

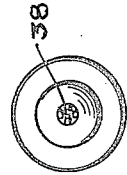
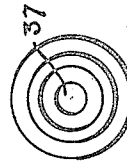
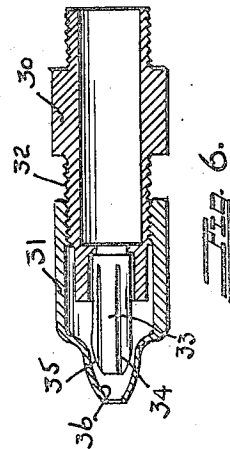
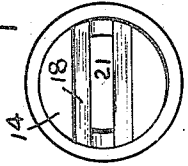
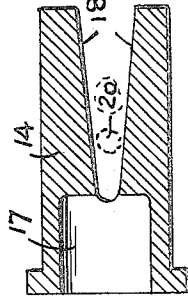
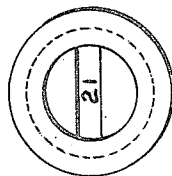
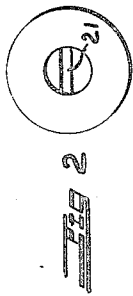
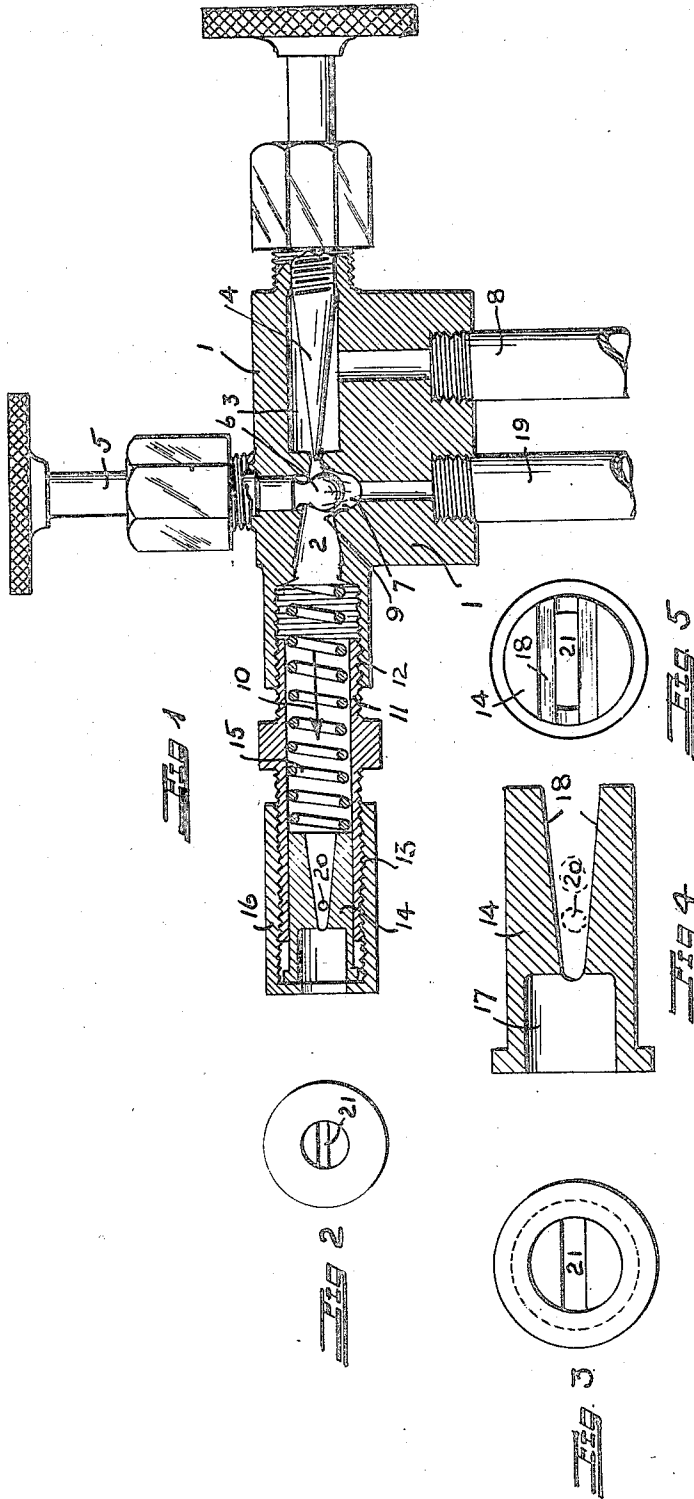
July 17, 1923.

1,462,020

J. D. MURRAY

SPRAY NOZZLE

Filed Oct. 10, 1921



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UNITED STATES PATENT OFFICE.

JOHN D. MURRAY, OF SAN FRANCISCO, CALIFORNIA.

SPRAY NOZZLE.

Application filed October 10, 1921. Serial No. 506,716.

To all whom it may concern:

Be it known that I, JOHN D. MURRAY, a citizen of the United States, and resident of the city and county of San Francisco, State of California, have invented new and useful Improvements in Spray Nozzles, of which the following is a specification.

