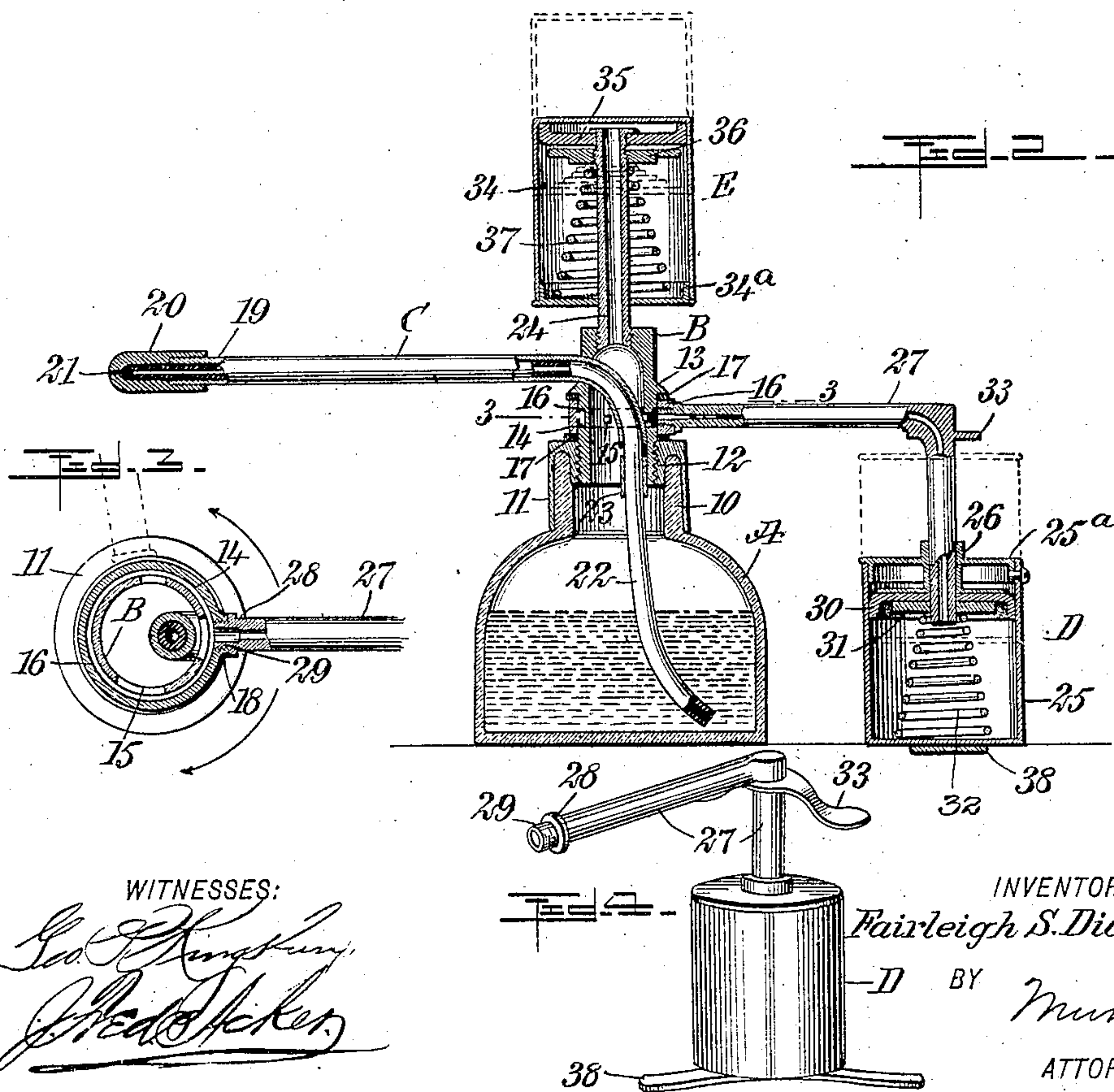
