

W. M. HERMAN.
 SPRAY NOZZLE.
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1,346,750.

Patented July 13, 1920.

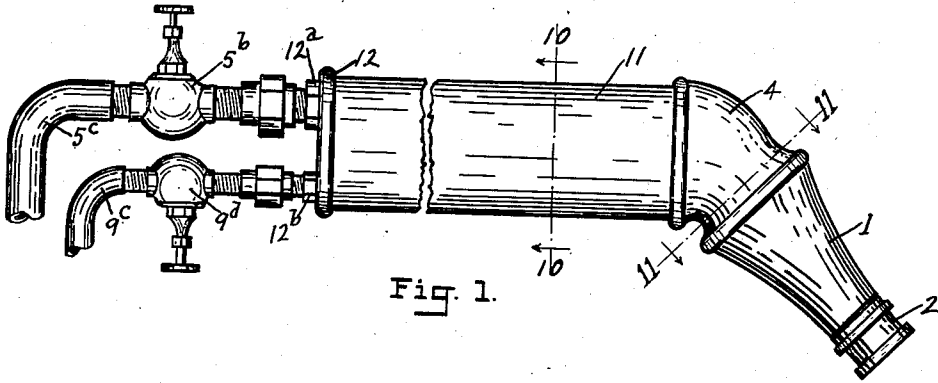


Fig. 1.

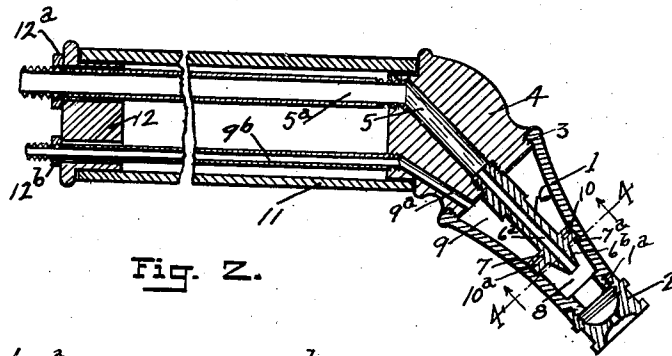


Fig. 2.

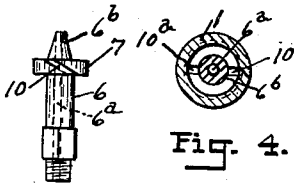


Fig. 3.

Fig. 4.

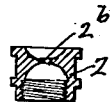


Fig. 5.



Fig. 6.

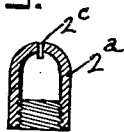


Fig. 7.

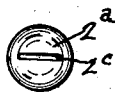


Fig. 8.

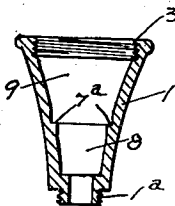


Fig. 9.

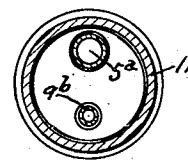


Fig. 10.

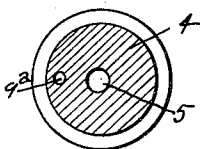


Fig. 11.

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SPRAY-NOZZLE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM M. HERMAN, a citizen of the United States, residing at San Jose, in the county of Santa Clara and State of California, have invented certain new and useful Improvements in Spray-
Nozzles, of which the following is a specification.

My invention relates to spray nozzles used to produce a finely atomized spray of liquid for coating or spreading said liquid, with considerable force, onto various objects; and more particularly to spray nozzles used in air brush work for coating surfaces with paint and my objects are:—

First, to provide a spray nozzle that will require less air pressure to produce a spray of liquid much more thoroughly atomized and of a more uniform flow than the spray obtained from nozzles of this class now in use.

Second, to provide a spray nozzle in which the air is given a whirling motion of high velocity in a chamber into which the liquid is permitted to flow at the desired rate.

Third, to provide a spray nozzle that may be used on air brushes, spray rods and the like in place of the nozzles now being used.

With these and other objects in view my invention resides in the novel construction and in the unique arrangement of parts to be hereinafter more fully described and claimed, it being understood that various changes in form, proportion and minor details of construction may be resorted to within the scope of the appended claims.

For a more perfect understanding of the invention and the merits thereof, reference is to be had to the accompanying drawings forming a part of this specification in which similar reference characters represent corresponding parts in all the views.

In the drawings—

Figure 1 is a side elevation of my spray nozzle attached to a suitable handle with regulating valves attached.

Fig. 2 is a vertical, longitudinal sectional view of Fig. 1, regulating valves removed.

Fig. 3 is a side elevation of the nozzle for admitting liquid showing the flange or disk with the oblique or slanting apertures or slits through which the air passes.

Fig. 4 is a sectional view through the mixing chamber as indicated on line 4—4 of Fig. 2.

Fig. 5 is a sectional view of the spray button for delivering a cone shaped spray.

Fig. 6 is an end view of Fig. 5.

Fig. 7 is a sectional view of a spray button adapted to deliver a fan shaped spray.

Fig. 8 is an end view of Fig. 7.

Fig. 9 is a sectional view of the thimble or sleeve showing the shoulders on the inner walls.

Fig. 10 is a sectional view as shown on line 10—10 of Fig. 1.

Fig. 11 is a sectional view as shown on line 11—11 of Fig. 1.

