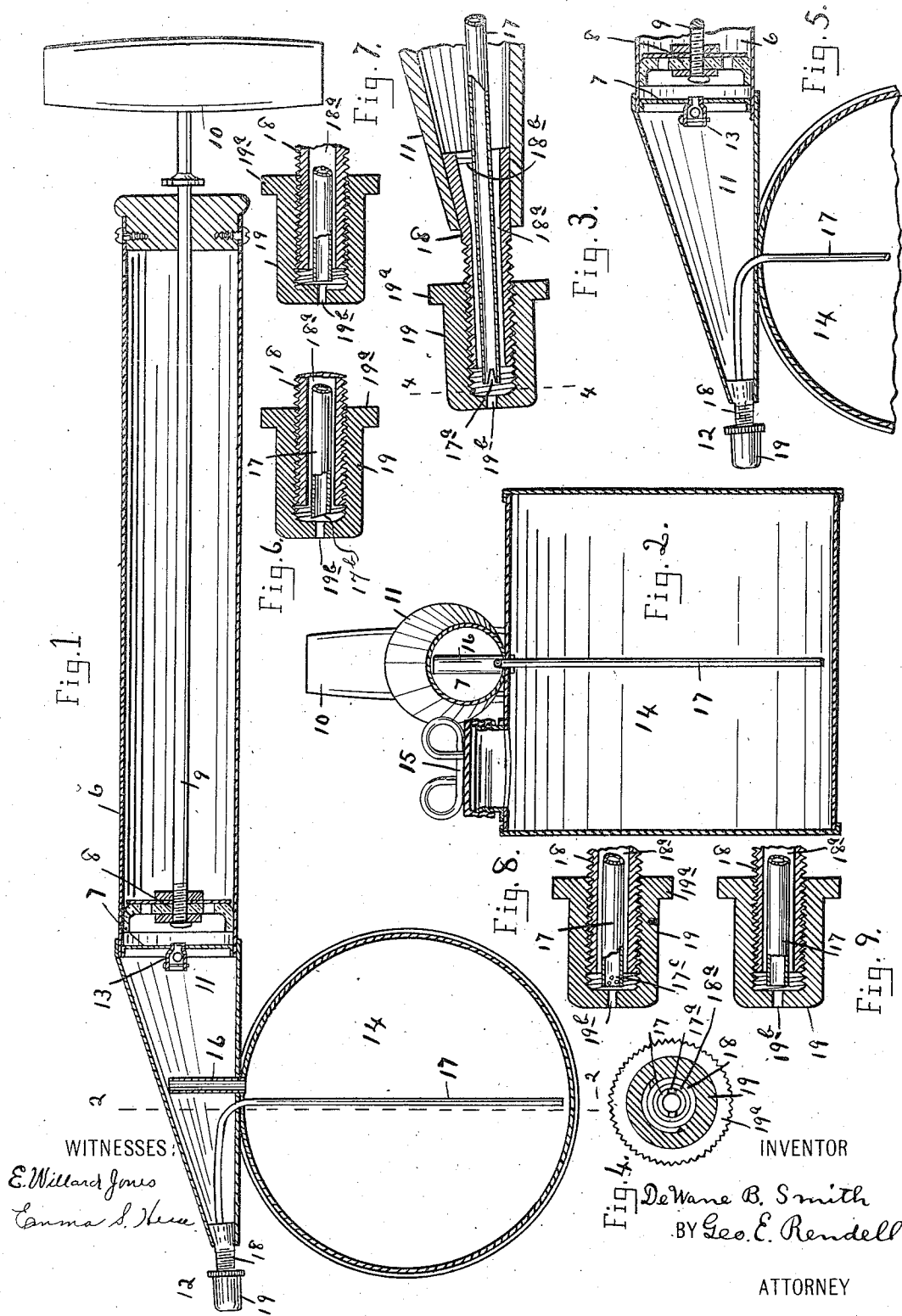


DE WANE B. SMITH.
 SPRAYER.
 APPLICATION FILED OCT. 15, 1909.

1,000,447.

Patented Aug. 15, 1911.



