May 25, 1926. 1,586,009

A. SHELBURNE

AIR BRUSH

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Fig. 1.

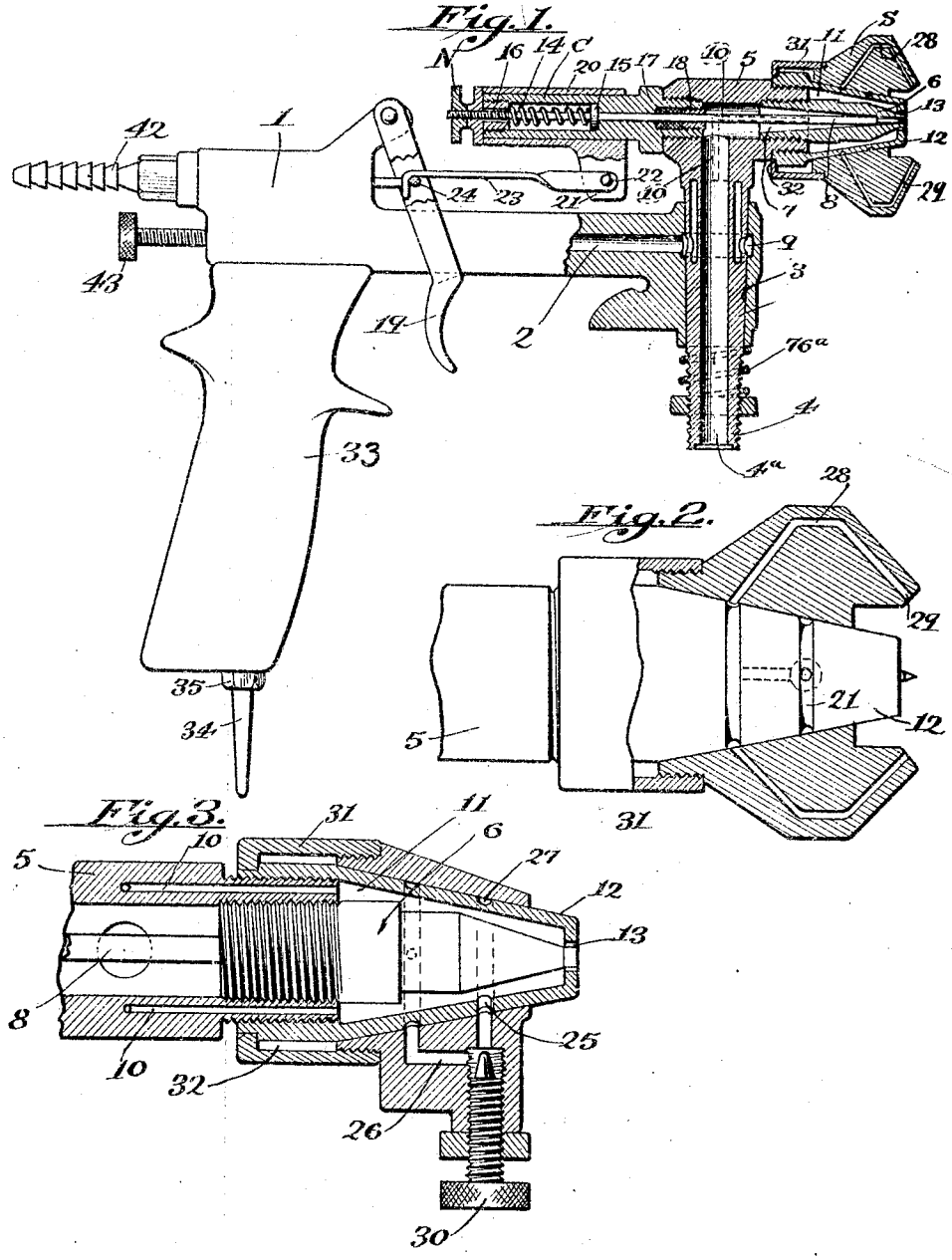


Fig. 2.

Fig. 3.

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Fig. 6.

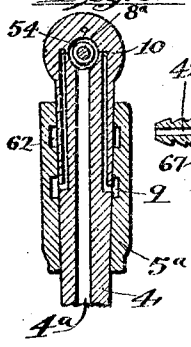


Fig. 4.

