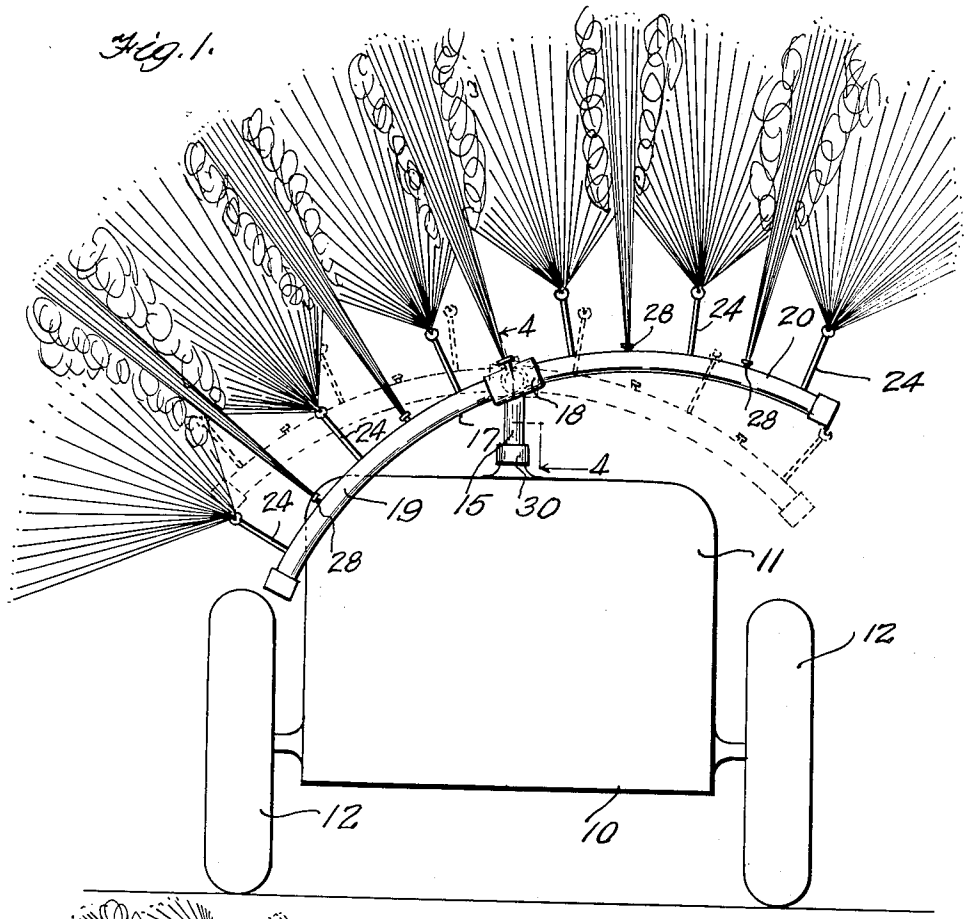
July 10, 1956 H. J. WILLIAMSON 2,754,151

SPRAY NOZZLE ASSEMBLY

Filed April 23, 1954

2 Sheets-Sheet 1

Fig. 1.



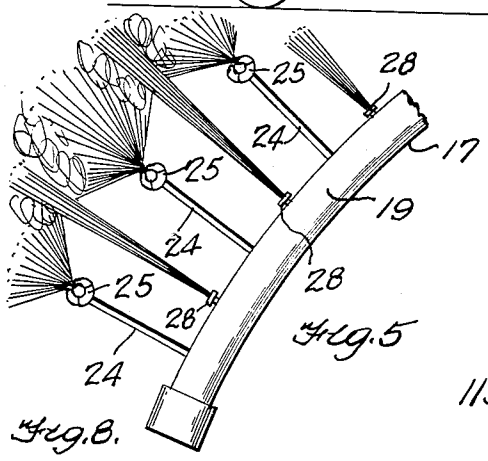


Fig. 5

Fig. 8.

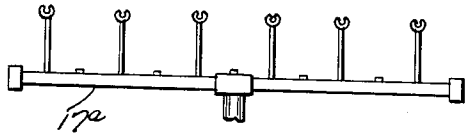


Fig. 8a

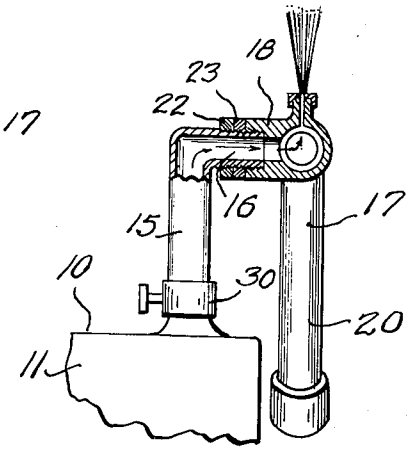


Fig. 4.

