

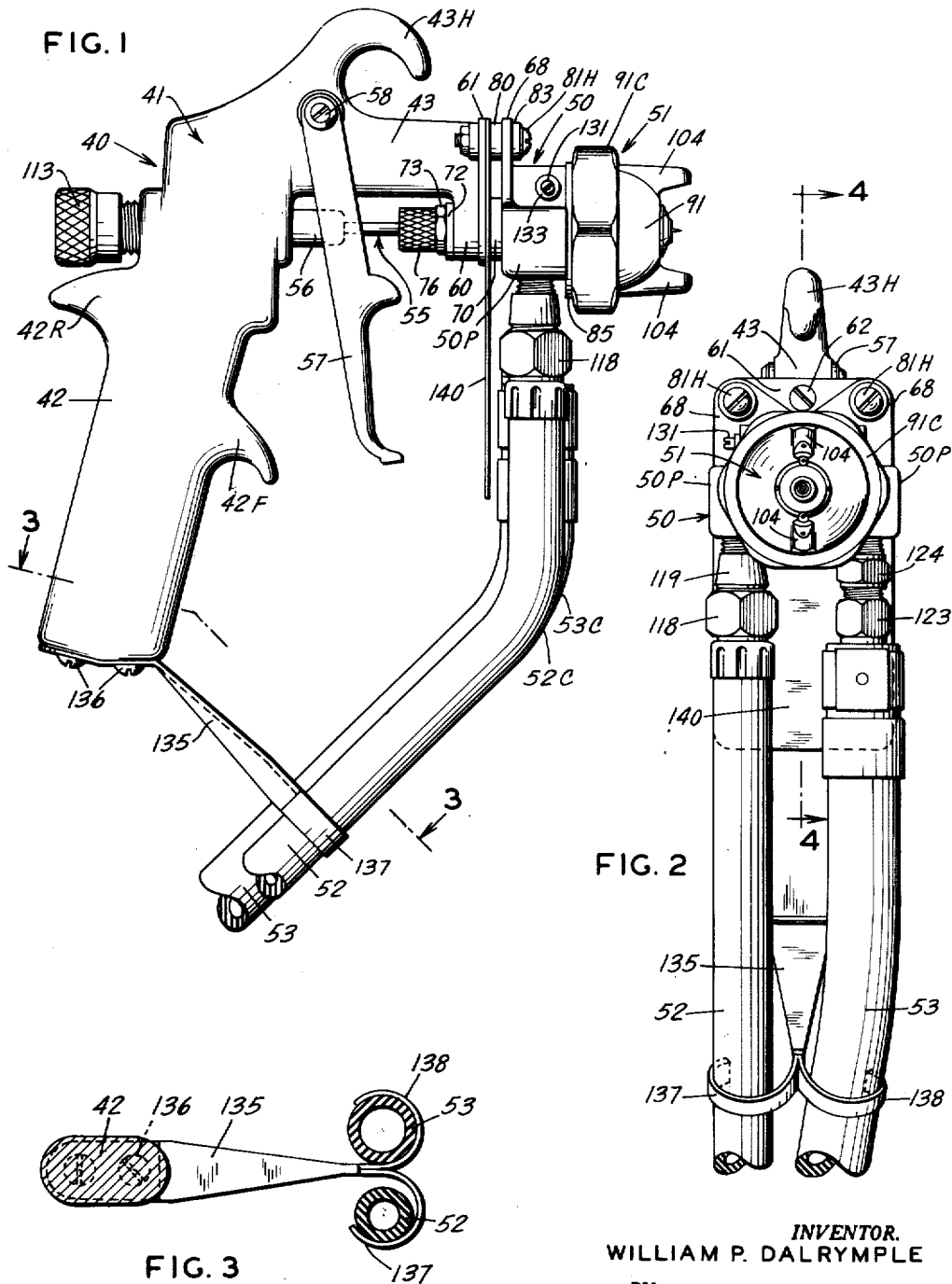
Dec. 16, 1952

W. P. DALRYMPLE
SPRAY GUN

2,621,970

Filed June 2, 1950

5 Sheets-Sheet 1



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5 Sheets-Sheet 2

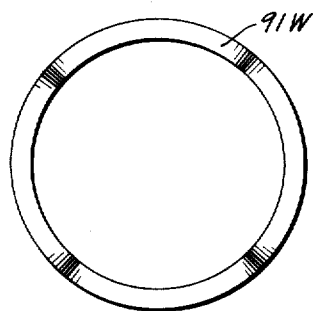
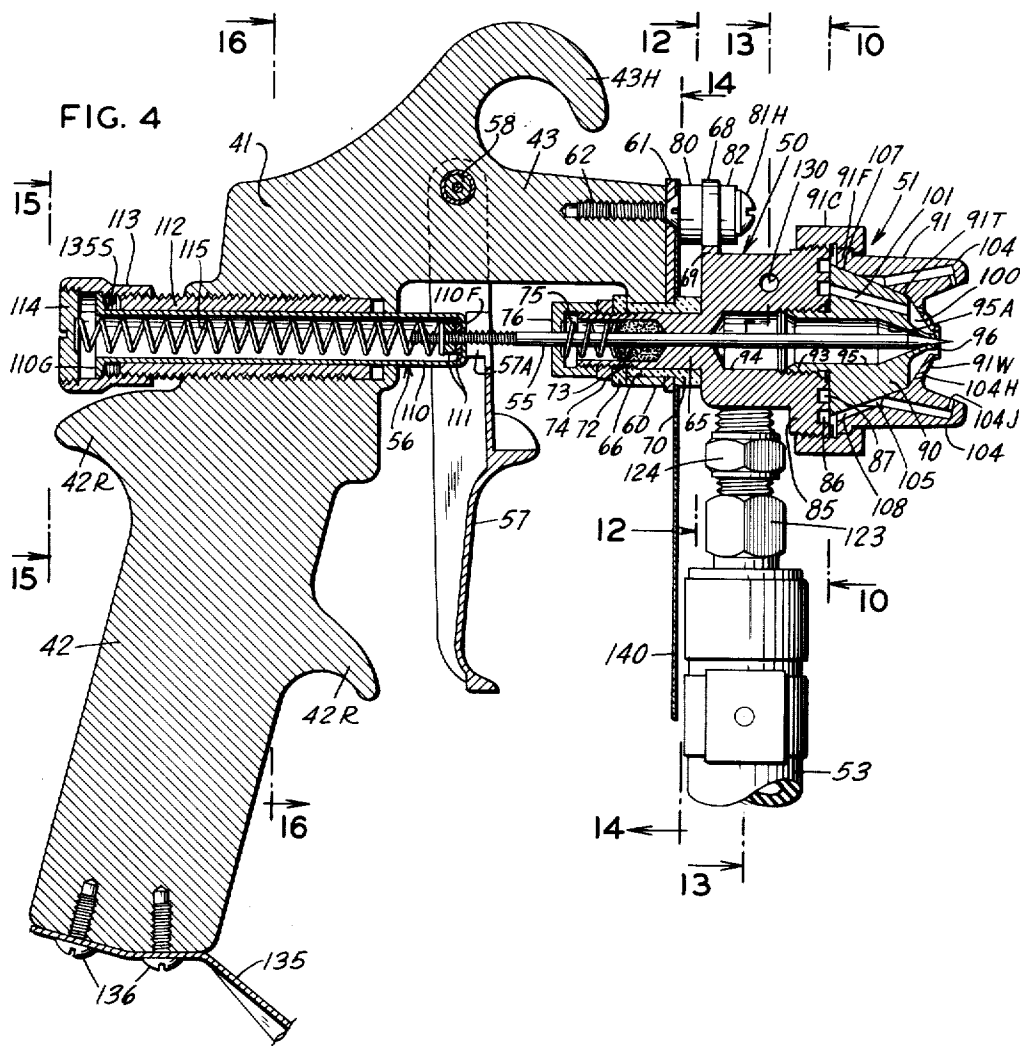


