

(No Model.)

H. I. LEITH.
NON-FILLING BOTTLE.

No. 529,035.

Patented Nov. 13, 1894.

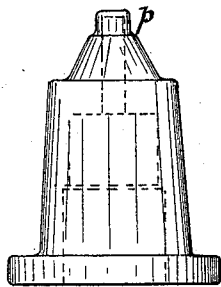


Fig. 6.

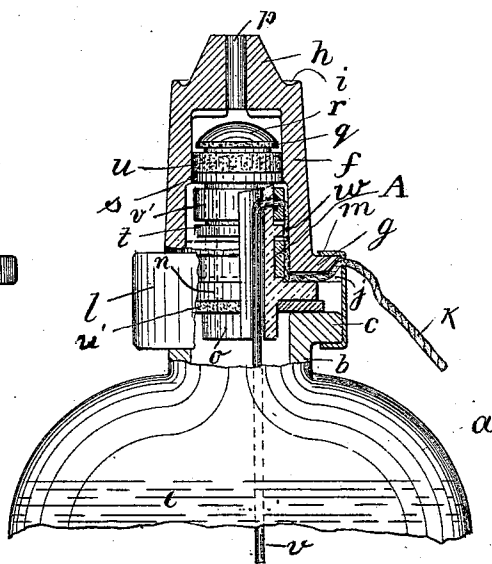


Fig. 1.

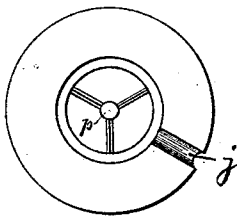


Fig. 2.

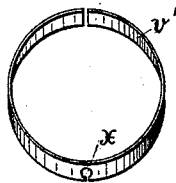


Fig. 4.

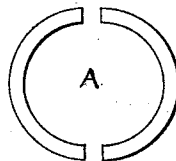


Fig. 3.

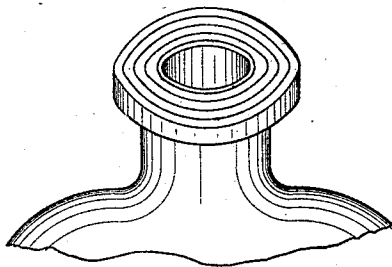


Fig. 6.

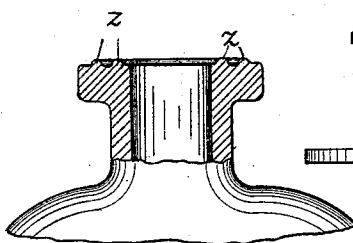


Fig. 7.

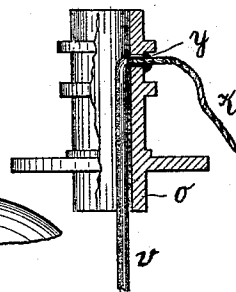


Fig. 5.

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HARVEY I. LEITH, OF PROVIDENCE, RHODE ISLAND.

NON-FILLING BOTTLE.

SPECIFICATION forming part of Letters Patent No. 529,035, dated November 13, 1894.

Application filed June 22, 1894. Serial No. 515,331. (No model.)

To all whom it may concern:

Be it known that I, HARVEY I. LEITH, a citizen of the United States of America, and a resident of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Non-Filling Bottles, (Case No. 5,) of which the following is a specification.

My invention relates to the construction of a bottle whose contents are guaranteed to be of a certain or first quality, and which it is desired shall be obtained from the bottle by any party. It is impossible by means of the bottle to introduce any liquid whatever without completely removing the stopper. It is provided with a metallic seal, so that the stopper cannot be removed without breaking the seal. Of course the bottle could be broken, but such an act would show that it had been tampered with. The bottle is so constructed that provided it is in order, the contents will flow out in a large stream, even better than from an ordinary bottle, because I provide a separate entrance for air.

The invention relates to improvements upon former methods invented by me, as set forth in United States Patents No. 360,102, filed March 29, 1887; No. 368,345, filed August 16, 1887; No. 489,966, filed January 17, 1893; No. 489,965, filed January 17, 1893; No. 489,967, filed January 17, 1893; No. 505,469, filed September 26, 1893, all granted to myself.

In order that the invention may be understood so that another may construct it, the accompanying drawings are described by reference letters.

Figure 1 shows a portion of a bottle to which is applied the stopper involving my invention. It is represented partly in vertical section and partly in elevation. Fig. 2 is a plan of the complete device. Fig. 3 is a plan of a semicircular piece of wood or other porous substance. Fig. 4 shows the blotting paper or other absorbing material. Fig. 5 is a vertical section of a portion of the stopper, in order to represent by itself the temporary seal, the purpose of which is hereinafter explained. Fig. 6 shows a modified form of lip for the bottle. Fig. 7 is a cross section of that shown in Fig. 6, which is a perspective. Fig. 8 is a modification in which the glass cap is closed at one end.