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July 10, 1956 H. J. WILLIAMSON 2,754,151

SPRAY NOZZLE ASSEMBLY

Filed April 23, 1954 2 Sheets-Sheet 2

Fig. 2.

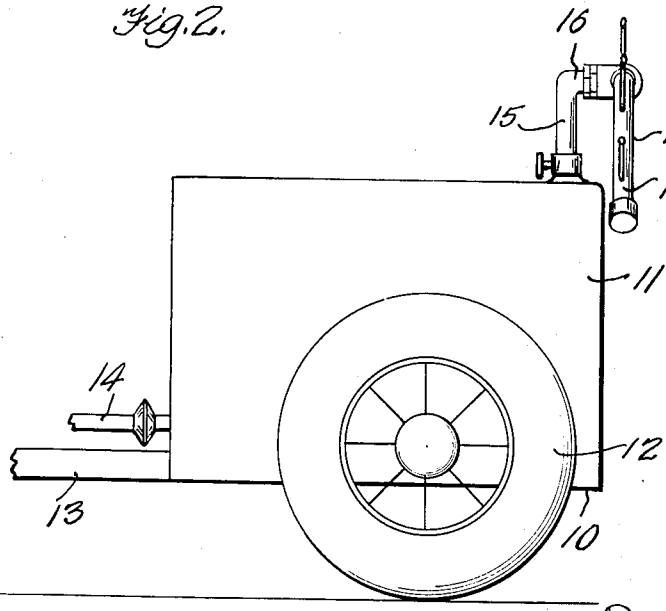


Fig. 6.

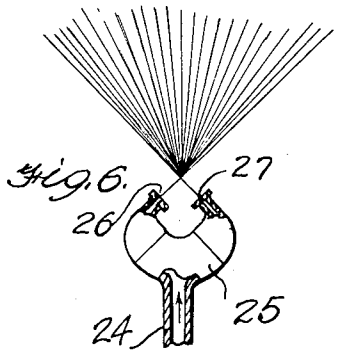


Fig. 7.

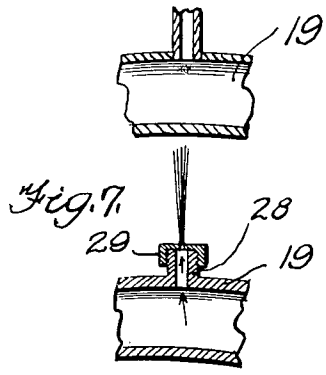
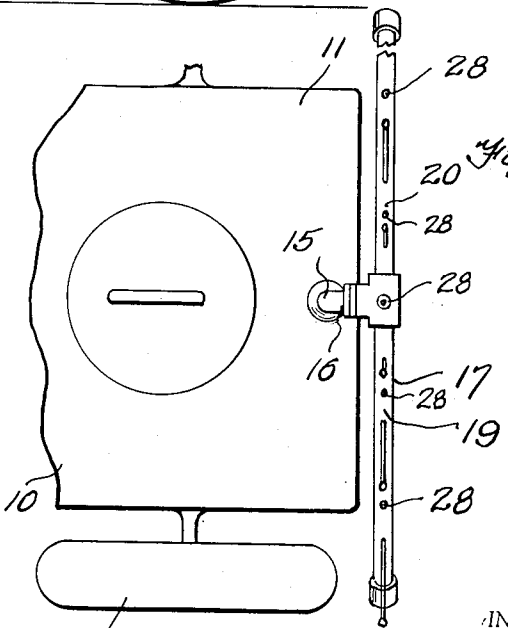


Fig. 3.



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2,754,151

SPRAY NOZZLE ASSEMBLY

Herbert Joseph Williamson, Burlingame, Calif.

Application April 23, 1954, Serial No. 425,256

5 Claims. (Cl. 299—39)

This invention relates to a spray nozzle assembly and has for one of its objects the production of a simple and efficient nozzle for discharging fogged streams of liquid from atomizing or fogging types of spray heads and intercepting these fogged liquid streams by relatively straight jetted streams of liquid to produce a far-reaching effect upon the fogged streams of liquid.

A further object of this invention is the production of a simple and efficient spray nozzle having spaced outwardly opening fog forming spray heads, between which are located jet forming orifices or nozzles to produce a venturi effect by intercepting fogged streams of liquid with relatively straight jetted streams of liquid, the nozzle being mounted upon a substantially horizontal axis to facilitate the vertical rotation of the nozzle to an adjusted position and to thereby selectively regulate the direction of discharge of streams of fluid from the nozzle, such for instance, from a relatively vertical direction to a relatively lateral direction.

