Sept. 22, 1942. C. C. DAGGETT 2,296,773

POCKET TYPE ATOMIZER

Filed Oct. 17, 1940

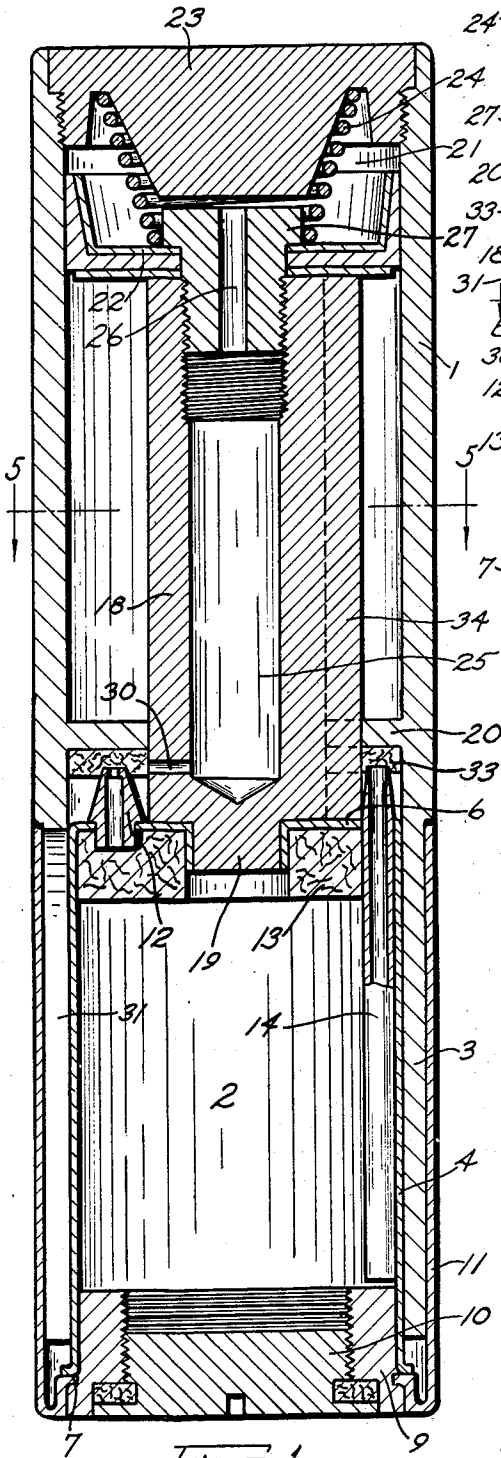


FIG. 1.

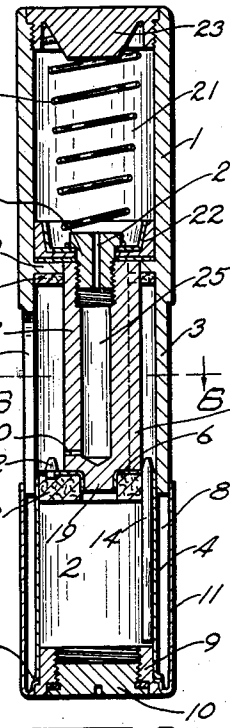


FIG. 2.

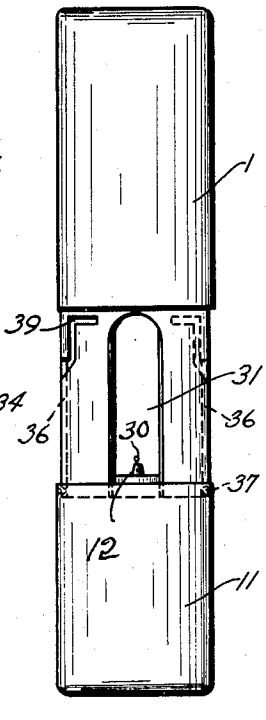


FIG. 3.

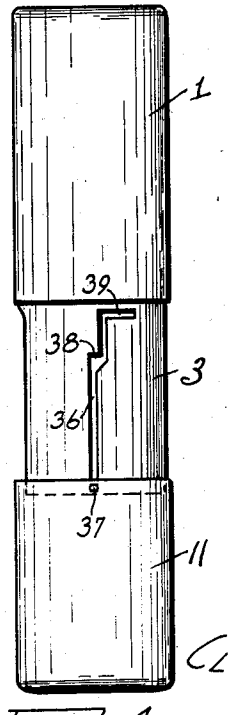


FIG. 4.

