(No Model.)

H. I. LEITH.

BOTTLE.

No. 505,469. Patented Sept. 26, 1893.

Fig. 1.

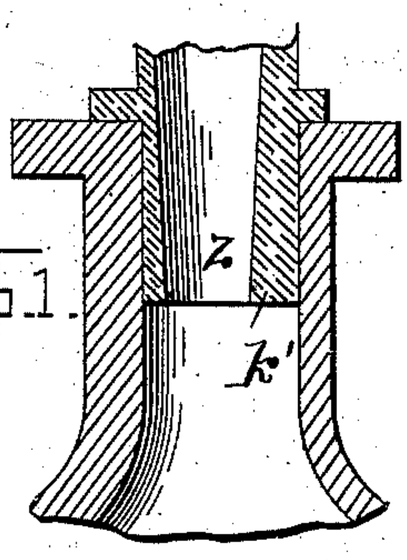


Fig. 2.

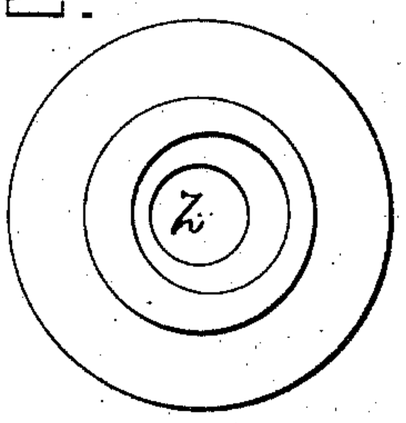
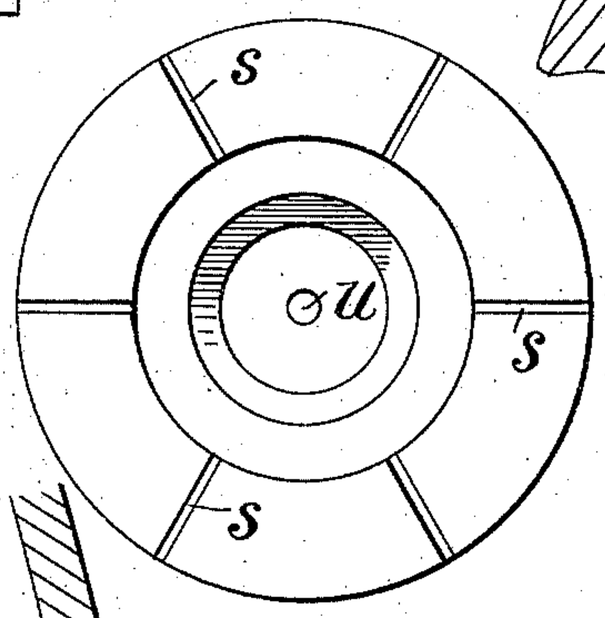


Fig. 4.



Witnesses
Wm A Courtland
Leocadia M. Lennan

Fig. 3.