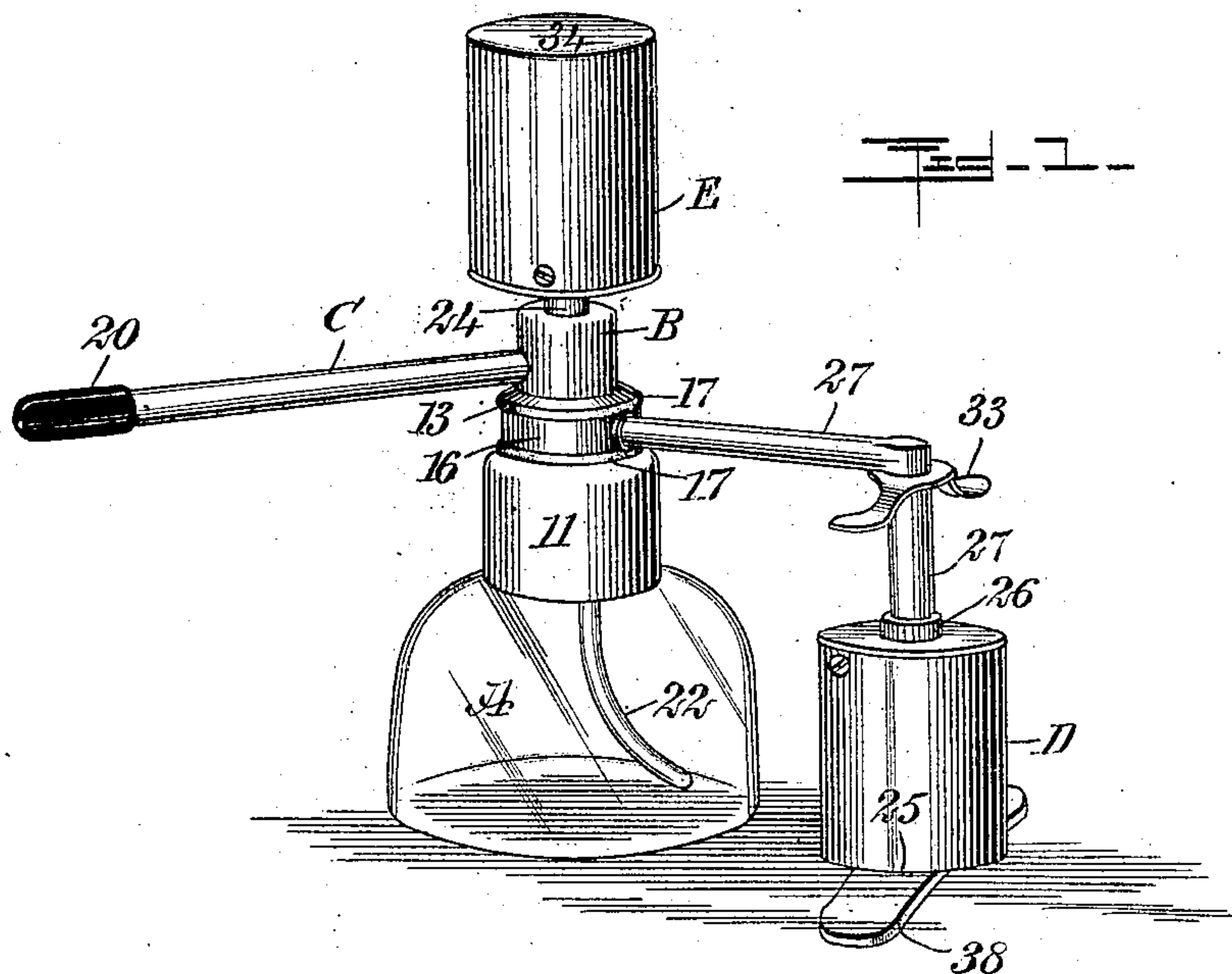