FIG. 4A



FIG. 4B

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5 Sheets-Sheet 3

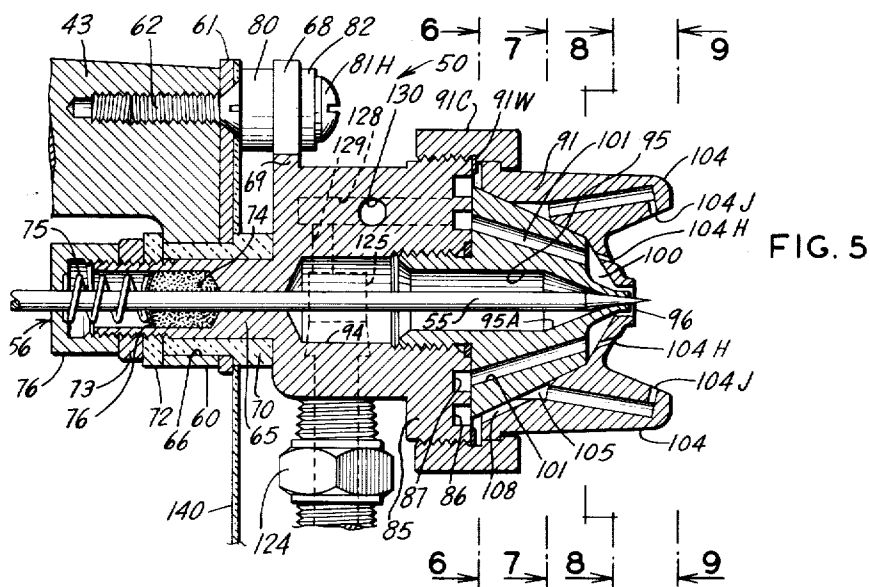


FIG. 5

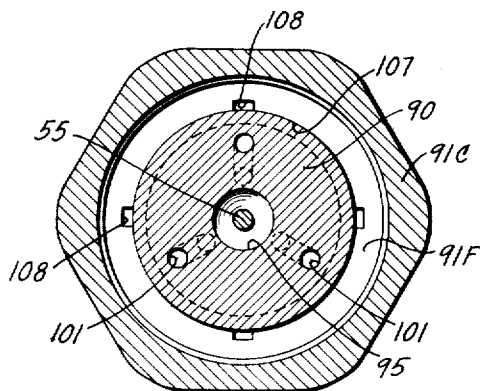


FIG. 6

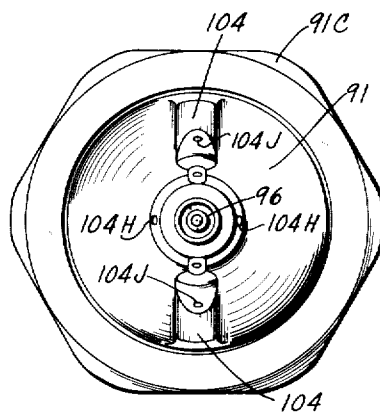


FIG. 9

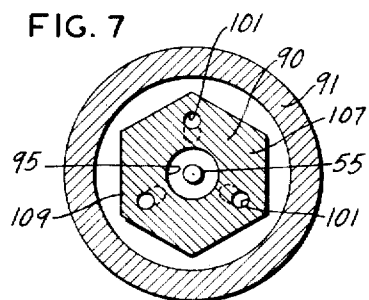


FIG. 7

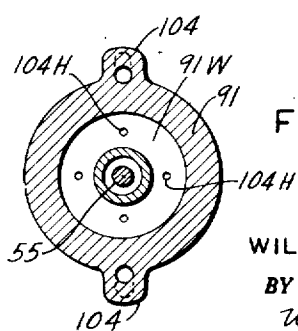


FIG. 8

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5 Sheets-Sheet 4

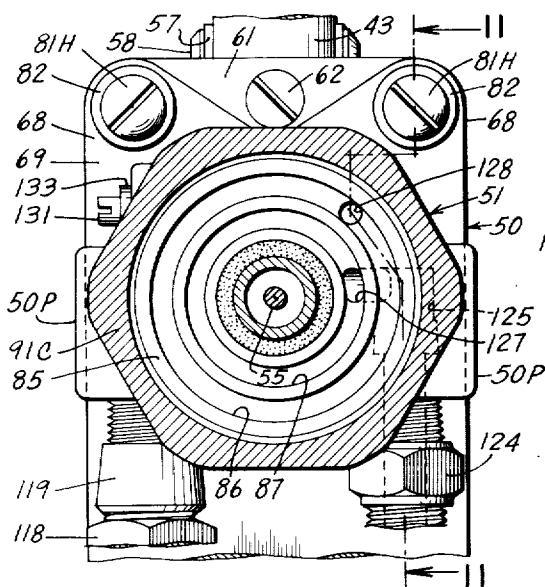


FIG. 10

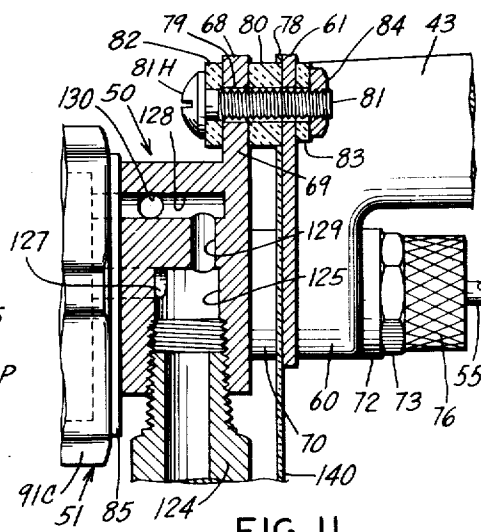


FIG. 11

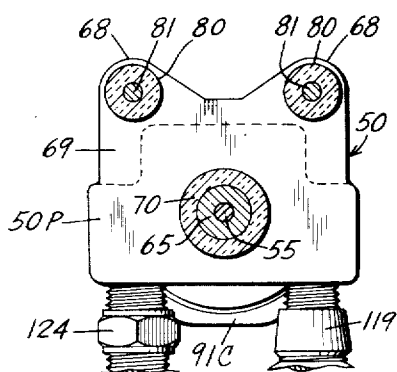


FIG. 12

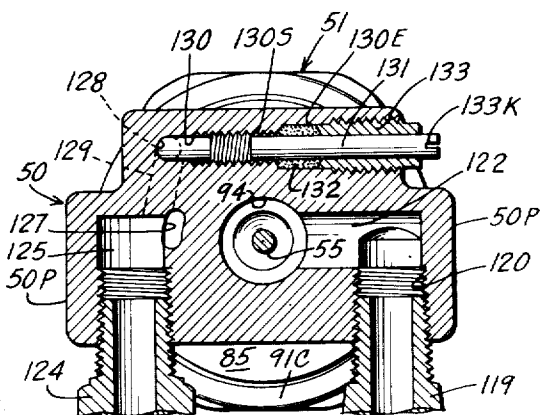


FIG. 13

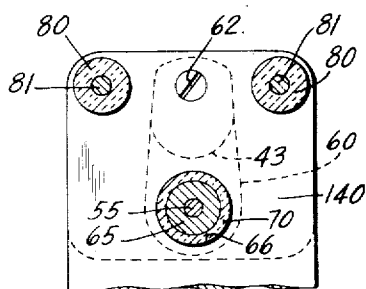


FIG. 14

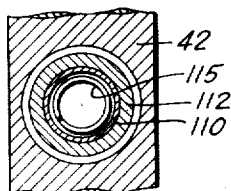


FIG. 16

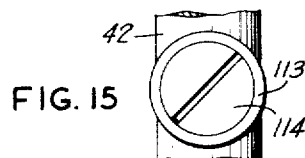


FIG. 15

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5 Sheets-Sheet 5

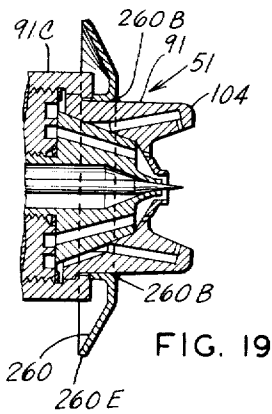


FIG. 19

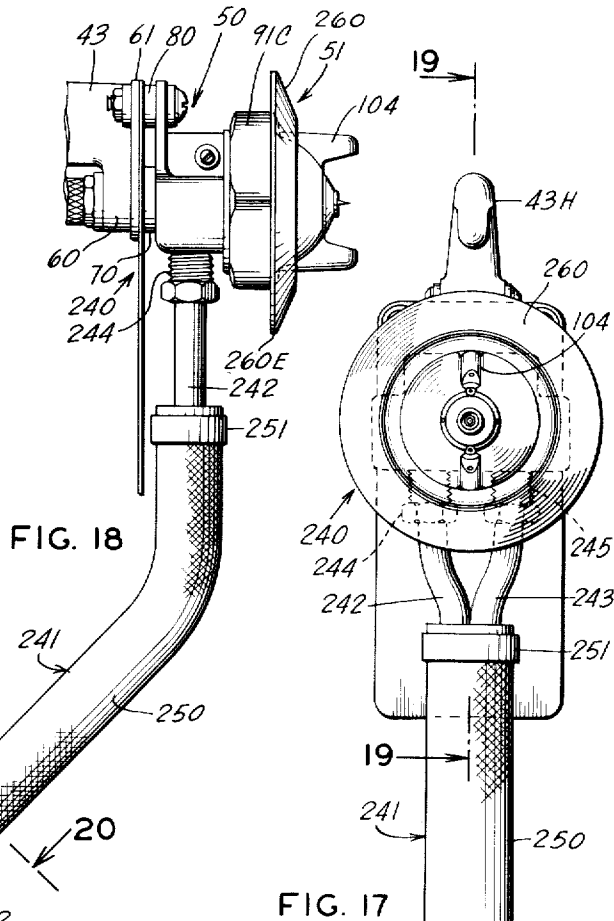


FIG. 18

FIG. 17

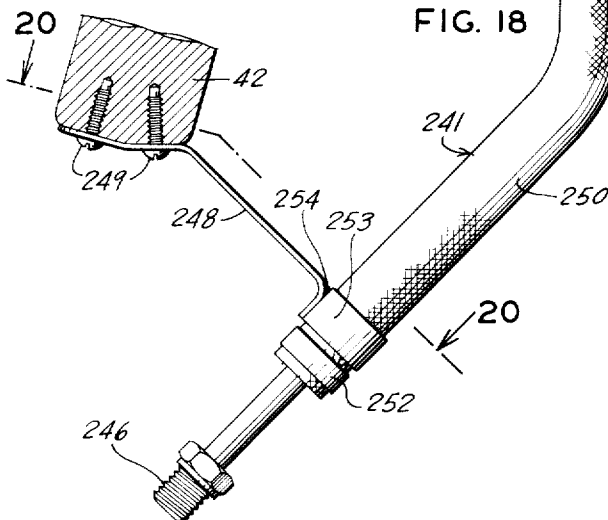


FIG. 20

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UNITED STATES PATENT OFFICE

2,621,970

SPRAY GUN

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Application June 2, 1950, Serial No. 165,786

12 Claims. (Cl. 299—87)

1

This invention relates to spray guns of the type utilized for spraying surface coating materials.

In the paint spraying field, there has been recently developed a method of spraying paints, lacquers, and like surface coating materials through the use of steam as the pressure or motive fluid for atomizing and distributing the coating material, and it has been determined that in many situations such steam spraying of the coating material enables such coating material to be more economically and advantageously applied than where pressure air is used as the motive fluid. In attempts to apply this process commercially, it has been found, however, that use of steam as the motive fluid introduces many problems, particularly by reason of the extreme heat that is encountered. Thus, it is