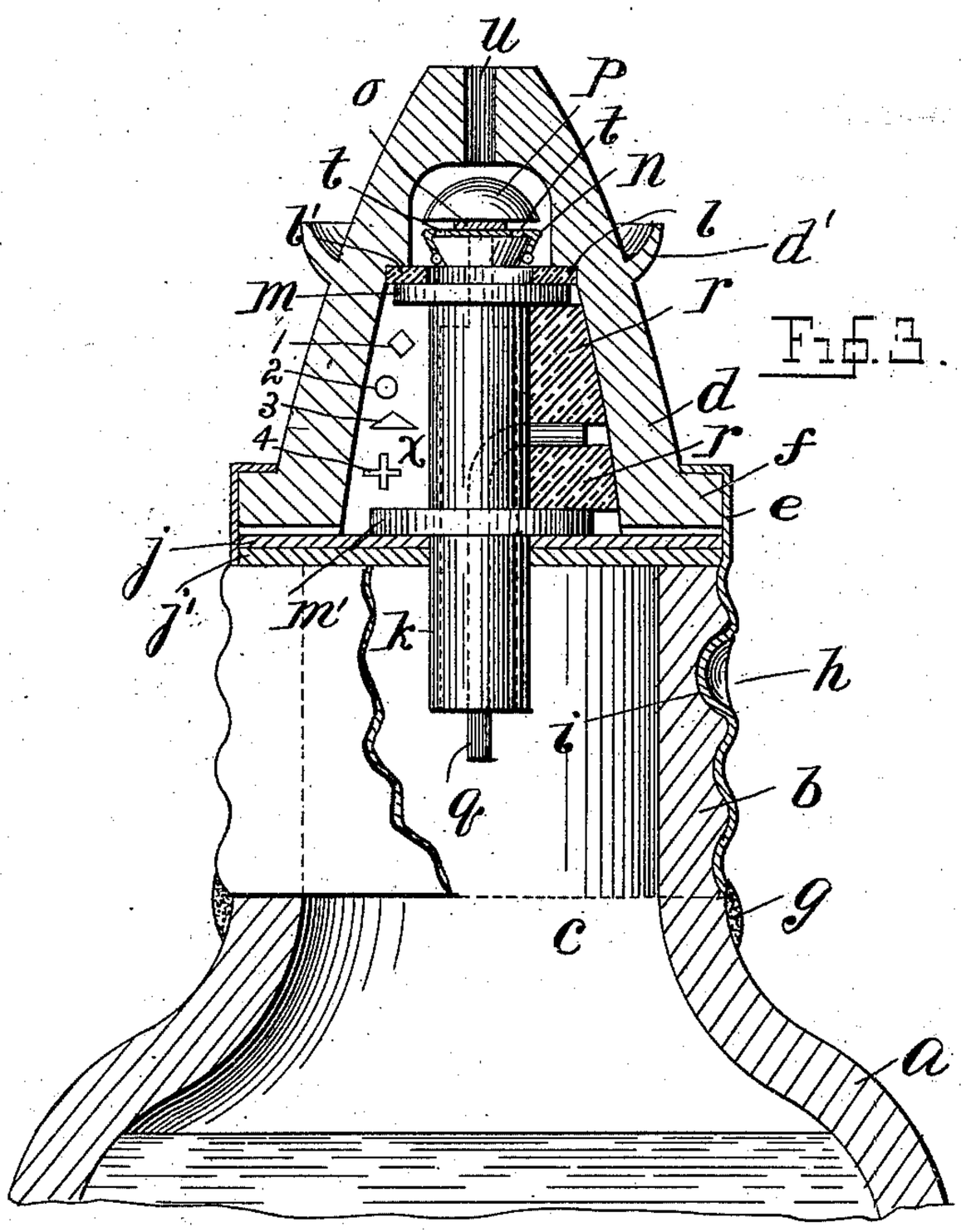


Fig. 5.

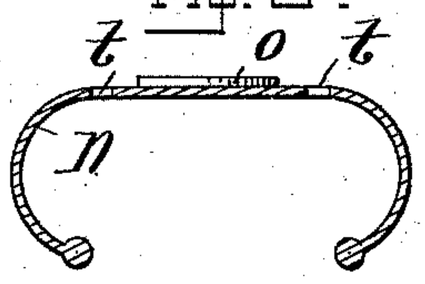


Fig. 6.

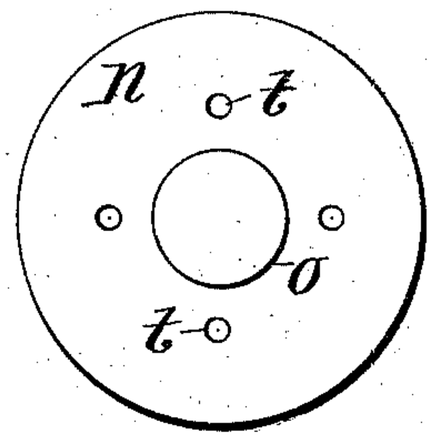


Fig. 7.

