottle-neck has substantially passed below a horizontal plane, when the said valve will quickly tumble from its seat and meet a stop at the main passage of the case, the valve or the edge of the passage being provided with fluid-passages. This case or shell has its circular exterior tapered, and this tapered portion is surrounded by a yielding packing-ring, preferably of cork, the said ring when the case or shell is put into the bottle-neck passing a snug or contracted part of the neck, the said snug thereafter acting on the ring in such manner that should any attempt be made to withdraw the case or shell the tapered surface of the latter acting within the ring expands the same and forces it tighter and tighter against the snug, so preventing the withdrawal of the case or shell. I have also shown the case or shell as provided with a float-valve of peculiar construction, it being placed in a supplemental chamber of the case or shell.

Figure 1, on an enlarged scale, shows a bottle-neck stoppered in accordance with my invention; Fig. 2, a view of one-half of the case

or shell detached; Fig. 2^a, a detail to be referred to; Fig. 3, a section on the line *x*, Fig. 2; Fig. 4, a top view of the tipping valve detached. Fig. 5 shows part of the case or shell with the valve and compressible ring. Figs. 6 and 7 show the parts of Fig. 5 in two different positions; Fig. 8, a top or plan view of the float-valve; Fig. 9, a modification of the parts shown in Fig. 5. Fig. 10 shows a modified form of my invention; Fig. 11, a section on the line *x'*, Fig. 10; Fig. 12, an upper end view of the part *n'* of Fig. 10; Figs. 13 and 14, a top view and section of a modified form of valve; Figs. 15 and 16, a top view and section of yet another modified form of valve; and Fig. 17 shows a cork which may be used, if desired.

The bottle-neck A, of any usual or suitable shape, has in its neck a choke *a* and at its lower end a shoulder *a'*. The neck receives a case or shell B, which in its most simple form is composed of a body having through it a passage *b*, the body being tapered externally, as shown at *b'*, said tapered portion being surrounded by a compressible ring *b*², preferably made from cork, the lower end of said ring acting against a shoulder *b*²⁰ at the lower end of said tapered body. The case or shell is shown as prolonged beyond the passage *b*, thus providing a head *b*⁴, as represented in Figs. 1 and 2, and said head is chambered, as at *b*⁵, in prolongation of the passage *b*, and externally the head is provided with an annular groove *c*, a series of eduction-orifices *c'*, connecting the bottom of said groove with the chamber *b*⁵, and the top of the head is notched, as at *c*², so that fluid entering the outlet and the chamber may flow through the eduction-orifices and pass from the notches *c*² out from the bottle-neck.

To make an absolutely safe non-refillable bottle, the central chamber *b*⁵ of the head of the case will be stopped with a glass disk *c*³, it being put into a molded glass case or shell, with liquid glass cement, but in some cases it may be desired to stop the central hole in the head with a cork *d*. (Shown in Fig. 17.) The case or shell when made of glass may be molded in two pieces. One of these pieces is shown separately in Fig. 2, and each half has a hole 2 and a pin 3, the pin on one part entering a hole in the other part.

While I prefer to use the head shown in Figs. 1 and 2, yet it may be omitted, as shown in Figs. 5 to 7, and the passage *b* may be closed in any suitable manner, as by a cork.

Below the passage *b* is a valve-chamber *e*, in the lower end of which is a seat *e'*, composed of an edge surrounding a passage *e²*, on which rests the smooth unobstructed spherical upper side of the valve *f*; it being made, preferably, of glass or some non-corrosive substance or metal, the upper side of the said valve being cut away to leave channels, as at *f'*, to leave a series of legs *f²* to contact with the valve-stop *e⁴*, it being at the lower end of the passage *b*, when the bottle is tipped over or inverted, as shown in Fig. 7, the channels *f'* allowing the fluid to pass about the valve and enter the said passage. If the bottle-neck is tipped over, as in Fig. 6, the tipping valve will tip, but owing to its convex lower end being the heavier it will not leave the valve-seat, but on turning the bottle-neck over far enough to tip the valve bodily over, as in Fig. 7, the valve will move against the stop *e⁴*. Instead of making the seat *e'* as part of a collar, as represented in Figs. 5, 6, and 7, it may be made as a cup, as shown at *g*, Fig. 9, the valve *f* resting on the edge of the passage made through the end of the cup.

Fig. 5 shows the compressible ring embracing the tapered exterior of the case or shell loosely; but on pushing the case or collar into the neck of the bottle past the choke *a* the choke compresses the ring and causes it to be compacted firmly against the tapering surface, and should it thereafter be attempted to withdraw the case or shell the outward strain put on the case or shell will cause the tapering surface to swell the ring inside the choke, which will actually prevent the withdrawal of the case or shell.

With the case or shell provided with the head closed at top it is impossible to insert a wire into and so as to disturb the valve to hold it open for the purpose of refilling.