No. 838,960.

PATENTED DEC. 18, 1906.

F. S. DICKINSON.
ATOMIZER.

APPLICATION FILED JAN. 20, 1906.



UNITED STATES PATENT OFFICE.

FAIRLEIGH S. DICKINSON, OF NEW YORK, N. Y.

ATOMIZER.

No. 838,960.

Specification of Letters Patent.

Patented Dec. 18, 1906.

Application filed January 20, 1906. Serial No. 296,973.

To all whom it may concern:

Be it known that I, FAIRLEIGH S. DICKINSON, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and useful Improvement in Atomizers, of which the following is a full, clear, and exact description.

My invention relates to an improvement in atomizers; and the object of the invention is to provide a force-pump to be used in connection with an atomizer, wherein a spring is employed for the return stroke, thereby avoiding muscular action to operate the plunger on the return stroke, which greatly facilitates the operation of the instrument.

A further purpose of the invention is to provide a fluid-containing receptacle with a force-pump of the character mentioned, together with an equalizing-pump constructed on the same principle as the force-pump, but which is automatic in action, the two pumps being so arranged with reference to each other and the fluid-containing receptacle as to produce a continuous spray at the outlet of said receptacle.

A further purpose of the invention is to provide a coupling between the force-pump and the fluid-containing receptacle which will permit the force-pump to be moved around said receptacle to any position best adapted for its use without in the slightest degree interrupting the direct passage of air from the force-pump to the said fluid-containing receptacle.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a perspective view of the atomizer having the improvement applied thereto. Fig. 2 is a vertical section through the atomizer, taken about centrally thereof. Fig. 3 is a horizontal section taken practically on the line 3 3 of Fig. 2, and Fig. 4 is a detail perspective view of the force-pump employed.

A represents a receptacle adapted to contain the material to be sprayed, which receptacle is provided with a neck 10, and around this neck a collar 11 is secured, having an upper interiorly-threaded section 12, which ex-

tends within the neck 10, as is shown in Fig. 2. The neck of the receptacle A is adapted to receive the lower end of a tubular stopper B, open at its bottom and closed at its top, the said stopper B being screwed to the threaded section 12 of the said collar 11, as is also shown in Fig. 2.

An annular flange 13 is exteriorly formed on the stopper B between its center and its upper end, and below the said flange 13 an annular groove 14 is exteriorly produced in said stopper, and openings 15 are made in the grooved portion of the stopper, which openings communicate with the chamber of the stopper. A band 16 is mounted to turn around the said stopper below the flange 13, and said band covers the said annular groove 14 in the stopper, as is best shown in Fig. 3.

A packing 17 is provided at the top and at the bottom of the band 14, so as to render the stopper liquid and air tight where the band 14 is located, the upper packing engaging with the under face of the flange 13 and the lower packing engaging with the upper face of the neck-collar 11. The band 16 is provided with a threaded opening 18, which extends through to the annular recess or groove 14, and the atomizing-tube C for the fluid-containing receptacle A usually consists of an outer metal section 19, which is carried into the chamber of the stopper B at a point above the flange 13, terminating at a point near the bottom of the said chamber, and an inner and smaller rubber tube 22, which extends from the bottom portion of the fluid-containing receptacle A through a suitable guide 23, attached at the interior of the stopper B, and then through the outer metal pipe and beyond the outer end of said pipe, the outer or outlet end of the inner or flexible tube 22 being provided with an outlet-opening more or less contracted. A tip or nozzle 20 is secured in any suitable or approved manner upon the outer end of the outer metal tube 19 of the atomizer-tube C, into which nozzle the outlet end of the inner tube 22 is carried until the outlet end of the inner tube 22 registers with a contracted outlet-opening 21 in the said tip or nozzle 20.

A tube 24 is screwed or otherwise secured in the top of the stopper B, extending upwardly therefrom and having communication with the interior of the said stopper B, and consequently with the interior of the fluid-containing receptacle A, the said tube 24 being open at both top and bottom, and

said tube is adapted for a purpose to be hereinafter described.