found that in order to enable the coating material to be sprayed through the use of steam where the spray gun is to be handled by the workman, as distinguished from installations where the spray gun is permanently mounted as a part of a machine, there is an objectionable tendency to raise the temperature of the gun to such a point that it is extremely difficult for a workman to handle and manipulate. Most spray guns heretofore developed for this purpose have been of such a character as to require that the workman protect his hands through the use of gloves, and this is recognized as being undesirable because of the delicate character of the control operations that must be performed in order to attain a proper and even distribution of the surface coating material.

In view of the foregoing, it is the primary object of the present invention to enable spray guns to be constructed for use in a steam spraying operation in such a manner that the guns may readily be handled and manipulated by a workman, and an object related to the foregoing is to enable such spray guns to be so constructed that despite the application of steam to certain parts of the gun, the handle and control elements thereof remain at a relatively low and unobjectionable temperature.

Where steam is used as the motive fluid in the application or spraying of surface coating materials, it is, of course, necessary to conduct the steam to the spray gun through hoses or the like that are relatively strong and heavy, and which in many instances may be insulated to avoid heat losses, and where such weight is added to the weight of the paint or coating supply hose, it is found that there is a tendency to disturb the balance of the spray gun, thus to induce fa-

2

tigue on the part of the workman. It is, therefore, another important object of the present invention to enable steam spray guns to be effectually balanced in respect to the steam and coating material supply hoses, and to thereby avoid undue fatigue on the part of the user of such guns.

