(No Model.)

A. M. SHURTLEFF.

ATOMIZER.

No. 447,064. Patented Feb. 24, 1891.

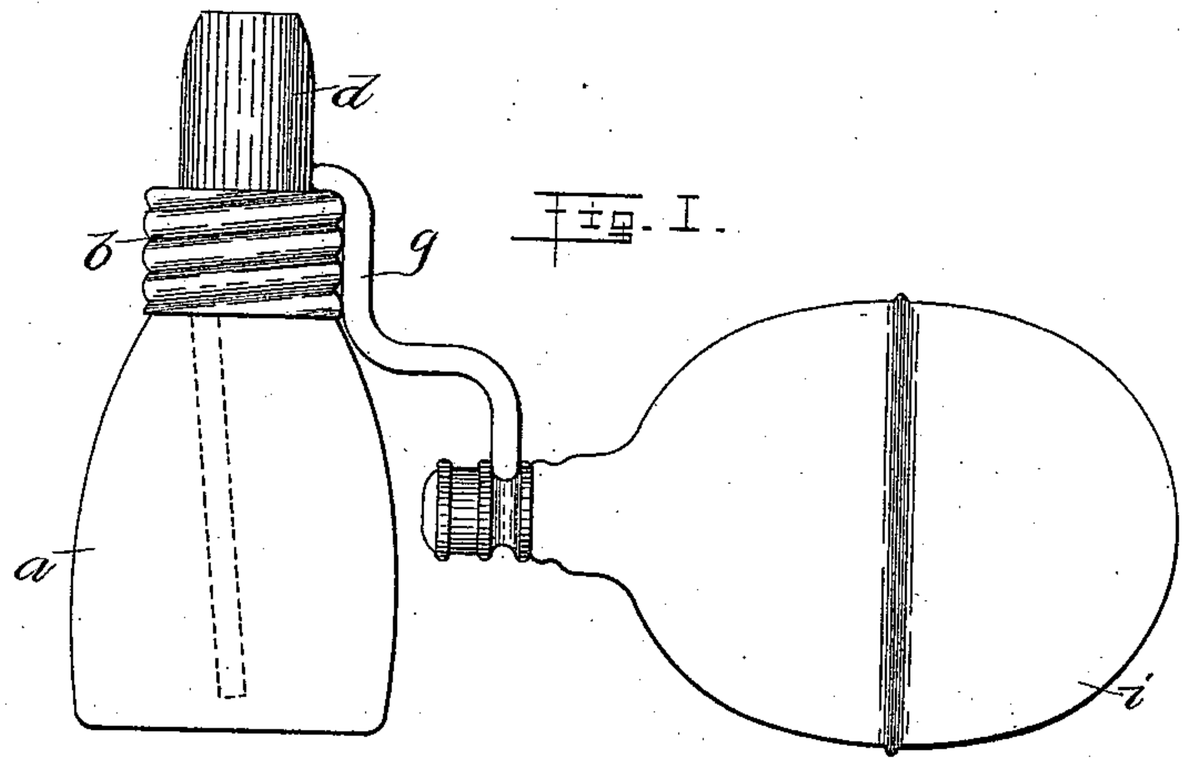


Fig. 1.

Fig. 2.