Other objects and advantages of the present invention will appear throughout the following specification and claims.

In the drawings:

Figure 1 is a rear elevational view of the apparatus;

Figure 2 is a side elevational view thereof;

Figure 3 is a fragmentary top plan view of the apparatus;

Figure 4 is an enlarged vertical sectional view taken on line 4—4 of Figure 1, the tank of the vehicle being shown in fragmentary elevation;

Figure 5 is a fragmentary side elevational view of the nozzle;

Figure 6 is a fragmentary vertical sectional view of one of the fog-forming spray heads, a portion of the nozzle pipe being shown in section;

Figure 7 is a fragmentary vertical sectional view of the nozzle pipe, illustrating one of the jet forming orifices;

Figure 8 is a rear elevational view of a modified form of nozzle element.

This application is a continuation in part of my application filed March 10, 1952, Serial Number 275,730, now abandoned, relating to Spray Nozzle Assembly.

By referring to the drawings, it will be seen that 10 designates the vehicle which preferably comprises a tank 11 mounted upon wheels 12 to facilitate transportation of the apparatus. A draft bar 13 is preferably carried by the vehicle 10 for connection with a powered towing apparatus. A shaft 14 is carried by the vehicle for connection with a pressure actuating and producing means of a conventional type to maintain pressure upon the liquid within the tank 11.

The tank 11 is provided with an outlet or discharge element 15, which preferably extends vertically from the tank 11 near the rear end thereof. This discharge element is provided with a rearward and horizontally extending neck 16 which constitutes a substantial horizontal axis for the nozzle element 17. This nozzle element 17 comprises a substantially T-shaped union 18 which is threaded upon the horizontally extending neck 16 and communicates with the hollow discharge element 15 of the tank 11. The union 18 carries the laterally extending arc-shaped nozzle pipes 19 and 20 which project upon opposite sides of the union 18. These pipes 19 and 20 are preferably arched upwardly, as shown in Figure 1. Lock nuts 22 and 23 are threaded upon the neck 16 and are adapted to provide abutting friction gripping action against the union 18 to lock the nozzle element 17 in a selected adjusted position after the element 17 has been manually rotated upon its horizontal axis which is provided by the neck 16. In this way the nozzle element 17 may be firmly held in an adjusted position after being manually swung from the dotted position shown in Figure 1 to the full line position in said figure. The nozzle element 17 may be manually rotated about its horizontal axis, the neck 16, to any desired or selected position, and may then be locked in this position by means of the lock nuts 22 and 23, or by means of any suitable or convenient locking means within the spirit of the invention.

The pipes 19 and 20 of the nozzle element 17, each carry upwardly or outwardly discharging protruding hollow outlet stems 24 and each stem 24 carries a suitable fog-forming spray head 25. These stems 24 are spaced along the length of the nozzle element 17, as shown and the heads 25 are supported in outward spaced relation relative to the pipes 19 and 20 to discharge fogged streams of liquid at a spaced distance outwardly with respect to the nozzle element 17. Each head 25 is provided with inturned discharge or inwardly facing closely arranged openings 26 and 27, which discharge cross streams of liquid at angles of about 45°, thereby producing a fog-like spray. Jet-forming orifices 28 which discharge fluids upwardly and outwardly are carried by each pipe 19 and 20, and each orifice carries an outwardly perforated cap 29 for discharging a straight stream of liquid outwardly of the nozzle 17. These orifices 28 are located intermediate the stems 24, and the caps 29 are carried close to the pipes 19 and 20, whereas the heads 25 are located outwardly beyond the caps 29. The discharge element 15 preferably carries a control valve 30 to cut off the supply of liquid through the element 15, from the tank 11 when the apparatus is not in use.

When the valve 30 is opened and the apparatus is operating, after the nozzle 17 has been adjusted and locked in a selected position, the fluid under pressure from the tank 11 is discharged outwardly from the aligned fog-forming heads 25 in a fan-like formation at a spaced distance from the nozzle 17. Fluid under pressure is also discharged outwardly from the orifices 28 to produce a venturi effect, the straight jetted streams of liquid from the orifices 28 intercepting the fogged streams of liquid in the manner shown in Figures 1 and 5, to define a far reaching agitated fog mass projected in a selected direction, and in a continuous bank throughout the length of the nozzle 17 in a substantially vertical plane in an upwardly and outwardly direction.