It is recognized that one of the primary virtues of the steam spray application of surface coating materials is the ability under such processes to utilize relatively thick or viscous coating materials, thus eliminating the need for and cost of the usual solvents that are required in connection with spraying of surface coating materials. As heretofore practiced, this surface coating material has been heated by the steam as the steam strikes the surface coating material in the mixing chamber or mixing zone of the spray nozzle, and this contact, of course, takes place almost at the instant when the steam and the atomized paint or surface coating material are discharged from the spray nozzle. This has been found to be satisfactory in many instances, but it is a further and important object of the present invention to improve the steam spray action through a more efficient application of the heat of the steam to the surface coating material. Another and related object of the invention is to enable the surface coating material to be in effect preheated by the steam as the surface coating material approaches the mixing or atomizing chamber of the spray nozzle, and it is also an object to enable this to be accomplished in a simple and expeditious manner.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show a preferred embodiment of the present invention and the principle thereof and what I now consider to be the best mode in which I have contemplated applying that principle. Other embodiments of the invention embodying the same or equivalent principle may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

In the drawings:

Fig. 1 is a side elevational view of a steam spray gun embodying the features of my invention;

Fig. 2 is a front elevational view of the gun;

Fig. 3 is a sectional view taken substantially along the line 3—3 of Fig. 1;

Fig. 4 is a vertical sectional view taken sub-

3

stantially along the line 4—4 of Fig. 2 and showing the internal details of the spray gun;

Figs. 4A and 4B are face and side elevational views of a resilient washer utilized in the gun;

Fig. 5 is an enlarged sectional view showing the nozzle and adapter fitting illustrated in Fig. 4;

Figs. 6, 7, 8 and 9 are views taken substantially and respectively along the lines 6—6, 7—7, 8—8 and 9—9 of Fig. 5;

Figs. 10, 12, 13, 14, 15 and 16 are views taken substantially and respectively along the lines 10—10, 12—12, 13—13, 14—14, 15—15, and 16—16 of Fig. 4, Figs. 10 and 13 being on a somewhat larger scale;

Fig. 11 is a sectional view taken along the line 11—11 of Fig. 10;

Fig. 17 is a front elevational view of a steam spray gun embodying an alternative form of the present invention;

Fig. 18 is a fragmental side elevational view of the spray gun shown in Fig. 17;

Fig. 19 is a fragmental vertical sectional view of the nozzle structure embodied in Figs. 17 and 18; and

Fig. 20 is a sectional view taken substantially along the line 20—20 of Fig. 18.

For purposes of disclosure, the invention is herein illustrated in Figs. 1 to 16 of the drawings as embodied in a steam spray gun 40 having a main body element 41 that is of the general form utilized in the spray gun of my copending application, Serial No. 734,819, filed March 14, 1947, now Patent No. 2,559,407, issued on July 3, 1951, and this body member 41 includes a downwardly extending handle portion 42 and a forwardly extending arm 43 at the upper end of the handle 42. The handle 42 is of the pistol-grip type and is provided with the usual forwardly and rearwardly extending finger-engaging lugs 42F and 42R, as is common practice in the art, and the forwardly projecting arm 43 has an upwardly and forwardly extending mounting hook 43H that facilitates suspension of the gun from the stationary hook or the like when the gun is not in use.

At the forward end of the arm 43, the gun is provided with an adapter fitting 50 and a spray nozzle 51 that are associated with the arm 43 in a manner that will be described in detail hereinafter, and paint is supplied to the fitting 50 by means including a supply hose 52 while the required steam is supplied to the fitting 50 by a supply hose 53, as will hereinafter be described in further detail.

The coating material is, of course, atomized by the action of the steam, as will be described, so as to be discharged from the spray nozzle 51, and the flow of the coating material is controlled by a needle valve 55 which is associated with an operating plunger 56 and a control trigger or lever 57 in substantially the same manner as the corresponding elements shown in my aforesaid copending application, it being noted that the trigger or control lever 57 is pivoted at its upper end on the arm 43 by means of a pivot 58, and that this control lever extends downwardly along and in spaced relation to the upper forward face of the handle 42 so that this control lever 57 may be actuated and governed by the operator in the usual or conventional manner.

Under and in accordance with the present invention, the adapter fitting 50 upon which the nozzle 51 is mounted, is arranged to be supported on the arm 43 of the main body 41 in such a manner that the heat supplied to the adapter

4

fitting 50 is not transmitted back to the handle 42 in any appreciable or objectionable degree, thereby to assure that the handle 42, as well as the control lever 57, will remain at all times at a temperature sufficiently low to enable the operator to readily handle and manipulate the spray gun. Thus, in accomplishing such mounting of the adapter fitting 50, the forward end of the arm 43 has a downwardly projecting mounting ear 60 at its forward end, this ear 60 being of substantially the same form and arrangement as the corresponding element in my aforesaid copending application. On the forward end of the arm 40, a metallic mounting plate 61 is arranged so as to extend over the entire vertical extent of the forward end of the arm 63, as well as the depending ear 60, and this mounting plate 61 is substantially rectangular in form, as will be evident in Fig. 14 of the drawings, so as to extend for a substantial distance on each side of the arm 43. The plate 60 is held in place on the arm 43 by means including a screw 62 that extends through the plate 61 and into the arm 43 adjacent to the upper edge of the arm 43 and centrally thereof, as will be evident in Figs. 4, 10 and 12.

The adapter fitting 50 is arranged to be supported in part by the plate 61, as will be described in some detail hereinafter, and this adapter fitting 50 also serves to receive and slidably support the needle valve 55 in substantially the same manner as disclosed in my aforesaid copending application. Thus, the adapter fitting 50 is formed so as to be of generally block-like form with a rearwardly extending nipple 65 that extends through a bore 66 formed in the ear 60 in axial alignment with the spring plunger assembly 56. The extension of the nipple 65 rearwardly through the bore 66 serves as a part of the mounting means for supporting the adapter fitting on the arm 43, and such support is augmented by additional means that are connected between the adapter fitting 50 and the upper, outer edge portions of the mounting plate 60. The adapter fitting 50 is accordingly provided with spaced, upwardly projecting mounting ears 68 that are formed as parts of an upwardly extended flange 69 that is afforded along the rear, upper edge of the block-like body of the adapter fitting 50.

