

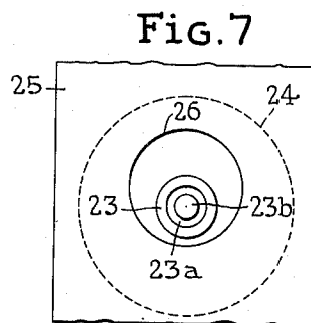
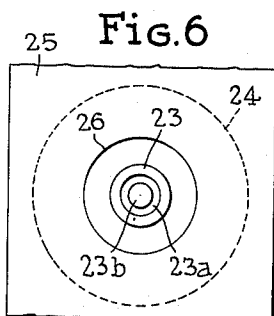
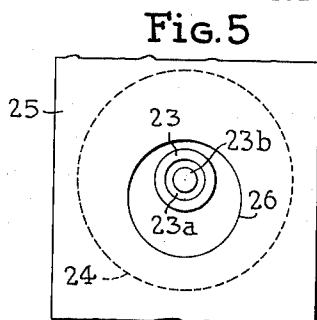
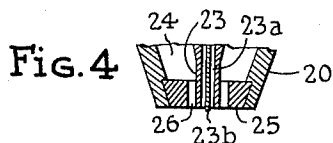
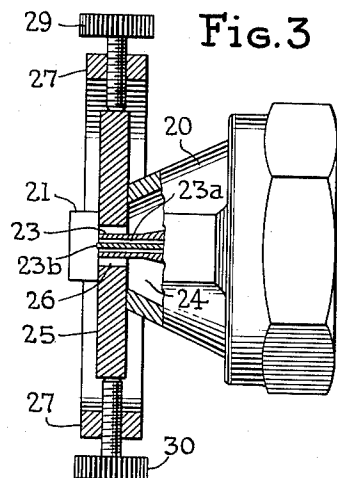
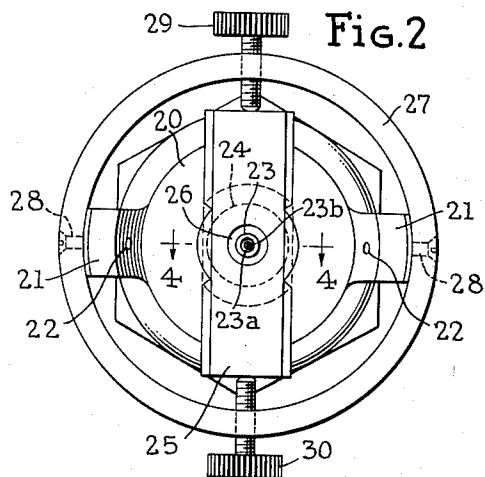
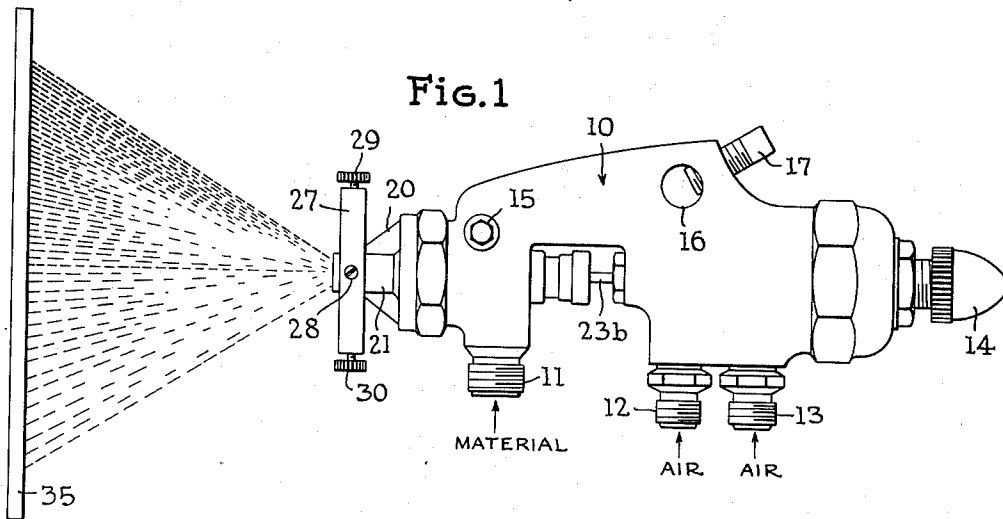
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ADJUSTABLE AIR NOZZLE SPRAY GUN

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2,715,046

ADJUSTABLE AIR NOZZLE SPRAY GUN

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5 Claims. (Cl. 299—128)

This invention is concerned with apparatus for spraying coating materials, and more particularly with improvements in a spray gun head for controlling the spray distribution pattern and/or concentration.