My invention has for its object an atomizing or spray nozzle particularly adapted to producing a spray of liquid, by compressed air. My nozzle is particularly applicable for the purpose of spraying paint, whitewash or the like on surfaces; or a germicide on trees, or for spraying chocolates or the like and is readily applicable to a great variety of uses.

A further object is a provision of a special form of outlet control means for the said spray nozzle.

By referring to the accompanying drawings my invention will be made clear.

Figure 1 is an enlarged cross section through the nozzle of my invention.

Fig. 2 is a front view of the nozzle outlet.

Fig. 3 is a front view of the nozzle tip.

Fig. 4 is a cross section through the nozzle tip.

Fig. 5 is a rear view of the nozzle tip.

Fig. 6 is a cross section through the discharge end of my nozzle showing a variation in the structure whereby the discharge area may be enlarged or reduced at the will of the operator.

Fig. 7 is a rear view of Fig. 6.

Fig. 8 is a front view of Fig. 6.

Throughout the figures similar numerals refer to identical parts.

An inlet pipe adapted to supply compressed air to the nozzle is shown at 8 and a pipe by which liquid is admitted under an equal or greater pressure is shown at 19. The body of the nozzle is shown by the numeral 1 having a discharge throat 2 and compressed air port 3 and air valve 4 and liquid valve 5 having a ball or cone seat 6 and a liquid inlet port 7 from which the liquid is adapted to issue as an annular spray at 9 around the ball valve 6, at which point it is picked up by air admitted by the valve 4 from the port 3 and supply pipe 8. The liquid is here atomized and carried in the stream of said air flowing outwardly as shown by the arrow 10. A cylindrical member 11 is threaded at 12 into the body of the nozzle and is provided with an external thread at 13 and of smooth internal

bore within which slides the cylindrical tip 14. This tip is forced outwardly by the coil spring 15 and against the cap 16 which engages the threads 13 and is adjustable thereon to move the tip 14 inward against the compression of the spring 15. The tip 13 is provided with a cylindrical discharge chamber 17 and a wedge shaped slot 18 which slot normally straddles the pin 20 passing through the walls of the member 11 and normally rigid therewith so that the tip 14 may slide back and forth within the member 11 but is prevented from rotating by the cylindrical pin 20. If the cap 16 advances inward on the threads 13 so that the spring 15 is compressed the tip 14 will advance towards the pin 20 until the said pin wedges between the sides of the wedge shaped slot 18. In this position the pin will close the channel for spray issuing from the throat 2 and if the cap 16 be advanced outwardly on the threads 13 the spring 15 will cause the tip 14 to advance therewith opening a clearance by the movement of the wedge sides away from the pin 20 so that the spray issuing from the throat 2 may pass around said pin and issue through the outlet nozzle slot 21. It will now be seen that the long dimension of the slot 21 will at all times remain fixed regardless of the reduction of the cap 16.

In some adaptations of my nozzle a circular shaped issuing spray is preferable to a rectangular discharge and in such cases I prefer the type of adjustable nozzle shown in Figs. 6, 7, 8, wherein the member 30 is adapted to fit the threads 12 of the nozzle body 1 and the cap 31 is adjustably mounted upon the threads 32. Within the member 30 is the tubular shaped nozzle 33 having a plurality of longitudinal cuts as 34 and a conical formed exterior end 35 over which advances the concentric interior surface 36 of the cap 31, when the said cap is advanced on the threads 32. When the cap is so advanced a surface 36 is pressed against the conical surface 35 and the outlet area of the said tip may be varied from the maximum size shown at 37 to the minimum size shown at 38. In this way providing by the movement of the cap 31 adjustment of the size and quantity of the issuing stream.

Referring particularly to Fig. 1 the ball valve 6 co-operating with the valve port 7 is shown opening into a taper throat 2 whereby air issuing from the chamber 3

around the valve 4 and extending in the throat 2 produces a partial vacuum around the ball valve 6 causing the liquid from the port 7 to spray into the throat piece 2 even where the pressure in the pipe 19 is equal to or slightly less than the supply pipe 8. The principle here employed is similar to that in the well known boiler injector.

I claim:

- 10 1. A spray nozzle comprising an inlet port for gas and a control valve therein, an outwardly flaring conical throat forming a continuation of said port, a liquid inlet opening into said throat in a direction at right
15 angles to the axis thereof, and a globular valve controlling said liquid inlet and mounted for movement transversely through said throat, whereby the liquid and gas are
20 ejected from said throat when pressure is applied behind said liquid and said gas, a discharge nozzle tip for said throat comprising an orifice and controlling means for

said orifice adapted to vary the discharge from said orifice.

2. A spray nozzle as set forth in claim 1 25 wherein said controlling means is cylindrical with a wedge shaped passage and said tip has a circular orifice and said wedge shaped passage thereto on its inner side is movable with respect to said controlling means. 30

3. A spray nozzle as set forth in claim 1 wherein said controlling means is cylindrical within a wedge shaped passage and said tip has a circular orifice and said wedge shaped passage thereto on its inner side is movable 35 with respect to said controlling means, and a spring adapted to normally force said nozzle tip away from said controlling means and a circular member externally milled and in thread engagement with the body of the 40 nozzle and inclosing said tip whereby the tip may be forced to compress said spring in the direction of said controlling means.

JOHN D. MURRAY.