Dec. 23, 1941. C. LINDEN ET AL 2,266,767

ATOMIZER

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Fig. 1.

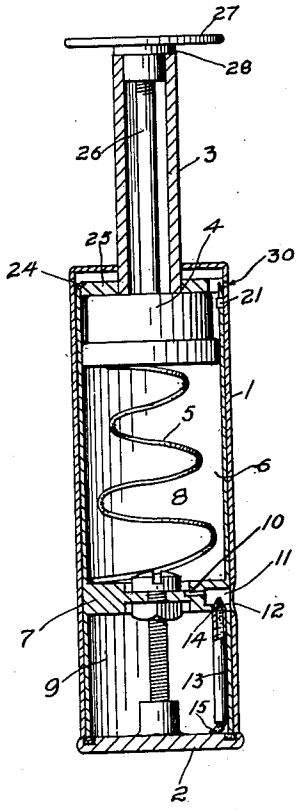


Fig. 2.

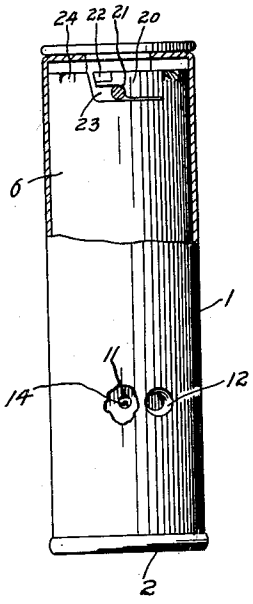
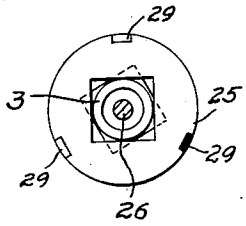


Fig. 4.



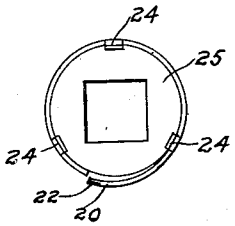


Fig. 3.

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Fig. 5.

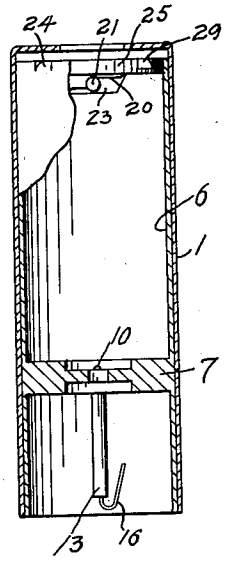


Fig. 9.

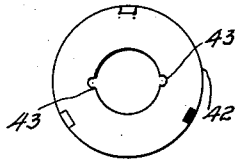


Fig. 7.

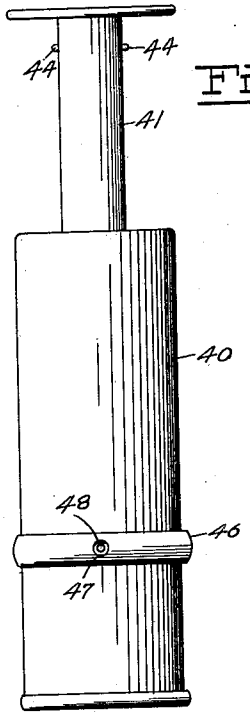
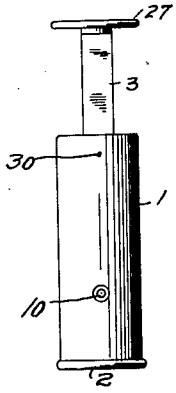


Fig. 6.



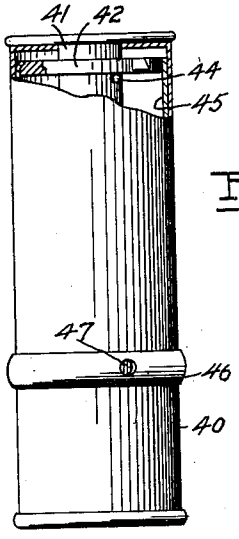


Fig. 8.

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UNITED STATES PATENT OFFICE

2,266,767

ATOMIZER

Caesar Linden, Los Angeles, and Lewis Sharp, Huntington Park, Calif.

Application July 13, 1937, Serial No. 153,372

5 Claims. (Cl. 299—88)

This application has relation to a device for dispensing liquids, such as perfume and disinfectants, and refers particularly to means for dispensing such liquid in minute quantities and in highly volatilized form.

Dispensing devices of the type referred to are usually termed atomizers and are generally manufactured in the form of bottles provided with a rubber bulb for expelling the liquid. Such devices are rather bulky and belong on the dressing table or in the medicine cabinet; they are not truly portable, in the sense that they cannot conveniently be carried around with a person on the body of the person. The structure of the invention, on the other hand, is designed to fit into a pocket or into the handbag or wrist bag so universally carried by women.

