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F. W. FUNKE

2,263,405

SPRAY NOZZLE TIP

Filed April 29, 1941

Fig. 1.

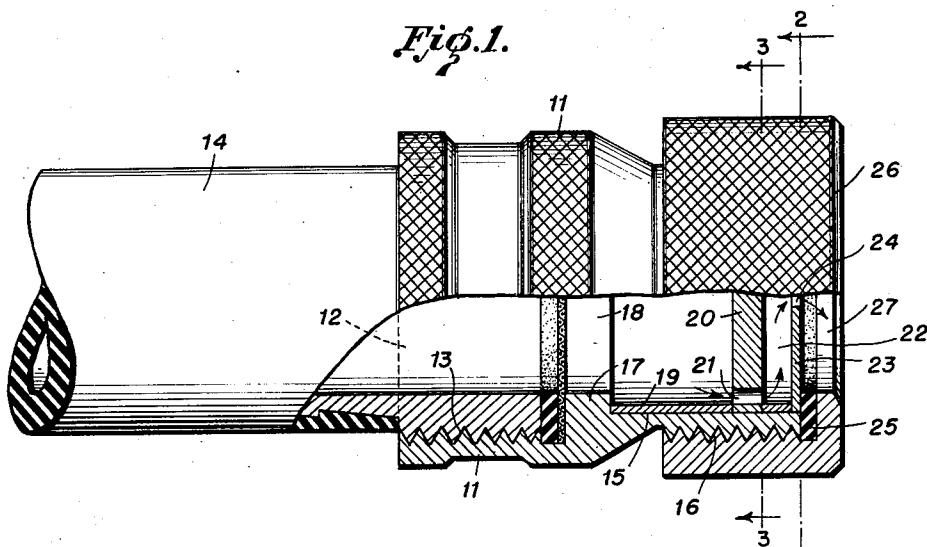


Fig. 2.

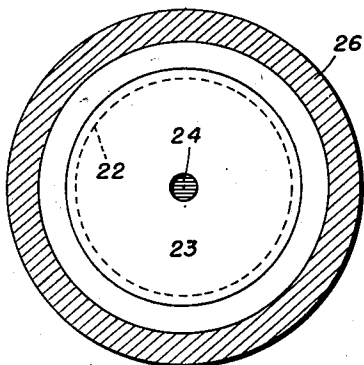


Fig. 3.

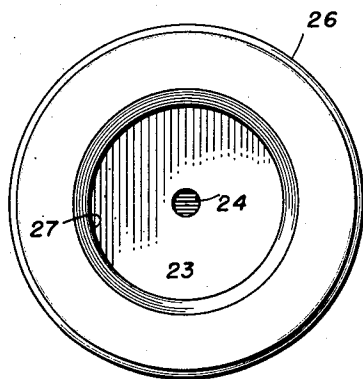
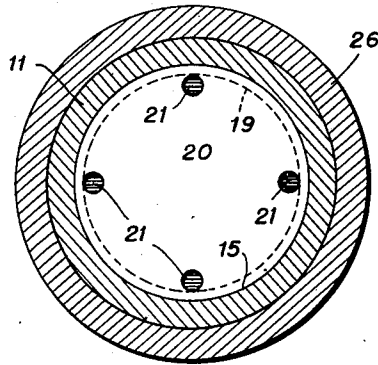


Fig. 4.

INVENTOR
FREDERICK W. FUNKE

BY

H. A. For
G. J. Kramer
ATTORNEYS

UNITED STATES PATENT OFFICE

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SPRAY NOZZLE TIP

Frederick W. Funke, Oakland, Calif.; dedicated to
the free use of the People in the territory of the
United States

Application April 29, 1941, Serial No. 390,932

1 Claim. (Cl. 299—107)

(Granted under the act of March 3, 1883, as
amended April 30, 1928; 370 O. G. 757)

This application is made under the act of March 3, 1883, as amended by the act of April 30, 1928, and the invention herein described and claimed, if patented, may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment to me of any royalty thereon.

I hereby dedicate the invention herein described to the free use of the People in the territory of the United States to take effect on the granting of a patent to me.

This invention relates to nozzles and more particularly to a nozzle tip for use on a water hose for the purpose of producing a spray or vapor stream.