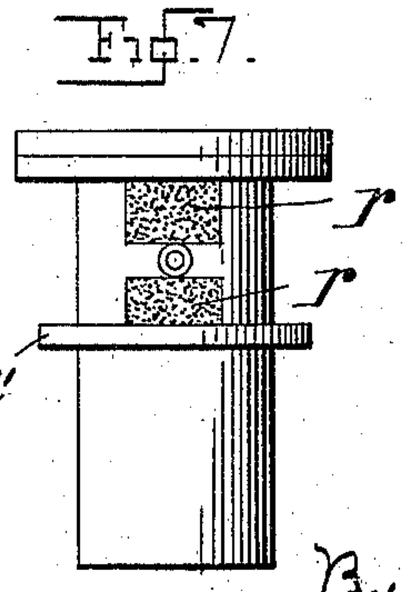
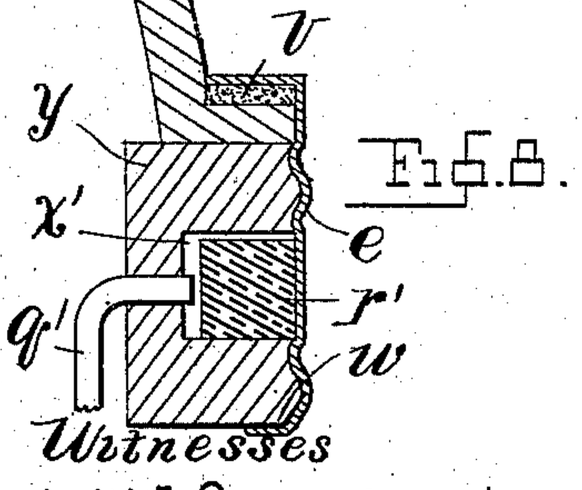


Fig. 8.



Inventor
Harvey I. Leith,
By his Attorney,
Edward P. Thompson

UNITED STATES PATENT OFFICE.

HARVEY I. LEITH, OF PROVIDENCE, RHODE ISLAND.

BOTTLE.

SPECIFICATION forming part of Letters Patent No. 505,469, dated September 26, 1893.

Application filed December 31, 1892. Serial No. 456,870. (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, State of Rhode Island, have invented certain new and useful Improvements in Bottles (Case No. 4,) of which the following is a specification.

My invention relates to improvements upon inventions set forth in my former applications, namely, Serial No. 425,098, filed March 16, 1892; Serial No. 435,879, filed June 7, 1892; Serial No. 446,409, filed September 21, 1892, and especially upon the last named application, in which the tube is shown fitting into the mouth of the bottle. I have found that the lip's periphery and the mouth of bottles are not concentric, and therefore difficulty is found in equipping the bottle by the use of such a tube. One part of my invention is for the purpose of overcoming the objection. The other parts of the invention relate to improved means for sealing on the cap; for closing the air conduit when one attempts to introduce a liquid; and for indicating to the eye the introducing of liquids of different chemical types. All the details are exhibited in the following drawings.

Figure 1 and 2 are respectively vertical section and plan of a bottle-neck and tube therefor. Fig. 3 is a vertical section of a completely equipped device for carrying out the details of the invention, some portions being shown by an exterior view. Fig. 4 is an inverted plan of the cap itself. Fig. 5 shows a sectional view of the valve. Fig. 6 is a plan of the valve. Fig. 7 is a side elevation of a portion of the device shown mostly in section in Fig. 3. Figs. 5, 6 and 7 are drawn to a different scale in order to exhibit the construction plainly. Fig. 8 is a sectional view of a small portion of the complete device showing a modification of means for automatically closing the air conduit upon tampering with the device.

Referring to the several figures, the device embodying my invention consists of the combination of a bottle *a* having a threaded neck *b*, and a mouth *c;* a cap *d*, perforated and clamped to the bottle by a threaded collar *e* bent over a flange *f*, and sealed to the bottle by a plastic cement *g* and by compressing the collar *h* into the indentation *i* in the neck of the bottle; a metallic washer *j* and yielding or cork washer *j'* between the cap and neck and respectively against the cap and neck; a tube *k* passing through the washers and extending from the interior of the bottle to the upper portion of the cap which is divided into two compartments by a washer *l* located between an inward projection *l'* of the cap and a flange *m* of the said tube; a valve *n* over the upper end of the tube *k* carrying a small metal plate *o* and a valve protector *p*, the said valve, plate and protector being located in the upper compartment, and the perforation *t* of the cap communicating between the upper compartment and exterior of the cap; a small flexible tube *q*, extending from the interior of the bottle through the tube *k* and into the lower compartment of the cap; blocks *r* fitted into the lower compartment upon opposite sides of said tube *q;* and pieces of chemically prepared paper 1, 2, 3, 4 located within the lower compartment.