In connection with the fluid-containing receptacle A and its stopper B, I employ a pump D, adapted to force air into the chamber of the stopper B and into the fluid-containing receptacle A to force the fluid contained in said chamber out through the atomizer-tube C. This pump consists of a cylinder 25, the upper head 25^a whereof is preferably removable and is provided with a central opening surrounded by a collar 26. An angular or elbow tube 27 is used in connection with the cylinder 25, the vertical member of the said air-supply tube 27 being made to pass through the opening in the upper head of the pump-cylinder 25 in such manner that the pump-cylinder can readily slide on the said vertical member of the said air-supply tube. The outlet end 29 of the horizontal member of the air-supply tube 27 is threaded to enter the threaded aperture or opening 18 in the band 16 surrounding the said stopper, and just back of the threaded end 29 of the said air-supply tube a collar 28 is provided in order that a tight joint may be made between the said pipe 27 and said band 16. A piston-head 30 is located within the cylinder 25, and said piston-head is secured to the inner end of the vertical member of the air-supply tube 27 in any suitable or approved manner, as, for example, by means of a nut 31, and a spring 32, usually a helical spring, is made to bear against the under face of the nut 31 on the piston-head 30, and upon the lower head of the cylinder 25. Where the vertical and the horizontal members of the air-supply tube 27 connect a finger-piece 33 is attached to or made integral with the said air-supply tube. In the operation of this pump the finger-piece 33 is pressed upon by the first and second fingers of the hand, while the thumb is placed beneath the cylinder 25, and by bringing the said fingers and the thumb in direction of each other the cylinder 25 is forced upward on the vertical member of the air-supply pipe 27, and air is thereby forced through said pipe into the fluid-containing receptacle A. The spring 32 restores the cylinder 25 to its lower or normal position when the grip on the said cylinder is relaxed. Thus the pump D may be operated with the least possible amount of muscular exertion, and by reason of the rotary connection between the pump and the stopper B of the fluid-containing receptacle A the pump may be carried around the said receptacle to any point that may be desired—as, for example, it may be brought in front of the operator, or it may be carried at a right angle to the operator or at any angle which is most convenient to the person being operated upon or by the person operating the pump. The said revoluble connection between the receptacle A and the pump D

is such that no matter in what position the pump D may be placed circularly with relation to the receptacle A the air forced from the pump will always find its way through the medium of the recess 14 in the stopper and the apertures 15 into the receptacle A.

In connection with the pump D and the stopper B, I employ what I term an "equalizing-pump" E. This pump consists of a cylinder 34, the lower head 34^a whereof is preferably removable, which cylinder is mounted to slide on the said tube 24, extending upward from the stopper B; but the tube 24, while it passes through the lower head of the cylinder 34, does not pass through its upper head, and the said cylinder has free movement on the said tube. A piston-head 35 is secured to the upper end of the tube 24, being held thereto by means of a nut 36 or its equivalent, and a spring 37 has bearing against said nut 36 or the piston-head 35 and upon the bottom of the cylinder 34. As the force-pump D is operated to force the liquid from the receptacle A out through the outlet of the atomizer-tube C the surplus air forced into said receptacle A will find its way up into the cylinder 34 of the equalizing-pump E and will cause the said cylinder to rise to a greater or less extent, as shown by dotted lines in Fig. 2, and the air thus stored in the cylinder 34 on the return stroke of the pump D is forced out from the cylinder 34 of the equalizing-pump E into the receptacle A by the action of the spring 37. Thus there is a constant pressure of air on the liquid in the liquid-containing receptacle A sufficient to maintain an uninterrupted and constant spray at the outer end of the atomizing-tube C.

The force-pump D is provided with a foot 38, extending beyond opposite sides, which foot when the pump is used serves as an extended bearing for the hand of the operator, and to that end the foot is more or less concaved at its bottom.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination with a liquid-containing receptacle, of a force-pump in communication with the said receptacle, and an equalizing-pump for providing for a continuous supply of air to the receptacle, the equalizing-pump comprising a cylinder mounted to slide and connected with the receptacle, the said cylinder receiving air from the force-pump and moving in one direction at the forcing stroke of said force-pump, and means for automatically returning the said cylinder to its normal position at the return stroke of the force-pump to dispense air to the receptacle.