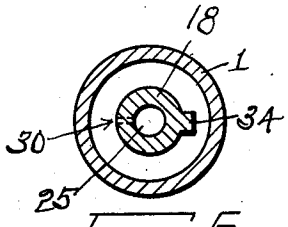


FIG. 5.

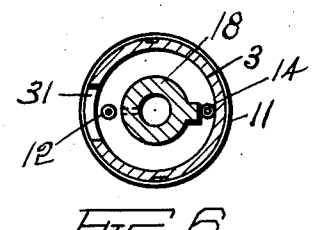


FIG. 6.

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Patented Sept. 22, 1942 2,296,773

UNITED STATES PATENT OFFICE

2,296,773

POCKET TYPE ATOMIZER

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Application October 17, 1940, Serial No. 361,493

10 Claims. (Cl. 299—88)

This invention relates to atomizers for perfume, toilet water, or the like, and particularly to such an atomizer of small and compact form for carrying in a pocket or purse.

The primary object of the invention is the provision of an atomizer of this character of improved construction, whereby to enhance the practicability and commercial value and to increase the operating efficiency thereof.

A further object of the invention is the provision of an atomizer of this character of unique construction and arrangement of parts, whereby the pump and liquid container are axially aligned and entirely separated and out of communication one with another.

Other objects and advantages of the invention will be apparent from the following detailed description and from the accompanying drawing illustrating one embodiment thereof, in which—

Figure 1 is an enlarged central longitudinal section of an atomizer embodying the invention, with the parts in closed position and with parts in full; Fig. 2 is a similar view reduced in size from that of Fig. 1, but enlarged with respect to commercial size, with the parts in completely separated position; Fig. 3 is a side elevation of Fig. 2 turned a quarter way around; Fig. 4 is a similar side elevation in the same position as Fig. 2, and Figs. 5 and 6 are sections on the lines 5—5 and 6—6 taken respectively on Figs. 1 and 2, with the former reduced in size.

By reference to the drawing, it will be noted that the device embodying the invention includes a compressor cylinder 1 and a receptacle 2, for the liquid to be sprayed, disposed in axial alignment and one telescoped with the other to permit relative axial reciprocatory movements thereof. In the present instance, the inner end of the wall of the cylinder 1 has an extension or skirt portion 3 which telescopes over the side wall 4 of the receptacle. The receptacle 2 has its inner end closed to form a bottom 6, while its outer end is open preferably terminating in an outwardly directed radial edge flange 7.

A bushing 9 is fixedly secured in the outer end portion of the receptacle wall 4, being sealed therein in any suitable manner, and has its outer end flanged to engage over the flanged edge 7 of said wall. A plug 10 is removably threaded into the bushing 9 and has suitable gasket seating engagement therewith to prevent leakage.

A protecting sleeve 11 is provided on the receptacle 2 around its wall 4 in spaced relation thereto, so as to receive the extension or skirt end 3 of the cylinder 1 therebetween. This sleeve is attached to the receptacle by inwardly flanging its outer end and depressing such flange to provide a countersunk inwardly projecting edge flange in coaction with the edge flange 7 of the receptacle wall and between it and the outwardly flanged edge of the bushing 9, which latter seats within the depressed portion of the sleeve end and serves both to center the sleeve relative to the receptacle and to hold the inturned sleeve end in engagement with the receptacle wall. The sleeve, however, is not held in fixed engagement with such wall but is free to turn relative thereto for the purpose hereinafter described.

A discharge nozzle 12 is mounted in the bottom or inner closed end of the receptacle 2 adjacent to the outer edge of the bottom and has its bore in communication with the interior of the receptacle preferably through a porous packing material 13 of felt, or other suitable material, in the bottom of the receptacle. This nozzle is of shallow form and projects only a short distance from the end of the receptacle. The receptacle is also provided with a vent tube 14 which preferably opens into the receptacle near its outer end, while its other end is projected through an opening in the bottom of the receptacle near one edge thereof and preferably in a position substantially diametrically opposed to the nozzle 12. The outer end of the vent tube opens to the atmosphere and such end is substantially in the same cross plane of the device as the discharge end of the nozzle 12.