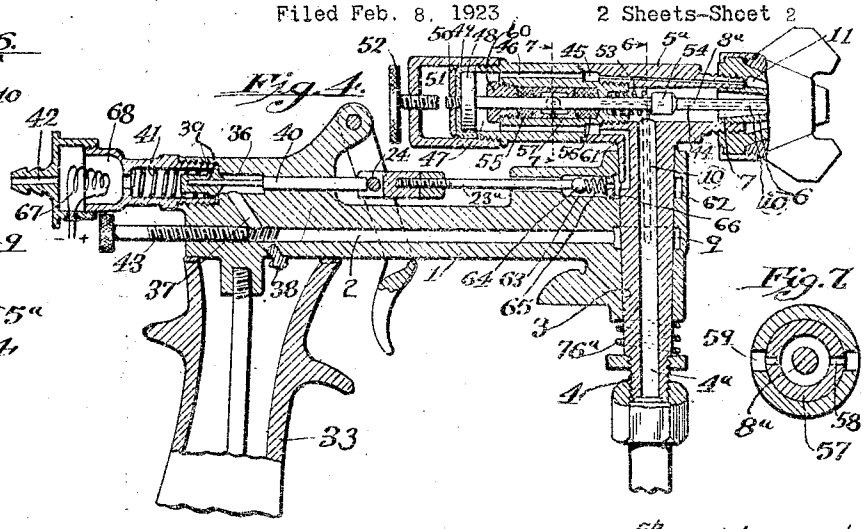
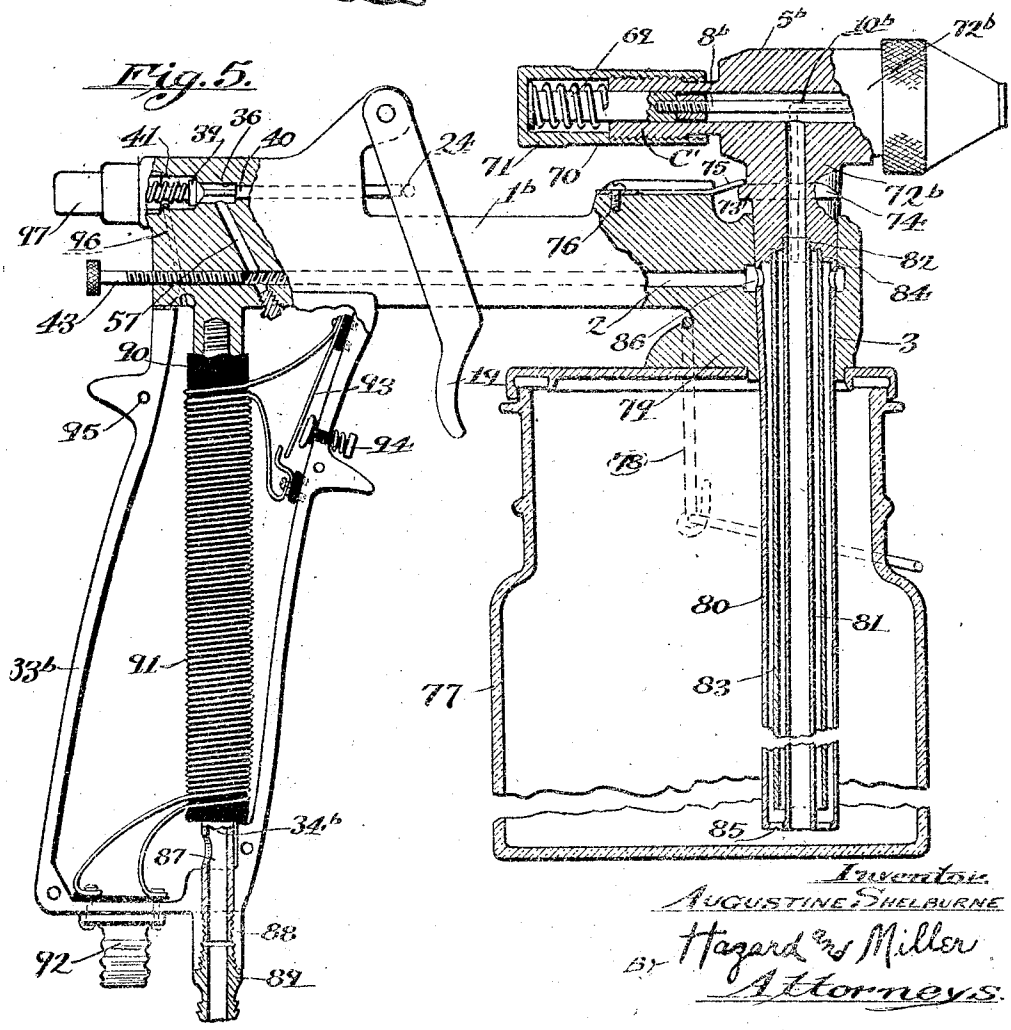


Fig. 7

Fig. 5.