2. The combination with a liquid-containing receptacle, and an outlet for the same, of a force-pump having rotatable connection with the interior of the receptacle, and an equalizing-pump also connected with the in-

terior of the receptacle, receiving air from the force-pump at its forcing stroke and dispensing air to said receptacle at the return stroke of said force-pump.

5 3. The combination with a receptacle, of an air-supply pipe having a horizontal member and a vertical member, the horizontal member being connected with the receptacle, a cylinder mounted to slide upon the vertical member of said air-supply pipe, a piston-head secured to the end of the air-supply pipe entering the cylinder, and a spring having bearing against the said piston-head and the opposing end of the cylinder.

15 4. The combination with a receptacle having an outlet, of an angular air-supply having a horizontal member and a vertical member, the horizontal member being removably connected with said receptacle and having communication with its interior, a finger-piece secured to the vertical member of the said air-supply pipe at its junction with the horizontal member, a cylinder held to slide upon said vertical member of the said air-supply pipe, a piston-head secured to the end of the vertical member of the air-supply pipe entering the said cylinder, and a spring within the cylinder, having bearing against the piston-head and opposing end of the cylinder.

30 5. The combination with a receptacle, of a tubular stopper therefor, closed at the top and open at the bottom, the said stopper being provided with an exterior annular groove and openings in the grooved portion of the stopper communicating with its interior, a band mounted to slide around the grooved portion of the stopper, an outlet-pipe extending from the said receptacle through the said stopper, an air-supply pipe connected with the said band, being likewise in communication with the said annular groove in the stopper, a cylinder mounted to slide on the said air-supply pipe, a piston-head secured to that portion of the air-supply pipe extending within the cylinder, a spring within the cylinder bearing against the piston-head and the opposing end of the cylinder, and a finger-grip carried by the said air-supply pipe, located opposite the head of the cylinder through which the air-supply pipe extends.

50 6. In an atomizer, the combination with a fluid-receiving receptacle, a tubular stopper for said receptacle, open at its bottom and

closed at its top, said stopper being provided with an exterior annular groove and openings 55 in the grooved portion of the stopper in communication with its interior, a spray-pipe extending from the interior of the said receptacle out through the said stopper, and a band mounted to turn around the said stopper at its grooved portion, covering the said groove, of an angular air-supply pipe, the horizontal member whereof is attached to the said band and is in communication with the said groove of the stopper, a cylinder mounted to slide upon the vertical member of the said air-supply pipe, a piston-head secured to the end portion of the vertical member of the said air-supply pipe within the said cylinder, and a spring bearing against the said piston-head and opposing end of the cylinder, a tube in communication with the interior of the stopper at its upper portion, extending upwardly therefrom, being open at the top and at the bottom, a cylinder mounted to slide on said tube, the open upper end of the tube being within the said cylinder, a piston-head secured to the upper end of the tube within the cylinder, and a spring having bearing against said head and opposing end of the cylinder, the cylinder and parts carried thereby connected with the air-supply pipe constituting a force-pump, and the cylinder operating upon the upright tube constituting an equalizing-pump for the purposes set 85 forth.

7. The combination with a liquid-containing receptacle, of a force-pump in communication with said receptacle, and an equalizing-pump receiving air from the force-pump at its forcing stroke and dispensing air to the receptacle at the return stroke of the force-pump, the said equalizing-pump comprising a tube connected with the receptacle, a cylinder mounted to slide on the said tube, the tube opening within the cylinder, a piston-head secured to the tube within the cylinder, and a spring having bearing against the said head and the opposing end of the cylinder.

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

FAIRLEIGH S. DICKINSON.

Witnesses:

J. FRED. ACKER,
JNO. M. RITTER.