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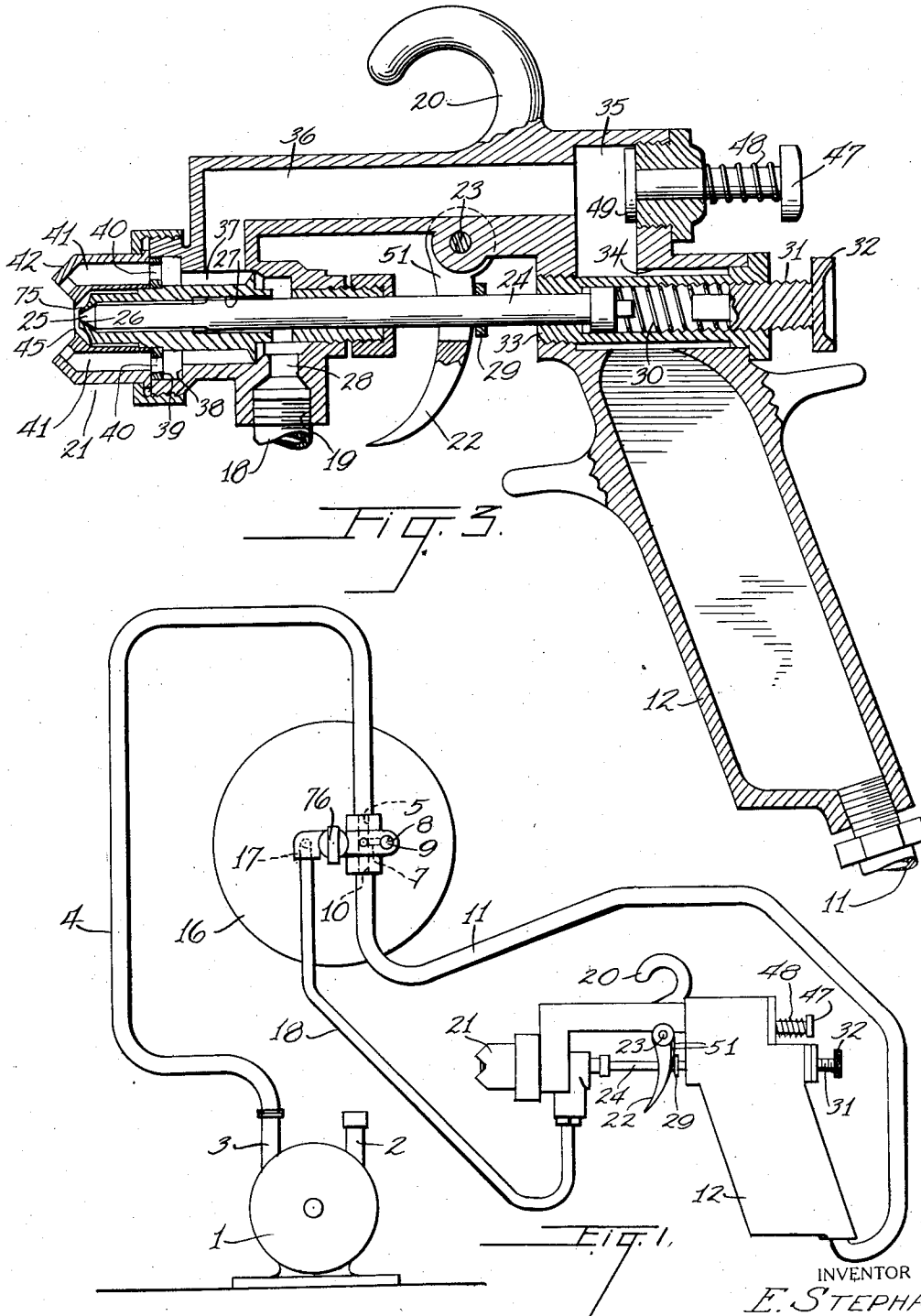
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SPRAY GUN AND MEANS FOR OPERATING THE SAME