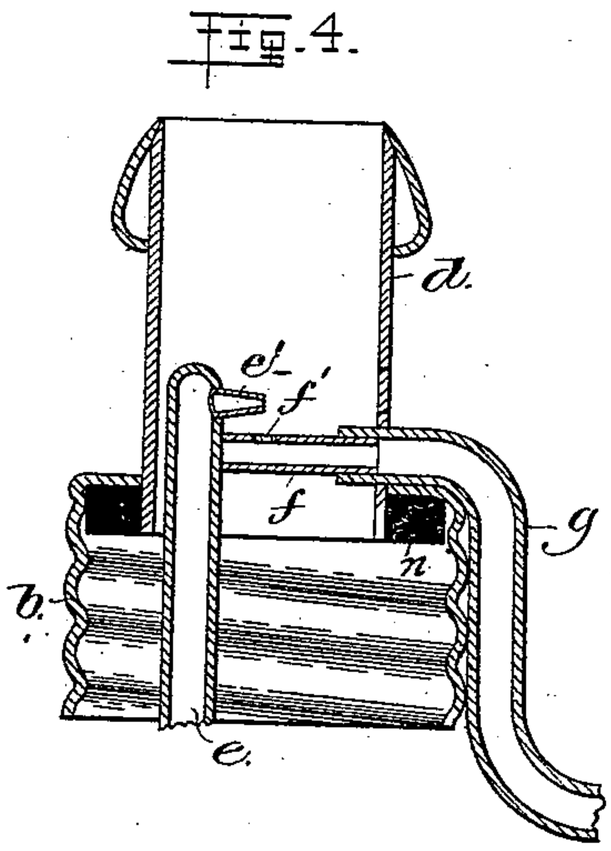
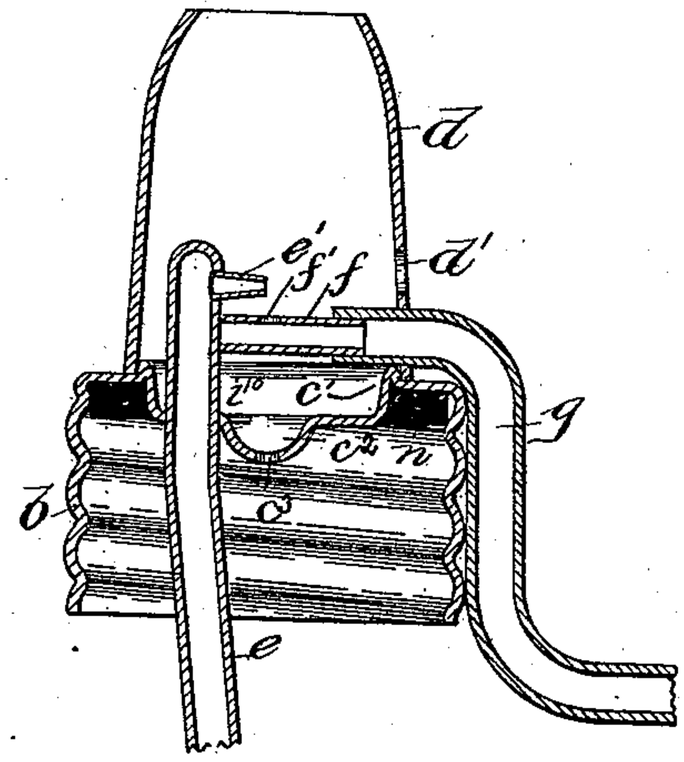


Fig. 4.



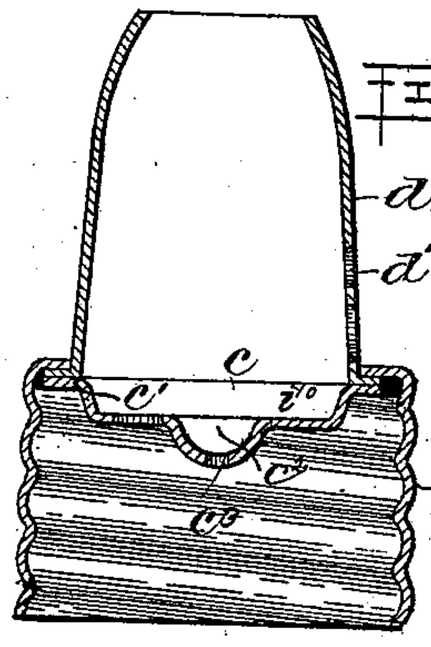


Fig. 3.

Witnesses.

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UNITED STATES PATENT OFFICE.

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ATOMIZER.

SPECIFICATION forming part of Letters Patent No. 447,064, dated February 24, 1891.

Application filed March 20, 1890. Serial No. 344,610. (No model.)