WITNESSES:

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DE WANE B. SMITH, OF DEERFIELD, NEW YORK.

SPRAYER.

1,000,447.

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To all whom it may concern:

Be it known that I, DE WANE B. SMITH, a resident of Deerfield, in the county of Oneida and State of New York, have invented certain new and useful Improvements in Sprayers; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the reference-numerals marked thereon, which form part of this specification.

The purpose of my present invention is to provide a hand sprayer of simple construction yet adapted to throw a continuous spray, and having means to easily regulate the fineness of the spray.

Figure 1. is a longitudinal sectional view. Fig. 2. is a perpendicular cross sectional view on line 2—2 of Fig. 1. Fig. 3. is a longitudinal sectional view of the nozzle and adjacent parts of the sprayer on an enlarged scale. Fig. 4. is a cross sectional view on line 4—4 Fig. 3. Fig. 5. is a longitudinal sectional view of the sprayer without air connection between the air chamber and liquid receptacle. Figs. 6, 7, 8 and 9 are longitudinal sectional views of modified forms of nozzle on an enlarged scale.

Referring to the drawing in a more particular description, 6 is the air compression cylinder having a cylinder head 7 at the end where the compression is made, and receiving the piston head 8 which is operated by the piston rod 9 and the handle 10. Beyond the cylinder head 7 there extends from the cylinder 6, the air chamber 11 preferably tapering toward its outer end in which is located the atomizing nozzle 12.

In the cylinder head 7, a ball valve 13 is placed adapted to allow air to be forced from the cylinder 6 into the air chamber 11 and to close and prevent the air from escaping back into the cylinder when the piston head 7 is withdrawn on its backward stroke.

Immediately below the air chamber 11 is placed the liquid receptacle 14 which may be of any desired shape but which I make preferably in the form of a cylinder hav-

ing its side toward the air chamber 11 and having its longitudinal axis at right angles to the longitudinal axis of the air chamber 11 and cylinder 6. For filling the liquid receptacle 14 there is an opening at its top to one side of the air chamber 11, having an air tight screw cap 15. There is a passage for air from the air chamber 11 to the liquid receptacle 14, preferably in the form of a tube 16 which extends upward nearly to the top of the air chamber. A tube 17 for the passage of the liquid extends from near the bottom of the liquid receptacle 14 upward through the top thereof into the air chamber 11 and then forward into the nozzle 12.

The nozzle 12 consists of a part 18 projecting from the tapering end of the air chamber 11 and threaded to receive the cap 19 which has a knurled flange 19^a to allow the cap to be easily screwed to desired position on the part 18. Through the part 18 is a hole 18^a large enough to allow the liquid tube 17 to extend therethrough and still have an air space between the tube 17 and the part 18 on all sides. Inward projections 18^b from the part 18 hold the tube centrally located in the hole 18^a. The tube 17 extends slightly beyond the part 18 and has cut into this projecting length slots 17^a. In the end of the cap 19 a hole 19^b is provided opposite the end of the fluid tube 17.

For operation the liquid receptacle 14 is filled and herein lies one of the advantages of my invention in providing a separate air chamber. Heretofore many sprayers have been constructed in which the top of the liquid receptacle has acted as the only air chamber, necessitating the partial filling only of the liquid receptacle and giving very uncertain and unsatisfactory spray at the beginning of operations and particularly if the receptacle had been too nearly filled. As the tube 16 extends upward some distance into the air chamber 11, the sprayer can be held at a considerable angle either way off of the horizontal without the liquid escaping into the air chamber even when the liquid receptacle is full.

In operating, a few strokes of the piston

causes air pressure enough to obtain a continuous spray which is thereafter easily maintained by little effort on the part of the operator. It is evident that as the air is compressed in the air chamber it operates in two ways upon the liquid; in one way, by the rush of air directly out of the air chamber 11 through the holes 18^a and 19^b, causing a suction upon the adjacent end of the liquid tube 17 after the manner of an ejector or the common atomizer; in the other way the air pressure is directed downward through the tube 16 upon the surface of the liquid and thereby forces the liquid out of the receptacle through the liquid tube 17. The relative quantity of air and liquid passing out and thereby the character of the spray is easily controlled by the operator adjusting the cap 19 nearer to or farther away from the end of the tube 17. The slots 17^a are of such size as to allow sufficient air to atomize the fluid, to mingle with the liquid in the nozzle even if the cap is screwed up tight to the end of the tube 17.

