

United States Patent

Richterkessing

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[54] **ASSEMBLY OF FLUID SPRAYING GUNS** 2,273,119 2/1942 Lichterman223/70
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 [72] Inventor: **Frank H. Richterkessing**, Louisville, Ky. 2,969,926 1/1961 Peeps239/526
 [73] Assignee: **The Cissell W. M. Manufacturing Company**, Louisville, Ky. 2,686,694 8/1954 Freeman239/444 X
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Primary Examiner—Lloyd L. King
Attorney—William E. Sherwood

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 239/446; 223/57, 70, 67

[57] **ABSTRACT**

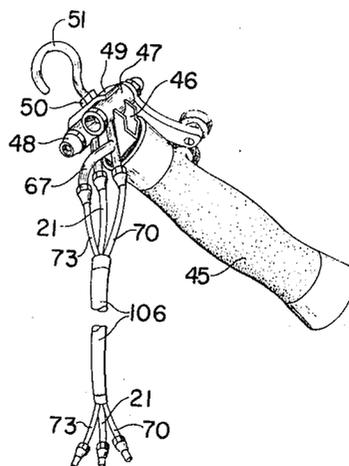
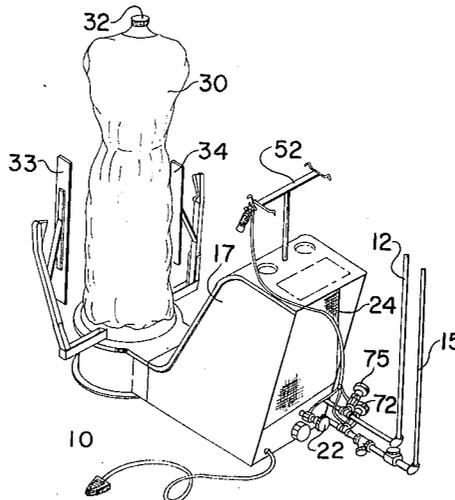
A garment finisher having steam supply and steam return conduits serving the same includes an assembly of fluid spraying guns communicating with the steam conduits. An improved steam gun fed by a circulating dry steam source is disclosed.