The connections between the ears 68 and the plate 61, and the association of the nipple 65 with the ear 60, are afforded under the present invention in such a way that transmission of heat by conduction from the adapter fitting 50 to the arm 43 is minimized. In carrying out this mounting, the nipple 65 is made of a diameter somewhat smaller than the bore 66, and a flanged heat insulating sleeve 70 is put in position about the nipple 65 and within the bore 66. The flanged insulating sleeve 70 has its enlarged flange disposed at one end against the rear face of the adapter fitting 50, and has its other face or shoulder engaged with the forward face of the mounting plate 61, thereby to serve as a physical locating element for maintaining the adapter fitting 50 in proper spaced relationship with respect to the mounting plate 61. The sleeve 70 terminates at the rear face of the ear 60, and a washer 72, formed of insulating material, is placed on the externally threaded projecting rear end of the nipple 65 so as to engage the rear surface of the ear 60. Just rearwardly of the insulating washer 72, a metallic nut 73 is threaded onto the nipple 65 so as to hold the nipple and the related insulating struc-

5

ture in the proper and desired relationship with respect to the ear 60.

The nipple 65 serves in the present instance to afford a packing gland 74 that is of the same general character as the packing gland described in my aforesaid copending application, and this packing gland includes a pressure spring 75 and a retaining cap 76 of the character disclosed in such application.

The ears 68 of the adapter fitting 50 are effectually connected to the mounting plate 61 in the manner shown in detail in Figs. 10, 11, 12 and 14. Thus, the mounting plate 61 has apertures 78 formed therein so as to be disposed opposite apertures 79 formed in the ears 68, as shown in Fig. 11, and a spacer sleeve 80 of insulating material is disposed between each ear 68 and the plate 61 in alignment with the respective paths of apertures. A connecting screw 81 is extended rearwardly through each pair of apertures, so that the heads 81H thereof are spaced from the ears 68 by washers 82 of insulating material, and these screws extend through the respective insulating sleeves 80 and the respective openings 78 so as to project beyond the rear face of the mounting plate 61. An insulating washer 83 is placed on the rear end of each screw 81 in abutment with the rear face of the plate 61, and a retaining nut 84 made of metal is threaded onto the rear end of each of the screws 81. Thus, the adapter fitting 50 is supported on the arm 43 through heat-breaker connections so that the heat supplied by the steam that is conveyed through the adapter fitting 50 will not objectionably heat up the handle 42 of the spray gun.

At its forward face, the adapter fitting 50 is provided with a disc-like portion 85 that has its outer edge threaded to afford a mounting for the spray nozzle 51, and it should be observed that this disc-like portion 85 is centered upon the axis of the nipple 65. In its forward face, the disc-like portion 85 has a pair of concentric annular grooves 86 and 87 in accordance with the structure and arrangement shown in my aforesaid copending application, these passages or grooves being utilized in affording a path for the steam into the nozzle, as will be described.

The nozzle 51, as herein shown, is afforded as a two-part structure having an inner nozzle 90 and an outer nozzle structure 91. The inner nozzle structure 90 is generally in the form of a truncated cone, the larger end face of which is adapted to seat firmly against the forward face of the disc-like portion 85, and this larger face has a rearwardly extending axial nipple 93 that is threaded into a rearwardly extending bore 94 formed in alignment with the nipple 65 so as to afford an internal paint-receiving chamber. The paint that is supplied to this internal chamber 94 moves forwardly through a bore 95 that extends forwardly through the nipple 93, and at its forward end, this bore is tapered as at 95A into a reduced and forwardly projecting paint discharge sleeve 96 that affords the discharge opening for the paint as well as a valve seat for cooperation with the tapered forward end of the needle valve 55.

The outer nozzle 91 serves to embrace the inner nozzle 90, and is formed as a generally hollow structure having a mounting flange 91F about its rear edge. The flange 91F has an internally threaded securing collar 91C associated therewith, so that this collar 91C may be

6

threaded onto the threaded outer edge of the disc-like portion 85, and when this is done, a resilient spring washer 91W, Figs. 4A and 4B, which is disposed within the collar 91C, serves to apply retaining forces for holding the collar 91C in position on the fitting 50. The spring washer 91W also serves to hold the collar 91C on the outer nozzle 91 as described in my aforesaid copending application.

Within the outer nozzle member 91, an annular tapered inner surface 91T is formed for cooperation or engagement with the outer tapered surface of the inner nozzle member 90 adjacent to the forward end thereof, and just forwardly of the surface 91T, the outer nozzle has a forward wall 91W which terminates in a central aperture which surrounds the discharge end 96 of the inner nozzle in spaced relation so that the steam may be fed forwardly about the discharge end 96 of the inner nozzle. This steam is supplied to a chamber 100 between the wall 91W and the forward end of the nozzle 90 through a passage 101 extended from the forward end of the nozzle 90 and rearwardly in a location such that it will meet the annular passage 87 to which discharge steam is supplied, as will be described hereinafter.

The nozzle 91 also embodies wing jets 104 that have the passages thereof connected to an annular groove 105 formed in the internal surface of the nozzle member 91. While different arrangements of control orifices may be afforded in the wing jets 104 and in other portions of the outer nozzle member 91, it will be noted that in the present instance a pair of angularly directed control orifices 104J are formed in the respective wing jets 104, and a plurality of supplemental control jets 104H are provided in the wall 91W in a symmetrical pattern around the central discharge orifice and sloping slightly toward the axis of the spray nozzle. Steam is supplied to the annular passage 105 from the outer annular groove 86 of the adapter fitting 50. Thus, it will be noted that near its rear edge the outer nozzle member 91 has a tapered annular surface 107 that engages the outer tapered surface of the inner member 90, and this engagement is for centering and aligning purposes. However, this surface 107 has a number of slots 108, Figs. 4, 5 and 6, formed therein that serve to afford communication between the outer annular groove 86 and the annular groove 105, thereby to supply steam to the wing jets 104. It might be observed that while the outer surface of the inner nozzle member 90 is generally conical in form, flattened nut-like faces 109 are afforded on opposite sides thereof and in the space between the points of engagement of the surfaces 91T and 107, as shown in Fig. 7, so that this inner nozzle member 90 may be engaged with a wrench to screw the nipple 93 thereof into or out of the threaded bore 94.

As shown in Fig. 4, the rear end of the needle valve 55 is operatively connected with the spring unit 56, and this spring unit comprises an inner sleeve 110 that has a flange 110F at its forward end, and the threaded rear end of the needle valve 55 is extended through a central opening in this flange. A pair of nuts 111 are threaded on to the valve 55 within the sleeve 110. The sleeve 110 is in turn mounted within a sleeve 112 which is threaded into a suitable bore formed in the handle 42 and aligned with the bore 66 of the ear 60. The sleeve 110 has a flange 110G at its rear end, and this flange is disposed within

a cap member 113 that is threaded onto the projecting rear end of the sleeve 112. The sleeve 113 affords a shoulder 113S against which the flange 110G may engage when it is moved in a forward direction, thereby to limit the forward movement of the sleeve 110. A closure head 114 is removably threaded into the end of the cap or sleeve 113, and a spring 115 disposed within the sleeve 110 acts between the head 114 and the nuts 111 to urge the sleeve 110 and the associated needle valve 55 in a forward direction. The needle valve 55 is thus normally closed and rearward opening forces are applied to the needle valve by engagement of an abutment 57A on the control lever 57 with the forward end of the sleeve 56.