If for any purpose, very coarse spray is desired, the cap 19 can be entirely removed, giving freer escape to both air and liquid and resulting in a spray of appreciable drops.

A further modification shown in Fig. 5 is to dispense entirely with the air tube 16, resulting in the sprayer acting entirely by the force of the air at the blast opening and without the direct forcing pressure of the air upon the liquid. The presence of the air chamber still maintains a continuous spray.

I consider the form of nozzle having the slots 17^a in the liquid tube the preferable form of construction but do not wish to confine myself to that form but to cover any form allowing air from the hole 18^a to mingle with the liquid in controllable proportion proximate the blast opening.

Greater facility for escape of air from the air chamber controls the character of the spray by increasing the proportion of air to water absolutely in both forms of sprayer and also relatively in the form having an air connection between the air chamber and liquid receptacle by reason of the freer escape of air reducing the downward force of air upon the liquid and so forcing less liquid out through the liquid tube.

Fig. 6 shows the constant opening 17^b for mingling air with the liquid formed by having the end of tube 17 at an angle with the inner face of the cap 19; Fig. 7 shows the constant opening formed by having slots in the inner face of the cap extending from outside the end of the tube 17 to a point within.

Fig. 8 shows the constant opening formed by holes 17^c in the tube 17 near the nozzle end.

In all these forms a constant opening is formed admitting enough air to atomize the liquid even when the cap 19 is screwed up tight to the end of the tube 17 and more air can be admitted by slightly unscrewing the cap with the result before mentioned.

Fig. 9 shows a form of nozzle where no constant opening is provided but the amount of air is determined by unscrewing the cap the desired distance from the end of the tube 17.

It is evident that various other modifications in and from the form of construction herein shown may be made without departing from the spirit of my invention.

What I claim as new and desire to secure by Letters Patent is:

1. The combination in a sprayer of a cylinder having a head with a trap valve, a piston operating in the cylinder, an air chamber adjacent to the cylinder head, a liquid receptacle beneath said air chamber, a liquid tube leading from the lower part of said liquid receptacle, an air tube connecting the top of the liquid receptacle with the upper part of the air chamber, and a nozzle opening out of the air chamber and surrounding the end of the liquid tube with sufficient passage for air on all sides, substantially as set forth.

2. The combination in a sprayer of a cylinder having a head with a trap valve, a piston operating in the cylinder, an air chamber adjacent to the cylinder head, a liquid receptacle adjacent to the air chamber, a liquid tube extending from the lower part of the liquid receptacle and provided with slots in its outer end, a nozzle opening out of the air chamber and surrounding the end of the liquid tube with sufficient passage for air on all sides, and a cap in threaded engagement with said nozzle and having a hole in its head opposite the liquid tube, said cap being movable on said nozzle into and out of engagement with the slotted end of said liquid tube, substantially as set forth.

3. The combination in a sprayer of a cylinder having a head with a trap valve, a piston operating in the cylinder, an air chamber adjacent to the cylinder head, a liquid receptacle beneath said air chamber, a liquid tube extending from the lower part of said liquid receptacle and provided with slots in its outer end, an air tube connecting the top of the liquid receptacle with the upper part of the air chamber, a nozzle opening out of the air chamber and surrounding the end of the liquid tube with sufficient passage for air on all sides, and a cap

in threaded engagement with said nozzle
and having a hole in its head opposite the
liquid tube, said cap being movable on said
nozzle into and out of engagement with the
5 slotted end of said liquid tube, substantially
as set forth.

In witness whereof, I have affixed my sig-

nature in the presence of two witnesses, this
7th day of October, 1909.

DE WANE B. SMITH.

Witnesses:

EMMA S. HESSE,

E. EHRESMAN.

BEST AVAILABLE COPY