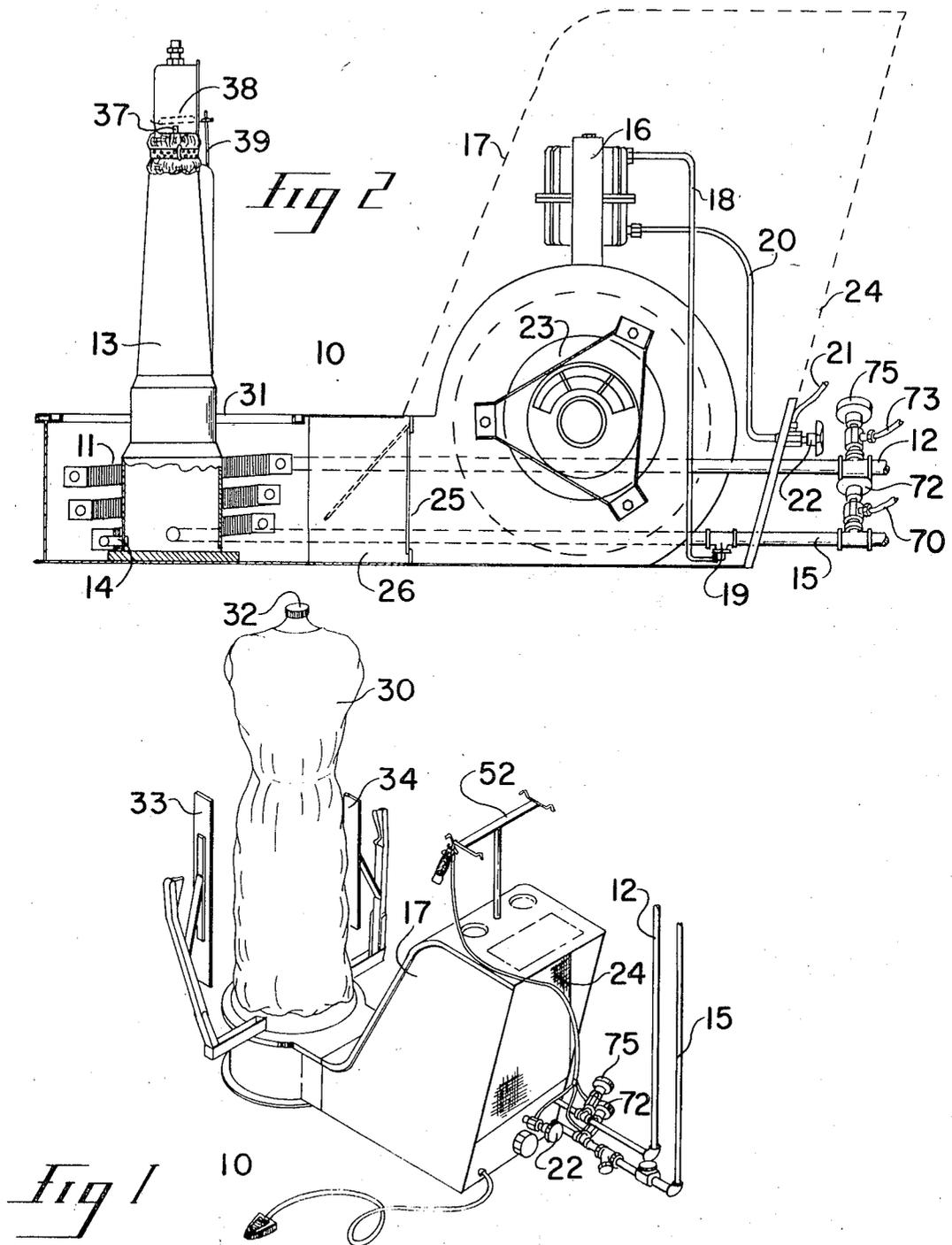
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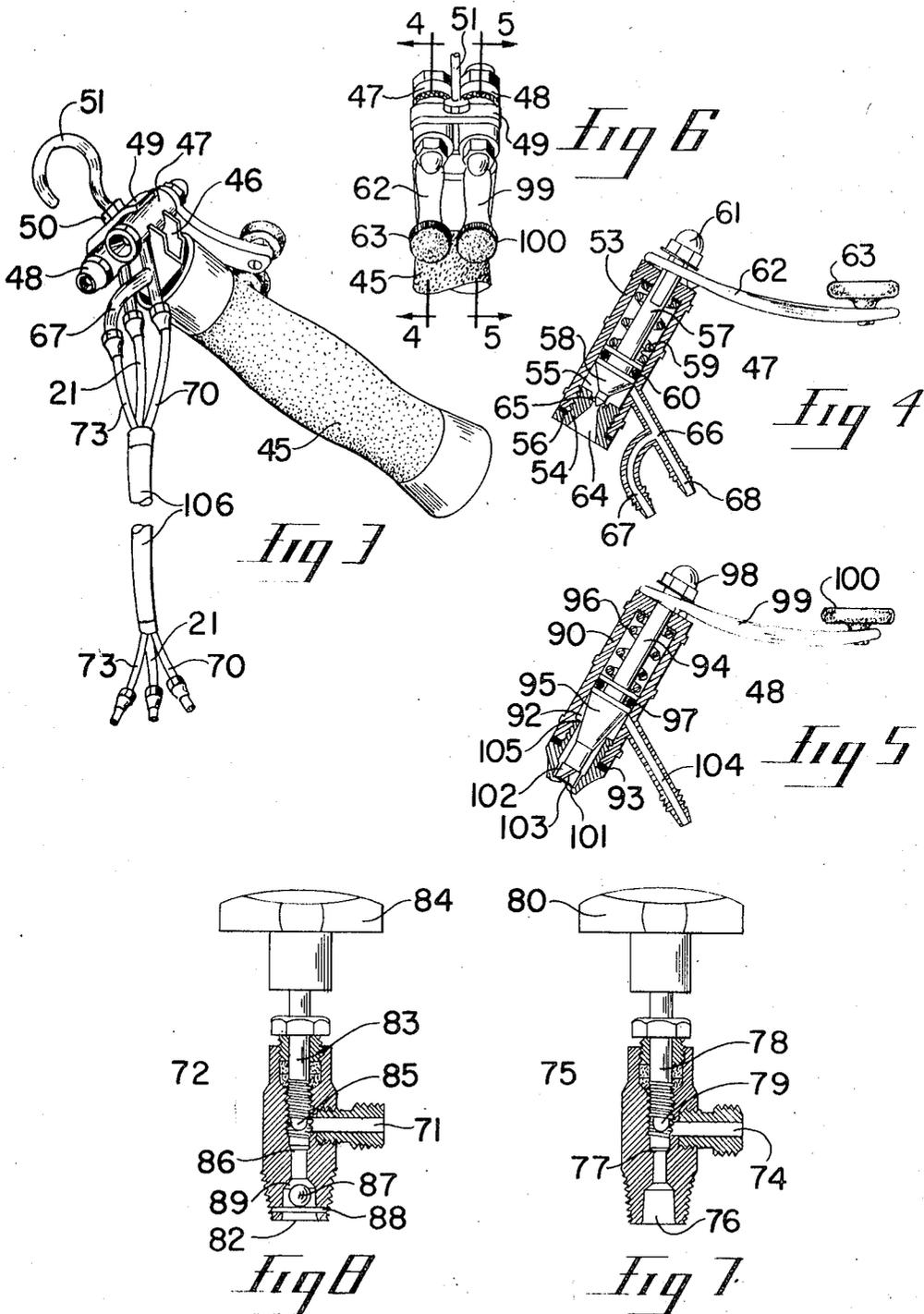
3 Claims, 8 Drawing Figures





INVENTOR.
FRANK H. RICHTERKESSING

BY
W. E. Sherman
Atty.