While the spring plunger arrangement 56 and the nozzle structure 51 have been described in some detail hereinbefore, it is to be observed that these elements may take different conventional forms insofar as the present invention may be concerned.

The supply of coating material is conducted to the chamber 94 in the adapter fitting 50 through means including the supply hose 52, and this supply hose 52 is arranged with a conventional hose coupling member 118 at its upper end. The coupling member 118 is arranged to be threaded onto the lower end of a double nipple 119, the upper end of which is threaded into a vertical bore 120 that is extended upwardly into the lower face of the adapter fitting 50 adjacent to the left-hand edge thereof as viewed in Figs. 2 and 10, thus to communicate with a transverse passage 122 that extends laterally into the chamber 94.

Similarly, the steam is supplied to the adapter fitting 50 through the supply hose 53 which has a hose connector fitting 123 at its upper end, and this fitting 123 is threaded onto the lower end of a double nipple 124, the upper end of which is threaded into a vertical bore 125 that is extended upwardly into the lower face of the adapter fitting 50 adjacent the other edge thereof. Steam that is thus supplied to the bore 125 is conducted to the annular groove 86, as well as to the annular groove 87, thereby to supply steam for the wing jets 104 and for the aspiration of the coating material through the discharge end 96 of the inner nozzle. Thus, a first bore 127 is extended in a forward and somewhat angular direction from the bore 125 so as to extend to the inner annular groove 87, as will be evident in Figs. 10, 11 and 13, and this affords a constant steam supply to the groove 87.

The other connection is afforded, of course, to supply steam to the wing jets 104, and since the rate of motive fluid discharge from these wing jets serves in a known manner to control the spray pattern, the connection with the groove 86 is arranged so that the effective area may be regulated by settable valve means. Thus, in affording such connection, a bore 123 is extended rearwardly and in a somewhat angular direction into the fitting 50 from the bottom of the channel 86, and near its rear end this bore 128 intersects with a vertical bore 129 that is extended upwardly from the upper end of the bore 125. This affords a constant steam supply connection between the bore 125 and the wing jets, and valve means for adjusting the effective area of this passage are provided in a laterally and horizontally extending bore 130 that opens through the right-hand side of the adapter fitting 50, as viewed in Fig. 13. This bore 130 inter-

sects with the bore 128, and in the portion of the bore 130 that is adjacent to the bore 128, screw threads 130S are provided for cooperation with complementary threads formed on a valve member 131. This valve member 131 has its left-hand end, as viewed in Fig. 13, formed in a rounded shape so that it may seat tightly against the left-hand side of the bore 128, as will be evident in Fig. 13. Just to the right of the screw threads 130S, the bore is enlarged as at 130E to receive compressible packing material 132. This packing material is adapted to be compressed by a packing sleeve 133 that is threaded into the right-hand end of the bore 130E, as will be evident in Fig. 13. The outer end of the valve 131 projects beyond the end of the packing sleeve 133, and has a transverse kerf 133K formed therein so that the valve member 131 may be readily adjusted.

It will be observed, particularly in Fig. 13 of the drawings, that the end of the valve member 131 is disposed over one of the laterally extending ends of the adapter fitting 50, and it should be observed that these ends extend outwardly from the central line of the bore 94 in an amount such that parallel end surfaces 50P on the adapter fitting 50 constitute pads that may be engaged for clamping the adapter fitting 50 in a vise. This enables the inner and outer nozzle members 90 and 91 to be readily removed, and also facilitates the attachment of other screw threaded parts such as the nipples 119 and 124 to the fitting 50.

The hoses 52 and 53 are, under the present invention, associated with the other elements of the gun in such a way as to afford an unusually fine balance for the gun and the attached hose structures, and this is attained by affording means on the gun for holding adjacent lower portions of the hoses in a predetermined relationship with respect to the gun. Thus, as will be evident in Figs. 1, 2 and 3, a locating and supporting bracket 135 is formed from sheet metal and is attached by means such as screws 136 to the lower end of the handle 42, and the bracket 135 extends forwardly and downwardly from the lower end of the handle 42. At its forward end, the bracket 52 has a pair of oppositely curved retaining hooks 137 and 138 that are of such a size that the hoses 52 and 53 may be put in position within the respective hooks. When this is done, the two hoses curve rearwardly as indicated at 52C and 53C in Fig. 1 of the drawings, and this serves to so locate the lower portions of the hoses with respect to the gun that proper balance of the gun is attained.

In the use of the gun, the operator must necessarily locate one or more of his fingers about the forward surfaces of the lower end of the control lever 57, and this, of course, places the operator's finger or fingers relatively close to the steam hose 53 and its connecting fittings. While many operators do not find this to be objectionable, I have found that all danger that might otherwise arise from this situation may be eliminated through the provision of a downwardly depending protective shield 140 in the form of a relatively thin insulating plate. This insulating plate 140 may be made from a material such as vulcanized fiber and may be secured at its upper end to the forward face of the mounting plate 61 by putting the same in position prior to the mounting of the screw 62, the screws 81, and the other connecting elements therethrough. The plate 140 is ex-

tended down to a level somewhat below the lower end of the control lever 57.

In Figs. 17 to 20 of the drawings, an alternative embodiment of the invention is afforded which incorporates two additional features that are of marked advantage in steam spraying of surface coating materials. Thus, in this alternative form of the invention, a spray gun 240 is provided which in most of its structural characteristics is similar to the embodiment hereinbefore described, and where there is correspondence of form and function, the same reference characters are utilized for corresponding structural elements. It will be noted in this embodiment of the invention that the hose connections to the adapter fitting 50 are considerably modified, and in accomplishing this, means are afforded for pre-heating the surface coating material before it reaches the spray nozzle 51. Thus, a pre-heating unit 241 is afforded, and this pre-heating unit comprises a pair of relatively small metal pipes 242 and 243 that are connected to the bores 120 and 125 of the adapter unit 50, in place of the nipples 119 and 124, this being accomplished by conventional connector devices 244 and 245. Just below the points of connection with the adapter fitting 50, the pipes 242 and 243 are bent toward each other so as to be disposed for a substantial distance in a side by side relationship, as will be evident in Fig. 20 of the drawings. The two pipes are then bent outwardly at their lower ends into a separated relationship, and connector nipples 246 and 247 are secured on the respective lower ends thereof so that the connector fittings 118 and 123 of the two hoses 52 and 53 may be connected thereto. The length of the pipes 242 and 243 is such that the two connector nipples 246 and 247 are disposed in a slightly spaced relationship beneath the lower end of the handle 42, and a bracket 248 is secured by screws 249 to the lower end of the handle so as to project forwardly and downwardly from the handle for association with the pipes 242 and 243.