A stem 18 is fixed to the inner or bottom end of the receptacle 2 intermediate the nozzle 12 and vent tube 14 and projects axially therefrom into the compressor cylinder 1. In the present instance this stem is attached to the receptacle by providing the inner end of the stem with an axially projecting lug 19 which is inserted into a centrally disposed inwardly flanged opening in the bottom of the receptacle and firmly secured therein by cementing, soldering, or any other suitable manner. The stem 18 projects through a web 20 in the inner end of the body portion of the cylinder 1, such web cooperating with the outer closed end of the cylinder 1 to form a compressor chamber 21. Within this chamber the stem 18 is provided with a compressor plunger 22 of any suitable construction. The outer end of the chamber 21 is closed by a plug 23 which, in the present instance, is threaded in the cylinder and is pref-

erably sealed therein by cementing. An expansion spring 24 of the conical type is disposed in the chamber 21 with one end thrust against the plug 23 and its other end thrust against the piston 22.

The stem 18 has a longitudinally extending bore 25 therein extending to near the inner end of the stem with its outer end in communication with the interior of the compressor chamber 21 through a small passage 26 in a plug 27, which is secured in the outer end of the stem bore and serves, in the present instance, to attach the piston 22 to the stem. The instroke of the piston within the compressor chamber is limited by the outer end of the plug 27 striking an inwardly projected central portion of the plug 23.

A discharge orifice 30 for air compressed within the chamber 21 is provided in the stem wall from the inner end portion of the stem bore 25 in position to direct its discharge across the outer end of the discharge nozzle 12 in impinging relation thereto, so as to draw liquid from the receptacle 2 through the nozzle and porous packing 13 and effect its discharge in spray-form from the nozzle transversely thereof and outwardly with respect to the stem. This spray discharge from the nozzle is directed outwardly from the device through an elongated slot or opening 31 provided in the extension or skirt portion 3 of the cylinder wall 1. The opening 31 extends from the inner open end of the wall portion 3 to near the web 20 and is of sufficient length for the nozzle 12 to be exposed to the outside during substantially the full operating stroke of the compressor. When the cylinder 1 and receptacle 2 are in completely telescoped or compressed relation, the outlet ends of the nozzle 12 and vent tube 14 bear against and are closed by a gasket 33 which seats against the receptacle side of the web 20. It is thus apparent that when the two parts of the atomizer are in closed relation the two outlets from the receptacle 2 are sealed to prevent any leakage therefrom.

The stem 18 is preferably provided with a feather or rib 34 at one side thereof working in a recess in the web to prevent relative turning of the cylinder 1 and receptacle 2. When the atomizer parts are in closed relation, substantially as shown in Fig. 1, the sleeve 11 completely covers and closes the opening 31 in the skirt portion of the cylinder 1. This sleeve also has cooperative action with such skirt portion to limit the inward working strokes of the parts, so as to prevent a complete closing of the opening 31 during a spraying operation of the device, and also to effect a locking of the parts in completely closed relation. For this purpose, the skirt portion 3 is provided at opposite sides thereof with longitudinally extending grooves or recesses 36 receiving guide pins 37 in the adjacent end portion of the sleeve 11. Such recesses have straight portions sufficiently long to take care of the full operating stroke of the parts, such stroke being stopped at its inner end by engagement of the pins 37 with aligned shoulders 38 in the inner end portions of the recesses 36. The inner ends of the recesses 36 adjacent the shoulders 38 are offset and then continue inward and laterally in bayonet slot form, as shown at 39, so that the pins may be turned into the laterally angled ends of such portions to lock the atomizer parts in closed relation with the gasket 33 in sealing engagement with the projecting ends of the nozzle 12 and vent tube 14.

In an operation of the device, presuming the parts to be in closed locked relation, the sleeve is first turned to release its pins 37 from the laterally extending end portions of the recessed parts 39, thereby permitting the sleeve 11 and detached receptacle 2 to be moved outward relative to the cylinder 1 to the full limit of the outward stroke, by the action of the spring 24, which movement carries the piston 32 to the inner end of the cylinder. The operator may now effect successive inward movements or strokes of the parts of the device by applying successive pressure on the ends of the device between the thumb and a finger of a hand by which it is held. This action compresses air within the compressor chamber 21 and such air forcefully discharges from the compressor through the orifice 30 in a small stream which is directed across the liquid discharge nozzle 12, thereby effecting a drawing of liquid from the receptacle and a discharge of the same in spray-form laterally from the device through the opening 31.