INVENTOR
FRANK H. RICHTERKESSING
BY
W. E. Sherwood
att'y

ASSEMBLY OF FLUID SPRAYING GUNS

BACKGROUND OF THE INVENTION

Various types of apparatus for finishing garments and for removing wrinkles from the garment are available, and in some forms of such apparatus a highly skilled operator is required in order to obtain optimum results from the operation of the apparatus. In the finishing of garments such as coats, dresses, blouses, skirts, jackets and the like having areas of two or more thicknesses of fabric, or badly wrinkled areas such as seat portions, the general steaming and drying of the garment by the automatic operation of the apparatus often is insufficient, and additional treatment in the form of touch-up after the garment is removed from the apparatus, is needed.

This touch-up treatment may be reduced, if not entirely eliminated, by application of dry steam or water vapor, or both, to selected portions of the garment while still in position on the apparatus and before being dried by that apparatus, provided a suitable means for spraying fluid on the garment is available to the operator. Various forms of such spraying means, commonly called spray guns, have been proposed but when a steam gun, in which condensate may collect, is used, unsatisfactory results often occur. Purging of such a gun requires disposition of the condensate before dry steam can be applied to the garment, and this involves a loss of time on the part of the operator and often entails spillage of liquid on the floor.

Moreover, the application of the dry steam or water vapor, or both, from the guns usually occurs while the apparatus is undergoing its steaming cycle and must not interfere with the steaming treatment being applied to the interior of the garment. It is problems of the above indicated type which it is the purpose of the present invention to solve.

SUMMARY OF THE INVENTION

The invention is embodied in a steam gun and liquid vapor gun assembly which can be handled with one hand and adapted to spray dry steam, or liquid vapor, or both, by the selective depressing of thumb operated valves in the respective guns. The steam gun body has a tubular connection extending therefrom upstream of the valve therein and a pair of branch conduits which communicate with this connection and with each other have flexible hoses extending respectively to a dry steam supply conduit and to a wet steam and condensate return conduit, the supply and return conduits simultaneously serving a garment finishing apparatus. The liquid vapor gun employs a single flexible hose connected thereto upstream of the valve therein and leading to a reservoir of condensate derived from a heater in the finishing apparatus and supplied to the liquid vapor gun under the pressure existing in the return conduit from that apparatus.

Among the objectives of the invention is the provision of an improved combination of apparatus including a garment finisher and an attached assembly of fluid spraying guns; the provision of a compact spray gun assembly which has a bundle of flexible hoses leading thereto and in which the steam and liquid vaporizing guns thereof may be readily actuated by the thumb of the user in order to spray dry steam or vaporized liquid simultaneously or in sequence upon a garment and while holding the assembly handle with one hand, and the provision of an improved steam gun having a constantly available source of circulating dry steam and provided with a means for preventing the ejection of wet steam or condensate from the gun.

These and other objects and advantages of the invention will become more apparent as the description proceeds and when considered in conjunction with the accompanying drawings in which:

FIG. 1 is a rear perspective view of the garment finisher showing the attachment of the fluid spraying apparatus to the fluid conduits which jointly serve the finisher and the spraying apparatus, and indicating the location of valves.

FIG. 2 is a side elevation view, partly in section and with portions omitted, of the garment finisher, and further indicating the location of certain connections to the fluid conduits.

FIG. 3 is a perspective view of the fluid spraying apparatus shown to a larger scale.

FIG. 4 is a sectional view of the steam gun taken on line 4—4 of FIG. 6.

FIG. 5 is a sectional view of the liquid vaporizing gun taken on line 5—5 of FIG. 6.

FIG. 6 is a plan view of the discharging end of the manipulatable fluid spraying apparatus of FIG. 3.

FIG. 7 is a longitudinal sectional view of the control valve in the steam supply conduit for the spraying apparatus, and

FIG. 8 is a longitudinal sectional view of the combined control and check valve for connection jointly to the spraying apparatus and to the return conduit from the garment finisher.