Filed Aug. 20, 1925

2 Sheets-Sheet 1



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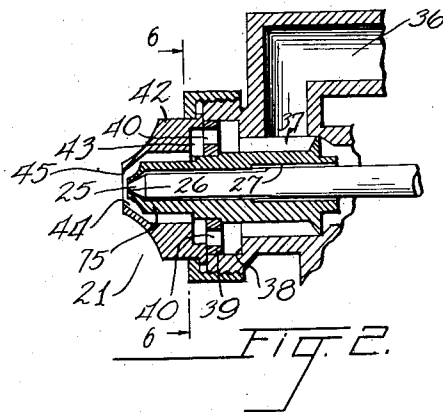
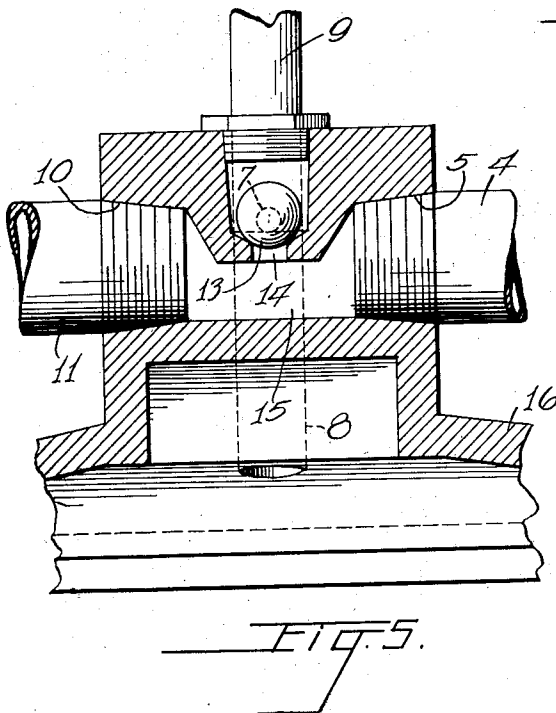
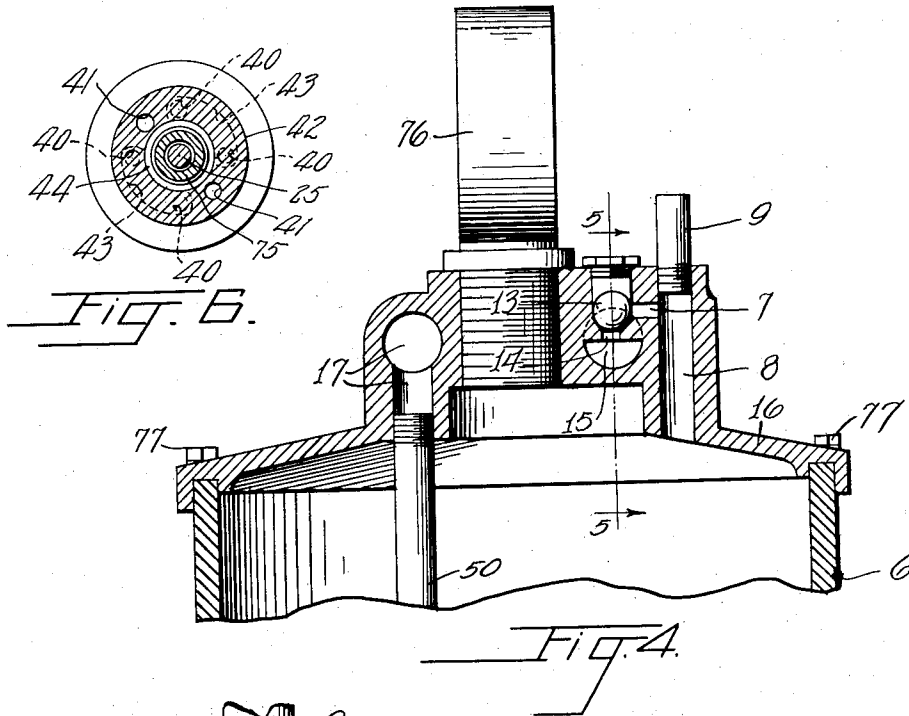
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UNITED STATES PATENT OFFICE.

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SPRAY GUN AND MEANS FOR OPERATING THE SAME.

Application filed August 20, 1925. Serial No. 51,501.

My invention relates to improvements in spray guns and means for operating the same, and it consists in the combinations, constructions, and arrangements herein described and claimed.

An object of my invention is to provide a spray gun which has novel means for employing air under low pressure for spraying the paint or other liquid, the gun being designed so as to have the air flow continuously through the gun whether the valve controlling the flow of paint through the gun is open or closed. In this way I do away with extra parts which are necessary in spraying apparatus which employs air under a high pressure for spraying the paint.

