Jan. 10, 1939. H. MALTNER 2,143,079

ATOMIZER FOR LIQUID WITH PRESSURE PUMP CONSTRUCTED AS FLAT EXTENSIBLE VESSEL

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Fig. 1

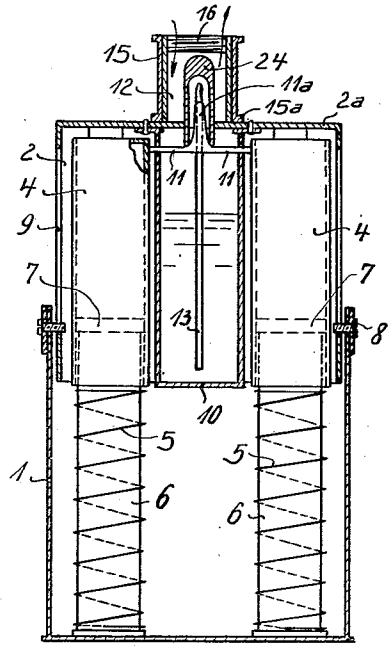


Fig. 2

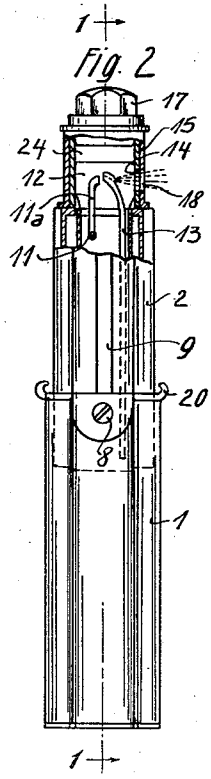


Fig. 3

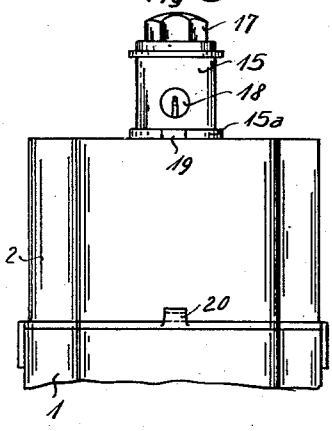


Fig. 4

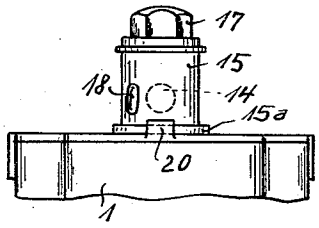


Fig. 5

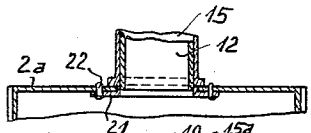


Fig. 6

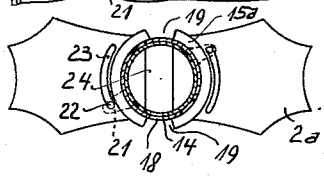


Fig. 7

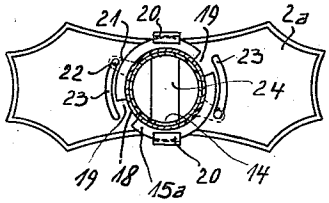
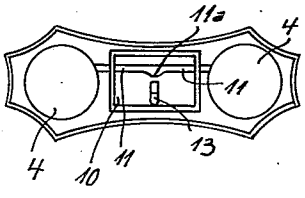


Fig. 8



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ATOMIZER FOR LIQUID WITH PRESSURE PUMP CONSTRUCTED AS FLAT, EXTENSIBLE VESSEL

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Fig. 9

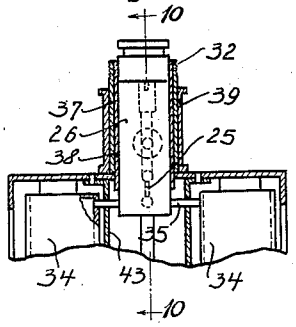


Fig. 10

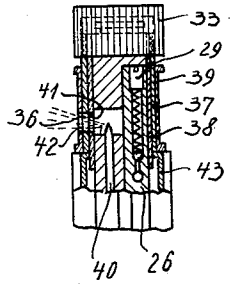


Fig. 11

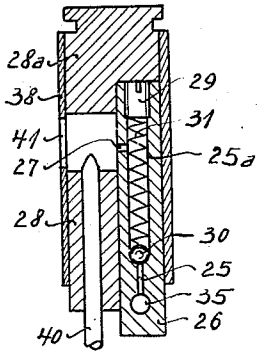
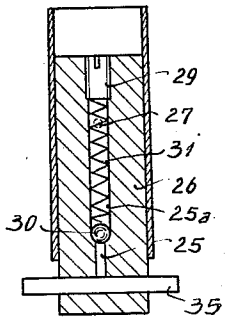


