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MULTICOLOR SPRAY GUN

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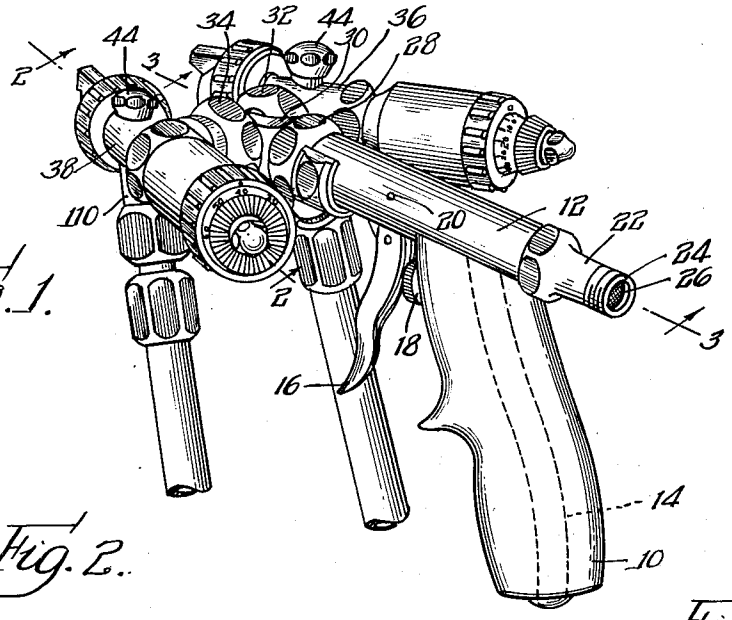


Fig. 1.

Fig. 2.

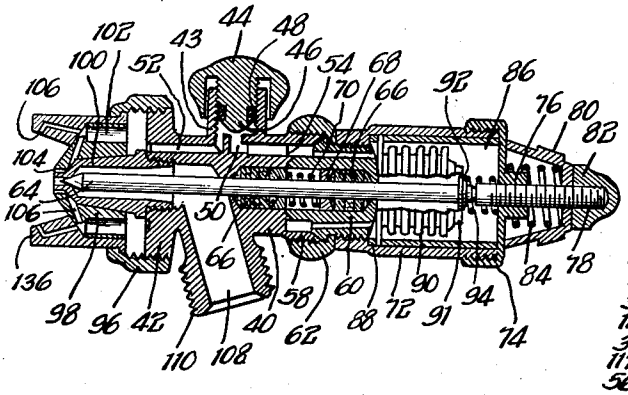


Fig. 3.

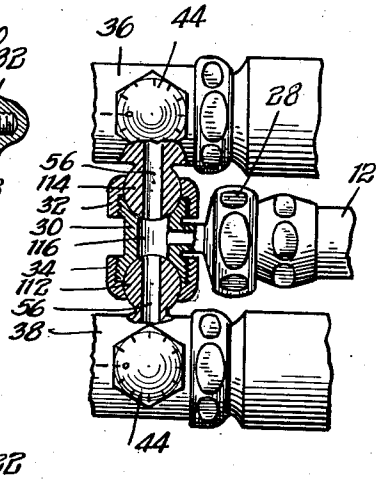
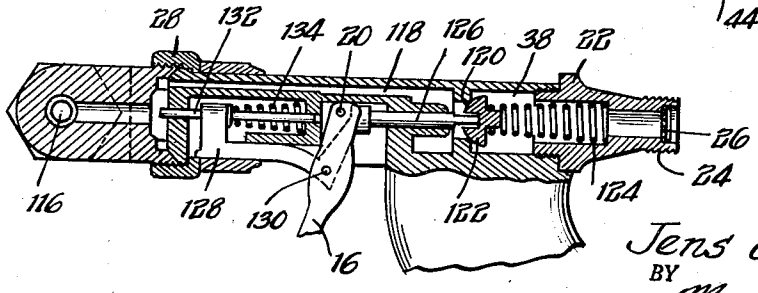


Fig. 4.



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MULTICOLOR SPRAY GUN

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1 Claim. (Cl. 299—140)

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The present invention relates to a multi-color spray gun of the type having a plurality of nozzles mounted upon a hand support provided with a control lever or actuating trigger. More particularly the present invention relates to such apparatus for applying a plurality of colors or for applying a protective coating by the coalescence of two compositions as for example latex and a coagulant such as acetic acid or other chemical fluids or silver, gold, and other chemical metals applied by atomized mixture of fluids of varying compositions.

Heretofore it has been proposed to utilize a plurality of spray guns or airbrushes for certain classes of work such as the application of a plurality of colors to produce unusual blended effects. Such effects are often utilized in the preparation of wall paper and the like where the colors may be evenly blended or the one color may be applied so as to predominate over the other color. For certain other classes of work it is desired to protectively coat articles, as for instance coating the uppers of shoes to protect them from becoming soiled or injured during subsequent operations. Such protective coating commonly is one which is removable from the finished shoes in a safe and easy manner and comprises the application of latex together with a coagulant such as acetic acid. For such purposes it is desired to provide an arrangement whereby the spray pattern may be controlled individually from a small round to a wide fan shape by a calibrated adjustment. It further is desired to provide an adjustment whereby the proportions of the materials to be applied may be adjusted, particularly where it is desired to produce two-tone effects with difference colors.