Under the present invention, the heat transfer relationship between the side by side portions of the pipes 242 and 243 is rendered more efficient by the provision of an enclosing sleeve 250 formed from an insulating material and extending along the two pipes 242 and 243 throughout the portions thereof that are located in side by side relationship. Clamping collars 251 and 252 are provided about the upper and lower ends, respectively, of the insulating sleeve 250 so as to hold the same securely in position about the pipes. The bracket 248 is connected to the lower portion of the sleeve 250 just above the clamping collar 252, and this is accomplished by means of another clamping collar 253 that is secured as by welding at 254 to the lower, forward end of the bracket 248. It will be evident that with this pre-heating unit 241, the balance of the spray gun is maintained while at the same time assuring that when the coating material reaches the spray nozzle, such coating material will be in a pre-heated condition so as to thereby increase the efficiency of operation of the spray gun.

In the use of a steam spray gun, it is important that the nozzle portions of the gun be maintained at a relatively high working temperature at all times, even though the spraying operation may be interrupted, and in order to accomplish this, the steam is allowed to flow through the gun at

all times, and the control of the spraying operation is attained solely through the opening and closing of the needle valve 55. Because of this constant flow of steam, there may be a tendency under some circumstances for the steam to condense upon parts of the gun, and this is particularly true in the event that the screw threaded connections, such as the connector afforded by the collar 91C, are not absolutely tight against the flow of steam under pressure. In the embodiment of the invention illustrated in Figs. 17 to 20, means are afforded for disposing of any such condensate without impairment of the operation of the spray gun. This is accomplished through the provision of a relatively large drip plate 260 that is disc-like in form and which has a central sleeve-like flange surrounding the outer nozzle 91 just forwardly of the connecting element 91C and fixed thereto as by brazing at 260B. This disc-like member 260 extends radially outwardly and then assumes a somewhat conical form so as to slope in a rearward direction, and thus a lower discharge or dripping edge 260E, Fig. 19, is afforded so that any condensate that may gather upon the parts of the nozzle may drip downwardly off of such edge. It will be noted in this regard that the edge 260E is located a considerable distance rearwardly and a considerable distance downwardly from the discharge end of the nozzle so that the natural air flow past the disc will be at a rate or speed that is sufficiently low to avoid drawing the dripping condensate into the paint spray.

From the foregoing description, it will be apparent that the present invention enables a steam spray gun to be so constructed that the handle of the gun may be readily held and manipulated by the operator, and it will also be apparent that this is accomplished in such a way that the desired balance of the spray gun is attained and addition of excessive weight to the spray gun is avoided. It will also be evident that the present invention provides for pre-heating of the surface coating material, thereby to render the spraying operation more effective. Moreover, it will be observed that under the present invention, any condensate that may form on the spray head is disposed of in such a manner that it is not drawn into the paint spray, thereby to assure the production of high quality surface coating.

Thus, while I have illustrated and described the preferred embodiment of my invention, it is to be understood that this is capable of variation and modification, and I therefore do not wish to be limited to the precise details set forth, but desire to avail myself of such changes and alterations as fall within the purview of the following claims.

I claim:

1. In a steam spray gun, a main body element affording a pistol-grip handle with a mounting arm projecting forwardly from its upper end and having a movable control lever projecting downwardly along and in spaced relation to the forward edge of said handle, a spray head having cooperating passages for coating material and for steam to be employed as the motive fluid, an adapter fitting element on the forward face of which said spray head is mounted, said fitting element having independent passages formed therein and operatively connected to the steam and coating material passages of said spray head, heat-breaking connecting means supporting said adapter fitting element on the forward end of said arm and comprising at least one screw threaded

element acting between said fitting element and said body element and a plurality of rigid heat insulating members clamped in position between said fitting element and said body and screw threaded element, and a needle valve mounted in said fitting element for controlling discharge of coating material from said spray head and operatively connected to said control lever for actuation thereby.

2. In a steam spray gun, a main body including a handle and a control lever, a spray head, an adapter fitting, means affording interconnecting coating material passages in said fitting and said head through which coating material supplied to said fitting may be fed, means affording interconnecting steam passages in said fitting and said head through which steam supplied to said fitting may flow as a motive fluid to effect heating, atomization and discharge of the coating fluid as a spray, a needle valve mounted in said fitting and connected to said control lever for governing such discharge of coating material, and rigid means made of heat insulating material and disposed between said fitting and said body, screw threaded clamping means acting between said body and said fitting and extending through said rigid means to cooperate with said rigid means to support said fitting on said body in a heat-breaking relationship so as to thereby effect substantial thermal isolation of said fitting and spray head with respect to said main body.

3. In a steam spray gun, a main body including a handle and a control lever, a spray head, an adapter fitting, means affording interconnecting coating material passages in said fitting and said head through which coating material supplied to said fitting may be fed, means affording interconnecting steam passages in said fitting and said head through which steam supplied to said fitting may flow as a motive fluid to effect heating, atomization and discharge of the coating fluid as a spray, a steam control valve mounted on said fitting and effective to control the flow of steam therethrough, a needle valve mounted in said fitting and connected to said control lever for governing such discharge of coating material, and spacer means made of heat insulating material and disposed between said body and said fitting and screw threaded clamping means connected between said body and said fitting and extended through said spacer means to support said fitting on said body in a heat-breaking relationship so as to thereby effect substantial thermal isolation of said fitting and spray head with respect to said main body.

4. In a steam spray gun, a main body affording a pistol-grip handle with a mounting arm projecting forwardly from its upper end and having a movable control lever projecting downwardly along and in spaced relation to the forward edge of said handle, a spray head having cooperating passages for coating material and for steam to be employed as the motive fluid, an adapter fitting on the forward face of which said spray head is mounted, said fitting having independent passages formed therein and operatively connected to the steam and coating material passages of said spray head, means comprising a plurality of rigid heat-breaker connections supporting said adapter fitting on the forward end of said arm, a needle valve mounted in said fitting for controlling discharge of coating material from said spray head and operatively connected to said control lever for actuation thereby, steam

and coating material supply conduits connected to the lower face of said fitting and extended rearwardly and downwardly therefrom, and a positioning bracket connected to the lower end of said handle and to said conduits to support said conduits in a balanced relation to said gun.

5. In a steam spray gun, a main body affording a pistol-grip handle with a mounting arm projecting forwardly from its upper end and having a movable control lever projecting downwardly along and in spaced relation to the forward edge of said handle, a spray head having cooperating passages for coating material and for steam to be employed as the motive fluid, an adapter fitting on the forward face of which said spray head is mounted, said fitting having independent passages formed therein and operatively connected to the steam and coating material passages of said spray head, means comprising a plurality of rigid heat-breaker connections supporting said adapter fitting on the forward end of said arm, a needle valve mounted in said fitting for controlling discharge of coating material from said spray head and operatively connected to said control lever for actuation thereby, steam and coating material supply conduits connected to the lower face of said fitting and extended rearwardly and downwardly therefrom, a positioning bracket connected to the lower end of said handle and to said conduits to support said conduits in a balanced relation to said gun, and means thermally associating said conduit in a heat-transfer relationship between said bracket and said fitting for rendering the steam effective to preheat the coating material as it moves toward said fitting.