In the application of electroconductive coatings or films upon glass and similar objects, such coatings have been applied by spraying the conductive material with an air-operated spray gun. Conventional spray guns are designed to project a spray of substantially uniform concentration of sprayed coating material. Where electroconductive films are sprayed upon glass panels to be used as space heaters, windows, windshields, and the like, it is desirable to control the electrical resistance of the conductive film, and hence the heating effect in particular areas of the panels, by varying the thickness of the film. It is thus desirable to deposit a thicker or denser coating of conductive material upon one portion of the glass base than upon other portions of the base. The apparatus described hereinafter has been found particularly in applying a tin salt solution upon a heated glass base to provide a transparent tin oxide electroconductive coating to which an electrical current may be connected for heating the base by electrical resistance heating. The thickness of the conductive film in any area determines the resistance of the film and the amount of heating produced in said area by the electrical potential applied across said area. It will be readily apparent, however, that this invention also has utility in spray coating procedures other than the application of electroconductive films to glass panels.

It is an object of this invention to provide a spray gun head with an adjustable member for accurately controlling the distribution of the spray material.

It is another object of this invention to provide a spray gun head with an adjustable aperture for directing air flow to and around the sprayed material to produce a desired spray concentration and film thickness over a particular area.

It is another object of this invention to provide a spray gun head with a vertically adjustable aperture to control the vertical spray concentration.

It is a still further object of this invention to provide an adjustable aperture mounting applicable to standard spray guns to permit control of the spray concentration.

Other objects and advantages of the present invention and the manner by which they are attained will be more fully understood by reference to the following description of a preferred embodiment of suitable apparatus.

Referring to the accompanying drawings, for the purposes of illustration,

Figure 1 is a side elevational view of a spray gun provided with an adjustable aperture air control mechanism

Figure 2 is an end elevational diagrammatic view of the nozzle of a spray gun showing the mounting for the adjustable aperture mechanism.

Figure 3 is a side elevational diagrammatic view,

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partly in section, of the nozzle and adjustable aperture mechanism.

Figure 4 is a cross section diagrammatic view of the adjustable apertured member and a portion of the nozzle taken on line 4—4 of Figure 2.

Figure 5 is an enlarged diagrammatic view showing one position of adjustment of the apertured member with respect to the spray gun material and air outlets.

Figure 6 is an enlarged diagrammatic view showing another position of the apertured member with respect to the material and air outlets.

Figure 7 is an enlarged diagrammatic view showing still another position of the apertured member with respect to the material and air outlets.

In Figure 1, a conventional automatic spray gun is designated by the numeral 10. The details of the spray gun itself form no part of the present invention. The gun 10 may be provided with a material inlet connection 11, an atomizing air inlet connection 12, and an air control inlet connection 13. Also illustrated are a material control knob 14 and a side port air control 15. The gun may be rigidly supported on a rod or the like passing through the opening 16 and engaged by the set screw 17.

The spray gun nozzle 20 is provided with a pair of forwardly projecting wing members 21 which may have ports or apertures 22 for the delivery of side air to the spray. As shown in Figure 3, the spray nozzle 20 may have a central projecting tube 23 defining an annular port 23a surrounding the control needle 23b for the air projection of coating material. The needle 23b is controlled by knob 14. The tube 23 may be surrounded by an annular port 24 for the projection of additional atomizing air.

An adjustable apertured plate or member 25 is provided in contact with and extending across the end portion of nozzle 20. The plate member 25 is preferably in the form of a sliding bar, and is provided with a circular aperture 26 having a diameter smaller than the outer diameter of the atomizing air port 24. The bar 25 preferably slides in a vertical groove in the end of nozzle 20, and the cross section of bar 25 may be of dovetail shape to slide and be retained in a groove of similar shape in the nozzle end, as shown in Figure 4. The tube 23 and control needle 23b project into the aperture 26 of sliding plate 25. A ring 27 is secured to the wings 21 of the nozzle 20 by means of screws 28. Threaded thumbscrews 29 and 30 extend through ring 27 in vertical alignment and engage the ends of the aperture bar 25. The screws 29 and 30 are utilized to adjust the aperture bar 25 in a lateral direction across the front face of the spray head nozzle 20. The bar 25 should make a close fit against the nozzle 20 to prevent atomizing air from leaking out between the bar and the nozzle.

The operation of the illustrated spray concentration control construction will now be described. When it is desired to spray coat a glass panel 35 or the like with an even thickness coating or film of electroconductive material or other coating material, the thumbscrews 29 and 30 are adjusted to position the aperture bar 25 with its aperture 26 substantially axially aligned with the axis of control needle 23b of the nozzle 20, as shown in Figure 6. In this position the aperture 26 will not disturb the even distribution of sprayed material over the panel 35 being coated. When it is desired to form a thicker coating on the upper portion of panel 35, the aperture bar 25 is adjusted downward to a position such as illustrated in Figure 5. In this position the center of the bar aperture 26 is below the center of the material port 23a and thereby reduces the flow of atomizing air from air port 24 at the upper portion of the spray. The reduction of air flow on the upper portion of the

spray permits coating material to deposit on the upper portion of the panel 35 at a greater rate than on the lower portion. This produces a thicker coating or film of electroconductive material on the upper portion of the panel, which in turn creates a coating of lower electrical resistance and hence greater heating effect upon the application of a given electrical potential across the coating.