It is apparent that I have provided a very compact and efficient atomizer of the character described, in which the compressor unit and liquid container are disposed at opposite ends, with the plunger of the compressor unit fixedly projecting from the inner end of the container and also with the discharge from the container arranged between the adjacent ends of the compressor unit and container and adapted to have its discharge transversely thereof. It is also apparent that both the liquid discharge nozzle and the air vent are disposed in enclosed protected relation within the device and are completely sealed to prevent leakage when the compressor cylinder and container are in closed or compressed relation, and also that there is no communication at any time between the interior of the compressor cylinder and that of the liquid container.

I wish it understood that my invention is not limited to any specific construction, arrangement or form of the parts, as it is capable of numerous modifications and changes without departing from the spirit of the claims.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent, is:

1. In a pocket type atomizer, a compressor cylinder and a liquid container mounted in telescoping axial reciprocating relation, said container having a liquid discharge orifice between the inner ends of said cylinder and container, a plunger fixedly projecting from the inner end of said container and into said cylinder and having an exposed air discharge orifice in communication with the interior of said cylinder disposed to direct a discharge of air across the outlet end of said liquid discharge orifice in a plane transverse to the cylinder axis to effect a discharge of liquid in spray form from the container when the cylinder and container are relatively reciprocated, and gasket means on the inner end of the cylinder for sealing the liquid discharge orifice when the cylinder and container are at the limit of their relative inward movements.

2. In a pocket type atomizer, an air compressor cylinder having an extension at its inner end, a liquid container guided for reciprocatory movements relative to said cylinder by said extension and having a liquid discharge orifice at the end thereof adjacent to said cylinder and directed toward the cylinder, a plunger fixedly projecting from the inner end of said container and

into the cylinder at a side of said orifice and having provision for directing a stream of air across said orifice to effect a spray discharge of liquid from the container when the cylinder and container are relatively reciprocated, said orifice being enclosed by said extension when the cylinder and container are at the limit of their relative inward movements, and means for sealing said orifice when the cylinder and container are in said relative position of movement.

3. In a pocket type atomizer, an air compressor cylinder having an extension at its inner end, a liquid container guided for reciprocatory movements relative to said cylinder by said extension and having a liquid discharge orifice at the end thereof adjacent to said cylinder, a plunger fixedly projecting from the inner end of said container into said cylinder at a side of said orifice and having provision for directing a stream of air across said orifice to effect a spray discharge of liquid from the container when the cylinder and container are relatively reciprocated, means for retaining the cylinder and container in fully telescoped relation, and a gasket fixed to the inner end of said cylinder and positioned to coact with and seal said orifice when the cylinder and container are in substantially fully telescoped relation.

4. In a pocket type atomizer, a compressor cylinder and a liquid container mounted in telescoping axially reciprocating relation, said container having a liquid discharge orifice and a vent orifice at its inner end, a plunger fixedly projected from an end of said container into said cylinder and having an air discharge orifice in communication with the interior of said cylinder and disposed to direct a discharge of air across the outlet end of said liquid discharge orifice to effect a discharge of liquid in spray form from the container when the cylinder and container are relatively reciprocated, means for retaining the cylinder and container in fully telescoped relation, and means for sealing the discharge ends of said orifices when the cylinder and container are in fully telescoped relation.

5. In a pocket type atomizer, an air compressor cylinder having an extension at its inner end lengthwise thereof, a liquid container guided for reciprocatory movements relative to said cylinder by said extension and having a liquid discharge orifice and a vent orifice at the end thereof adjacent to said cylinder and within said guide extension, a plunger fixedly projected from the inner end of said container at a side of each of said orifices and having provision for directing a stream of air under compression across said liquid discharge orifice to effect a spray discharge of liquid from the container when the cylinder and container are relatively reciprocated, a gasket on the inner end of the cylinder in position to coact with and seal both of said orifices when the cylinder and container are at the inner ends of their relative strokes, and means for securing the cylinder and container in such orifice sealing position.

