Aug. 11, 1959 H. J. WILLIAMSON 2,899,138

SPRAY NOZZLE ASSEMBLY

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Fig. 1.

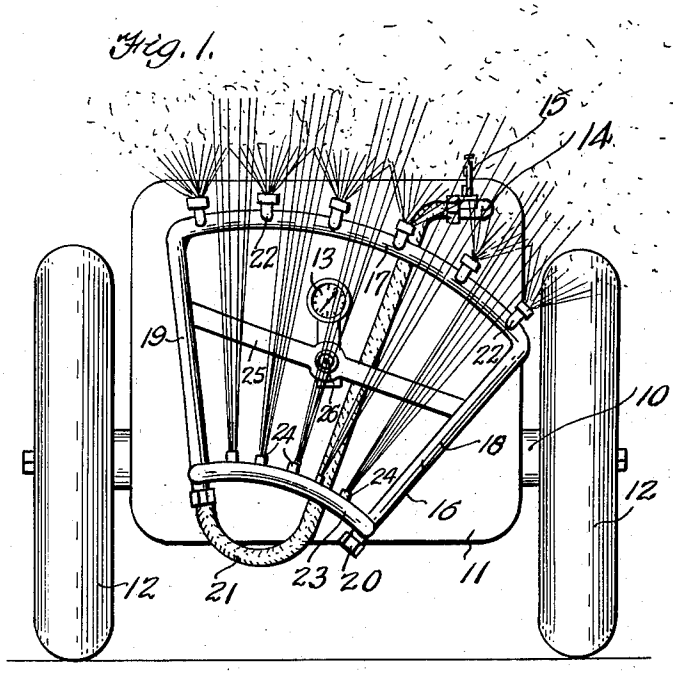


Fig. 2.

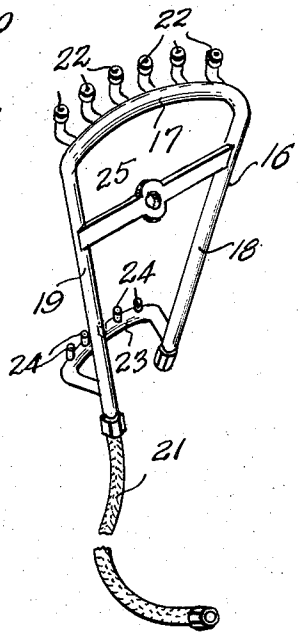
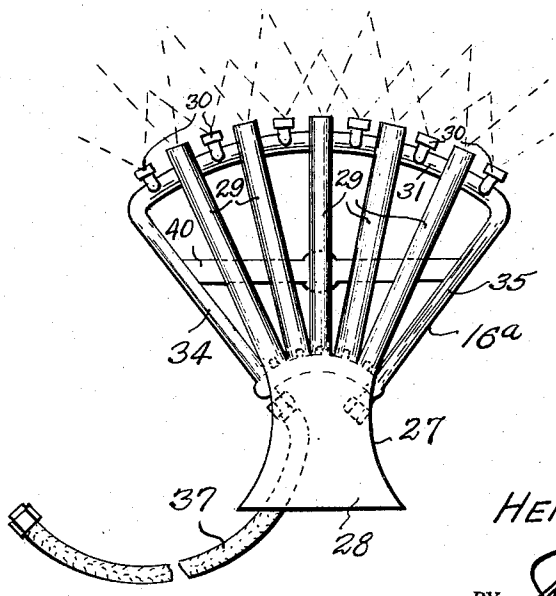


Fig. 3.



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Fig. 4.

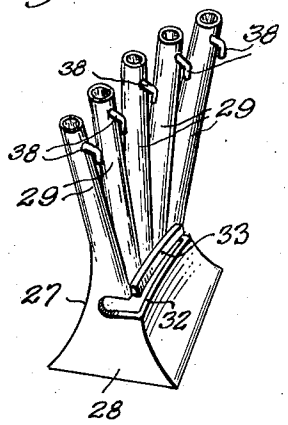


Fig. 5.