Conversely when a low resistance relatively thick coating is desired on the lower portion of panel 35, the sliding bar 25 is adjusted upwards to place its aperture 26 axially above the axis of the material port 24, as illustrated in Figure 7. Such adjustment causes the spray nozzle to apply coating material to the bottom or lower portion of panel 35 at a greater rate than to the upper portion, hence depositing a lower electrical resistance film on said lower portion. It will be apparent that the adjustable aperture bar construction disclosed permits precise adjustment to all positions intermediate of the two extreme positions illustrated in Figures 5 and 7, and hence permits wide variation in and accurate control of the distribution concentration.

The spray concentration control construction may be used with spray gun nozzles having a single circular outlet port for projecting both material and atomizing air through a single port.

Although the present invention has been described with reference to the specific details of a preferred embodiment thereof, it is not intended that such details shall be regarded as limitations upon the scope of the invention except insofar as included in the accompanying claims.

I claim:

1. A spray concentration control construction for an air and coating material spray nozzle having an air discharge port, said control construction comprising, a plate having a single aperture therethrough, said plate being adapted to engage the discharge end of said spray nozzle and overlap said air discharge port, and adjustable means carried by said spray nozzle and engageable with said plate for sliding said plate laterally across said nozzle end to positions in which the axis of said single aperture is displaced from the axis of said air discharge port to modify the air discharge for controlling the concentration pattern of material sprayed from said spray nozzle.

2. A spray concentration control construction for an air and coating material spray nozzle having an annular air discharge port said control construction comprising, a sliding bar having a single circular aperture therethrough, said aperture being of smaller diameter than the outer diameter of said annular air discharge port, said sliding bar being adapted to engage the discharge port end of said nozzle, support means adapted to be secured to said spray nozzle, and adjustable means carried by said support means and engageable with said bar for sliding said bar laterally with respect to said discharge port to positions in which the axis of said single circular aperture in said bar is displaced from the axis of said

annular air discharge port to modify the air discharge for controlling the concentration pattern of coating material sprayed from said nozzle.

3. A spray concentration control construction for an air and coating material spray nozzle having an air discharge port, said control construction comprising, a sliding bar having a single circular aperture therethrough, said bar being adapted to engage the discharge end of said spray nozzle, a supporting ring adapted to be rigidly secured to said spray nozzle adjacent the discharge end of said nozzle, and an adjusting screw carried by said ring and engageable with said bar for sliding said bar laterally across said nozzle end to positions in which the axis of said aperture is out of axial alinement with said air discharge port of said nozzle to control the concentration pattern of coating material sprayed from said nozzle.

4. A spray concentration control construction for an air and coating material spray nozzle having an air discharge port, said control construction comprising, a sliding bar having a single circular aperture therethrough, said bar having longitudinal side edges engageable with the edges of a groove across the discharge end of said nozzle to guide the sliding movement of said bar, support means adapted to be secured to said spray nozzle, thumbscrew means carried by said support means and engageable with the end of said sliding bar to slide said bar in said groove to positions in which the axis of said aperture is out of axial alinement with the axis of said air discharge port to control the concentration pattern of coating material sprayed from said nozzle.

5. A spray concentration control construction for use with a spray nozzle having a central material discharge port and a concentric air discharge port therearound, said control construction comprising, a sliding bar having a single circular aperture therethrough, said aperture being of smaller diameter than the outer diameter of said air discharge port and being of larger diameter than the outer diameter of said material discharge port, said sliding bar being adapted to engage the discharge end of said nozzle, and adjustable means adapted to be supported by said nozzle and engageable with said sliding bar for positioning said bar aperture in positions in and out of axial alinement with the axis of said discharge ports to control the air discharge from said air discharge port and the concentration pattern of coating material sprayed from said nozzle.

References Cited in the file of this patent

UNITED STATES PATENTS

Re. 13,366	Bowers	Feb. 6, 1912
458,762	Charonnat	Sept. 1, 1891
977,748	Milburn	Dec. 6, 1910
1,093,907	Birnbaum	Apr. 21, 1914
1,154,833	Baker	Sept. 28, 1915
1,987,248	Seizer	Jan. 8, 1935
2,035,677	Steinke	Mar. 31, 1936
2,302,488	Bowen	Nov. 17, 1942
2,590,848	Di Stefano	Apr. 1, 1952