To all whom it may concern:

Be it known that I, ASAHEL M. SHURTLEFF, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Atomizers, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object to improve the construction of atomizers.

In accordance with this invention the cap or stopper of the vial has secured upon it a cylindrical or other shaped nozzle, and the atomizing-orifices are located within said nozzle above the cap or stopper. This nozzle is of sufficient size to form a chamber for the reception of the spray and is adapted to be inserted in the nostril. The nozzle is provided at one side with a small hole through which a piece of wire or other suitable implement may be passed to cleanse one of the atomizing-orifices. The top of the cap or stopper has a depression or cavity formed in it, which serves as a receptacle for the condensed spray, and a small hole is provided at the bottom of said depression or cavity, which allows such condensed spray to enter or be drawn into the vial as the liquid contents thereof are withdrawn. This small hole at the bottom of the depression or cavity serves also as an air-inlet to allow the liquid contents of the vial to be withdrawn freely. The top of the cap or stopper having this depression or cavity may be formed integral with the side walls of the cap or stopper, or it may be formed as a separate piece and attached thereto. An annular projection is formed upon the top of the cap or stopper to conveniently attach the nozzle thereto. The liquid-tube which extends down into the vial passes up through the cap or stopper and is secured thereto, it having its upper end closed and having an orifice leading from it at right angles. For cheapness in construction and convenience in manufacture the air-tube consists of a short tube secured to that portion of the liquid-tube contained within the nozzle at right angles thereto, and is provided with a small hole upon its upper side adjacent to the termination of the liquid-orifice and arranged to direct the current of air across the end of said liquid-orifice in usual manner to draw the liquid up the liquid-tube and reduce it to spray. A bent tube is secured to said short air-tube, it passing through the side wall of said nozzle, and falling down the side wall of the cap or stopper is secured to said cap or stopper, said bent tube constituting a continuation of the air-tube. Any usual bulb or other air-supplying device provided with an air-valve is secured to said bent air-tube.

Figure 1 shows in side elevation an atomizer embodying this invention; Fig. 2, an enlarged vertical section of the cap or stopper and the parts attached to it; Fig. 3, a modification to be referred to, and Fig. 4 a vertical section of a modification to be referred to.

The vial *a*, of any suitable size and shape, has a screw-threaded neck. The cap or stopper, comprising a screw-threaded side wall *b* and a top *c*, is arranged to be screwed upon the screw-threaded neck of the vial. The top *c* is formed with an annular projection *c'*. (See Fig. 2.) A nozzle *d* is secured to the cap or stopper embracing the annular projection *c'*. The nozzle *d* is of suitable size and shape to contain the atomizing-orifices and to receive the spray, it having a contracted outlet to enter the nostril, and for this last purpose I prefer to make the nozzle conoidal, as shown. The liquid-tube *e* extends down into the vial *a* and passes up through the top *c* of the cap or stopper, being rigidly secured to said top *c* by solder or otherwise.

That end of the liquid-tube *e* which extends up into and terminates within the nozzle *d* is closed, and at one side of the tube, near its closed upper end, a short liquid-orifice *e'* is provided, projecting from the liquid-tube at right angles. A short tube *f* is also secured to the liquid-tube *e* at a point just below the liquid-orifice *e'*, but within the nozzle *d* and without communicating with tube *e*, it extending from said liquid-tube at right angles substantially parallel with the liquid-orifice *e'*. This short tube *f* is provided at its upper side adjacent the termination of the liquid-orifice with a hole *f'*, which directs the air forced through the tube *f* across the end of the liquid-orifice to draw the liquid contained in the vial up the liquid-tube *e* and to spray it. A bent tube *g* is secured to the end of said short tube *f*, it passing through the side wall of the nozzle *d* and extending be-

tween the side wall of the cap or stopper and thence outward at right angles thereto. This bent tube *g* is preferably secured to said cap or stopper and constitutes a continuation of the air-tube *f*. A bulb *i* or other air-forcing device provided with a suitable air-valve is secured to said bent air-tube *g*, as shown in Fig. 1. By compressing the bulb the air is forced through the air-tube and the spray is formed in the nozzle *d*.