The low pressure air has still another feature in connection with the gun, in that it eliminates the fog which is usually prevalent when spraying guns employing air under high pressure are used.

A further object of my invention is to provide a spray gun of the character described having a novel cut-off valve which temporarily stops the flow of air through the gun and causes the air to back up into the paint containing receptacle so as to create a pressure within the receptacle to deliver a greater quantity of paint to the gun.

A further object of my invention is to provide a spray gun of the character described in which the mouth piece of the gun is designed so as to be turned into one position when a flat spray is desired, and into a position at 45° to the first position when a round spray is desired. The mouth piece may be turned into two positions for the flat spray, these positions being so arranged that the operator may throw a horizontal spray or a vertical spray without the necessity of turning the gun.

A further object of my invention is to provide a spray gun of the character described which has means for regulating the movement of the trigger so as to control the opening of the paint control valve.

Other objects and advantages will appear in the following specification, and the novel features of the invention will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings, forming part of this application, in which

Figure 1 is a side view of the gun, and further shows in diagram how the gun is connected to the paint containing receptacle and to the pump,

Figure 2 is a sectional view of the mouth piece of the gun, showing the mouth piece in a different position from that shown in Figure 3,

Figure 3 is a sectional view of the gun,

Figure 4 is a sectional view through the cover of the paint tank,

Figure 5 is a section along the line 5—5 of Figure 4, and

Figure 6 is a section along the line 6—6 of Figure 2.

In carrying out my invention I provide an air pump 1 of any standard construction. In the present form of the device, I have shown this pump as being of the rotary type. The pump may be actuated by any means such as the engine, not shown. The pump has an inlet pipe 2 and an outlet pipe 3. To the outlet pipe I secure a hose 4. I have found that this hose should be at least fifty to seventy-five feet in length, although it is obvious that any length of hose desired may be employed with the machine. The free end of the hose is connected to the inlet opening 5 of a paint containing tank 6. The tank 6 is shown diagrammatically in Figure 1 and is provided with a cover having the opening 5 therein. The opening 5 communicates with the interior of the tank 6 by means of openings 7 and 14 and passageway 8. The passageway 8 is provided with an air release valve 9 at the top thereof. The opening 5 also communicates with an outlet opening 10. To this outlet opening I connect a hose 11 and this hose in turn is connected to the handle portion 12 of the spray gun.

Disposed between the inlet opening 5 and the outlet opening 10 is a gravity actuated ball valve 13. This valve normally closes the opening 7 and also an opening 14. The opening 14 communicates with the passageway 15 that in turn connects the inlet opening 5 with the outlet opening 10. The function of the ball valve 13 will be hereinafter described.

The cover 16 for the tank also has a paint outlet opening 17 therein. To this opening a paint hose 18 is connected. The hose 18 is

of the same length as the hose 11 and has its free end connected to the gun at the paint inlet opening 19. I have found that the hose 11 and 18 should be of a length sufficient to permit the tank to be placed in the same room where the painting operation is being carried on, if the painting is being done in a room, and to permit the operator to paint all of the walls of the room without the necessity of moving the paint tank, unless perchance the room is of exceptional size, in which event the tank may be moved from place to place in the room as the case demands.

I will now describe the specific construction of the spray gun. The gun consists of a body portion, preferably cast, the casting being provided with a hook portion 20 by means of which the gun may be suspended when not in use. The body portion is provided with the handle portion 12, with a mouth piece indicated generally at 21, and with a trigger 22. The trigger 22 is pivotally secured to the body portion at 23 and straddles a plunger 24. The plunger is provided with a valve 25 for closing an opening 26. The opening 26 is in communication with the paint hose 18 through the medium of passageways 27 and 28. The trigger 22 is connected to the plunger 24 by means of a collar 29, and it will be seen from this construction that when the trigger 22 is actuated, it will move the plunger 24 against the tension of a coil spring 30 so as to open the valve 25 and permit the paint to flow through the opening 26.

I also provide means for limiting the movement of the trigger 22 so as to limit the movement of the valve 25. This means consists of a screw plug 31 that has a knurled head 32 by means of which the plug may be turned. The plug may be turned so as to vary the distance between the inner end of the plug and the end of the plunger 24 disposed adjacent to the plug. At the same time the tension of the coil spring 30 is varied. It will be readily seen that the distance between the adjacent ends of the plunger 24 and the plug 31 determines the distance through which the plunger 24 is moved.