The individual parts of the invention are as follows:

a represents the bottle to which the device may be applied. It has the usual neck *b*, and lip *c*, and liquid contents, *e*.

f is a cap, preferably of glass, having an outwardly extending flange *g*, at one end, and a conical extension *h*, the base of which is surrounded by a groove *i*, which is circular, the whole cap being circular in cross section. The greater portion of the cap, measured from the flange, serves as a reservoir or compartment of a given diameter, while the other end has a smaller diameter, as far as the opening is concerned, so that the two compartments taken together form a continuous passage from one end of the cap to the other. The base of the flange is notched at *j*, so that if the cap were placed upon a flat surface, with the flange touching the same, a string *k* could pass through the notch from the outside to the inside of the cap. This string is shown so applied. The diameter of the flange for best effects, is the same as that of the lip of the bottle.

The cap is fastened to the lip by means of a seal consisting of a cylindrical ring *l*, having the inwardly turned flange *m*, which lies upon the upper surface of the flange *g*, of the cap, and presses downward thereon. The lower end of the ring *l* is turned under all around and beneath the lip *c*, so that the cap *f* is held very firmly upon the bottle, but before the cap is applied to the bottle certain necessary parts of the device are placed within the cap and these are now described.

Between the flange *g*, of the cap, and the lip *c*, of the bottle, is a flat ring *k*, which is held to the bottle by the same seal ring *l*, which holds the cap to the bottle. Through the ring *n* is a tube *o*, which extends from the interior of the bottle to the upper part of the notched interior of the cap, so that this tube forms a passage way for the contents of the bottle to the small opening *p*, in the upper portion of the cap. Between the upper end of the tube *o*, and the outlet of the cap is a loose valve, which for the purpose must be made of cork or at least some material which will be uninjured by the liquid contents of the bottle, and which should preferably be yielding. It should have the properties of leather, but leather

would not be as valuable as cork, because of the fact that it is not very durable in contact with chemicals. The valve is lettered *g*. On top of the valve is a protector *r*, made of some very hard and smooth substance, such, for example, as porcelain. The space between the upper end of the tube *o*, and the upper end of the notched portion of the cap is only such as to permit the slight movement of the valve from its seat, when the bottle is inverted. There are two flanges on the tube *o*, *s* and *t*, so arranged that there are three places for collars. The uppermost space is provided with a cork collar *u*, whose diameter is such as to be even with the flanges *s* and *t*. Between the two flanges is an air vent connecting with an air tube *v*, which extends as far as possible to the other end of the bottle, or at least just so far that it only escapes the bottom of the bottle. When the bottle is inverted, this air tube communicates between the air in the bottle and the air space within the cap *f*, between the flanges *s* and *t*, which, in turn, communicate with the outside air through the notch *w*, as well as around the edges of the projection *t*, which being made of a hard substance, such as enameled wood, permits air to escape around its edge, and between the same and the inner surface of the cap *f*. Within the space between the two flanges *s* and *t*, is a ring of blotting paper which, when dry, does not fill said space, but when it becomes saturated with water or other liquid, it expands and forms a cork between the air vent or tube *v*, and the space beyond the flange *t*, so that if any of the liquid should come through the air tube into the space between the flanges *s* and *t*, it would, by this expanding process, automatically stop up the passage way between the air vent or tube *v*, and the space between the flange *t*, and the top of the bottle, which latter space contains normally a carrier of some substance which will expand like blotting paper when moistened. I use for this purpose semicircular pieces of bass wood, *A*, which are applied to the tube *o*, before it is inserted in the cap. The piece of blotting paper which serves as the other absorbent may be made in the form of a strip as in Fig. 4, having a notch *x*, opposite the air vent. This piece of blotting paper *v'* is simply wrapped around the tube *o*, before insertion into the cap.

As with the piece of blotting paper, so with the wooden carrier, both fitting normally, that is when dry, snugly but not tightly, so that air may pass around the same on its way from the outside air to the vent and yet when they absorb one or more liquids they will swell and fill the spaces in which they are located water tight.

k is a string which passes through the notch *j*, into the interior of the cap through the notch *w*, and plugs up the air vent in conjunction with sealing wax *y*.

In Figs. 6 and 7, the upper portion of the lip of the bottle has concentric corrugations, *z*. These corrugations, in conjunction with

a cork washer, *u'*, serve to produce a better sealing joint between the ring *n*, and the lip *c*.

Having set forth the elements of construction, and their relative positions to each other, I will now describe the operation and state the exact function of each element.