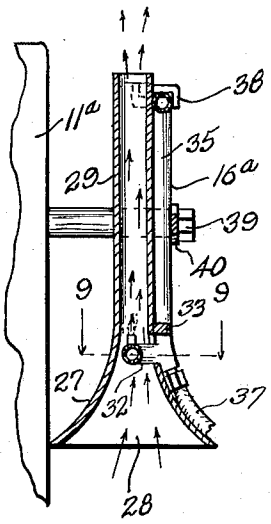


Fig. 6.

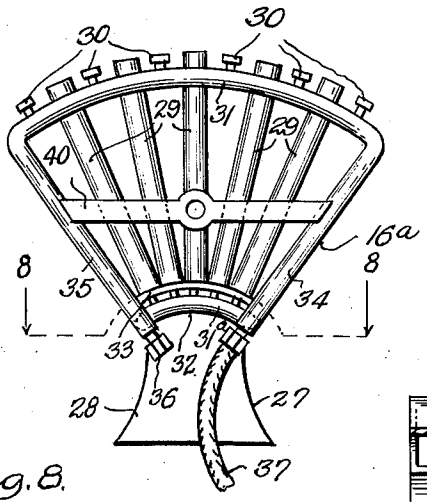


Fig. 7.

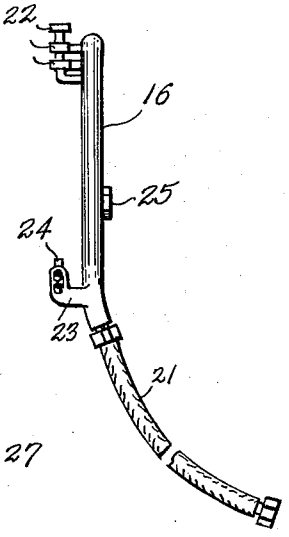


Fig. 8.

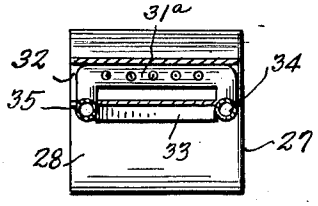
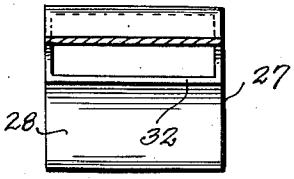


Fig. 9.



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SPRAY NOZZLE ASSEMBLY

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Application May 8, 1957, Serial No. 657,869

4 Claims. (Cl. 239—77)

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 mounting for the spray nozzle assembly for detachably and rotatably securing the spray nozzle assembly upon a supporting tank, in a manner to eliminate protruding elements beyond the area of the supporting tank, so as to protect the fogging nozzles, pipes and the like, from injury and the danger of throwing these vulnerable elements out of alignment which would result from the striking of these elements by tree limbs and other obstructions.

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 a mobile spraying tank showing the improved spray nozzle assembly mounted in position thereon;

Figure 2 is a perspective view of the spray nozzle in a dismounted position;

Figure 3 is a rear elevational view of the spray nozzle in association with a specially designed air funnel;

Figure 4 is a perspective view of the air funnel;

Figure 5 is a central vertical sectional view of the air funnel, the nozzle, with a portion of the supporting tank in elevation;

Figure 6 is an elevational view of the air nozzle in association with the air funnel, looking at the reverse side from that shown in Figure 3;

Figure 7 is a side elevational view of the spray nozzle;

Figure 8 is a horizontal sectional view taken on line 8—8 of Figure 6;

Figure 9 is a horizontal sectional view taken on line 9—9 of Figure 5.

By referring to the drawings in detail, it will be seen that **10** designates the mobile vehicle which preferably comprises a tank **11** mounted upon wheels **12** to facilitate transportation of the apparatus. A suitable pressure gauge **13** is carried by the tank, and a control valve **14** is also carried by the tank **11**, preferably near the top thereof, as is shown in Figure 1. A remote control actuating means **15** preferably actuates the valve **14** and may be actuated by an operator.