Other details are as follows:—On the lower part of the flange *f* are grooves *s* radiating from the interior of the cap to the exterior thereof. The blocks *r*, are conveniently placed respectively between the end of the tube *q* and the upper flange *m* and lower flange *m'* of the tube *k*. The papers 1, 2, 3 and 4 are saturated with respectively red litmus, blue litmus, cobaltic chloride and a mercuric compound, so that they will change color according as to whether there is introduced respectively an alkali, an acid or water or as to whether the bottle is heated so that the color of the mercuric compound is changed by the heat;—for example, one might heat the bottle to destroy the valve *n*. The sealing material or wax *g* prevents any one from removing the cap except by breaking the seal. *d'* is a lip on the cap *d*, to catch drippings. When the bottle is inverted and shaken, the liquid contents will exit through the tube *k*, the holes *t*, in the valve *o*, and through the perforation *u* in the cap *d*. At the same time, air will enter all around the cap and between the flange thereof, and the collar *e*, and along the grooves *s*, around the blocks *r*, through the tube *q* and into the bottle to take the place of the liquid. It is now evident that the purpose of the metal plate *j* is to prevent the small

grooves *s* from being stopped up as probably would occur if the cork *j'* pressed directly thereon. The cork washer *j'* serves to close the mouth of the bottle outside of the tube *k*. If any one attempts to introduce an adulterated liquid into the bottle through the perforation *u*, the valve will remain closed: if through the tube *k*, the blocks *r* of a substance expansible by liquids, will close the tube *k* on account of the pressure upon both sides thereof. Alkaline, acid and neutral aqueous solutions, if introduced between the collar *e* and cap, will change the color of one or more of the papers 1, 2, 3 and 4, which will therefore be a visible signal indicating that some one has tampered with the bottle. The protector *p* which is made of a smooth and very hard substance deflects a wire which may be inserted through the perforation *u* for puncturing the delicate membrane forming the valve *n*.

It is preferable in some cases to insert a yielding washer between the flange *f* and the collar *e*. This is shown by *v* in Fig. 8. In such a case the soft metal collar *e* would be turned down under the threaded lip of the bottle as indicated at *w* where air could enter into the lower compartment which is lettered *x*. In the last named figure also, is shown a modified arrangement for the automatic air vent stopper. A groove *x'* is made around the enlarged lip *y* of the bottle, and a block *r'* similar to the blocks *r*, is inserted in said groove, between the end of the short tube *q'* and the collar *e*. When it becomes wet, it swells and covers tightly the opening of the tube *q'*.

In Figs. 1 and 2 the tube *k* is modified over that in Fig. 3, in that it closes the mouth of the bottle by fitting tightly therein. The eccentricity of the central opening or mouth with regard to the periphery of the lip is compensated for by making the hole *z* eccentric with regard to the tube *k*.

I claim as my invention--

1. The combination of a bottle having a threaded lip or neck, a perforated cap located over the mouth of the bottle and having radial grooves in the lower part thereof and between itself and the bottle, a metallic or similar hard washer and a yielding washer located between the cap and the bottle, a flange upon the end of the cap opposite the end containing the perforation, a threaded collar screwed upon the said lip and bent over the said flange, a seal connecting the collar to the bottle, the collar being partly compressed into an indentation in the said lip, the cap being divided into upper and lower compartments, a tube connecting the interior of the bottle with the upper compartment, from which it is separated by a valve, a tube passing partially through the first named tube from the interior of the bottle to the lower compartment, and blocks expansible by liquids fitting in the lower compartment and pressing upon opposite sides of the last named tube.

2. The combination with the neck of a bottle of a yielding washer, placed over the mouth thereof, a perforated cap upon the washer, a tube passing through the washer and connecting the interior of the bottle with the interior of the cap, a valve between the cap and bottle and a seal connecting the cap to the bottle.

3. The combination with a bottle, of a cap covering the mouth thereof, and divided into two compartments, a tube containing a valve and connecting the upper compartment with the neck of the interior of the bottle, an air conduit connecting the interior of the bottle with the lower compartment which is open to the atmosphere, and chemically prepared substances, changeable in appearance under the influence of liquids or heat, located in the lower compartment the upper compartment being open to the atmosphere.

4. The combination with the neck of a bottle of a perforated cap over the mouth thereof, and provided with a flange, a collar turned over the flange, a seal connecting the collar to the bottle, an air conduit, or passage leading from the outside atmosphere to the interior of the bottle, chemically prepared substances changeable under the influence of liquid or heat, located in the air conduit and a valve between the cap and the interior of the bottle.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 23d day of December, 1892.

HARVEY I. LEITH.

Witnesses:
STEPHEN O. EDWARDS,
FREDERIC HAYES.