In accordance with the present invention, a plurality of automatically opening and closing airbrush nozzles are mounted on a common support provided with a control lever or trigger. The control lever or trigger controls the supply of air to each of the airbrush nozzles which are actuated by an air cylinder connected to the needle valve of the fluid conduit.

It, therefore, is an object of the present invention to provide an improved multi-fluid airbrush.

It is a still further object of the present invention to provide an improved multi-fluid airbrush carried by a common support whereby the position of each of the individual nozzles may be adjusted relative to the other nozzles and the support so that the spray patterns can be made to converge at a desired point ahead of the nozzles in accordance with the effect to be

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produced either when different colors are used or when coagulating materials or other chemicals are mixed in the atomizing area.

It is a still further object of the present invention to provide a multi-fluid airbrush with a plurality of nozzles which are controlled and independently regulated to deliver varying quantities of fluids to obtain the desired results by a single trigger action.

Other and further objects of the present invention subsequently will become apparent by reference to the following description taken in connection with the accompanying drawing wherein

Figure 1 is a perspective view of the assembled multi-fluid airbrush;

Figure 2 is a cross sectional view of one portion of the invention shown in Figure 1 as seen in the direction of the arrows along the line 2—2;

Figure 3 is a cross sectional view of another portion of the invention shown in Figure 1 as seen in the direction of the arrows along the line 3—3; and

Figure 4 is a plan view of the common juncture of the various adjustably positioned parts with a portion of the common juncture broken away.

Figure 1 shows a handle 10 connected to a cylindrical body member 12 by means of a rod 14. The cylindrical body member is provided with a control lever or trigger 16 limited in operation by an adjusting screw 18. The lever 16 is pivotally secured to the barrel 12 by a bearing pin 20. The rear portion of the cylindrical body 12 is provided with a coupling connection 22 which threadedly engages the rear portion of the body 12. The coupling 22 adjacent its end is provided with an external threaded portion 24, and the aperture at the end thereof may be provided with a filter screen 26. The coupling 22 is adapted to be connected by a suitable conduit to a source of aeriform substance under pressure such as air. At the forward end of the cylindrical body 12 there is threadedly mounted a union ring 28 and a T-conduit 30. The T-conduit 30 is provided with two union nuts 32 and 34 for supporting two nozzle assemblies 36 and 38 in adjustable manner. Since each of the nozzle assemblies is of a construction similar to that of each of the others, only one of the nozzle assemblies will be described in detail.

By referring to Figure 2 the details of each nozzle assembly will become apparent. Each assembly includes a body portion 40 having a forwardly extending outwardly threaded portion 42 which supports a nozzle assembly. The body

portion 40 has an upwardly extending pipe-like portion 43 which is provided with internal threads for engagement by an indexed adjustable valve member 44 which has a valve head portion 46. Between the valve head portion 46 and the head portion 44 there is mounted a resilient ring 48 which engages the inner threaded walls of the upstanding pipe portion 42 to retain in adjusted position the adjustable valve 44. The valve head portion 46 cooperates with a valve seat 50 located at the juncture of three passages 52, 54, and 56, the latter passages being shown in Figure 4. The passage 52 extends forwardly to the nozzle structure whereas the passage 54 extends rearwardly toward a needle valve controlling structure. The rearward portion of the body 40 is provided with an externally threaded portion 58 which surrounds a conical seat into which is fitted an intermediate member 60 secured in position by a ring nut 62. The rearwardly extending portion of the body 40 and the intermediate member 60 are provided with a central aperture for receiving a needle valve 64 and the packings therefor which include at each end packing rings 66, packing glands 68, and a spring 70 positioned between the two packing glands. The rearward extremity of the intermediate member 60 is provided with external threads which are engaged by the internal threads of a housing 72. The housing 72 at its rear end is provided with threads which are engaged by a cap 74 having a central internally threaded boss 76. The boss 76 carries a threaded member 78 which adjacent its rear portion is provided with a conical adjusting member 80 having indicia thereon. The member 80 is retained in position on the threaded rod 78 by a lock nut 82. Within the conical member 80, there is positioned a coiled spring 84 which tends to retain in adjusted position the conical member 80. The threaded rod 78 extends through the boss 76 into a chamber 86 within the housing 72. The chamber 86 contains a compression or packing ring 88 which is engaged by the flange of a metal bellows member 90. The end of the metal bellows 90 is provided with a centrally apertured reinforcement 91. The needle valve 64 adjacent its rear end is provided with a reduced diameter portion which carries a collar 92 which is engaged by a spring 94 which also engages the cap 74. The reduced diameter portion of the needle valve 64 abuts the inner end of the threaded rod 78.