A spray element **16** is carried at the rear end of the tank **11**, and preferably defines a fan-shaped frame formed of hollow pipe or tubing. The spray element comprises an upper arched shaped tube **17** having depending converging side tubes **18** and **19**. A clean-out cap **20** normally closes the lower end of the side tube **18**, and a flexible tube or hose **21** is connected to the lower end of the side tube **19**. This side tube **19** is also connected at its opposite end to the control valve **14** to supply pressure to the spray element. Rearwardly off-set fogging nozzles **22** are carried in spaced relation upon the upper arched-shaped tube **17** and have their upper discharge ends facing upwardly, as shown. A rearwardly off-set spray jet tube **23** spans the distance between the lower ends of the side tubes **18** and **19** and carries a plurality of jet nozzles **24** arranged in lateral spaced relation with respect to each other and in staggered relation with respect to the upper fogging nozzles **22**. The jet nozzles **24** are spaced for a considerable distance below the fogging nozzles. The fogging nozzles **22** discharge fan-shaped streams of fog in the manner shown in Figure 1, when fluid under pressure passes through the spray element **16**. At the same time jet streams of fluid are discharged upwardly from the lower jets **24**, and between the fogging nozzles **22**. The jet streams from the jets **24** intercept the fog discharged from the fogging nozzles **22** in the manner shown in Figure 1 to define a far-reaching agitated fog mass projected in a selected direction, and in a bank throughout the width of the spray element **16** in a substantially vertical plane in an upwardly and outwardly direction. Fluid under pressure by being simultaneously discharged from the nozzles **22** and the jets **24** produces a mixing effect.

A transverse hub bracket **25** is carried by the spray element **16**, and the ends of the bracket **25** are preferably connected to the respective side tubes **18** and **19**. A journal bolt **26** constitutes a horizontal axis to connect the spray element **16** through the medium of the bracket **25** to the tank **11**. This bolt **26** is adapted to be adjusted to hold the spray element **16** in a selected adjusted position to discharge a fog spray in a selected and desired direction. It will be noted, by considering Figure 1, that the entire spray element **16** is contained within the area of the rear end of the mobile vehicle, thereby shielding the fogging nozzles, pipes, and the like, of the spray element **16** from injury and the danger of throwing these vulnerable portions out of alignment, which would result from the striking of these portions by tree limbs and other obstructions.

The mounting structure above described, eliminates an expensive rotary water-tight joint in a supply line or pipe, and permits the use of a flexible hose. The mounting of the spray element **16** upon the bolt **26** permits the whole nozzle assembly to be rotated from a centrally located horizontal axis. Furthermore, the mounting of the whole nozzle assembly, as shown, protects the structure at all times against injury from passing objects, and provides a compact structure of simple design which is easy to install and which may be produced economically. The placing of the jet nozzles **22** below the fogging nozzles **24** for a considerable distance, within a comparative area, produces greater air turbulence and force to carry the fogged liquid outwardly, than might otherwise be produced.

As is shown in Figures 3 to 6, and Figures 8 and 9, an air funnel **27** may be used with the spray element **16a**. The element **16a** is of a similar construction to the spray element **16**. In this form of the invention, the air funnel **27** comprises a hollow cone-shaped base **28**, which is provided with a plurality of upwardly extending hollow tubes **29**. These tubes **29** are secured to the hollow funnel or cone-shaped base and flare outwardly toward their upper ends in fan-shaped spaced relation. The upper ends of the tubes **29** extend between the rearwardly off-set fogging nozzles **30** which are carried by the upper arched-shaped tube **31** of the spray element **16a**, as is shown in Figures 3 and 6. The discharge outer ends of the tubes **29** are in substantial transverse alignment with the discharge outer ends of the fogging nozzles **30**. The rearwardly off-set spray jet tube **31a** of the spray element **16a** extends through the transverse notch **32** in

