

Oct. 22, 1935.

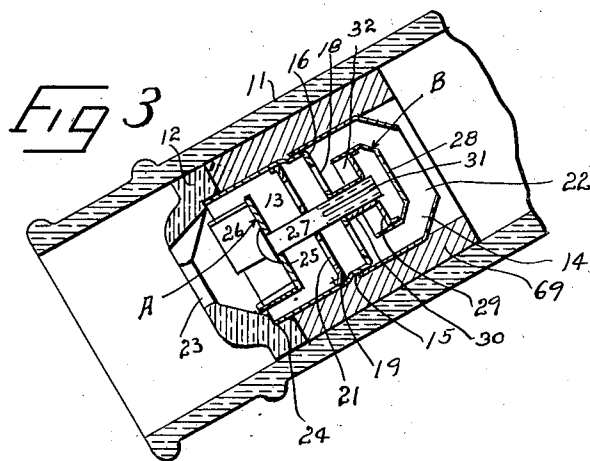
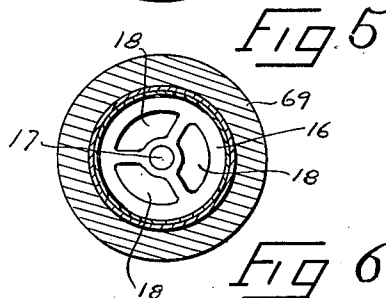
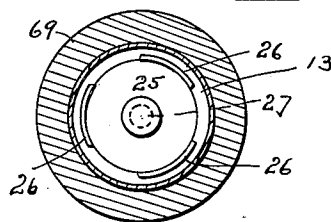
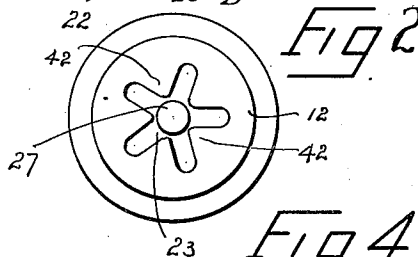
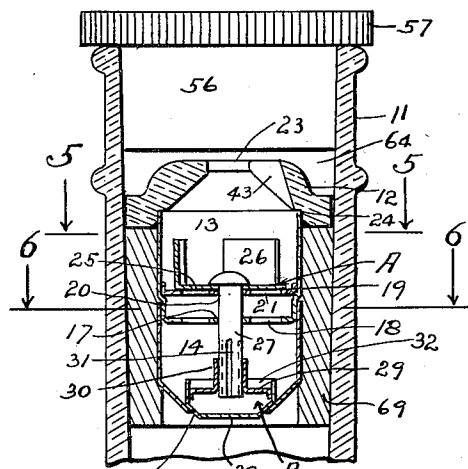
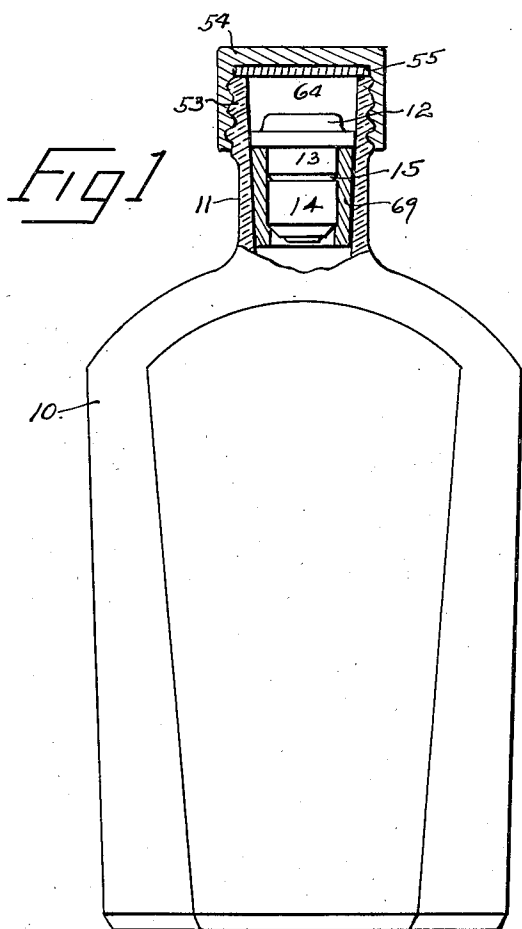
S. GRAUER

