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A. HEROLD

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METHOD OF AND APPARATUS FOR SPRAYING LIQUIDS

Filed Dec. 8, 1925

FIG. 1

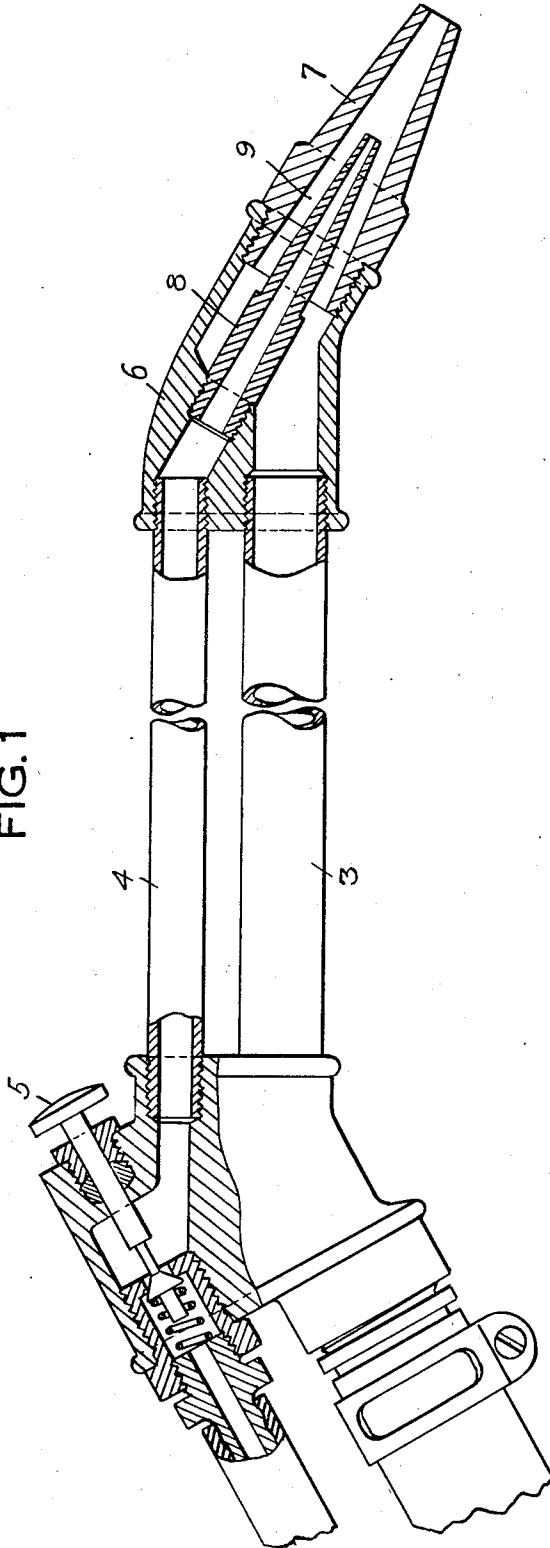
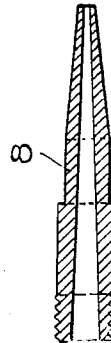


FIG. 2



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UNITED STATES PATENT OFFICE.

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METHOD OF AND APPARATUS FOR SPRAYING LIQUIDS.

Application filed December 8, 1925. Serial No. 74,137.

My invention relates to air and liquid spraying devices and particularly to those which are employed in connection with the washing of motor vehicles. However, my invention is not limited to such use, but may be utilized wherever a spray having the peculiar characteristics produced by my device is desired.

One object of my invention is to provide apparatus for forming a spray that is particularly effective in connection with the removing of grease and dirt which adheres to various parts of automobiles.

Another object of my invention is to provide an arrangement whereby substantially uniform results may be secured under varying conditions of water supply.

Still another object of my invention is to provide a spraying device wherein a relatively small amount of air is required.

One form which my invention may take is shown in the accompanying drawing, wherein Fig. 1 is a view, partially in longitudinal section, of apparatus embodying my invention, and Fig. 2 is a view of one of the air nozzles which I may employ.