The general operation consists in inverting the bottle. Immediately the contents will run out in a smooth stream from the exit of the cap. There is no bubbling or other disturbance during the outflow, for while the liquid is passing outward, air is entering the bottle by the passage way formed through the notch *j*, around the edges of the flange *t*, through the notch *w*, into the air vent through the air tube *v*, and into the bottle. After a sufficient quantity of the contents has been obtained, the bottle is placed again in its upright position. The valve *g*, which left its seat during inversion, resumes the same and closes the bottle from allowing evaporation to proceed, so that it is as well corked as if done so by hand in the usual manner. Practically no evaporation can take place through the capillary tube *v*. No liquid will pass through the air tube to the blotter, or to the wooden ring either before, during, or after use of the bottle in the manner described, because just as soon as the bottle is inverted, the weight of the water acting downward produces a suction which causes air to be forced into the bottle from the outside, and therefore, it is impossible for any liquid to pass in the opposite direction through the tube which is capillary, or at least, very small. However, there is a certain tampering of the bottle which will cause the liquid to come in contact with the blotter *v'*, and this explains the use of the blotter *v'*, which prevents, by its location and properties, the liquid from coming in contact with the wooden ring *A*. This may be explained as follows:—If the operator in any way stops up the exit *p*, in the conical extension, as for instance, by pressing his finger thereon, the liquid will find its way to the blotter, not by way of the valve. This would be impossible, because the cork *u*, closes up all passage between the valve chamber and the blotter *v'*; but nevertheless, some liquid will come to the blotter because there will be a certain leakage or dripping of the contents of the tube *v*, which will moisten the blotter. Of course, it is supposed, on theoretical grounds, that no liquid enters the tube, but it is found by practical experience that it is at least moist, getting so probably, by capillary attraction from the drops of water which necessarily adhere outside at the very end of the tube. By whatever means it gets into the tube, experiment proves that it does. As the finger prevents the water from coming out of the bottle, and therefore, prevents air from rushing in through the vent, the slight contents of the tube will gradually but comparatively quickly leak down the tube and moisten the blotter. By this peculiar operation or tampering with

the bottle, the further use of the bottle has become impaired to the extent that the liquid will only come out by drops and by shaking, instead of a constant stream. This defect in the bubbling exit of the water, will show that the bottle has been operated contrary to the directions which would be applied to each bottle in the following language, or in language to the same effect:—"Caution: Do not stop up the mouth of the bottle while inverted."

I will now explain how one cannot enter any liquid into the bottle without removing the seal. If one can do it, of course he would have to force it either through the air tube *v*, or through the nozzle *p*. In the first instance it is impossible for several reasons, and the first is that one cannot well apply any kind of nozzle to the notch *j*, in an air tight manner; but this is merely incidental. If he should secure a conduit of an air tight nature, so that he could force a liquid through the notch *j*, the liquid would not enter the bottle, because (or at least only a few drops) just as soon as the liquid saturated the semicircular rings *A*, they would swell to such an extent as to form a seal or obstruction to the entrance of the liquid into the tube *v*; also the blotter would swell and would assist in this corking of the passage way. Herein is seen the function of the expansible ring *A*. Again, no liquid could be forced into the nozzle *p*, because of the valve *q*, which applies to that class which will open only by pressure from within the bottle and will close more tightly by pressure from without.

Referring to Fig. 5, it will be seen how the air tube may be sealed, so that it can be opened from without. A string *k*, passes in through the notch *j*, through the notch *w*, and into the end of the tube *v*, and the string is sealed to the wall of the tube *o*, so that by the shaking of the bottle during transportation, no liquid will get into the air tube and leak out to the blotter, *v'*. When the purchaser is about to use the bottle for the first time, he jerks the string *k*, and the same is entirely separated from the bottle and leaves the air vent entirely open.

In Fig. 8, the cap is shown by itself modified, the passage way *p*, being fused so as to be closed. Before the bottle is used this portion is broken off. Its object is to prevent the escape of any liquid during transportation.

I claim as my invention—

1. The combination with a bottle, of a perforated cap, a seal clamping the cap over the mouth of the bottle, a tube having a valve and forming a communication from the interior of the bottle to the interior of the cap, an air conduit extending from the interior of the bottle to the exterior thereof, a seal stopping up the air conduit at a point within the cap, and a flexible ligature attached to the seal and extending to the outside of the cap and of the bottle.

2. The combination with a bottle, of a perforated cap, a seal clamping the two together, a tube passing from the interior of the bottle to the interior of the cap, a cork or a similar corking material at the upper portion of said tube and fitting tightly between the tube and the cap, the tube being provided with grooves around the outside of the same, porous rings fitting in the respective grooves loosely between the tube and the inner wall of the cap and located below the cork, and a capillary conduit extending from the interior of the bottle through the wall of said tube and into the upper groove, the lower groove being connected by a conduit with the outside of the bottle and with the upper groove.

3. The combination with a bottle of a closed cap fitted over the mouth thereof and sealed thereto, an air conduit extending from the bottom of the bottle, inside, through a valved partition into the cap, and having this entrance into the cap sealed, and a flexible ligature extending from the last named seal to the outside bottle.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 16th day of June, 1894.

HARVEY I. LEITH. [L. s.]

Witnesses:

WALTER F. ANGELL,
ISABEL PHELPS.