I will now describe how the air is conveyed through the gun and is discharged therefrom at a point adjacent to the opening 26. As heretofore stated, the hose 4 communicates with an opening in the handle 12 of the gun and the handle 12 is made hollow so as to provide an air passageway into the interior of the gun. A bushing 33 is provided for receiving the plunger 24 and also the screw plug 31. The drawing clearly shows how the bushing is spaced from a bore 34 so as to permit the air to flow past the bushing and into the chamber 35 and air passageway 36. The air passageway in turn communi-

cates with a bore 37. The outer end of this bore is enlarged to form a recess 38, and in this recess I dispose a disc 39 having four openings 40 therein to permit air to flow therethrough. The openings 40 are spaced 90° apart and two of these openings, spaced diametrically from each other, communicate with air passageways 41 in the mouth piece 42 when the mouth piece is in the position shown in Figure 3. When the mouth piece is turned at right angles, the other two openings feed the air to the passageways 41. The passageways 41 are turned so as to direct the air in streams that will cross each other at a point adjacent to the opening 26. The air flowing from the passageways 41 will entrain the paint fluid from the opening 26 when the valve 25 is opened. When the air passes from the passageways 41, it will cause the paint to be ejected from the gun in a flat spray. The two positions of the mouth permits a flat spray to be thrown from the device in a horizontal or vertical plane.

If the operator should desire to have a round spray instead of a flat spray, he merely swings the mouth piece 42 through an arc of 45° so as to swing the passageways 41 out of alignment with the openings 40 and bring a longitudinally extending recess (see Figure 2) into communication with the openings 40. The recess in turn communicates with an air passageway 44. When, therefore, the recess 43 is brought into alignment with the openings 40, the air will flow through the air passageway 44 instead of through the passageways 41. The air passageway 44 has an opening 45 that is spaced a slight distance away from the wall 46 defining the opening 26. In this way the air is fed in a cylindrical form from the opening 45 which causes a round spray to be ejected from the gun instead of a flat spray.

The gun is also provided with means for creating a greater pressure within the tank 6 when it is desired to force a greater quantity of paint from the tank. This consists of a spring pressed valve 47. This valve is normally held in open position by means of a spring 48. When the valve 47 is manually depressed by means of the thumb of the operator, the disc 49 closes the opening to the passageway 36. This stops air from flowing through the passageway 36, and therefore causes the air to back up into the hose 11. The air will thereupon cease to flow through the hose 11 and will back up through the opening 14 to lift the valve 13. The air, of course, is still being delivered from the pump 1, and instead of flowing through the hose 11 as was formerly the case, will flow through the opening 14, the opening 7, the passageway 8 and into the tank 6. This will increase the pressure within the tank and will cause the paint therein to be forced up through the pipe 50 and into the hose 18. In

this way the operator is enabled to use all of the paint within the tank and to cause the gun to vary the quantity of paint delivered as he so desires.

5 From the foregoing description of the various parts of the device, the operation thereof may be readily understood. The operator first fills the tank with the desired quantity of paint and then starts the pump
10 1. The air will instantly flow through the hose 4 and 11 and thence through the gun and out either of the passageways 41 or the passageway 44, depending in which position the mouth piece 42 has been turned. It
15 should be noted at this point that the air will continuously flow through the gun whether the valve controlling the paint solution is open or not. The operator then takes the gun and pointing it at the surface to be
20 painted operates the trigger so as to open the valve 25. The air will thereupon spray the paint upon the surface. If the operator wishes to have the gun eject a greater quantity of paint, he merely actuates the valve
25 47 which produces the desired result as heretofore described. This is one of the novel features of the invention. A second novel feature of the invention is the construction of the mouth piece which permits the paint
30 to be ejected in a flat spray or a round spray. This has been clearly set forth in a former part of the specification. Still another feature lies in the fact that the movement of the trigger 22 may be finely adjusted so as
35 to determine the amount of opening of the valve 25.

The invention is primarily designed for spraying lead and zinc paints, mineral
40 paints, or any other kind of paint made up of various compositions. The spraying is accomplished by means of a direct current of warm dry air of a large volume generated by the rotary pump 1 and delivered directly to the gun. As stated in an early part of
45 the specification, the prevailing spray paint methods now on the market embody a lot of unnecessary equipment, such as relief valves, reduction valves, air storage tanks, and the complicated air valve control by the trigger
50 of the gun itself. All of these parts are eliminated in the present device.