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Patented May 25, 1926. 1,586,009

UNITED STATES PATENT OFFICE.

AUGUSTINE SHELBURNE, OF SOUTH PASADENA, CALIFORNIA.

AIR BRUSH.

Application filed February 8, 1923. Serial No. 617,704.

My present invention relates to an air brush, it being a primary object of my invention to provide means for a free rotation of parts, in order to effect a suitable distribution of the paint or other liquid distributed thereby.

It is also one of the primary objects of my invention to provide suitable means for imparting heat to the liquid sprayed by an air brush, in order to maintain the same at a suitable temperature, regardless of external conditions, and even though the nature of the liquid to be sprayed may require a considerable elevation of temperature.

It is a further object of my invention to provide novel means whereby the opening of an air duct may incidentally and sequentially open a duct for the delivery of the liquid to be sprayed; and for this latter purpose I may employ either mechanical or pneumatic means.

It is a further object of my invention to provide an air brush comprising interchangeable parts, in order that suitable substitutions may be made in accordance with the requirements of the work in hand.

Further objects of my invention will appear from the following description taken in connection with the appended claims, it being understood that various features of my invention may be independently used and that various modifications may be made without departure from the spirit and scope of my invention, as the same is indicated by the said description and claims.

It is believed that the general character of my invention will be readily understood from the following description of preferred forms and alternative embodiments thereof, taken in connection with the accompanying drawings, in which—

Figure 1 is an elevation, partly in section, showing a simple form of my air brush, this form comprising a compression spring for closing the liquid exit and disconnectible, positive means for opening the same.

Figs. 2 and 3 are detail views at right angles to one another showing on a slightly enlarged scale the preferred type of spreader attachment, which may be employed in connection with any of my air brushes when a "fish-tail" or similar effect is desired, the mentioned attachment being adjustable to any desired relative angle.

Fig. 4 is an elevation of a device broadly similar to that shown in Fig. 1, but optionally comprising heating means and employing air pressure to open the liquid exit, and providing for a free rotation of the delivery head.

Fig. 5 is a similar view of a preferred alternative form involving means for both generating and transmitting heat, and also comprising a rotatable head.

Figs. 6 and 7 are detail views hereinafter referred to, these being taken respectively on the line 6—6 and the line 7—7 of Fig. 5.

Referring in detail to the form of my invention shown in Fig. 1, 1 is a main barrel provided with a main air duct 2 and containing a tapered seat 3 adapted to receive a correspondingly tapered suction tube 4 which may be integral with the delivery head 5. By means of the tapered connection referred to, this delivery head may be adapted to rotate relatively to the main barrel 1, and its forward portion may comprise an inner nozzle 6 provided with a passage 7, which may be closed by a needle valve 8, this valve controlling the movement of liquid that may be drawn up through the suction tube 4. To cause the mentioned movement of liquid through the inner nozzle 6, I provide means, such as the annular channel 9 connecting with the subsidiary air inlet ducts 10 leading into an annular space 11 within the nozzle cap 12, in order that the escape of air through the main air exit 13 may have an aspirating effect upon the liquid within a receptacle into which the suction tube 4 may extend. Ducts 10 are parallel with duct 4^a.