The nozzle *d* is provided at one side at a point directly opposite the end of the liquid-orifice *e'* with a hole, as *d'*, through which a wire or other implement may be passed to cleanse the said liquid-orifice.

The top *c* of the cap or stopper has formed in it a well i^{10}, and formed in said well centrally, or at a point directly below the atomizing-orifices or at some other convenient point, is a depression or cavity, as c^2, which serves as a receiver for the condensed spray which may accumulate in the nozzle *d*, and at the bottom of said depression or cavity a small hole c^3 is formed, which permits the liquid which may be collected there to return to the vial. As this hole c^3 is the only air-hole by which air may enter the vial to allow the free withdrawal therefrom of the liquid, it will be seen that any liquid that may collect in the depresssion or cavity will be at once drawn into the vial. A washer *n* is placed in the cap or stopper, which, when the latter is screwed on to the vial, insures a tight connection, said washer *n* fitting the space between the side wall of the cap or stopper and the side of the well i^{10}. The washer being thus held by the side walls of the stopper and well, cannot be displaced. If the hole c^3 becomes clogged, it may be cleansed by means of a wire or other suitable implement inserted at the outlet of the nozzle *d*.

As shown in Fig. 2, the top *c* of the cap or stopper is formed integral with the side wall thereof; but in Fig. 3 it will be seen that the said top *c* is formed as a separate piece secured thereto, and in this latter instance, in lieu of the annular projection or flange *c'*, to which the nozzle *d* is secured, the said nozzle *d* is provided with a flange, the parts being soldered or otherwise secured together.

Some of the features herein contained may be employed with equally good results with atomizers of other constructions, and so, also, I desire it to be understood that some of the details of construction herein described may be slightly changed without departing from this invention.

By making the hole c^3 of suitable size relative to the size of the outlet of the liquid-tube the liquid contents of the vial will not spill when the vial is overturned, as the pressure will be equalized by natural forces.

Referring to Fig. 4, the cap or stopper is shown with the entire central portion of the top removed. The nozzle *d* extends down through the top to form a wall below it to present in conjunction with the side wall of the stopper a groove or passage for the washer *n*. This construction embodies practically all the features contained in the device shown in Fig. 1, with the exception of the top for the cap or stopper. The functions of the air-holes c^3, and of the cavity c^2 and well i^{10}, are embraced by the thus open-ended nozzle, and I wish my claims to be understood accordingly.

In lieu of the metallic cap or stopper herein shown, any other suitable form or construction, or one of any other suitable material, may be employed, the vial being screw-threaded or not, as desired.

I claim—

1. In an atomizer, a vial and a cap or stopper, combined with a nozzle secured directly to said cap or stopper and adapted to be applied in the nostrils and in open communication with the interior of said vial, a liquid-tube extending down into the vial, atomizing-orifices contained within said nozzle, and an air-tube provided with an air-forcing device, all constructed and arranged to operate substantially as described.

2. In an atomizer, a vial and cap or stopper therefor having its top formed with a seat for the nozzle, combined with a liquid and air tube, atomizing-orifices in said tubes, and a nozzle fitting said seat, substantially as described.

3. In an atomizer, a vial and cap or stopper therefor, a liquid and air tube, and atomizing-orifices located above the cap or stopper, combined with a nozzle provided with a small hole at one side opposite one of the atomizing-orifices, substantially as and for the purpose specified.

4. In an atomizer, a vial and a cap or stopper therefor, a liquid-tube, and liquid-orifice, combined with an air-tube comprising a short tube, as *f*, secured to said liquid-tube and having an air-orifice *f'* suitably located, a bent tube attached to said short tube *f*, and a nozzle, substantially as described.

5. In an atomizer, a vial, a cap or stopper therefor, having a top *c*, with a well i^{10}, combined with the washer *n*, placed between the side walls of the cap or stopper and the well, substantially as described.

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

ASAHEL M. SHURTLEFF.

Witnesses:

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