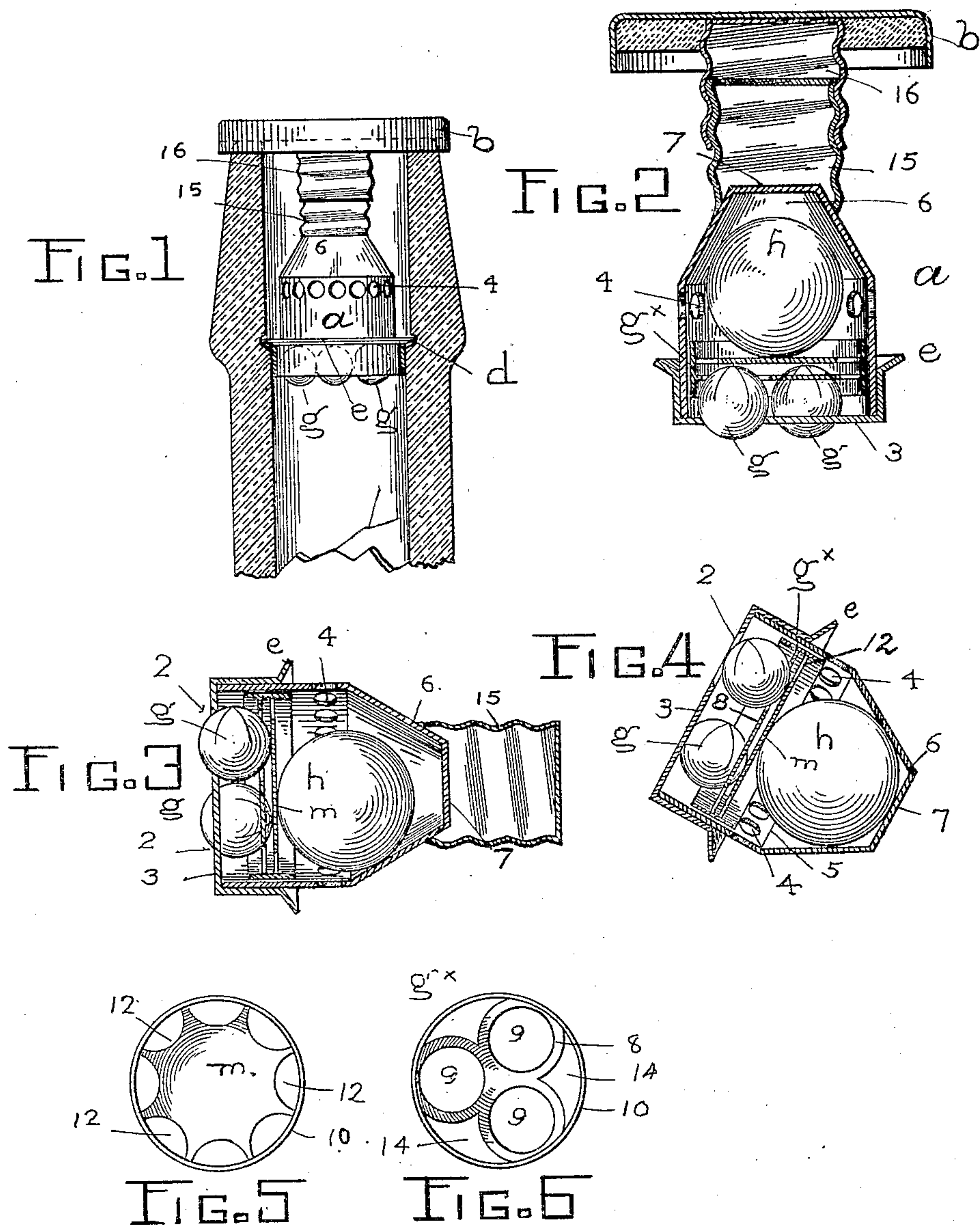


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NON-REFILLABLE BOTTLE STOPPER.  
APPLICATION FILED SEPT. 13, 1909.

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Witnesses:  
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# UNITED STATES PATENT OFFICE.

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NON-REFILLABLE-BOTTLE STOPPER.

962,681.

Specification of Letters Patent. Patented June 28, 1910.

Application filed September 13, 1909. Serial No. 517,352.

*To all whom it may concern:*

Be it known that I, WILLIAM R. VOSS, a  
citizen of the United States, and a resident  
of the city and county of San Francisco and  
State of California, have invented new and  
useful Improvements in Non-Refillable-  
Bottle Stoppers, of which the following is a  
specification.

This invention relates to improvements  
made in devices that are intended to prevent  
refilling a bottle after it has been emptied,  
without interfering with the outflow of the  
contents as the same is being poured out in  
the usual way, such devices being fixed in  
the neck of the bottle below the cork, and  
producing what is generally termed a non-  
refillable bottle.

The object of the present invention is  
chiefly to provide a device for the purpose  
mentioned having the function of a stopper  
as well as a controller of the passage through  
the neck of the bottle, and serving by its  
construction to effectively close the bottle  
without the use of a cork, while at the same  
time allowing the contents to be poured out  
as occasion requires.