In order to provide for imparting suitable movement to the needle valve 8, I prefer to provide a chambered extension C at the rear of the delivery head 5, this extension being shown as containing a closing spring 14, adapted to engage at one end a lug 15 upon the mentioned valve, and adapted to engage at the other end a tapped plug 16, having threaded engagement with the walls of the extension chamber. Suitable packing 17 may be held in place by a gland 18, and suitable means may be provided for a retraction of the valve 8. In order that the valve 8 shall be retracted whenever air is permitted to enter the main air duct 2, this being effected by means of a trigger 19, I may provide, on the outside of the mentioned extension, a retracting sleeve 20, provided with a lug 21 to which I may secure by means such as the pin

22, a retracting link 23, which may engage the transverse pin 24 on the mentioned trigger. By the means referred to, it will be seen that I have provided, upon the main barrel of my air brush, a delivery head capable of rotation relatively to this main barrel and provided with disconnectible means, in the form of a retracting link, whereby the needle valve controlling the exit of liquid may be opened whenever air is admitted into said main barrel, to atomize a liquid drawn through said delivery head.

In the preferred form of my invention, as shown in Figs. 1, 2 and 3, I employ a spreader attachment S upon the nozzle cap 12 and provide the latter with a lateral port or opening 25, which I may refer to as a spreader inlet, this opening being preferably connected by a short duct 26 with a plurality of annular grooves 27, which may be cut in the exterior of the mentioned nozzle cap, one of these grooves being opposite the spreader inlet, and the other being opposite a plurality of spreader ducts 28 leading to the spreader exits 29 (see Fig. 2), the construction being such that the jets of air provided by these spreader exits made to produce a "fish-tail" effect upon the atomized liquid escaping through the central aperture 13 of the nozzle cap. I prefer to provide in the spreader attachment S a suitable means for the control of air escaping therethrough, and such means may comprise the valve 30, as shown in Fig. 3. In order to permit a free rotation of the mentioned spreader attachment relatively to the delivery head 5, I prefer to employ means such as the retaining collar 31, which may have, at one end, a threaded engagement with the spreader attachment, and at the other end, may engage an annular channel 32 cut in the nozzle cap, or the angular body 5.

The form of my invention shown in Figs. 1, 2 and 3 comprises a handle 33, which may be held in place by means of a bolt 34 and a nut 35, as well as certain features of construction which are common to the forms shown in subsequent figures, as for example Fig. 4, in which it will be seen that I have provided a valve chamber 36 extending parallel with the main air duct 2 and connected therewith by a transverse duct 37, plugged at 38, the valve 39 being provided with a rod 40 which may be unseated by the camming action of the mentioned transverse pin 24, on the trigger 19. It will be understood that the unseating of the valve 39, against the compressive action of the spring 41, will permit the entrance of air through the air inlet 42, and the maximum movement of fluids may be further controlled by the choke valve 42 and by nut N.

Referring now to the specific form of my invention shown in Fig. 4, it will be noticed that although the link 23ª may optionally be rendered inoperative, as by disconnecting it from the pin 24, no disconnecting of this link is necessary, in this form of my invention, to permit a free rotation of the delivery head 5ª. In order to obviate the necessity of such disconnection, I may provide pneumatic means for the control of the needle valve 8ª from the trigger 19. It being understood that air may be admitted through the main air duct 2 and the subsidiary air ducts 10, as in the form of my invention already described, I provide an additional air duct 44 leading from within the nozzle cap to an annular chamber 45 from which the ducts 46 lead to a chamber 47 on one side of the retracting piston 48 comprising, for example, the leather cup 49 secured by the disc 50 and moving within the chamber 51, which may be provided with an adjusting screw 52 to limit the outward movement of said piston. The needle valve 8ª may be seated by any suitable means such as the compression spring 53 bearing upon the abutment nut 54, and the escape of air along the sides of the valve stem may be obviated by the use of packing as shown at 55 and 56, this packing being held in place by a central cage 57 (which may be provided with lateral ports 58 opposite to openings 59) and by means of the gland 60.

In order to permit the escape of air from the chamber 47 at the moment when the valve 8ª is to be seated by the action of the spring 53, I may provide an exhaust duct 61, connecting by the annular groove 62 with the valve chamber 63, within which is the ball valve 64 seated by the spring 65, which may be held by the perforated nut 66, the ball valve 64 being unseated by the movement of the mentioned link 23ª, releasably connected with the pin 24 upon the trigger 19. From the construction described, it will be obvious that when the trigger is pulled, to permit the entrance of air through the main duct 2, the ball valve 64 being seated, the pressure of air will retract the piston 48 and thereby the needle valve 8ª; and that, when the trigger is released, the ball valve will be unseated, thereby permitting an escape of air from the chamber 47, and the seating of the valve 8ª under the action of the spring 53.