This invention is especially useful in fire fighting to increase atmospheric humidity. By playing the spray or vapor upon a fire, a deep penetration of humidified atmosphere is established by means of which the fire may be brought under control more effectively than with the conventional solid straight streams. In actual tests during a fire season, it was found that this increased effectiveness is in the ratio of ten to one. The device may also be used to produce a vapor area for the purpose of insulating nozzlemen and others against the reflected heat of intense fires.

One of the objects of this invention is the provision of such a nozzle tip which will produce a vapor stream having a solid and uniform pattern.

Another object of this invention is the provision of such a nozzle tip which will project the vapor stream forwardly in large quantities without reducing its velocity.

A further object of this invention is the provision of such a nozzle tip which can be operated efficiently at low pressures and discharges of water and which can be used with different pressures and discharges.

A still further object of this invention is the provision of such a nozzle tip which can be used to produce spray or vapor patterns of different characteristics.

An embodiment of this invention is illustrated in the accompanying drawing, in which:

Figure 1 is an assembled elevational view, partly in section, showing the nozzle tip attached to the end of a hose;

Figure 2 is a section along the line 2—2 of Figure 1;

Figure 3 is a section along the line 3—3 of Figure 1; and

Figure 4 is a top plan view of Figure 1.

Referring with more particularity to the drawing in which like numerals designate like parts,

the embodiment illustrated comprises a tubular body member 11 having a lower hollow section 12 with internal threads 13 for attachment to the nozzle end of a hose 14, and an upper hollow section 15 having external threads 16. A wall 17 between the two sections has an aperture 18 therethrough for the passage of water into the section 15 from the hose 14. Within the upper section 15, there are removably disposed, one above the other, respectively, a tubular spacer 19, a plate 20, referred to as the correction plate, having apertures 21 near its periphery as the only means through which the water may travel therethrough, another spacing tube 22, a disc 23 having a central orifice 24, and a washer 25. The members 19, 20, 22, 23, and 25 are held in position by means of a cap 26 engaging the external threads 16, the top being flanged over the rubber washer 25. The cap 26 has an opening 27 large enough to prevent interference of the cap with the spray or vapor issuing from the orifice 24. The plate 20 should be thick enough to cause the water passing through the apertures 21 to become free of turbulence.

In operation, water enters under pressure from the hose 14 into the tubular spacer 19 which acts as a reservoir. The water from this reservoir is forced through the apertures 21. In normal operation, the space in the tube 22 between the two plates 20 and 23 will be filled with water. Consequently, water forced through the apertures 21 contacting the body of water in the tube 22 will flow through the mass of water in said tube and converge at an angle toward the orifice 24 to follow the path of least resistance without turbulence. The size of the orifice 24 is smaller than the apertures 21 for the purpose of keeping the space in the tube 22 flooded at all times. Under these operating conditions, the velocity of the jets passing through the apertures 21 is of a much lower constant than the velocity passing through the orifice 24 for any given pressure condition. This results in a gradual bending of the jets as they issue from the apertures 21. Consequently, the water flow through the tube 22 is smooth resulting in pressure equalization of the jets passing through the apertures 21. These jets follow an equalized path through the water body and impinge below the orifice 24, combine, and issue together through said orifice. This is one of the essential differences of the present invention over other types of inventions designed for similar purposes in that this impinging is accomplished within the nozzle rather than externally and,

consequently, jet pressures through the apertures 21 are equalized.

I have determined experimentally that the spacing between the plate 20 and the plate 23 controls the spray pattern as to diameter and characteristic, that is, this spacing determines the width of the spray or vapor pattern. Reducing this spacing causes the spray pattern to increase in width and reduces the distance to which the pattern can be projected, while an increase in the spacing reduces the width of the vapor pattern and increases the projection. The spray pattern in operation of the device may also be varied by varying the design of the orifice 24 and the size and number of the apertures 21 in the plate 20. Since the entire assembly is easily demountable, substitute orifice plates 23, spacing tubes 22, and correction plates 20 may be pro-

vided to obtain various spray or vapor pattern characteristics.

Having thus described my invention, I claim:

5 A spray nozzle tip comprising a tubular body having an intake adapted to be connected to a source of liquid, a tubular spacer within said body having one end adjacent said intake, a plate on the other end of said spacer, said plate having apertures therethrough near its periphery, said apertures being long enough to cause 10 liquid passing therethrough to become free of turbulence, a second tubular spacer on the other side of said plate, a disc on said second tubular spacer, said disc having a central aperture there- 15 through, and means for holding said plate, spacers and disc in position within said body against the pressure of liquid flowing therethrough.

FREDERICK W. FUNKE.