2,018,019

NONREFILLABLE BOTTLE

Filed July 20, 1934

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

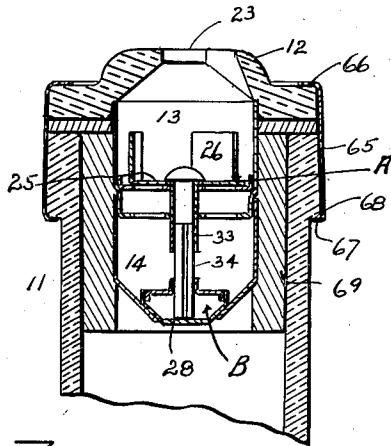


Fig 7

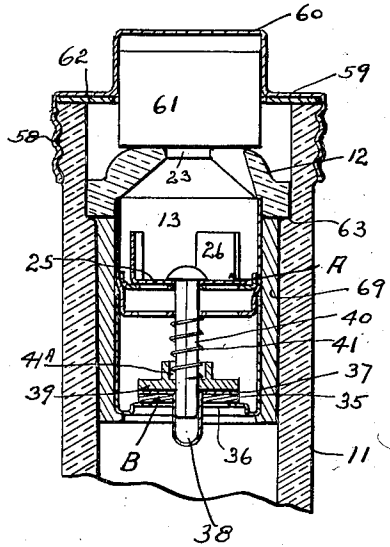


Fig 8

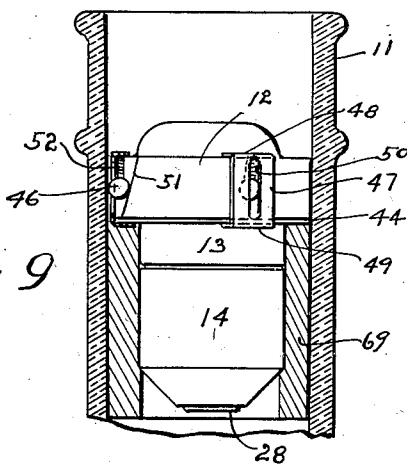


Fig 9

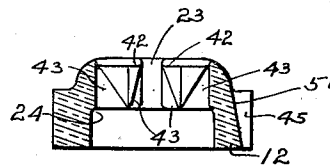


Fig 11

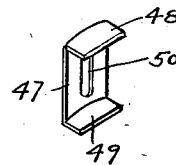


Fig 12

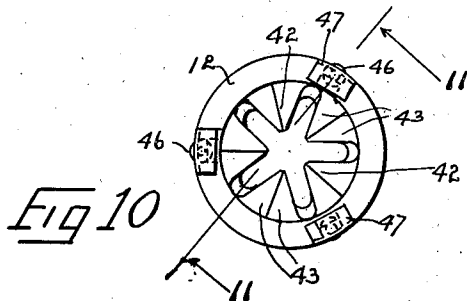


Fig 10

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UNITED STATES PATENT OFFICE

2,018,019

NONREFILLABLE BOTTLE

Solomon Grauer, Brooklyn, N. Y.

Application July 20, 1934, Serial No. 736,196

7 Claims. (Cl. 215—25)

The invention relates to bottle stoppers of the type which when inserted in a bottle will make this non-refillable and it is a further improvement on the device shown in my application for Letters Patent, filed October 30, 1933, and bearing Serial No. 695,738. It has for its main object to provide a bottle stopper which cannot be removed from the bottle when once inserted and which will positively prevent the introduction of any liquid or other substance into the bottle, even when air is evacuated from the bottle and a partial vacuum formed therein.

Another object is to provide a bottle stopper which can be adapted to make any type of bottle non-refillable without having to alter its shape, change its general appearance, or even change the ordinary stopper used in such bottles. A further object is to provide a bottle stopper, of simple and inexpensive construction, which can be inserted in a bottle as readily, and with practically the same means, as the ordinary cork now generally used.

This and various other objects and advantages will be readily understood from the following description and from the accompanying drawings of preferred embodiments of the invention in which, however, modifications may be made without departing from the scope of the appended claims. In the drawings

Fig. 1 is a side elevation of a bottle, shown partly in cross-section to indicate the position of the bottle stopper which forms the subject of this invention;

Fig. 2 is a cross-sectional side elevation of the bottle stopper, shown inserted in a bottle neck;

Fig. 3 is a view similar to Fig. 2, but showing the valves in the bottle stopper in their positions when liquid is poured from the bottle;

Fig. 4 is a top view of the bottle stopper;

Fig. 5 is a cross-sectional view taken on line 5—5, in Fig. 2;

Fig. 6 is a cross-sectional view taken on line 6—6, in Fig. 2;

Fig. 7 is a cross-sectional side view of a slightly modified stopper, shown secured in the bottle neck in a modified manner;

Fig. 8 is another cross-sectional side view of another slightly modified bottle stopper, shown secured in the bottle neck in another manner.