Figs. 4 and 5 both involve the incorporation of heating means with other features of my invention. In Fig. 4 I have diagrammatically indicated, in connection with the air inlet 42, a heating means 67 within a heating chamber 68, this heating means being sufficient, in some cases, to maintain the entire air brush, and the liquid delivered thereby, at a suitable temperature.

In the form of my invention shown in

Fig. 5, I employ means in the form of a spring 69 for withdrawing the needle valve 8^b, to permit the delivery of paint or other liquid, this spring being seated within a chambered extension C' about which I provide the threaded cap 70, having the head 71, by the rotation of which the needle valve 8^b may be seated. In this form of my invention I employ very simple means for securing the delivery head 5^b within the tapered aperture of the barrel 1^b in such manner as to permit its free rotation. Upon the upper portion of the connecting plug 72^b I prefer to provide a collar 73 cut away at one side which I may term the front, the mentioned collar being provided with a beveled portion shown at 74 adjacent the opening therein, in order that the rotation of the head relative to its seat may cause the mentioned collar to be engaged by the spring 75, held by means such as the screw 76. This has advantages over the use of the compression spring 76^a. By the means referred to the delivery head is held in place, although free to rotate, and capable of being withdrawn by turning the nozzle end of the head to the rear.

Perhaps the most important features of novelty in the form of my invention shown in Fig. 5, are those which relate to the heating of the liquid which is to be delivered by my air brush and which may be confined within a detachable receptacle 77, which may be held in place by means such as the spring bail 78 adapted to engage upon the extension 79, which may be integral with the barrel 1^b. In this form of my device, instead of permitting the air which is used in aspirating the liquid to ascend directly through the delivery head, I employ a means for conducting preheated air into the receptacle which may contain a paint, or varnish, or enamel, in such manner as to maintain and deliver the same at a proper temperature. For this means I prefer to provide an outer sleeve 80 which may be integral with the tapered connecting plug 72^b and may be brazed to an inner tube 81 after the same is threaded, as shown at 82, into the said connecting plug, an intermediate tube 83 having been previously threaded therein at 84, this intermediate tube being adapted to extend to a point slightly above the flange 85 by which the inner tube 81 is connected with the outer sleeve 80.

By the means described, it will be apparent that I have provided means by which preheated air, entering through the port 86, may be caused to descend to the bottom of the tube 83 and then rise between the tubes 81 and 83 before passing into the ducts 10^b leading to the outlet of the nozzle cap, the liquid from the receptacle 77 being drawn up through the inner tube 81 and atomized in the usual way.

In order to preheat air entering through the main air duct 2, I may provide any suitable means, and in Fig. 5 I have shown a heating means enclosed within the handle of my air brush, this construction being advantageous in enabling the operative to judge of the temperature of the air employed. In the form shown, I have substituted a tube 34^b having an air inlet opening at 87 for the bolt 34 shown in Fig. 1, and in place of the ordinary nut 35 I employ a cupped nut 88 provided with a thread to engage the nipple 89, with which an air hose may be connected. About the tube 34^b I may provide a tube 90 of insulating material such as pocelain, and upon this I may wrap a heating coil 91 with which I may connect a plug 92, and a switch 93, which may be operated by means such as the finger piece 94, passing through the handle 33^b, which may be of insulating material, and which may be provided with a cover plate (not shown) secured by screws entering the openings 95. Air entering through the opening 87 and heated by the described means may pass into the valve chamber by means of the duct 96, and a cap 97 may be employed to close the alternative opening in which the nipple 89 may be seated when the heating means is not to be employed.

From the foregoing description, it will be apparent that I have provided an air brush having a delivery head which may be freely rotated and which carries a spreader attachment adapted for free rotation thereon; and it will also be appreciated that I have provided means by which a fluid delivered through said head may be brought to and maintained at a suitable temperature, such as may be required for the application of enamels or other coating materials in a fine spray under varying conditions.

The nut N and the adjusting screw 52 and the head 71 constitute means for controlling of the needle valve regardless of the angular adjustment of the delivery head or angular body 5 or 5^a or 5^b; and it will be understood, for example, that I may employ the valve control of Fig. 1 or Fig. 4 in connection with the heating or the heat exchanging means shown in Fig. 4 or Fig. 5.

