

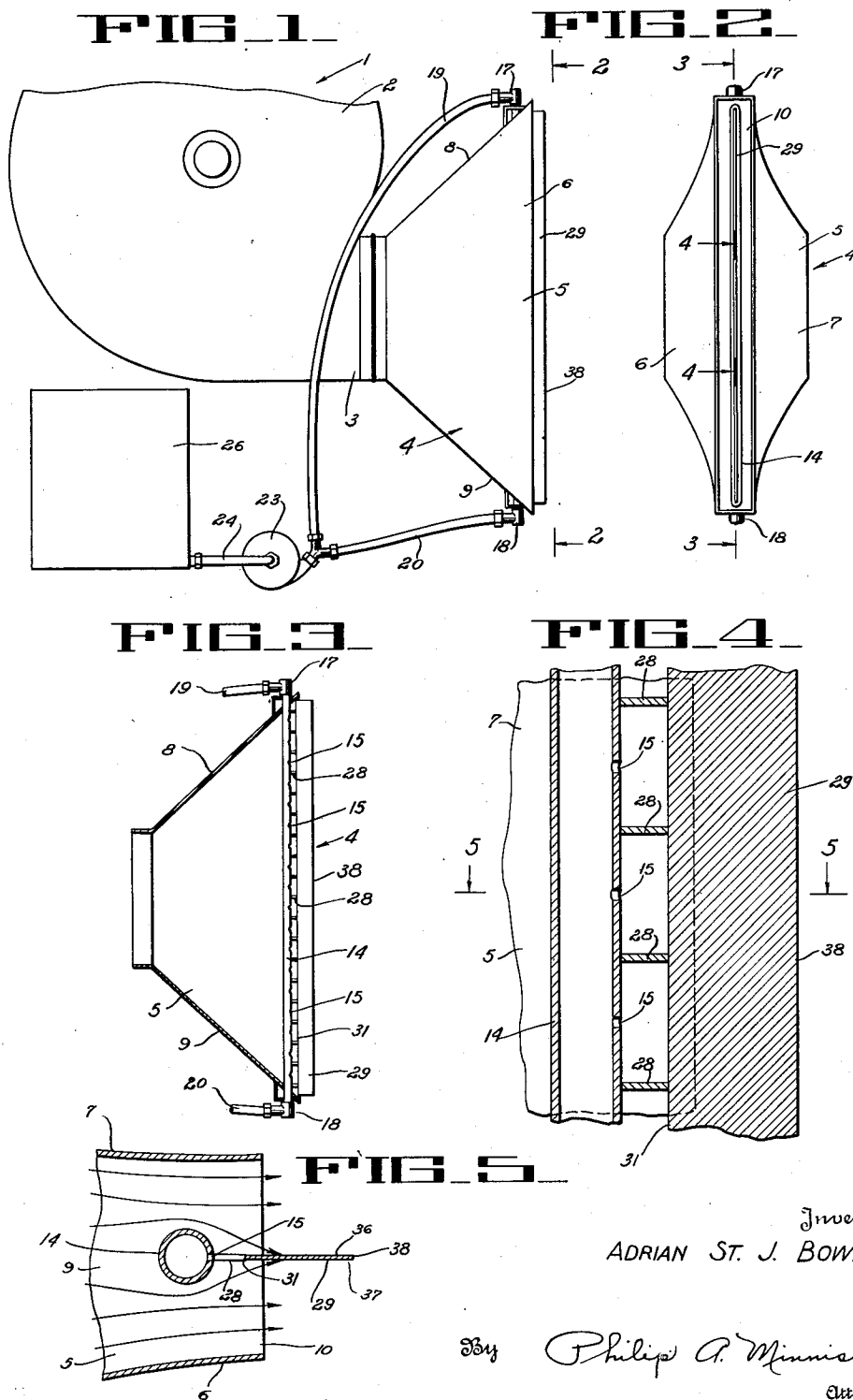
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APPARATUS FOR ATOMIZING LIQUID

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APPARATUS FOR ATOMIZING LIQUID

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The present invention appertains to an apparatus for discharging and atomizing liquids and relates more specifically to a device for atomizing liquid spray materials such as insecticides or the like and applying the same to the foliage of trees, brushes or other plants.

Other of the objects of the present invention is to provide an apparatus for effectively atomizing liquids within a blast of air without changing the direction of travel of the air.

Another object is to provide an apparatus for atomizing liquids with a minimum of waste or drip thereof.