A further object of the invention is to  
provide in a single device or structure a  
means for preventing the inflow of a liquid  
through the neck of a bottle without inter-  
fering with the outflow, and also a means for  
closing the mouth of the bottle without the  
use of a cork.

To these ends and objects the invention  
comprises a stopper adapted to be inserted  
in the mouth of a bottle and composed of a  
body part provided with valve-controlled  
apertures through which the liquid may flow  
and find escape in an outward direction, but  
not in the contrary direction, and a cap or  
closure detachably secured to the body part  
and adapted to seal or close the mouth of  
the bottle when the body part is fixed in the  
neck, and the cap is attached in place; the  
said parts being so constructed that they  
will fit and operate each in its own special  
manner in the mouth of a bottle of any well  
known form or size having a neck, or in the  
mouth or outlet opening of a can, jar or  
other vessel or package in which liquids and  
substances of varying consistency or degree  
of fluidity are vended, poured or served  
from the original package.

The nature of my said improvements and

the manner in which I proceed to produce,  
apply and carry out the same will be more  
clearly understood from the following de-  
scription and the accompanying drawings to  
which reference is made.

Figure 1 of the drawings is a general  
view of the device of my invention, on an  
enlarged scale, showing the same fixed in  
the neck of a bottle and closing the mouth.  
Fig. 2 is a vertical sectional-view of the com-  
plete structure with the cap and body part  
secured together when closing the mouth of  
a bottle. Fig. 3 is a longitudinal sectional  
view of the body part placed in a horizontal  
position with the cap removed, and the  
valves in position closing the passages and  
preventing the flow of liquid in either direc-  
tion. Fig. 4 illustrates the position of the  
parts when the device is tilted at a sufficient  
angle to open the passage and permit an  
outflow of the liquid; the shell or body of  
the device being shown in section. Fig. 5 is  
a top plan view of the movable guide or part  
that controls the ball valves in the body part  
of the stopper. Fig. 6 is a bottom plan  
view of the same.

The body part *a*, and the cap *b* together  
form the complete structure or stopper as it  
is herein termed; the former part being suf-  
ficiently less in diameter than the neck of the  
bottle to leave space between the body part  
and the surrounding walls when fixed in the  
bottle, and the latter being attachable to the  
body part by means of a threaded neck on  
one part and a threaded socket on the other  
part, and fitted to cover and close the mouth  
of the bottle on being screwed down in place.

Provision is made for permanently fixing  
the body *a* in the neck of the bottle by form-  
ing in the wall of the passage a groove *d* to  
admit a flange or projecting rim *e* on the cir-  
cumference of the body *a*, and a tight-joint  
at that part is secured by running in a small  
quantity of melted aluminum, or of some ce-  
ment that will seal the joint all around the  
body *a* on becoming set. At and below the  
line of this flange or projection *e* the body *a*  
is preferably made to fit the neck of the bot-  
tle, by which the passage between the device  
and the neck is tightly closed at that line.  
But above the flange *e* the body of the stop-  
per is smaller in diameter than the neck, and  
stands clear of the same all around, afford-  
ing a free passage for the liquid which finds



an outlet from below through the valve-controlled apertures 2 in the bottom 3 of the body *a* and from the inside of that part through a number of openings 4 in the sides of the shell 5. Above the line of these outlet openings 4 in the shell 5 which is substantially cylindrical from the bottom up to a line above those openings, the walls of the body converge uniformly giving the top portion 6 a truncated conical shape, with a closed or solid top 7, and preferably closed on the sides, so as to give communication with the interior of the body from above only through the apertures in the perpendicular sides, and preventing the valves *g* inside the stopper from being held off their seats or otherwise tampered with by inserting wires or other instruments into the stopper through the mouth of the bottle.

The valves in this stopper are of the spherical buoyant kind having less specific gravity than the liquid with which the bottle is to be filled, so as to be carried against the bottom and caused to seat on the outlets by the return flow of the liquid in the event of an attempt being made to refill the bottle. A novel feature of my invention in connection with valves *g* of this character, which are caused to seat on the outlets under certain conditions by virtue of their being lighter than the liquid consists in so controlling the valves by or through a movable guide *g*<sup>\*</sup> and a follower *h* of greater specific gravity than the liquid that the valves will start from a position of rest and be carried quickly upward toward the outlets 2 at the instant that the inclination of the bottle becomes sufficient to set the weight *h* in motion. Such movement of the valve guide *g*<sup>\*</sup> as it is struck by the weight *h* and pressed toward the bottom of the stopper has the effect to overcome the inertia of the valves *g*, causing them to seat on the outlets tightly even before the pressure of the liquid entering the mouth of the bottle is sufficient to carry the valves against the outlets; insuring quicker closing of the apertures in the bottom of the stopper than it is possible to effect by the pressure of the liquid alone—and enabling also the use of a much lighter ball valve than is practicable where the buoyancy alone is relied on to carry the valve to its seat.