Fig. 9 is still another cross-sectional side view of another slightly modified bottle stopper, shown secured in the bottle neck in still another manner;

Fig. 10 is a bottom view of the bottle-stopper cap employed in the embodiment shown in Fig. 9;

Fig. 11 is a cross-sectional side view of this cap taken on line 11—11, in Fig. 10; and

Fig. 12 is a perspective view of a clamp used in connection with the embodiment shown in Fig. 9.

Reference is first had to Figs. 1 to 6 inclusive. A bottle is shown at 10 and its neck at 11. The stopper is inserted in this neck and consists of a cap 12, an upper shell 13, and a lower shell 14 in which the various valve parts are contained. The lower end of the upper shell is shouldered as shown at 15, and fits tightly in the lower shell, as plainly shown in Figs. 2 and 3. Both the shells are open at the upper ends.

The bottom 16 of the upper shell has a central opening 17, as shown in Fig. 6, and a plurality of orifices 18. A disc 19 is secured in the upper shell a short distance above its bottom and this disc is likewise provided with a central opening 20 and with a plurality of orifices 21. This is plainly shown in Figs. 2 and 3. The lower shell, which is angular at its lower end, has an orifice 22 in the bottom. The cap 12 has an orifice 23 in the top and a seat 24 in which the upper end of the upper shell is cemented or otherwise secured. The detailed construction of this cap will be explained later.

An upper valve A is contained in the upper shell 13 and consist of a disc 25 having a plurality of upwardly extending stops 26. This valve is rigidly secured to a valve stem 27, which is free to slide in the openings 17 and 20, and the disc 25 covers the orifices 21, in the disc 19, when the bottle is in an upright position.

A lower float-valve B is contained in the lower shell 14. It consists of a cupped, angular valve body 28, which is adapted to close the orifice 22, and a disc 29 which is rigidly secured in the valve body. The disc 29 is provided with a tubular extension 30 which is free to slide on the lower end of the valve stem 27. A plurality of grooves 31 are formed on the valve stem to enable the air to escape from the interior of valve B as it slides on the valve stem. The disc 29 is preferably inserted some distance in the valve body 28 so that an annular cup 32 is formed on top of the valve.

In the embodiment shown in Fig. 7 the annular cup 32 has been omitted and the valve stem has been made in two parts. The upper part 33 of valve stem is tubular and the lower part 34 of the stem is slidingly mounted in the upper part. The valve B is free to slide on the part 34. All the stoppers are held in the bottles by means of cork sleeves 69.

In the embodiment shown in Fig. 8, a disc valve

35, made of cork or other similar very light material, has been substituted for the valve body 28. The bottom of the lower shell 14 is constructed as shown and the disc valve 35 is adopted to close the orifice 36. A metal washer 37, having a downwardly extending closed tubular member 38, is placed on top of the disk valve 35 and the disc valve is free to slide on this member. A relatively heavy metal washer 39 is placed on top of the washer 37 and this washer and the tubular member 38 are free to slide on the valve stem 40. A very light compression spring 41 is placed on the valve stem and abuts against the bottom 16 of the lower shell and against the washer 39; its lower end being guided in a recess 41^A formed in the washer. To cause the parts to slide very easy on the valve stem, the valve stem is preferably made of triangular cross-section. In fact a valve stem of such cross-section may be used with all the various embodiments.

When a bottle in which the stopper is used is in the upright or normal position, shown in Fig. 2, the valve A closes the orifices 18 while the valve B closes the orifice 22. It is therefore evident that no liquid can be poured into the bottle when in this position. Even if it was possible to lift the upper valve A by inserting some instrument through the orifice 23, in the cap 12, the lower valve B would still remain closed and effectively prevent the introduction of the liquid. When the bottle is tilted, as shown in Fig. 3, both the valves will open and the liquid will flow freely from the bottle through the orifices 22, 18, 21 and 23.

Many so-called non-refillable bottles can be refilled by partly inverting the bottle and inserting it in a vessel filled with liquid. If such an attempt is made with a bottle equipped with the present stopper, the valve B will immediately close.

This is due to the fact that this valve is constructed as a float and has sufficient buoyancy to ride on top of the liquid. With ordinary liquids the buoyancy of either of the valves B, shown in Figs. 2 and 7, will effectively stop the introduction of liquid in the manner stated, but with liquid of very low specific gravity, I prefer to use the valve B, shown in Fig. 8 as this has greater buoyancy than the other valves.