I may use an ordinary cork in the bottle-neck above the head of the case or shell after the latter has been inserted into the neck, as shown in Fig. 1.

To further prevent refilling, I may, as I have shown in Fig. 1, provide the case or shell with a second cup *h*, fitted to the valve-seat *e'*, and in the chamber of this cup I place a float-valve *h'*, the said float being composed, preferably, of a many-sided box, (shown in section in Fig. 1 and in top view, Fig. 8,) said box being packed with cork, the top of the box having feet *4*, so that when the bottle is inverted the said feet will contact with the under side of the seat *e'*, so that the fluid in the bottle may readily pass the flattened secant sides of the float and between the feet.

Instead of making the main valve *f* just as shown in Figs. 1 to 9 I may modify the shape as shown in Figs. 13 and 14, when the heavy body *f* is surrounded by a rim *m*, having a series of holes *m'*, or, as in Figs. 15 and 16,

wherein the holes are cut through the rim to leave a series of fingers *m²*.

In the modification Fig. 10 the tipping valve is designated by the letter *n*, and to enable the fluid to pass about the valve I have provided the body of the valve-chamber (marked *n'*) with a series of grooves *n²* and have notched the rest or shoulder at the lower end of the passage *b*, as shown at *n³*, Fig. 12.

I prefer to use the float-valve for the best results; but my invention is not in all cases limited to its use.

Preferably the case or shell and its seats will be made of glass or some equivalent moldable acid-resisting compound which will not corrode.

The shoulder *a'* will, in practice be located at a distance below the choke *a* corresponding substantially with the length of the shell or case used or the length desired for the neck of the bottle.

The under side of the float-valve is shown as provided with a depression, as 30, so that the outflowing liquid acting in the depression will act more effectively and quickly to overcome the air-pressure which is produced by the air rushing into the bottle to fill the space left by the liquid as it flows from the bottle.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A bottle-stopper composed of a shell or case having an extended liquid-passage, and provided below the inner end of said liquid-passage with a chamber having at its lower end a seat and at its upper end a rest, combined with a tipping valve, said chamber being shallow, and said valve nearly filling the chamber and being substantially hemispherical in shape, being heavier on its under curved portion than on its upper plane or diametrical side, whereby when the bottle is slightly tipped the said hemispherical valve tends to slide or roll as described on and along its said seat, substantially as set forth.

2. A bottle-stopper composed of a shell or case having an extended liquid-passage, and provided below the inner end of said liquid-passage with a chamber having at its lower end a seat and at its upper end a rest, combined with a tipping valve, said chamber being shallow, and said valve nearly filling the chamber and being substantially hemispherical in shape, being heavier on its under curved portion than on its upper plane or diametrical side, whereby when the bottle is slightly tipped the said hemispherical valve tends to slide or roll as described on and along its said seat, said valve having in its said plane or flat side next said rest a series of grooves or liquid-passages, substantially as described.

3. A bottle having within its neck a choke or snug, an independent shell or case externally tapered from the delivery end of said

shell toward its inner end, said taper having a shoulder at its inner end, the upper or delivery end of said shell next to said tapering surface being surrounded by an extended flange, a compressible ring mounted on and surrounding the said tapered surface and retained between said flange and said shoulder, said ring engaging said choke and being peripherally compressed thereby when the shell or case is in position in the bottle-neck, said shell or case having within it a shallow chamber provided at its lower end with a valve-seat and at its upper end with a rest, a tipping valve nearly filling the chamber, said valve being substantially hemispherical in shape and made solid of heavy material, the upper side thereof being cut away to lighten it and provide fluid-passages and the under side being smooth to slide or roll around on its seat as described and substantially as shown.

4. In a bottle-stopper, a shell or case having an extended liquid-passage and provided below the inner end of said liquid-passage with two chambers one below the other, one of said chambers containing a float-valve in the form of a many-sided box, said box being packed with light material like cork and extending above said packing in the form of a plurality of feet, and said other chamber be-

ing shallow and containing a weighted hemispherical valve nearly filling the chamber, substantially as described.

5. A bottle-stopper composed of a shell or case containing a valve-seat, a valve cooperating with said seat, the lower end of said valve being spherical in cross-section, a float-valve chamber located below said seat, combined with a float-valve in said float-valve chamber, said float-valve being many-sided to form liquid-channels about its sides, liquid-passages at the upper end of said valve, the lower end of said float-valve being provided with a depression to operate substantially as described.

6. The combination with a bottle-stopper containing a chamber, of a float-valve in said chamber, said float-valve being many-sided to form liquid-channels about its sides, and having at one end a series of feet, the lower end of said float being provided with a depression to operate, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALFRED G. ELY.

Witnesses:

FREDERIC C. WOODWARD,
THEODORE F. SANDERS.