Fig. 12



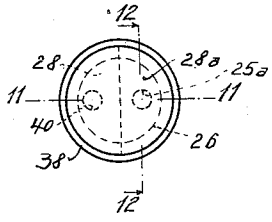


Fig. 13

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UNITED STATES PATENT OFFICE

2,143,079

ATOMIZER FOR LIQUID WITH PRESSURE PUMP CONSTRUCTED AS FLAT EXTENSIBLE VESSEL

Heinrich Maltner, Offenbach-on-the-Main, Germany, assignor to Heinrich Maltner Kom. Ges., Offenbach-on-the-Main, Germany

Application August 3, 1937, Serial No. 157,074
In Germany August 22, 1936

8 Claims. (Cl. 299—88)

The liquid atomizer forming the object of the invention, which is designed chiefly to be carried in lady's handbags, traveling bags or the like, has, in known manner a pressure pump constructed as a flat extensible vessel, one part of the vessel containing pistons wound around with springs and the other part cylinders for receiving the pistons. The chief characteristic feature of the invention is that the nozzles for the compressed air and for the liquid are located at the height of the mouth of a neck on the extensible part of the vessel and that on the neck a rotatable sleeve with aperture in the wall is arranged which, when being pushed into the other part of the vessel can bolt up with the same and at the same time shut off the outlet for the spray jet. This presents the serious advantage that the atomizer if not in use—for instance when accommodated in a lady's handbag—is positively secured against the outflowing of liquid such as perfume. The bolting movement to be carried out for retaining the extensible part in the other part serves to also bolt up the outlet aperture for the spray jet.

Two forms of construction of the liquid atomizer are shown, by way of example, in the accompanying drawings.

Fig. 1 is a longitudinal sectional view of the liquid atomizer in operative position, taken on line 1—1 of Fig. 2,

Fig. 2 is a side elevational view of the liquid atomizer in operative position, partly in section,

Fig. 3 is a fragmentary front elevational view of the liquid atomizer in operative position,

Fig. 4 is a fragmentary front elevational view of the liquid atomizer in inoperative position,

Fig. 5 a part longitudinal section of the cover of the extensible part,

Figs. 6 and 7 top plan views on the cover and cross section through the neck of the atomizer and in different turned positions the sleeve surrounding the neck,

Fig. 8 a top plan view on the extensible part, the cover being omitted,

Fig. 9 a longitudinal section corresponding to Fig. 1 through the top part of the liquid atomizer of a second form of construction and in the extending position,

Fig. 10 is a sectional view of the upper parts of the liquid atomizer taken on line 10—10 of Fig. 9,

Fig. 11 the neck part of the liquid atomizer on larger scale in section taken on line 11—11 of Fig. 13,

Fig. 12 the neck part of the liquid atomizer on larger scale in section taken on line 12—12 of Fig. 13, and

Fig. 13 a top plan view of the atomizer neck.