Some non-refillable bottles can be refilled by placing the bottle on its side in a vessel filled with liquid and then shake the bottle back and forth so as to cause the valve parts to open and close. This will allow the introduction of some amount of liquid into the bottle. With the embodiment shown in Fig. 8 this method of refilling cannot be employed as the spring 41, even if it does allow the washer 39 and the valve disc 35 to slide on the stem, will effect the closing of the valve before any liquid can enter the bottle.

Extensive experiments have shown that when the valve B is buoyant and constructed in the manner shown, the bottle can not even be refilled when it is inserted in a closed vessel containing liquid and the air evacuated from the bottle.

However, in providing a non-refillable bottle stopper, it is not only necessary that the valve construction should be such that liquid cannot be poured back through the valves, but the stopper itself must be so constructed that it can not be removed from the bottle. To accomplish this the following methods are employed in the present invention.

The bottle stopper is generally inserted so deep in the neck of the bottle that no tool can be in-

troduced under the bottle cap to pry out the stopper. There is always a danger that some tool may be inserted through the orifice 23 in the cap 12 and used for extracting the cap and the stopper. To avoid this the orifice in the cap is constructed in the following manner. A reference to Fig. 2 and Fig. 10 will show that the orifice is formed as a five pointed star and that the inwardly extending parts 42 are chamfered from the seat 24 and to the top of the cap as plainly shown at 43 in Fig. 11. Thus not only does the odd-sided shape of the orifice make it difficult to employ a tool, but the chamfered sides will cause any tool to slip when an attempt to extract the stopper is made.

There may however, be instances where the user would not want an orifice such as shown, but would want an ordinary circular orifice. In such a case the means shown in Fig. 9 is employed to prevent the extraction of the stopper. In this case the upper shell 13 is provided with a flange 44 which abuts against the lower edge of the cap 12. A plurality of angular grooves 45 are formed in the circumference of the cap and in these grooves balls 46 are contained. The balls are held in place, prior to the insertion of the stopper in the bottle, by clamps 47 which also, by means of the bent-over edges 48 and 49 clamp the shell 13 to the cap. A groove 50 is provided in each clamp through which a part of the ball may extend. However, these slots are narrow enough to retain the balls in the grooves.

When a stopper of this construction is inserted in the bottle neck the balls will roll freely up on the incline face 51 of the groove 45, but if an attempt is made to extract the stopper the ball will be wedged between the face 51 and the bottle neck. To prevent the balls from dropping into the wide part of the groove when the bottle is inverted, light compression springs 52 are inserted in the clamps between the balls and the bent-over ends 48.

As non-refillable bottles of this or other kinds are generally shipped from place to place, it is generally necessary to provide a stopper, in addition to the non-refillable stopper so that liquid will not be spilled from the bottle in transit, and as various users of bottles use various stoppers, the following invention has been devised with this in mind, so that ordinary stoppers of any kind may be used in combination with the invention.

For example in Fig. 1, the outer side of the neck of the bottle is threaded as shown at 53 and a threaded cap 54, having a gasket 55, is employed. In Fig. 2, a cork 56, having a knurled and an enlarged neck 57, is employed. In Figs. 3 and 9 ordinary corks may be used.

In Fig. 8 the bottle neck is threaded as shown at 58 and a metal closure cap 59 is employed. This cap is provided with a concentric, upwardly extending cap 60 in which a cork 61 is inserted. A gasket 62 is also used between the closure cap and the top of the bottle and the cap 12 may be seated against the shoulder 63 formed in the bottle neck. It will be seen that when the closure cap is screwed on the bottle neck, the cork, after engaging with the top of the cap 12, will be forced upward in the cap 60 until the gasket 62 prevents any further seating of the closure cap. With this form of a closure no liquid can flow from the orifice 23 and fill the space 64 (see Figs. 1 and 2) which is left between the bottle stopper cap and the cork or closure device.

In Fig. 7 the cap 12 is placed on top of the bottle neck and an annular band 65 holds the stopper

from being withdrawn from the bottle. This band has a flange 66 which engages on top of the cap and the lower end 67 of the band is spun under a shoulder 68 formed on the bottle neck.

5 From the foregoing it will be seen that the present device not only effectively prevents the refilling of any bottle to which it may be applied, but that it may be adapted to bottles now in use without having to alter the general appearance
10 in any way or add to the cost of manufacture.