It will be noted that the fogged streams of liquid are discharged outwardly from the aligned spray heads 25, which heads 25 are spaced outwardly from the nozzle element 17 so as to discharge radiating or substantially parallel fan-shaped streams of fog-like liquid outwardly beyond the nozzle element 17. The aligned jet orifices 28 are located at spaced intervals between the stems 24 of the aligned fog-forming spray heads 25 and are carried close to the nozzle element 17, as shown in detail in Figure 5. The jet orifices 28 discharge relatively fine jet streams of liquid outwardly from a point inwardly of the location of the fog-forming spray heads 25 so that these jet streams intercept the junction of the fan-shaped fog-like streams of liquid discharged from the

heads 25 in the manner shown in Figure 5, thereby causing the edges of the fan-shaped streams to swirl inwardly toward center of the fan-shaped streams in the manner also shown in Figure 5 and to propel and disseminate the fog-mass outwardly with added impetus. The nozzle element 17 as stated may be rotated on its horizontal axis so as to direct the fog-mass in a direction from one side of the vehicle 10 and upwardly as shown in Figure 1, so as to cover trees, bushes and other vegetation to be treated. The vehicle 10 may pass down between a row of trees, bushes and other vegetation, and the fog-mass may be selectively directed to a desired area due to the fact that the hollow nozzle element 25 is rotatable on a horizontal axis and may be vertically swung upon this axis to direct the fog-mass at a desired angle with respect to the vehicle 10. The outer ends of the pipes 19 and 20 are provided with clean-out caps, as shown.

As shown in Figure 8, the nozzle element may be of a straight construction as indicated at 17^a within the spirit of the invention, although it is preferable to construct the same on the arc of a circle, as shown in Figure 1. It should be further understood that certain detail changes may be made in the construction and arrangement of parts, so long as such changes fall within the scope of the appended claims. Any type of spraying liquid may be used within the spirit of the invention.

Having described the invention, what is claimed as new is:

1. A device of the class described comprising a support, a hollow nozzle element mounted for vertical rotation upon a substantially horizontal axis upon said support, said element having laterally extending nozzle pipes, closely arranged upwardly and outwardly discharging inturned fog-forming spray means carried by and communicating with said pipes and spaced outwardly of said pipes for discharging a plurality of fan-shaped streams of liquid outwardly beyond said pipes, and upwardly and outwardly discharging jet orifices carried by said nozzle element, adapted to discharge relatively narrow jetted streams of liquid lying close to said pipes and located intermediate the fog-forming spray means and inset relative to the location of said fog-forming spray means for intercepting said fan-shaped streams of liquid at the point of junction of said fan-shaped streams of liquid to co-mingle therewith and to further propel said liquid outwardly in a fog-like mass in a selected direction and to thereby discharge a substantially vertical continuous bank of fog mass from said nozzle element throughout the length thereof in an upwardly and outwardly direction.

2. A device as defined in claim 1, wherein said hollow nozzle element is mounted upon a liquid containing body adapted to contain liquid under pressure, and wherein said horizontal axis constitutes a liquid communicating means between said nozzle and said liquid containing body.

3. A device as defined in claim 1, wherein said horizontal axis comprises a horizontally extending hollow portion, a union carried by said nozzle element and rotatably mounting said nozzle element upon said hollow portion to facilitate the rotation of said nozzle element in a vertical plane upon said horizontally extending member to change the vertical angle or discharge from said nozzle element.

4. A device as defined in claim 3, with the addition that a locking means is carried by said union and engages said support for locking said nozzle element in a selected vertical angular position upon said horizontal axis.

5. A device of the class described comprising a body adapted to contain liquid under pressure, a hollow nozzle element, having a hollow journal and laterally extending nozzle pipes extending therefrom, a nozzle element supporting member carried by and communicating with said body and nozzle element, said supporting member having a horizontally extending portion upon which said hollow journal of said nozzle element is rotatably mounted, said nozzle element being adapted to be rotated in a vertical plane upon said hollow journal to direct discharge of liquid under pressure from said nozzle element in a selected direction, a plurality of upwardly extending aligned fog-forming spray heads supported at spaced intervals upon said nozzle element and communicating therewith, said heads being spaced outwardly of said nozzle element, said nozzle element having a plurality of upwardly discharging aligned spaced orifices, one orifice being located between the respective spray heads and lying close to said nozzle element in inset relation to said heads, and said orifices being adapted to discharge straight jetted streams of liquid outwardly to intercept the junction of fogged streams of liquid discharged from said fog-forming spray heads and to thereby discharge a continuous bank of fog mass from said nozzle element throughout the length thereof.

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