The liquid atomizer consists of a lower part 1 and of an upper part 2 of a vessel extensible to a limited degree, of substantially flat, preferably profiled form. Pistons 6 having each a packing collar 7 on the front face are standing on the bottom of part 1, are wound round with springs 5, extending into cylinders 4 of the extensible part 2, the latter being forced up on part 1 by the action of the springs. The extending movement is limited by screws 8 on part 1 striking against the ends of slots 9 in the side walls of the extensible part 2. A container 10 of rectangular shape is fixed in the extensible part 2 on the top plate 2a of the same and between the two cylinders 4 and holds the liquid to be atomized, for instance perfume. A tube 11 extends from each cylinder 4, these tubes merging both into a vertical tube 11a projecting into a neck 12 of the atomizer vessel and terminating in a nozzle. During the movement of the extensible part 2 relative to part 1 liquid rises from the container 10 through the riser pipe 13 under the action of the compressed air flowing out through the vertical tube 11a. The neck 12 has at the height of the nozzle of tube 11a a hole 14 through which the spraying jet can pass (Fig. 2). The neck 12 serves to guide a sleeve 15 and further as charging tube for the container 10. A screw stopper 17 is screwed into the internal thread 16 in the upper part of neck 12. The sleeve 15 turnable on the neck 12 has an aperture 18 in its wall adapted to be brought into register with the aperture 14 in neck 12. A collar 15a at the lower edge of sleeve 15 has recesses 19 at two diametrically opposite points through which recesses can pass claws 20 on the lower part 1 of the vessel (see Figs. 3 and 6) said claws engaging over the collar 15a when the sleeve 15 is turned so that the extensible part 2 is locked on part 1 (Figs. 4 and 7). It is important that when sleeve 15 is being turned into the position in which it locks the extensible part 2 the aperture 18 in the wall of the sleeve is turned relative to the aperture 14 so that both these apertures are simultaneously shut off (Fig. 4). In order to securely determine this overlapping position the sleeve 15—in the form of construction shown—has on its inner surface projections 21 and pins 22 vertically projecting from these projections, said pins being guided in arcuate slots 23 in the top plate 2a, as is clearly shown in Figs. 5 to 7.

A bridge 24 extending over the atomizer tubes 11, 11a, 13 in the neck 12 serves to protect the

atomizer tubes and to separate the liquid from the air path when liquid is being filled into the container.

By turning sleeve 15 into the position shown in Figs. 3 and 6 the claws 20 of part 1 come into register with the recesses 19 in collar 15a so that the now unlocked part 2 is pushed out of part 1 by the action of the springs 5. A pumping effect produced by alternately pressing down and releasing top plate 2a of part 2 causes the ejection of a spraying jet, which can be freely ejected as during the turning of sleeve 15 the aperture 18 in the wall of this sleeve has come into register with the aperture 14 in neck 12 of the atomizer. (Fig. 2.)

To stop the atomizing the extensible part 2 is locked on part 1 (Fig. 4) in its lower position by turning back sleeve 15 so that aperture 14 of neck 12 is covered by the wall of the sleeve and leaking of liquid from the atomizer is prevented.

To avoid under any circumstances drops of liquid remaining on the sleeve, such drops forming if air compressed during the inserting of the extensible part into the bottom part of the vessel draws along some liquid which then passes through in the form of drops between neck and sleeve which has been moved into the closing spraying aperture, to appear in the bore of the position, an automatic closing valve is arranged as shown in Figs. 9 to 13 in the outlet tube or channel for the compressed air, said valve shutting off the channel for the compressed air as soon as the pumping effect ceases.

A connecting tube 35 between the cylinders 34 leads to the bore 25 of a stopper 26 in bush 38 inserted into the neck 37 of the atomizer vessel. The riser tube 40 is inserted in a removable stopper 28, 28a opposite a bore 27 in the stopper 26. The bore 27 branches horizontally from a channel 25a arranged axially to the bore 25 and closed by a screw 29. On the lower end of the channel 25a rests a valve ball 30 which is pressed upon its seat by means of a spring 31. In the neck 37 a hole 36 is provided at the height of the liquid nozzle, a hole 41 in the wall of bush 38 and a hole 42 in the turnable sleeve 39, these holes forming together an outlet for the spraying jet, as shown in Fig. 10.

Neck 37 serves also in this form of construction as pivot pin for the turnable sleeve 39 and as charging tube for the container 43, if the stopper 28, 28a cut out at an angle and fitted with riser tube 40 has been pulled out. An external screw thread 32 at the upper portion of neck 37 serves for the reception of an internal screw threaded closing cap 33 (Fig. 10).

The formation of the spraying jet takes place in that the air forced out of the cylinders 34 by the pistons flows through the transverse tube 35 into the channel 25, lifts the ball 30 in opposition to the action of the spring, flows through channel 31 and flows out through the hole 27, the air drawing liquid from the nozzle of tube 40 and atomizes this liquid.