The forward extending body 42 is engaged by a ring nut 96 of a nozzle 98. The nozzle 98 surrounds a valve seat 100 which is threadedly mounted in the body 40. The nozzle 100 has an annular passage 102 which is provided with primary and fanning air outlets 104 and 106, respectively. The annular passage 102 is in communication with the forwardly extending passage 52 of the body 40. The needle valve 64 cooperating with the valve seat 100 controls the egress of fluid from a passage 108 formed in a downwardly extending nipple portion 110 which is adapted to be connected to a source of fluid or liquid.

Reference may now be had to Figures 3 and 4 for an explanation of the remaining structure. From this it will be seen that the body members 36 and 38 are provided with ball portions 112 and 114 which have passageways 56 therein connected with a T-passage 116. The T-passage 116 is contained within the swivel member 30 and extends rearwardly in communication with passages within the cylindrical body 12 mounted on the handle 10. The forwardly extending portion 30 which carries the passage 116 is secured on to the cylindrical body 12 by the ring nut 28. The passage 116 communicates with the longitudinally extending passage 118 which is controlled by a valve opening or seat 120 against which a valve head 122 operates. The valve head 122 is biased toward closure by a spring 124 which is mounted within a recess in the rear extension member 22. The valve head 122 is arranged to be moved rearwardly against the action of the spring 124 by a rod 126 which is actuated by an upward extension of a lever 128. The lever 128 is pivotally connected to the trigger 16 by a pivotal connection 130. The lever 128 has an upwardly extending portion provided with a mounting for receiving a longitudinally extending rod 132 which is surrounded by a spring 134. The spring engages a portion of the cylindrical body 12 and the lever 128 so as to bias the trigger 16 toward a forward position.

Air is supplied under pressure by a suitable hose coupled to the threaded portion 24. When the trigger 16 is actuated air is admitted past the valve 120 into the passage 118 from which it enters the passage 116. The passage 116 is a T-shaped passage which communicates with the passage 56 extending through the ball connections to the bodies 36 and 38. The air therefore enters the passage 54 shown in Figure 2 and passes on into the bellows 90. Air pressure in the bellows 90 causes the bellows to expand against the action of the spring 94 thereby to move rearwardly the needle 64. A regulated amount of the air from the passage 56 passes through the valve seat 50 which is controlled by the valve head 46 of the valve member 44 into the passage 52 from where it goes into the passages 102, 104, and 106 of the nozzle structure 98. The escape of the primary air from the passage 104 which surrounds the needle valve seat 100 produces a partial vacuum or suction action which draws fluid or liquid up through the passage 108 for discharge from the nozzle head. By adjusting the indexed valve member 44 the amount of liquid discharged may be regulated by indexed means making identical feed of quantity of fluid desired. By adjusting the two forwardly extending portions 136 of the nozzle structure 98 the configuration of the spray may be varied from a circle to a fan shape. The adjustment of the valve 44 regulates the flow or volume of air through the passage 104 thereby to produce a high or low degree of atomization of the fluid to be sprayed. The two nozzles by virtue of the ball and socket connections are arranged so that at a selected distance in front of the nozzles the two spray patterns meet and become thoroughly mixed so that chemical solutions or different coatings may be variably atomized. By combining the two patterns, different combinations or color blends granulated, stipled or other color or chemical effects may be produced. The provision of two or more adjustably positioned spray heads also provides an apparatus whereby the materials sprayed may be evenly coated even though the coating otherwise would be difficult of application due to premature interaction of chemical or due to a separation of the constituents. By maintaining separate the various constituents, these disadvantages are overcome.

The instant at which the various needle valves are actuated may also be controlled by adjustment of the indexed adjustable members 80.

This adjustment in accordance with the reading indicated by the index controls the amount which each of the needle valves is opened, thereby also providing another means for accurate control of the proportions of the materials atomized and projected by each of the spray guns.

In multi-color world therefore a particular color may be projected in a quantity so as to predominate over the other color projected by the other spray gun. In spraying protective coatings, the proper proportions between the coating base and the coagulant may be controlled so that at a certain distance from the nozzles the two fluids will coalesce. By the ball and socket connections between the main support and the individual spray heads, it is possible to control the point at which the two fluids are atomized or commingle or mix.

While for the purpose of illustrating and describing the present invention, one embodiment has been shown wherein two or more airbrush nozzles have been provided so as to be air controlled by a single trigger lever, it is to be understood that a greater number might be utilized since obviously additional ball and socket joints could be provided. It will also be appreciated that such variations and modifications in the components and in their arrangements are contemplated as may be commensurate with the spirit and scope of the invention set forth in the following claim.

This invention is hereby claimed as follows:

In a multi-fluid airbrush, a body portion having a conduit therein adapted to be connected to a source of aeriform substance under pressure, a plurality of spray guns having aeriform substance passages therein, a plurality of ball and socket members interconnecting said body portion and said spray guns, each of said ball and socket members having a passage therein interconnecting said conduit with the spray guns, a single control valve means in said body portion for controlling the passage of aeriform substance from said conduit through said ball and socket member passages into the aeriform substance passages in said spray guns, a nozzle for each spray gun including fanning and primary air passages, and a single valve member for each spray gun located at the point of communication between aeriform substance passage therein and the passage through the adjacent ball and socket connecting member to control both the fanning and the primary air passages in the spray gun.

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