To this end, the object of the invention is to provide an atomizer in the form of a cartridge which, in general appearance and size may be similar to the lipstick cartridge favored by most women. It is a further object of the invention to provide an atomizer in this form which is simple, inexpensive, convenient to operate and of pleasing appearance. Another object is the provision of an atomizer cartridge the operation of which is controlled by a single simple relative movement of the exterior parts of the device. It is a further object to provide a leakproof device which may safely be carried in a pocket or a lady's handbag. A further object is to provide means for controlling the amount of liquid dispensed at each operation of the device. A still further object is the provision of means for dispensing uniform quantities of liquid.

The invention is hereafter fully described, and drawings are hereto annexed, in which structures embodying the invention are illustrated.

In the drawings:

Fig. 1 is an enlarged sectional elevation of a preferred form of the invention; Fig. 2 is a side elevation substantially in agreement with Fig. 1, except that the casing of the device is given a quarter turn in counterclockwise direction; Figs. 3 and 4 are detail views of parts of Figs. 1 and 2; Fig. 5 is a sectional elevation of the framing of the device substantially as it would appear upon removal of the interior mechanism; Fig. 6 shows the actual size of the device, and; Figs. 7 to 9 illustrate a slightly modified form of the invention.

The structure of Figs. 1 to 6 comprises a cylindrical casing 1 which is open at one end and its other end is shown perforated to receive a plunger 3 of a piston 4. These two parts constitute the movable pump members of the device. A spring 5 yieldingly maintains the plunger projected, as indicated in Fig. 1. Within the casing is fitted a cylindrical shell 6, upon which the casing 1 may be rotated to open and close the device as will be described presently.

The inner shell 6 is, by means of a partition 7, divided into two compartments, one of which forms a spring chamber 8, and the other serves as a reservoir 9 for the liquid to be dispensed. The open end of this reservoir is tightly closed by a suitable screw-cap 2. The spring chamber is, when the plunger 3 is projected as shown in Fig. 1, in communication with the outside atmosphere through a passage 10, which leads into a mixing chamber 11 and to a port 12 of the casing 1.

Within the reservoir 9 is seated a fine tube 13, which terminates in a nozzle 14, and the latter projects into the mixing chamber 11 directly in front of the passage 10. When the plunger is pushed into the cartridge, against the tension of the spring 5, it is noticed that air from the spring chamber is forced through the passage 10 and past the nozzle 14 to draw liquid through the tube 13 against the tension of the partial vacuum thereby created within the reservoir. Because of the small passage through the tube 13 and also because operating against this slight partial vacuum, only a very small quantity of liquid is withdrawn each time the plunger is operated. If, in addition, a fine wick 15 is seated within the tube 13, it follows that uniformity of the infinitesimal quantity withdrawn is assured.

The tube 13 is suitably fastened to the inner wall of the inner shell, and it should project well into the mixing chamber in order that no liquid may remain about the nozzle when the outrushing air absorbs the liquid delivered through the wick. Instead of a wick, it is possible to place a piece of wire 16 within the tube, as indicated in Fig. 5. This wire should be nearly as large in diameter as the passage it serves in order to limit the amount of liquid capable of being drawn through the tube. One advantage of substituting such wire is that it may be used to clean out the passage through the tube when the screw cap 2 is removed to refill the reservoir.

Referring now to Fig. 5, it is noticed that the pump plunger, piston, and other parts, are missing in this view. This has been done in order better to illustrate devices now to be described, but it is important to remember that, in practice, all the parts must be put in position before the casing is assembled on the inner shell 6. The latter is, at the top, slitted to provide a lip 20,

below which an internal projection 21 of the casing 1 may be seated to lock the casing and shell together. In order to facilitate this operation, the upper edge of the lip 20 is upwardly beveled, substantially as indicated at 22, to permit the projection 21 to slide easily over the end of the lip and into a widened portion 23 of the slit by means of which the lip is formed. Once the projection is seated in this widened portion behind the lip, it is not possible to pull the casing apart from the shell.

In the top of the shell is seated a disc 25, see also Figs. 3 and 4, which is perforated to receive the plunger 3. In the drawings, the plunger is shown square in cross section, and the perforation of the disc should also be squared to provide a sliding fit for the plunger and to prevent relative rotation. The disc is shown held in position in the shell by means of lips 24 of the shell engaging notches 29 in the upper edge of the disc. It is important to note that the disc and shell in this manner also are held against relative rotation.

The device is, in the first place, assembled by seating the spring 5 and then forcing the piston 4 into the shell, permitting the stem 26 of the piston to project out of the shell. The disc 25 is thereupon seated in the end of the shell, as aforesaid, the plunger is inserted through the disc, and the casing 1 is pushed on to the shell until the projection 21 slips into position behind the lip 20. The disc 25 should, of course, be relieved at this point to permit the lip to flex inwardly to allow the projection to pass. A screw-cap 27 is now caused to engage screw threads of the stem 26 to lock the plunger 3 rigidly to the piston 4.