Another object is to provide an apparatus for atomizing liquid spray material within a blast of air and for evenly distributing the atomized liquid throughout said blast of air.

Another object is to provide an apparatus for atomizing liquid in a blast of air exterior of the spray nozzle of the device.

Another object is to provide an apparatus for discharging and atomizing liquids which is of simple construction, non-clogging operation, and which may be easily cleaned.

Further objects and advantages of the present invention will become apparent from the following description and drawing, in which:

Fig. 1 is a side view of the atomizing apparatus of the present invention.

Fig. 2 is an end view of the spray nozzle structure of the atomizing apparatus of Fig. 1, the view being taken along lines 2-2 thereof.

Fig. 3 is a longitudinal section of the spray nozzle structure taken along lines 3-3 of Fig. 2.

Fig. 4 is an enlarged sectional view of a portion of Fig. 2 taken along lines 4-4 thereof.

Fig. 5 is a section of Fig. 4 taken along lines 5-5 thereof.

Referring now to the drawing, and especially to Fig. 1 thereof, 1 designates a blower structure of conventional construction, which includes a housing 2 provided with a discharge conduit 3 extending from the same and forming an integral part thereof. Secured to the conduit 3 is a spray nozzle structure 4 which comprises a casing 5 consisting of curved converging side walls 6 and 7 and diverging upper and lower end walls 8 and 9 forming an enlarged rectangular orifice 10 (see Fig. 2).

Mounted within the upper and lower walls and extending centrally through the casing 5 adjacent the orifice 10 substantially over the entire length of the same is a liquid supply pipe 14 provided with a plurality of liquid discharge openings 15 (see Figs. 3 and 4). The free ends

of the liquid supply pipe 14 extend through the upper and lower end walls 8 and 9 and are provided with pipe couplings 17 and 18 to which conduits 19 and 20, respectively, are connected. The conduits 19 and 20 may be preferably flexible hose members, the free ends of which are secured to a discharge outlet of a rotary pump 23. The pump 23 is further provided with an intake conduit 24 which is in communication with a liquid supply tank 26 adapted to contain spraying liquid such as insecticide, fungicide or the like.

Secured to the liquid supply pipe 14 by means of brackets 28 (see Figs. 3 and 4) is a liquid distributing plate 29, the outer end of which is unsupported for purposes referred to later on. This liquid distributing plate is arranged in spaced relation with respect to the liquid supply pipe 14 and extends parallel to the same substantially over the entire length of the orifice 10. The distributing plate 29 is so arranged and positioned with respect to the casing 5 of the spray nozzle structure adjacent the orifice 10 that it extends only a slight distance into the same.

The inner edge 31 of the plate 29 is positioned opposite the discharge openings 15 in spaced relation thereto. The plate 29 is preferably made from thin sheet metal or the like and may be either rigid or flexible, as desired. If a flexible liquid-distributing plate is preferred, the same may be made from rubber or other non-metallic flexible material.

From the above it will therefore be seen that upon operation of the blower 1 and pump 23, by an engine or other suitable source of motive power, not shown, a blast of air is forced through the casing 5 of the nozzle structure 4 past the pipe 14 and plate 29 and is discharged from the orifice 10, while at the same time the spraying liquid is delivered from the supply tank 26 under pressure to the liquid supply pipe 14 and discharged from the openings 15 thereof in fine jets against the distributing plate 29. The inner end 31 of the plate 29 divides each jet of spraying liquid so that the liquid is directed along the sides 36 and 37 of the plate 29 and toward the outer end 38 of the same and adheres to the sides 36 and 37 of said plate. Due to the curved configuration of the side walls 6 and 7 of the nozzle casing 5 and the turbulence of the air caused during the travel of the same past the liquid supply pipe 14, as illustrated in Fig. 5, the air discharging from the orifice 10 will strike the sides 36 and 37 of the plate 29 and impinge upon the spraying liquid adhering to the same, so that the liquid is spread out over the side surfaces of

the plate in vertical and horizontal directions, i. e., over the entire surfaces of the sides 36 and 37 of the plate 29, in a fine film and is driven by the air blast toward the end 38 of the plate 29 from which it is discharged into the blast of air in front of the orifice 10, whereby the liquid is dispersed and atomized into a fine fog or mist, which is thereupon efficiently mixed with the blast of air and carried along with the same. Due to the fact that the plate 29 extends substantially over the entire length of the orifice 10 and the liquid is evenly distributed over the side walls of the plate 29 prior to the atomization thereof an even and fine distribution of the atomized liquid throughout the blast of air discharging from the orifice 10 is obtained, so that the fog or mist of spray material is carried for a considerable distance from the machine and substantial areas of foliage may be thoroughly treated with the apparatus of the present invention.