6. In a steam spray gun, a main body affording a pistol-grip handle with a mounting arm projecting forwardly from its upper end and having a movable control lever projecting downwardly along and in spaced relation to the forward edge of said handle, a spray head having cooperating passages for coating material and for steam to be employed as the motive fluid, an adapter fitting on the forward face of which said spray head is mounted, said fitting having independent passages formed therein and operatively connected to the steam and coating material passages of said spray head, means comprising a plurality of rigid heat-breaker connections supporting said adapter fitting on the forward end of said arm, a needle valve mounted in said fitting for controlling discharge of coating material from said spray head and operatively connected to said control lever for actuation thereby, a pair of tubular members connected respectively to said steam and coating material passages of said fitting and extending downwardly and rearwardly therefrom and terminating in lower ends disposed somewhat below the lower end of said handle, hose connector fittings on the lower ends of said tubular members, a bracket extended between said handle and said tubular members for supporting the lower ends of said tubular members in a balanced relation with respect to the gun, portions of said tubular members being disposed in a side-by-side relation, and a heat insulating sleeve surrounding said portions of said members to promote heat transfer therebetween for preheating the coating material.

7. In a steam spray gun, a main body affording a pistol-grip handle with a mounting arm projecting forwardly from its upper end and having a movable control lever projecting downward-

ly along and in spaced relation to the forward edge of said handle, a spray head having cooperating passages for coating material and for steam to be employed as the motive fluid, an adapter fitting on the forward face of which said spray head is mounted, said fitting having independent passages formed therein and operatively connected to the steam and coating material passages of said spray head, a metallic mounting plate secured to the forward end of said arm in a vertical and transverse relation, a plurality of heat-insulating spacer sleeves disposed between said mounting plate and the rear face of said fitting, screw-threaded securing means extended through said sleeves and clamping said fitting and said plate against opposite end surfaces of said sleeves, and a needle valve extended through one of said sleeves for controlling the discharge of coating fluid and operatively connected to said control lever.

8. In a steam spray gun, a main body affording a pistol-grip handle with a mounting arm projecting forwardly from its upper end and having a movable control lever projecting downwardly along and in spaced relation to the forward edge of said handle, a spray head having cooperating passages for coating material and for steam to be employed as the motive fluid, an adapter fitting on the forward face of which said spray head is mounted, said fitting having independent passages formed therein and operatively connected to the steam and coating material passages of said spray head, means comprising a plurality of rigid heat-breaker connections supporting said adapter fitting on the forward end of said arm, a needle valve mounted in said fitting for controlling discharge of coating material from said spray head and operatively connected to said control lever for actuation thereby, and a shield plate of heat insulating material suspended from the forward end of said arm and depending for a substantial distance therefrom and in forwardly spaced relation with respect to said control lever for protecting the fingers of the operator.

9. In a steam spray gun, a main body affording a pistol-grip handle with a mounting arm element projecting forwardly from its upper end and having a movable control lever projecting downwardly along and in spaced relation to the forward edge of said handle, a spray head having cooperating passages for coating material and for steam to be employed as the motive fluid, an adapter fitting element on the forward face of which said spray head is mounted, said fitting element having independent passages formed therein and operatively connected to the steam and coating material passages of said spray head, means supporting said fitting element on the forward end of said mounting arm element comprising rigid heat insulating means disposed as a spacing means between at least certain of the opposed surfaces of said elements, headed screw threaded fastening means extended through one of said elements and said heat insulating means and anchored to the other of said elements to hold said elements together and in clamped relation to said heat insulating means, further rigid heat insulating means surrounding said screw thread means and acting as heat insulation between said one element and said screw threaded means, and a needle valve mounted in said fitting element for controlling discharge of coating material from said spray

head and operatively connected to said control lever for actuation thereby.

10. In a steam spray gun, a main body affording a pistol-grip handle with a mounting arm element projecting forwardly from its upper end and having a movable control lever projecting downwardly along and in spaced relation to the forward edge of said handle, a spray head having cooperating passages for coating material and for steam to be employed as the motive fluid, an adapter fitting element on the forward face of which said spray head is mounted, said fitting element having independent passages formed therein and operatively connected to the steam and coating material passages of said spray head, means supporting said fitting element on the forward end of said mounting arm element comprising rigid heat insulating means disposed as a spacing means between at least certain of the opposed surfaces of said elements, headed screw threaded fastening means extended through one of said elements and said heat insulating means and anchored to the other of said elements to hold said elements together and in clamped relation to said heat insulating means, further rigid heat insulating means surrounding said screw thread means and acting as heat insulation between said one element and said screw threaded means, a rearwardly projecting nipple formed on said fitting element and affording a packing gland for said needle valve, and means including a rigid heat insulating sleeve surrounding said nipple and engaging said mounting arm element to accurately locate said nipple relative to said main body.

11. In a steam spray gun, a main body element including a handle and a control lever, a spray head, an adapter fitting element, means affording interconnecting coating material passages in said fitting element and said head through which coating material supplied to said fitting element may be fed, means affording interconnecting steam passages in said fitting through which steam may flow as a motive fluid to effect heating, atomization and discharge of the coating fluid as a spray, a steam supply connection extended from said fitting element, a needle valve mounted in said fitting element and connected to said control lever for governing such discharge of coating material, and rigid means including rigid spacer means made of heat insulating material disposed between said fitting and body elements and screw threaded fastener means connected between said fitting and body elements, and annular rigid spacer members surrounding said fastener means and spacing said fastener means from one of said elements, to thereby support said fitting element on said body element in a heat-breaking relationship and effect substantial thermal isolation of said fitting element and spray head with respect to said main body element.

12. In a steam spray gun, a main body affording a pistol-grip handle with a mounting arm element projecting forwardly from its upper end and having a movable control lever element projecting downwardly along and in spaced relation to the forward edge of said handle, a spray head having cooperating passages for coating material and for steam to be employed as the motive fluid, an adapter fitting on the forward face of which said spray head is mounted, said fitting having independent passages formed

15

therein and operatively connected to the steam and coating material passages of said spray head, a steam connection extending from the lower side of said fitting, means affording rigid heat-breaker connections supporting said a-

5 dapter fitting rigidly on the forward end of said arm element, a needle valve mounted in said fitting for controlling discharge of coating material from said spray head and operatively connected to said control lever for actuation thereby, 10 and a shield of heat insulating material suspended from one of said elements in position to protect the fingers of the operator from the heat of said steam connection.

WILLIAM P. DALRYMPLE.

15

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Notice of Adverse Decision in Interference

In Interference No. 87,792 involving Patent No. 2,621,970, W. P. Dalrymple, Spray gun, final judgment adverse to the patentee was rendered April 10, 1957, as to claims 2 and 3.

[Official Gazette May 21, 1957.]

Disclaimer

2,621,970.—*William P. Dalrymple*, Rochester, N. Y. SPRAY GUN. Patent dated Dec. 16, 1952. Disclaimer filed Apr. 24, 1957, by the assignee, *Egener Corporation*.

Hereby enters this disclaimer to claims 1 and 2 of said patent.
[*Official Gazette May 28, 1957.*]