As during the turning of sleeve 39 the aperture 42 in the wall of the same comes into register with the aperture 36 in the neck 37 of the atomizer and with the aperture 41 in bush 38, this latter opening is liberated so that the spraying jet can be ejected (Fig. 10).

As soon as the pumping effect and therewith the inflow of compressed air through channel 25 ceases, the spring 31 will press the ball 30 upon its seat, and any outflow of air which might draw along any liquid is prevented with certainty.

I claim:—

1. A liquid atomizer, comprising in combination a vessel composed of a lower part and of an upper part extensibly mounted in said lower part and having an aperture in its top plate, two pistons in said lower part, cylinders open at the lower end mounted in said extensible part and engaging over said pistons, spiral springs wound around said pistons and bearing at the upper end against the bottom of said cylinders, a neck on the aperture in the top plate of said extensible part, said neck having an opening for a spraying jet in its wall, an air nozzle connected to said cylinders and a liquid nozzle extending from a liquid container between said cylinders in said aperture in the top plate, a sleeve turnably mounted on said neck and having a hole in its wall adapted to register with said opening for the spraying jet in the wall of the neck, and means for locking said sleeve with said lower part when said sleeve is brought into a position closing said opening for the spraying jet by its wall.

2. A liquid atomizer as specified in claim 1, comprising in combination with the sleeve turnable on the neck of the extensible part and having a hole in the wall, a collar at the foot end of said sleeve and having two diametrically opposite recesses, claws on the edge of the lower part of the vessel adapted to pass through said recesses during the insertion of said extensible part into said lower part and to overlap said collar to lock said extensible part in the inserted position in said lower part, when said sleeve is turned into a position closing the opening for the spraying jet.

3. A liquid atomizer as specified in claim 1, comprising in combination with the sleeve turnable on the neck of the extensible part and having a hole in the wall, a collar at the foot end of said sleeve and having two diametrically opposite recesses, claws on the edge of the lower part of the vessel adapted to pass through said recesses during the insertion of said extensible part into said lower part and to overlap said collar to lock said extensible part in the inserted position in said lower part when said sleeve is turned into a position closing the opening of the spraying jet, said claws being situated below the opening in the wall of the neck of the extensible part and being aligned therewith so that the hole in said sleeve registers with said opening in said neck when said sleeve is unlocked from said lower part.

4. A liquid atomizer as specified in claim 1, comprising in combination with the turnable sleeve and the top plate of said extensible part a slot- and pin connection between said sleeve and said top plate.

5. A liquid atomizer as specified in claim 1, comprising in combination with the cylinders of the extensible part, a riser pipe extending from the liquid container between said cylinders, horizontal tubes extending one from each air cylinder, and a nozzle tube on the ends of said horizontal tubes and opposite the mouth of said riser tube.

6. A liquid atomizer as specified in claim 1, comprising in combination with the cylinders in the extensible part, a riser pipe extending from the liquid container between said cylinders, a neck on said extensible part, said neck having an outlet opening opposite the discharge end of said riser pipe, and an automatically closing valve in front of said outlet opening on the path of the jet of compressed air.

7. A liquid atomizer as specified in claim 1,

comprising in combination with the air cylinders, the liquid container between said cylinders, the rising tube extending from said container, a nozzle on said riser tube, and the neck of the extensible part, a stopper in said neck and having an angular bore, means connecting the vertical part of said bore with said air cylinder said vertical part of the bore having a narrower lower end, a spring-controlled ball in said vertical part of the bore resting on the upper end of said narrower bore part, the horizontal arm of said angular bore ending at the height of said nozzle on the riser tube.

8. A liquid atomizer as specified in claim 1, comprising in combination with the air cylinders, the liquid container between said cylinders, the rising tube extending from said container, a nozzle on said riser tube, and the neck of the extensible part, a stopper in said neck and having an angular bore, means connecting the vertical part of said bore with said air cylinders said vertical part of the bore having a narrower lower end, a spring controlled ball in said vertical part of the bore resting on the upper end of said narrower bore part, the horizontal arm of said angular bore ending at the height of said nozzle on the riser tube, and a removable insert in the neck supplementing said stopper carrying the riser tube and having a transverse bore at the height of the nozzle of said riser tube registering with the aperture in said neck.

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