It should be noted at this point that the trigger has two arms 51, one of these arms being adapted to bear against the collar 29,
55 while the other is spaced therefrom see Figure 1. This construction is for the purpose of slightly rotating the plunger 24 each time the trigger 22 is actuated. In this way the valve 25 is automatically ground, and there-
60 fore will seat perfectly throughout the entire life of the device.

The valve 25 not only closes the opening 26, but is also adapted to keep the opening clear. The end of the valve extends flush
65 with the end of the valve body 75 and there-

fore prevents the opening 26 from clogging. It sometimes happens that foreign matter in the paint may clog the opening 26, or that the paint may be thicker in spots, and this
70 thick portion clog the opening. To clean out the opening, the operator merely has to release the trigger, whereupon the valve will instantly seat and will force the clogged matter from the mouth piece. The gun is
75 now ready for further use.

The openings 40 are also made large to prevent them from becoming filled with dust or other foreign matter. This construction
80 further carries out the non-clogging feature of the gun.

One of the principal objects of the invention is to provide a direct air passage from the pump to the gun. It is unnecessary to store the air in compression tanks and this is
85 solely due to the fact that air under low pressure is used. I have found that the best results are obtainable when fifteen cubic feet of air per minute is conveyed to the gun under a pressure between fifteen to
90 twenty-five pounds, but not to exceed this latter figure. The only time the air is bypassed from its direct passage to the gun is when the operator wishes to build up the air pressure within the paint tank in order to
95 force a greater quantity of paint to the gun. The handle 76 of the tank 6 is threaded, see Figure 4, to permit the handle to be unscrewed from the tank, and the tank to be
100 filled by pouring the paint through the threaded bore. This obviates the necessity of loosening the bolts 77 every time the tank needs filling.

I claim:

1. In a device of the type described, a tank, said tank having an inlet and an outlet opening in communication with each
105 other, passageways from said inlet and said outlet to the interior of the tank, and means for normally closing said passageways to cause air to flow directly from the inlet to
110 the outlet opening, said means placing said inlet opening in communication with said passageways when said outlet opening is closed.

2. In a device of the type described, a
115 tank, said tank having an inlet and an outlet opening in communication with each other, passageways from said inlet and said outlet to the interior of the tank, and means
120 for normally closing said passageways to cause air to flow directly from the inlet to the outlet opening, said means placing said inlet opening in communication with said passageways when said outlet opening is
125 closed, said tank having a fluid outlet, whereby a closing of said first named outlet will cause the air to enter the tank and force the fluid from said fluid outlet.

3. A spray gun comprising an integral handle having an air passageway there- 130

through, a mouth piece, an air passageway in said gun communicating with the air passageway in said handle, and means disposed in alignment with the air passageway in said gun and substantially adjacent one end thereof for manually closing said air passageway, said means comprising a disc adapted to be placed against the adjacent end of the air passageway in said gun, and spring means for normally holding said disc away from the air passageway in said gun.

4. A spray gun comprising an integral handle having an air passageway there-
 15 through, a mouth piece, an air passageway in said gun communicating with the air passageway in said handle, means disposed in alignment with the air passageway in said gun and substantially adjacent one end thereof for manually closing said air passageway in said gun, said means comprising a disc adapted to be placed against the adjacent end of the air passageway in said gun, means for manually moving said disc toward
 25 the end of said air passageway in said gun, and spring means for moving said disc away from the air passageway in said gun.

5. A spray gun having a mouth piece, an air passageway in said gun, means for conveying a liquid to the center of said mouth
 30 piece, said mouth piece comprising a valve body having a longitudinally extending opening therethrough, the outer end of said valve body having a conical-shaped annular flange integral therewith, means for connecting said opening with said liquid-conveying means, a valve disposed in said opening and adapted to be moved into engagement with said flange for controlling the amount of
 40 liquid passing through said opening, and an air control housing disposed concentric with said valve body and having air passageways therein communicating with the air passageway in said gun, the air passageways in
 45 said air control housing being adapted to cause the air from said passageways to intersect at a point in alignment with the liquid opening in said valve body.