Having described my invention and its objects, what I claim is new and wish to protect by Letters Patent is:

1. A bottle stopper for preventing the refilling
15 of a bottle; comprising a body member having an upper and a lower chamber; a cap, having an orifice, secured on top of the upper chamber; a valve located between the upper and the lower chamber; said valve having a valve stem of tri-
20 angular cross-section extending into the lower chamber; a separate valve, comprising a cork disc, located in the bottom of the lower chamber; a washer having a downwardly extending and closed tubular member on which the cork disc is
25 slidably mounted; a relatively heavy washer placed on top of the first-mentioned washer; both of said washers slidably mounted on the valve stem; a light compression spring secured on the
30 valve stem for aiding in seating the cork disc against its valve seat; and means for securing the stopper in the neck of the bottle.

2. In combination with a bottle; a stopper of the type described, comprising a body member having an upper and a lower chamber, a cap secured on the upper chamber and having an orifice
35 in its top, a valve located between the upper and the lower chamber, said valve having a valve stem extending into the lower chamber, a separate valve located in the bottom of the lower chamber and slidably mounted on said valve stem; said
40 last-mentioned valve containing an air chamber of sufficient size to make the valve buoyant in relation to the liquid contained in the bottle; a resilient sleeve for securing the stopper in the
45 neck of the bottle some distance below its upper end; and a regular stopper inserted in the upper end of the bottle neck for closing the orifice in the cap.

3. In combination with a bottle having an externally shouldered neck; a bottle stopper of the type described comprising a body member having an upper and a lower chamber, a cap secured on the upper chamber and having an orifice in its
50 top, said cap being of substantially the same diameter as the outside diameter of the top of the bottle neck, a valve located between the upper and the lower chamber, said valve having a valve stem extending into the lower chamber, a separate
55 valve located in the bottom of the lower chamber and slidably mounted on said valve stem; said last-mentioned valve containing an air chamber of sufficient size to make the valve buoyant in relation to the liquid contained in the
60 bottle; a resilient sleeve for securing the body of the stopper in the neck of the bottle; and an annular ring, having a flange for contacting with the
65 top of the cap and a flange spun in under the

shoulder on the bottle neck, for locking the stopper to the bottle.

4. A bottle stopper for preventing the refilling of a bottle; comprising a body member having an upper and a lower chamber; a cap, having an
5 orifice, secured on top of the upper chamber; a valve located between the upper and the lower chamber; said valve having a valve stem extending into the lower chamber; a separate valve, comprising a cork disc, located in the bottom of
10 the lower chamber; a washer having a downwardly extending and closed tubular member on which the cork disc is slidably mounted; a relatively heavy washer placed on top of the first-mentioned
15 washer; both of said washers slidably mounted on the valve stem; a light compression spring secured on the valve stem for aiding in seating the cork disc against its valve seat; and means for securing the stopper in the neck of the bottle.

5. A bottle stopper for preventing the refilling
20 of a bottle; comprising a body member having an upper and a lower chamber; a cap, having an orifice, secured on top of the upper chamber; a valve located between the upper and the lower chamber; said valve having a valve stem extending into the
25 lower chamber; a separate valve, comprising a cork disc, located in the bottom of the lower chamber; a washer having a downwardly extending and closed tubular member on which the cork disc is slidably mounted; a relatively heavy
30 washer placed on top of the first-mentioned washer; both of said washers slidably mounted on the valve stem; and means for securing the stopper in the neck of the bottle.

6. A bottle stopper for preventing the refilling
35 of a bottle; comprising a body member having an upper and a lower chamber; a cap, having an orifice, secured on top of the upper chamber; a valve located between the upper and the lower chamber; said valve having a valve stem extend-
40 ing into the lower chamber; a separate valve, comprising a cork disc, located in the bottom of the lower chamber; a washer having a downwardly extending and closed tubular member on which the cork disc is mounted; a relatively heavy wash-
45 er placed on top of the first mentioned washer; both of said washers slidably mounted on the valve stem; a light compression spring secured on the valve stem for aiding in seating the cork disc against its valve seat; and means for securing
50 the stopper in the neck of the bottle.

7. A bottle stopper for preventing the refilling of a bottle; comprising a body member having an upper and a lower chamber; a cap, having an orifice, secured on top of the upper chamber; a valve
55 located between the upper and the lower chamber; said valve having a valve stem extending into the lower chamber; a separate valve, comprising a cork disc, located in the bottom of the lower chamber; a washer having a downwardly extend-
60 ing and closed tubular member on which the cork disc is mounted; said tubular member slidably mounted on the valve stem; a relatively heavy washer mounted on the valve stem on top of the first-mentioned washer; and means for securing
65 the stopper in the neck of the bottle.

SOLOMON GRAUER.