What is claimed is:

1. In an air brush, a main barrel provided with a main air duct extending longitudinally therethrough, and a delivery head comprising a connecting plug movable in said barrel on an axis extending at an angle thereto and provided with a liquid duct extending throughout its length.

2. In an air brush, a main barrel provided with a main air duct extending longitudinally therethrough, and a delivery head comprising a connecting plug movable in said barrel on an axis extending at an angle thereto and provided with a liquid duct ex-

tending throughout its length and with subsidiary air ducts.

3. In an air brush, a main barrel provided with a main air duct extending longitudinally therethrough, and a delivery head comprising a connecting plug movable in said barrel on an axis extending at an angle thereto and provided with a liquid duct extending throughout its length and with subsidary air ducts parallel with said liquid duct.

4. In an air brush, a main barrel provided with a main air duct extending longitudinally therethrough, and a delivery head comprising a connecting plug movable in said barrel on an axis extending at an angle thereto and provided with a liquid duct extending throughout its length and with subsidary air ducts parallel with said liquid duct and connecting with said main air duct by means of an annular groove.

5. In an air brush, a main barrel provided with an air duct, an angular body element provided with a liquid duct and mounted to permit rotation on said barrel on an axis extending at an angle thereto, and a spreader mounted to permit rotation relatively to said angular body.

6. In an air brush, a main barrel, an angular body mounted for rotation thereon, and compression means for retaining said body seated in said barrel on an axis extending at an angle thereto.

7. In an air brush, a main barrel, an angular body mounted for rotation thereon, and compression means for retaining said body seated in said barrel on an axis extending at an angle thereto, said barrel being provided with an air duct, and said angular body being provided with a liquid duct.

8. In an air brush, a main barrel, an angular body mounted for rotation thereon, and compression means for retaining said body seated in said barrel on an axis extending at an angle thereto, said barrel being provided with a trigger adapted to control inlet of air.

9. In an air brush, a main barrel, an angular body mounted for rotation thereon, and compression means for retaining said body seated in said barrel, said angular body being provided with a valve to control the liquid outlet.

10. In an air brush, a main barrel, an angular body mounted for rotation thereon, and compression means for retaining said body seated in said barrel, said barrel being provided with a trigger adapted to control the exit of air, and said angular body being provided with a valve to control the liquid outlet.

11. In an air brush, a main barrel, an angular body mounted for rotation thereon, compression means for retaining said body seated in said barrel, said barrel being provided with a trigger adapted to control the exit of air, said angular body being provided with a valve to control the liquid outlet, and means for opening said valve by a movement of said trigger.

12. In an air brush provided with main barrel having a trigger and with a revolvable delivery head provided with a valve, manual means on said delivery head for controlling the position of said valve regardless of the angular adjustment of said delivery head, and additional means for opening said valve by means of said trigger.

13. In an air brush comprising a barrel having an air passage and a delivery head revolvable upon an axis extending at an angle relatively thereto, a trigger mounted on said barrel for controlling an air inlet, a valve for controlling the liquid outlet in said revolvable head, and connecting means whereby the movement of said trigger may operate said valve.

14. In an air brush comprising a delivery head mounted for rotation upon a barrel and on an axis extending at an angle thereto, said head being provided with a needle valve, resilient means for moving said valve in one direction, and manual means capable of controlling the movement of said valve regardless of the angular adjustment of said delivery head.

15. In an air brush comprising a delivery head mounted for rotation and with a needle valve, resilient means for moving said valve in one direction, manual means capable of controlling the movement of said valve regardless of its angular adjustment, and additional means comprising a trigger for moving said valve.

16. In combination, a nozzle cap provided with a duct for the lateral escape of a fluid therethrough, and with a plurality of annular grooves in the circumference thereof, and a spreader having ducts adapted to connect said grooves and to provide an exit thereof, said ducts being provided with a valve.

17. In an air brush adapted to fit upon a receptacle, a suction tube extending therein, means on said brush for imparting heat to the liquid in said receptacle, said means comprising a heat exchanging element adapted to extend into the said receptacle and to surround said suction tube.

18. In an air brush adapted to fit upon a receptacle, a suction tube extending therein, means on said brush for imparting heat to the liquid in said receptacle, said means comprising a heat exchanging element adapted to extend into the said receptacle and to surround said suction tube, in the form of concentric tubes.

In testimony whereof I have signed my name to this specification.

AUGUSTINE SHELBURNE.