one side of the air funnel **27** near the junction of the tubes **29** with the base **28**. A protruding abutment bar **33** is carried just above the notch **32** and terminates short of the ends of the notch **32**. The side tubes **34** and **35** abut against the ends of the bar **33** to hold the funnel **27** against lateral swing relative to the spraying element. The side tube **35** carries a clean-out plug **36** at its lower end and the side tube **34** is secured at its lower end to a flexible hose or tube **37** which leads to a supply tank **11**[a] similar to the supply tank **11**, shown in Figure 1. Each tube **29** carries a hook **38** near its upper end to overhang the upper arched-shaped tube **31** of the spray element **16**[a], thereby anchoring the upper ends of the tubes **29** firmly in position between the fogging nozzles **30**. The spray element **16**[a] is mounted upon the tank **11**[a] by means of a horizontal journal bolt **39** which engages a hub bracket **40** similar to the horizontal journal bolt **26** shown in Figure 1, to facilitate rotatable positionable adjustment of the spray element **16**[a] upon the tank **11**[a]. The entire spray nozzle assembly is mounted within the transverse area of the mobile support in a manner similar to that shown in Figure 1. As is shown in Figure 5, the cone-shaped base **28** abuts against the tank or support **11**[a] to brace the base **28** when it is mounted in position.

The above-described air funnel **27** creates a very efficient venturi since the jet streams from the jets **24** are carried through the tubes **29** and discharged at the outer ends of the tubes intermediate the fogging nozzles **22** and in substantially transverse alignment therewith so that the streams from the fogging nozzles **22** and the jets **24** commingle in close proximity to the discharge openings. This funnel **27** produces a controlled air force or draft to join the jetted stream of liquid to forcefully carry the combined fogged liquid from the nozzles outwardly. Any suitable fogging nozzles may be used for the nozzles **22** within the scope of the invention. The funnel or diverging base **28** provides a relatively wide air entrance opening at the lower end of the funnel **27** to facilitate an up-draft through the tubes **29**. The funnel is detachable for easy removal and placement to suit the desire of the operator and to accomplish the best results.

It should be noted that the spray nozzle assembly, because of the structure herein described will discharge a substantially vertical continuous bank of fog mass from the nozzles and jets throughout the length of the upper tube **17** in an upwardly and outwardly direction.

It should be understood that certain detail changes in the mechanical structure may be made without departing from the spirit of the invention, so long as such changes fall within the scope of the appended claims.

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

1. A device of the class described comprising a support, a spray element mounted for vertical rotation on a substantially horizontal axis upon said support, said spray element defining a substantially fan-shaped frame mounted exteriorly of said support and movable within the exterior area of said support to shield the frame when rotated upon said support, said frame comprising an upper arched-shaped tube having depending converging side tubes suspending a spray jet tube below said upper arched-shaped tube, a hub bracket connecting said side tubes and engaging said horizontal axis, said tubes having discharge nozzles arranged for a mixing discharge of fluid passing through said tubes, said support including a tank containing a spraying fluid, and flexible means connecting said tank to said spray element for supplying fluid to said spray element.

2. In combination with a substantially fan-shaped spray element having an upper series of radiating fogging nozzles and a lower series of radiating jets; and an air funnel; said fogging nozzles being carried by an arched-shaped tube, and said jets being carried by a spray jet tube located below said arched-shaped tube, said air funnel comprising a hollow base having a plurality of upwardly extending hollow tubes, said base having a transverse notch for receiving said spray jet tube, said upwardly extending hollow tubes of said air funnel having their upper discharge ends fitting between said fogging nozzles of said arched-shaped tube, and hooks carried by said upwardly extending hollow tubes overhanging said arched-shaped tube for anchoring the upper ends of said upwardly extending hollow tubes upon said arched-shaped tube to firmly support said air funnel upon said spray element, said notch receiving said spray jet tube to anchor said hollow base in position, and said hooks engaging said arched-shaped tube to anchor the upper einds of said upwardly extending hollow tubes of said funnel in position.

3. The structure as defined in claim 2, wherein said hollow base is diverging and abuts against said support to brace the base.

4. The structure as defined in claim 2, wherein said spray element is provided with side tubes, and a protruding bar is carried by said base above said notch and terminates short of the ends of said notch, and the ends of said bar abut said side tubes to hold said funnel against lateral movement relative to said spray element.

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