As embodied in the present construction the valve guide is composed of a flat plate 8 having a circular opening 9 for each spherical valve and a surrounding band or rim 10 loosely fitting the cylindrical body of the stopper and slidable in it, the extent of such movement being limited in one direction by the valves *g* which are situated in the space between the bottom of the stopper body *a* and the valve guide *g*<sup>\*</sup>, and in the opposite direction by the follower *h* on the opposite side which is confined be-

tween the conical walls of the stopper and the valve guide. By virtue of its greater size as well as its density—being either wholly or partly solid—this ball *h* exceeds the combined weight of the valves and the valve guide and is also of sufficiently greater specific gravity than the liquid to start the valve-guide moving toward the bottom of the stopper-body as soon as the neck of the bottle is sufficiently inclined to overcome the inertia of the heavy ball.

In the present construction a contact plate *m* is fixed in the rim of the guide to take the contact and pressure of the ball *h*, sufficient area of outlet for the liquid to pass through the plate being provided around the margin by openings 12 between the rim 10 and the plate *m*; and the skeleton plate 8 above which the plate *m* is fixed in the same rim, is likewise cut away around the guide ring 10 to afford openings 14 for the liquid. The advantage of arranging a plate or bearing surface of this character to receive the pressure of the heavy ball, is that it permits the use of larger balls for the valves, and a much larger ball for the follower than otherwise it would be practicable to use; for the plate *m* taking the pressure of the ball which otherwise would come in contact with the valves, causes the ball to move the guide evenly without binding in the casing or shell. Without this contact plate thus interposed between the ball and the valves, the latter would have to be of such size and the ball so proportioned also, that there would be a sufficient area of bearing surface in the center of the valve-guide between the seats or openings for the ball to bear against and not come in contact with the loosely held valves. This arrangement allows the valve guide to fit loosely in the casing so as to respond quickly to the weighted ball and move evenly without binding in the casing.

A novel feature in this stopper consists further in attaching to the top of the casing a cap *b* so shaped or formed as to seat on and cover the mouth of the bottle as a means of sealing or tightly closing the same in place of a cork. For this purpose the casing or stopper-body is provided with a screw-threaded neck 15, and the cap *b* with a hollow stem 16 also screw-threaded, depending from the underside and fitted to screw on the neck as the cap is rotated. The neck 15 is fixed on the top end of the stopper-body, or it is struck up or spun from the metal of the stopper-body itself as a part of the tapering top. As thus constructed the stopper-body is fixed permanently in the neck of the filled bottle at proper distance below the mouth to allow the cap to be applied and drawn down by the threaded connection to a tight seat on the rim; the stem of the cap being of suit-



able length to join the connection or the stopper-body when the latter is set well into the neck from above.

As embodied in the present construction the cap *b* is formed with a turned down flange milled or corrugated on the rim for greater convenience in screwing and unscrewing the cap; and a packing of some compressible or elastic substance, preferably cork, is fixed within the flanged rim to seat on the end of the bottle and seal the same as the cap is screwed down.

I claim:—

1. A non-refillable device for the neck of a bottle, having a hollow stopper provided with apertures for outflow of the contents of the bottle through the neck, and valves adapted to prevent a return flow, said stopper being adapted to be fixed in the neck, and a cap fitted to the mouth of the bottle to close the same, and connections between the stopper and the cap, whereby the same is drawn down to a seat on the neck to close the same, and is also detachable therefrom to afford outlet for the contents of the bottle.

2. The combination with the neck of a bottle of a hollow stopper fixed therein, having valve-controlled inlet apertures for passage of the contents of the bottle through the stopper, and provided with outlet apertures for outflow of the contents through the neck—a cap adapted to close the mouth of the bottle and screw threaded connections between the cap and the stopper, whereby the cap is detachably secured to the stopper for closing the bottle.

3. The combination with the neck of a bottle, of a hollow stopper adapted to be fixed

thereon, having inlet apertures in the bottom, a buoyant upwardly opening valve seated on each aperture, outlet apertures in the sides of the stopper, the diameter of the stopper body at and above the said outlet apertures being less than that of the neck, affording an outlet and discharge of the contents around the stopper and means for accelerating the seating of the buoyant valves, comprising a freely movable weight in the stopper situated above the valves and a loosely fitted slidable valve guide interposed between the valves and the weight.

4. In a non-refillable device for necked receptacles, the combination of a hollow stopper adapted to be fixed in the neck below the mouth and having outlet apertures there-through and valves controlling the inflow of liquid through the mouth, a cap adapted to close the mouth of the receptacle and removable therefrom, and connections between the said cap and the fixed stopper, operating to detachably secure the cap in position to close the mouth.

5. The combination with a hollow stopper having a top with converging sides and provided with apertures in the bottom, a buoyant valve to each aperture, a movable weight operating by gravity to accelerate the movement of the buoyant valves toward their seats in an inclined position of the receptacle in which the stopper is fixed, and a slidable valve guide interposed between the valves and the said weight.

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Witnesses:

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