6. A spray gun having a mouth piece, an
 50 air passageway in said gun, means for conveying a liquid to the center of said mouth piece, said mouth piece comprising a valve body having a longitudinally extending opening therethrough, the outer end of said
 55 valve body having a conical-shaped annular flange integral therewith, means connecting said opening with said liquid-conveying means, a valve disposed in said opening and adapted to be moved into engagement with
 60 said flange for controlling the amount of liquid passing through said opening, a disc disposed concentric with said valve body and having openings therein in communication with the air passageway in said gun, an air
 65 control housing disposed concentric with

said valve body, and means for holding said air control housing in engagement with said disc, said air control housing having air passageways therein adapted to be brought into alignment with two of the openings in
 70 said disc, the passageways in said air control housing being adapted to cause the air from said passageways to intersect at a point in alignment with the liquid opening in said valve body for ejecting the liquid in a ver-
 75 tically extending flat spray.

7. A spray gun having a mouth piece, an air passageway in said gun, means for conveying a liquid to the center of said mouth
 80 piece, said mouth piece comprising a valve body having a longitudinally extending opening therethrough, the outer end of said valve body having a conical-shaped annular flange integral therewith, means connect-
 85 ing said opening with said liquid-conveying means, a valve disposed in said opening and adapted to be moved into engagement with said flange for controlling the amount of liquid passing through said opening, a disc
 90 disposed concentric with said valve body and having openings therein in communication with the air passageway in said gun, an air control housing disposed concentric with said valve body, and means for holding said air control housing in engagement with said disc,
 95 said air control housing having air passageways therein adapted to be brought into alignment with two of the openings in said disc, the passageways in said air control housing being adapted to cause the air from
 100 said passageways to intersect at a point in alignment with the liquid opening in said valve body for ejecting the liquid in a vertically extending flat spray, said air control housing being adapted to be moved for
 105 bringing the passageways therein in alignment with the other openings in said disc for ejecting the liquid in a horizontally extending flat spray.

8. A spray gun having a mouth piece, an
 110 air passageway in said gun, means for conveying a liquid to the center of said mouth piece, said mouth piece comprising a valve body having a longitudinally extending
 115 opening therethrough, the outer end of said valve body having a conical-shaped annular flange integral therewith, means connect-
 120 ing said opening with said liquid-conveying means, a valve disposed in said opening and adapted to be moved into engagement with said flange for controlling the amount of liquid passing through said opening, a disc
 125 disposed concentric with said valve body and having openings therein in communication with the air passageway in said gun, an air control housing disposed concentric with said valve body, means for holding said air control housing in engagement with said disc, said air control housing having air
 130 passageways therein adapted to be brought

into alignment with two of the openings in said disc, the passageways in said air control housing being adapted to cause the air from said passageway to intersect at a point in alignment with the liquid opening in said valve body for ejecting the liquid in a vertically extending flat spray, said air control housing being adapted to be moved for bringing the passageways therein in alignment with the other openings in said disc for ejecting the liquid in a horizontally extending flat spray, and means carried by said air control housing and adapted to communicate with the openings in said disc when the passageways in said air control housing are moved out of alignment with the passageways in said disc for permitting the air to eject the liquid from the gun in a round spray.

9. A spray gun having a mouth piece, an air passageway in said gun, means for conveying a liquid to the center of said mouth piece, said mouth piece comprising a valve body having a longitudinally extending opening therethrough, the outer end of said valve having a conical-shaped annular flange integral therewith, means connecting said opening with said liquid-conveying means, a valve disposed in said opening and adapted to be moved into engagement with said flange for controlling the amount of liquid passing through said opening, a disc disposed concentric with said valve body and

having openings therein in communication with the air passageway in said gun, an air control housing disposed concentric with said valve body, means for holding said air control housing in engagement with said disc, said air control housing having air passageways therein adapted to be brought into alignment with two of the openings in said disc, the passageways in said air control housing being adapted to cause the air from said passageways to intersect at a point in alignment with the liquid opening in said valve body for ejecting the liquid in a vertically extending flat spray, said air control housing being adapted to be moved for bringing the passageways therein in alignment with the other openings in said disc for ejecting the liquid in a horizontally extending flat spray, means carried by said air control housing and adapted to communicate with the openings in said disc when the passageways in said air control housing are moved out of alignment with the passageways in said disc for permitting the air to eject the liquid from the gun in a round spray, said means including said air control housing having arcuate-shaped grooves positioned between the passageways therein and in communication with the openings in said disc, and a centrally disposed passageway concentric with said valve body and in communication with said grooves.

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