The apparatus comprises a water supply conduit 3 that may be connected to the ordinary city water supply, but when cleaning those portions of motor vehicles to which grease adheres, the water is preferably heated before entering the conduit 3. An air supply conduit 4 is also provided, such supply being controlled in any suitable manner, as by a valve 5. The conduits 3 and 4 communicate at their forward ends with a nozzle head 6 with which a spray nozzle 7 has screw threaded engagement. An air nozzle 8 has screw threaded engagement with the nozzle head 6, at a point to the rear of the nozzle 7. The forward end of the nozzle 8 is tapered somewhat for a considerable distance, on lines that are parallel to adjacent faces of the nozzle 7, thus providing an annular space 9 that is of substantially uniform cross sectional area. This space is of substantially $\frac{5}{16}$ inch in width (the distance between the outer wall of the air nozzle and the inner wall of the main nozzle 7) and the various sizes of nozzles hereinafter referred to will be of such outside diameter as to preserve said width.

Since the apparatus is usually employed around garages where substantially standard air pressures are available, at pressures from 45 lbs. per square inch and upward, I

make provision for altering the nozzle arrangement in accordance with variations in water supply. City water pressures are commonly found ranging from 20 lbs. pressure per square inch to 65 lbs. per square inch and upward.

I have found, in connection with air pressures of 45 lbs. per square inch and upward that by varying the size of the orifice of the air nozzle 8 and the distance of such orifice from the orifice of the water nozzle 7, in accordance with the water pressure, a desired quality of spray is secured. It is important that the air be introduced into the stream of water at the proper distance from the main orifice, and that the air orifice be of approximately certain diameters under designated water supply conditions. If the air supply is at too far a distance rearwardly of the main nozzle, the water will be impelled forwardly in bulk without being sufficiently broken up and will not have the desired cutting effect on the surface to be cleaned. On the other hand, if the air nozzle is located too far forward in the nozzle 7 the flow of water will be retarded. Also, the diameter of the air nozzle must be such as to secure the desired proportions of air and water.

In the drawing I have shown the main nozzle 7 as having its orifice approximately $\frac{3}{16}$ " in diameter and the orifice of the nozzle 8 as located 1" to the rear of the orifice of the nozzle 7. This arrangement has been found to give satisfactory results with pressures of 45 lbs. to 65 lbs. per square inch, and produces a spray which, at a distance of about 6" from the nozzle, has a diameter of approximately 6". Upon holding the hand in front of this spray, the water will be found to have been broken up into particles that produce a sensation similar to that produced by the grains of sand in a sand blast.

When the spraying device is intended to be used with water pressures of from 20 lbs. to 40 lbs. per square inch, an air nozzle of another size is substituted for the nozzle 8. The substituted nozzle will preferably have an orifice diameter of $\frac{3}{32}$ " and be disposed $\frac{7}{8}$ " rearwardly of the orifice of the nozzle 7. If a water pressure of 65 lbs. or more per square inch is used, an air nozzle having an orifice $\frac{3}{16}$ " in diameter is employed and disposed $1\frac{1}{8}$ " rearwardly of the main orifice. In each instance, a spray of

about 6" in diameter is produced at a distance 6" in front of the nozzle 7.

For other water pressures than those named above, air nozzles of still different sizes may be employed. Likewise, the air nozzles can be changed to conform to various air pressure conditions.

While ordinarily the cleaning action of the spray is such that it will readily remove grease if the water is slightly heated, without injury to paint, the device may also be employed for removing paint if steam or boiling water is substituted for water of relatively low temperatures.

I claim as my invention:

1. Spraying apparatus designed for use with air pressure of 45 lbs. and upwards per square inch and with water pressures of 65 lbs. and upwards per square inch, comprising a main nozzle provided with means for connection to a source of liquid pressure, and an air nozzle disposed within the main nozzle and adapted for connection to a source of air pressure, the air nozzle orifice having a diameter of substantially $\frac{3}{8}$ ", disposed

rearwardly of the orifice of the main nozzle a distance substantially $1\frac{1}{8}$ ", and having its outlet end spaced $\frac{5}{32}$ " from the inner wall of the main nozzle, the orifice of the main nozzle being substantially $\frac{1}{8}$ ".

2. The method of converting water into particles simulating grains of sand in a sand blast, comprising supplying said water in the form of an annular stream of predetermined diameter and under a predetermined pressure exceeding 20 lbs. and under predetermined velocity, discharging centrally into said stream a blast of air under pressure of at least 45 lbs. per square inch and of cross-sectional area determined by said water pressure and velocity, and discharging said mingled fluids in a stream of predetermined cross-sectional area and at a point, removed from the point of junction of the two fluids, which is dependent on said water pressure and velocity.

In testimony whereof I, the said ARTHUR HEROLD, have hereunto set my hand.

ARTHUR HEROLD.