By varying the force of the air blast or pressure of the liquid within pipe 14, or both, the degree of atomization of the liquid may be controlled in any desired manner.

If desired, the liquid distributing plate may be made from thin flexible sheet metal or any other suitable flexible material, such as rubber or the like, so that the free end 38 thereof may vibrate within the blast of air due to the turbulence thereof or the vibrations of the blower 1 and engine transmitted to the distributing plate. In such case, the vibratory movement of the free end of the distributing plate 29 assists in the atomization of the liquid and the distribution of the atomized liquid throughout the blast of air discharging from the orifice 10.

In view of the fine and even distribution of the spray material over the side surfaces of the plate 29 the device of the present invention is capable of atomizing of all kinds of spraying liquids and permits a very effective atomization even of insecticides of considerable consistency without drip or waste thereof. The simple construction of the atomizing mechanism renders all parts thereof readily accessible, so that they may be easily cleaned.

The simplicity of the structure of the atomizing mechanism prevents clogging thereof, especially if insecticides with an oily base are employed.

It should further be noted that in view of the extension of the pipe 14 and the distributing plate 29 substantially over the entire length of the orifice 10, an effective atomization of the spray material over the entire length of an elongated discharge orifice is obtained without the necessity of employing a complicated mechanism to effect such atomization and distribution of the atomized material throughout the blast of air discharged from the machine.

I desire it to be understood that the present invention is not limited to the particular application or precise details of construction illustrated, but that various applications, modifications, and variations may be resorted to without departing from the spirit and scope of the invention, and I deem myself entitled to all such applications, modifications, and variations as come within the scope of the appended claims.

Having thus described my invention, what I claim to be new and desire to protect by Letters Patent is:

1. In a spray nozzle, liquid supply means, a plate adjacent the liquid supply means, said liquid supply means having a discharge outlet so disposed in the plane of said plate as to discharge liquid onto the rear edge of the plate, and means for directing a stream of air past said plate, the rear edge of said plate being so shaped that the air will spread the liquid over the side surfaces of the plate and atomize the liquid as it leaves the front edge of the plate.

2. In a spray nozzle, liquid supply means, a thin resiliently flexible plate adjacent the liquid supply means, said supply means having a discharge outlet so disposed in the plane of said plate as to discharge liquid onto the rear edge of the plate, and means for directing a stream of air past said plate, the rear edge of said plate being so shaped that the air will spread the liquid over the side surfaces of the plate while vibrating the forward edge of the plate to atomize the liquid as it leaves the same.

3. In a spray nozzle, a thin, flat resiliently flexible plate, supply means for discharging liquid onto the rear edge of the plate, supporting means mounting the rear edge of the plate adjacent the supply means, said supporting means being attached to the rear edge of said plate leaving the remainder of the plate free to flex, and means for directing a stream of air past said plate in the direction of the plane thereof, the rear edge of said plate being so shaped that the air will spread the liquid over the side surfaces of the plate, said air serving to vibrate the forward free edge of the plate to atomize the liquid as it leaves said free edge thereof.

4. In a spray nozzle, an air conduit for discharging a stream of air, liquid supply means adjacent said conduit and within the stream of air, and a plate adjacent the liquid supply means, said liquid supply means having a liquid discharge outlet so disposed in the plane of said plate as to discharge liquid onto the rear edge of the plate, the rear edge of said plate being so shaped that the stream of air spreads the liquid over the side surfaces of the plate and atomizes the liquid as it leaves the forward edge of the plate.

5. In a spray nozzle, an air conduit having a discharge opening for discharging a stream of air, liquid supply means within said conduit adjacent the discharge opening thereof, and a flat plate adjacent the liquid supply means extending beyond the discharge opening of the conduit, said liquid supply means having a liquid discharge outlet directed toward the discharge opening of the conduit in the plane of said plate for discharging liquid onto the rear edge of the plate adjacent the opening, the rear edge of said plate being so shaped that the stream of air discharging from the conduit spreads the liquid in a film over the side surfaces of the plate and atomizes the liquid as it leaves the forward edge of the plate.

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