My improved spray nozzle, forming the subject matter of the present invention, consists of a thimble or sleeve 1 having one end reduced in size and provided with screw threads thereon as shown at 1^a, adapted to receive one of the desired spray buttons 2—2^a which may be of various types having different shapes and sizes of outlets as shown at 2^b—2^c.

The larger end of the thimble or sleeve 1 is provided with internal screw threads 3 adapted to be screwed onto a suitable plug 4, said plug having a longitudinal bore 5 centrally located and extending through the plug, each end of the bore 5 being screw threaded.

Into one end of the bore 5 and projecting into the thimble or sleeve 1 is a nozzle 6 screwed therein, said nozzle having a longitudinal bore 6^a communicating with the bore 5.

Into the other end of the bore 5 is screwed, a length of tubing 5^a adapted to be connected to a source of liquid supply under suitable pressure. A valve for manually regulating this supply of liquid to the nozzle is shown at 5^b. A suitable hose for connecting to the liquid supply is shown at 5^c.

On the nozzle 6 and a distance in from the free end thereof is a flange or disk 7 integral therewith, adapted to seat against the annular shoulder 7^a on the inner walls of the thimble or sleeve 1, said shoulder being so positioned that, when the sleeve is screwed onto the plug 4, the flange 7 seats firmly against the annular shoulder 7^a thus forming a small mixing chamber 8 between the flange 7 and the spray button 2, and a larger air chamber 9 between said flange and the plug 4.

Through the plug 4 is a second bore 9^a communicating with the air chamber 9.

Into the outer end of this bore is secured a length of tubing 9^b adapted to be connected to a source of compressed air by means of a length of hose 9^c. A regulating valve, for manually controlling the supply of compressed air to the chamber 9, is shown at 9^d.

The outer or free end of the nozzle 6 is made tapering to a point forming a tip as shown at 6^b adapted to assist in the atomizing of a fluid.

Through the flange 7 is provided a plurality of apertures or slits 10—10^a, the axes of these apertures or slits are at an angle to the axis of the bore 6^a of the nozzle 6, but in relation to each other, the slant of the axes are in the same direction obliquely across the outer periphery of the flange 7 whereby, when air is rapidly forced through said apertures from chamber 9 to the mixing chamber 8 it will be given a swift whirl about the tip 6^b and any liquid that is permitted to pass through the bore 6^a into the mixing chamber 8 will be picked up at the tip point, thoroughly broken up and atomized, and finally discharged through the desired spray button.

A handle or casing, made of suitable material, is shown at 11 inclosing the lengths of tubing 5^a—9^b and into one end of which the plug 4 fits. A plug adapted to fit the other end of this casing 11 is shown at 12 through which the ends of the tubes 5^a—9^b protrude. Suitable lock nuts 12^a—12^b screwed onto the tubes 5^a—9^b respectively, hold the handle and plugs together.

I am aware of the fact that various types of whirl spray nozzles are now in use in which the liquid, under great pressure, is given a whirling motion before, or as it is ejected through the spray button; also that there are nozzles in which the liquid and air are conducted to the nozzle separately and mixed just before final ejection, both methods requiring greater pressure maintained than my improved spray nozzle requires as, in my nozzle the compressed air is admitted obliquely through the slits 10—10^a in the flange 7 which forms the base of the mixing chamber 8. The air takes up a rapid whirling motion about the tip 6^b of the liquid nozzle 6, creating a partial vacuum at the tip 6^b. Any liquid entering the mixing chamber 8 through the nozzle 6 will be picked up by the whirling air and more thoroughly broken up and atomized with less pressure than by the nozzles now in use.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a device of the class described, the

combination of a thimble having one end reduced in size and screw threaded externally and the larger end screw threaded internally; a spray button having the desired outlet screwed onto said externally threaded portion of the thimble and a plug screwed into the larger internally threaded end of the thimble, said plug having a longitudinal bore internally screw threaded; a nozzle screwed into said bore and projecting into said thimble adapted to conduct liquid therethrough; a pointed tip on said nozzle, a flange on said nozzle, said flange having a plurality of apertures passing obliquely through said flange; an annular shoulder on the inner wall of the thimble against which the rim of said flange seats thus forming an air chamber between said flange and the plug and a mixing chamber between said flange and the spray button, said plug having a second bore for the admission of air under pressure to said air chamber; tubes connected one to each bore in the plug; a regulating valve on each tube and a casing inclosing said tubes substantially as described.

2. A device of the character described consisting of a tapered thimble or sleeve having one end reduced in size and externally screw threaded, adapted to receive a suitable spray button screwed thereon, the larger end of said thimble or sleeve being internally screw threaded; a plug adapted to be screwed into the larger end of the thimble or sleeve, said plug having a centrally located bore passing longitudinally therethrough and internally screw threaded; a flanged nozzle screwed into one end of said bore and projecting into said thimble or sleeve, said flanged nozzle having a plurality of slits or apertures passing obliquely through the flange; a tapered tip on the end of the nozzle; an annular shoulder on the inner wall of the thimble or sleeve against which the rim of the flange seats, thus forming an air chamber between the flange and the plug and a mixing chamber between the flange and the spray button, a second bore through the plug internally screw threaded at the outer end; an air conducting tube connected to said second mentioned bore and a liquid conducting tube connected to the first mentioned centrally located bore and manually operative means for controlling the flow of said liquid to the mixing chamber and the air to the air chamber substantially as set forth.

In testimony whereof I hereby affix my signature this 24th day of March, 1919.

WILLIAM M. HERMAN.