6. In a pocket type atomizer, a compressor unit including a cylinder and a plunger, said cylinder having an extension at its inner end with at least one side opening, a liquid container unit guided by said extension for reciprocatory movements relative to the cylinder axially thereof and having fixed connection at its inner end with said plunger, said container having a liquid discharge orifice and an air vent orifice at its inner end within said extension and directed toward the inner end of said cylinder, said plunger connection having an air discharge orifice in communication with the interior of said cylinder and positioned to direct a stream of air across the outer end of said liquid discharge orifice to effect a discharge of liquid in spray form from the container and through said extension opening, yielding means urging movement of said cylinder away from said container, means for retaining said cylinder and container at the inner ends of their relative strokes, and means for sealing said liquid discharge and air vent orifices when the cylinder and container are at the inner ends of their strokes.

7. In a pocket type atomizer, a compressor cylinder having a longitudinal extension at its inner end with a side opening therein, a liquid container telescoped within said extension for reciprocatory movements relative to the cylinder axially thereof, said container having a liquid discharge nozzle at its inner end within said extension and directed toward the inner end of said cylinder, a plunger in said cylinder having a stem projecting from the inner end of the cylinder and in fixed connection with the inner end of said container, said stem having a side discharge orifice in communication with the interior of the cylinder and positioned to direct an air stream across the discharge end of said nozzle to effect a discharge of liquid in spray form from the container when the cylinder and container are relatively reciprocated, said spray discharge being transverse to said stem and through said extension opening, a sleeve around said extension and attached at its outer end to the outer end of said container for lengthwise movements therewith and rotary movements relative thereto, said sleeve and extension cooperating by relative rotation to retain the cylinder and container at the inner ends of their relative strokes, and means for sealing the discharge end of said nozzle when the cylinder and container are at the inner ends of their strokes.

8. In a pocket type atomizer, a compressor cylinder having a longitudinal extension at its inner end with a side opening therein, a liquid container telescoped within said extension for reciprocatory movements relative to the cylinder axially thereof, said container having a liquid discharge nozzle at its inner end within said extension and directed toward the inner end of said cylinder, a plunger in said cylinder having a stem projecting from the inner end of the cylinder and in fixed connection with the inner end of said container, said stem having a side discharge orifice in communication with the interior of the cylinder and positioned to direct an air stream across the discharge end of said nozzle to effect a discharge of liquid in spray form from the container when the cylinder and container are relatively reciprocated, said spray discharge being transverse to said stem and through the side opening of said extension, a sleeve around said extension and attached at its outer end to the outer end of said container for rotary movements relative thereto, said sleeve and extension cooperating to retain the cylinder and container at the inner ends of their relative strokes, and means for sealing the discharge end of said nozzle when the cylinder and container are at the inner ends of their strokes, said sleeve and extension having sliding pin and slot engagement to limit the operating strokes of the cylinder and container and to permit relative movements of said cylinder and container

to nozzle sealing position and to lock them in such position upon a turning of the sleeve relative to the container.

9. In a pocket type atomizer, a compressor cylinder having an extension at the inner end of its side wall with an elongated longitudinally extending opening in its side, a liquid container telescoping within said extension and guided thereby for axial reciprocatory movements relative to the cylinder, said container having a liquid discharge orifice at its inner end within said extension and adjacent to said opening, a plunger fixedly connected to the inner end of the container and working in said cylinder, said plunger having provision for discharging an air stream across the outlet end of said orifice to discharge liquid in spray form from the container when the cylinder and container are relatively reciprocated, a sleeve attached to the outer end of the container and cooperating therewith to form a hollow wall for receiving said extension and for closing said opening when the cylinder and container are in closed relation, and means operable by a relative turning of said sleeve and container to secure the cylinder and container in such closed relation.

10. In a pocket type atomizer, a member forming a compression cylinder at one end and an extension at the other end with a partition separating the chamber from the extension, a liquid container guided for reciprocatory movements by said extension relative to said chamber and having a liquid discharge orifice at its inner end adjacent to said partition, a plunger fixedly projecting from the inner end of said container at a side of said orifice and projecting through said partition and operating in said chamber to effect a compression of air therein when the member and container are relatively reciprocated, said plunger having a discharge orifice in communication with the compression end of the chamber through the plunger and positioned to have its discharge into the space between said partition and the inner end of the container and across the container discharge orifice when the member and container are relatively reciprocated, the communication of both said orifices with said space being closed by said partition when the member and container are at the limit of their inward strokes, and means for retaining the member and container in orifice closing position.

CLYDE C. DAGGETT.