As stated, the plunger 3 is square, but the screw-cap 27 is made with a cylindrical shoulder 28, which is no larger in diameter than the shortest distance between the parallel sides of the plunger. This shoulder portion is made slightly longer than the thickness of the disc in order that, when the shoulder is seated within the disc at the time the plunger is fully inserted, the plunger may be turned on this cylindrical shoulder into a position substantially as indicated in Fig. 4. While in this position, it is seen that the corners of the plunger, as indicated partly in dotted outline, ride under the disc, and that the device in this manner is locked in the collapsed, inoperative position shown in Fig. 2. It is also important to note that, in this position, the port 12 has traveled far enough away from the mouth of the mixing chamber 11 to shut off the latter from communication with the outside. It is, as a consequence, possible to carry the device in a pocket or handbag in a lying or reversed position without danger of leakage.

When it is again desired to operate the device, it is merely required to grip the casing between the fingers and to turn the screw-cap to the right, thereby to rotate the inner shell until the port 12 resumes its position of registration with the mixing chamber, at which point the square portion of plunger becomes properly alined with the disc perforation to permit the spring 5 again to project the plunger. The widened portion 23, of the shell slit, should be long enough to permit the port 12 to withdraw far enough from the mixing chamber to insure a leakproof closure.

As above stated, when the shell and casing are interlocked, they cannot be pulled apart. It may, however, be desired to take the device apart for inspection or cleaning. For this purpose, the wall of the casing is, opposite the lip 20, shown provided with a very small perforation 30, through which a fine piece of wire may be projected to push the lip 20 inward far enough to permit the projection 21 to pass. The casing may then be withdrawn and the parts disassembled. This perforation can be so small that it is hardly noticeable and may never be noticed by the user of the device.

In Fig. 6, the device of the invention is shown reduced to the size in which it is actually made in order that the observer may readily apprehend the ease with which the device may be manipulated even by the hand of a child. When locked in collapsed, inoperative position, it is seen that it may conveniently be carried in a ladies' handbag or a vest pocket.

The structure illustrated in Figs. 7 to 9 is substantially like the foregoing. The casing 40 may remain exactly like the casing 1, except that its end perforation is shaped to fit a cylindrical plunger 41. The disc 42 also is cylindrically perforated, and it is made in its inner periphery with notches 43 for passing projections 44 of the plunger. When the latter is pushed in all the way, it is found that these projections take a position directly below the disc, as indicated in Fig. 8. The plunger is then given a slight turn to bring these projections out of registration with the notches 43 to lock the device in collapsed, inoperative position.

The above described means for interlocking the casing with the shell is here omitted, because the shell 45, in this case, does not have to rotate relative to the casing 40 to bring the port of the casing out of registration with the mixing chamber. An annular belt 46 is shown mounted for limited rotation on the casing 40, and this belt is made with a port 47 which, when the device is to be operated, is brought into registration with the mixing chamber 48 by turning the belt on the casing, as indicated in Fig. 7.

From this, it is seen that the two structures above described are substantially alike but that, in the modified form, the discharge orifices may be opened and closed independently of the plunger operation. Other changes and modifications may be instituted so long as they remain within the scope of the following claims:

We claim:

1. An atomizer comprising, a casing including two relatively rotatable members axially interlocked and having orifices for mutual registration upon relative rotation of the members, a pump operatively seated within said members, and means for rendering said pump inoperative upon relative rotation of the said members to bring said orifices out of registration with each other.

2. An atomizer comprising, a cylindrical casing, a shell rotatably fitted within said casing and having a port for registration with a port of the casing, a pump axially operable within said shell, and means for locking said pump against axial movement upon relative rotation of the casing and shell to bring said ports out of registration.

3. In an atomizer, a cylindrical casing comprising two interfitting shells relatively rotatable, a pump seated for axial operation within said shells, a reservoir within the shells having a discharge port through the walls of the shells, there being a passage for forcing air by the pump through said ports to draw liquid from said reservoir, and means operable upon relative rotation of the two shells to bring said ports out of registration and for locking said pump against axial operation.

4. In an atomizer, a cylindrical casing, a shell rotatably fitted within said casing and divided into an upper and a lower compartment, a pump having a plunger axially movable in said upper compartment, there being in the wall between the two compartments a mixing chamber discharging through the wall of the casing and passages from the two compartments into said chamber, means for locking said plunger against axial movement when fully entered by a relative rotation of said casing and shell to close the discharge orifice of said mixing chamber.

5. In an atomizer, a cylindrical casing divided into upper and lower compartments, a shell rotatably encompassing said casing, a pump axially movable in said upper compartment, a mixing chamber in the wall between the two compartments discharging through a port in the wall of the shell, a passage from the upper compartment into said mixing chamber, a tube seated in said lower chamber and having a nozzle projecting into said mixing chamber, means seated in said tube for controlling the passage therethrough, and means for locking said pump against axial movement when fully entered and for closing said port by a relative rotation of said casing and shell to close said port.

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