Referring now to FIGS. 1 and 2, the garment finisher structure comprises essentially a housing generally indicated at 10, a steam radiator 11 located within the housing and receiving dry steam from a supply conduit 12, a hollow upwardly projecting steam chest 13 communicating at 14 with the lower end of the radiator, and a wet steam and condensate return conduit 15 communicating with the lower end of the steam chest and extending from the apparatus in a direction generally parallel to the supply conduit.

A condensate reservoir 16 is suitably mounted in the enlarged rearward and elevated portion 17 of the housing and includes an inlet conduit 18 attached as at 19 to the return conduit 15 and feeding into the upper portion of the reservoir. An outlet conduit 20 extends from the lower portion of the reservoir and connects with a third hose 21 leading to the improved spraying apparatus later to be described. A conventional manually adjustable valve 22 accessible on the outside of the housing serves to regulate the flow of liquid into hose 21. Contained within the housing portion 17 is a blower 23 suitably driven and controlled by means forming no part of the present invention. This blower draws air through a filter 24 extending across the intake at the rear face of the housing portion 17 and across the reservoir 16, and then directs the air past a suitable damper 25 into the duct 26 and into contact with the radiator 11.

Rotatably mounted on steam chest 13 is a conventional garment finisher form having a bag 30 with an open lower end supported thereon and adapted to receive the air heated by the radiator and rising through the opening 31 in the housing around the steam chest. Preferably this bag comprises a fluid pervious cloth material in substantially flaccid shape and with a size and shape, when fully distended, corresponding to a relatively small size of garment. The vertical length of the bag, however, is such as to accommodate relatively long garments and by means of a conventional adjustable neck and shoulder element adapted to extend through openings at the upper sides of the bag, and of the type more fully disclosed in Richterkessing U.S. Pat. No. 3,033,429, and which is mounted upon the inner form and operable by turning of the knob 32, the shoulders of larger garments may be suitably supported while the garment is undergoing treatment. Conventional front and rear clamping plates 33, 34, respectively, also are mounted on the inner form supporting the bag and serve to press the garment against the distended flaccid bag 30 during the finishing operation. These plates are also equipped with conventional latching means not described.

Adjacent the upper end of the steam chest 13 a normally closed valve 37 adapted to be opened by the depressing of lever 38 and rod 39, is provided. The rod is moved by a suitable electromagnetic solenoid, not shown, when the circuit thereto is closed as by means of a foot switch 40. Upon opening of valve 37 steam, of course, is sprayed into the interior of bag 30.

As will now be apparent, and in contrast to garment finishers in which the bag size corresponds to the maximum size of garment to be treated and the operator is required to exercise skill in reducing the size of the distended bag to the

size of the garment under treatment by manipulating a means for adjusting the diametrical size and shape of the bag, the present invention contemplates the application of steam or liquid vapor, or both, to the outer surface of the garment to assist in removing wrinkles in the garment even while that garment is receiving steam or heated air, or both, passing through bag 30 to the inner surface of the garment.

Accordingly, an improved fluid spraying apparatus, now to be described, is provided for the operator and with the operation of the same suitably coordinated with the operation of the described garment finisher so that both operations may occur simultaneously and without detriment to either. Passing now to FIG. 3, a heat insulated handle 45 comprises a main body having a bracket 46 attached to one end and with a steam gun 47 and a companion liquid vaporizing gun 48 demountably cradled on the bracket and held in place by a plate 49 secured by a nut 50. A hook 51 secured to the bracket provides a ready means for stowing the apparatus on a framework 52 (FIG. 1) upstanding from the housing portion 17, when the spraying apparatus is idle. The steam gun is constructed so as to spray only dry steam with heavy impact against the garment and to avoid the spraying of liquid globules or to require purging before beginning its spray of steam. The gun 47, therefore, includes a cylindrical body 53 having a discharge nozzle 54 threaded into the bore 55 at one end of the body and sealed with a gasket 56. A reciprocable plunger 57 mounted in the bore has its upper end projecting outwardly from the body and includes a piston 58 with a portion serving as a valve and acting under the bias of a compression spring 59 and sealed with an O-ring 60. A crown nut 61 is threaded on the outer end of the plunger and engages a lever 62 pivotally mounted on the outer end of body 53 and having a button 63 at its distal end. The nozzle has a discharge orifice 64 with an inner seat for the valve and comprising an O-ring 65 against which the conical valve end of the plunger normally is seated. Between this seat and the piston a tubular connection 66 communicates with the bore 55 and includes tubular branch portions 67, 68 in communication with each other and with that bore. Significantly, this construction permits a steam circulation, with the steam conduits serving the garment finisher apparatus even when the steam gun is not in use. For this purpose an elongated thin wall, small diameter second hose 70 which conveniently may be made of teflon is attached at its respective ends to the branch portion 68 (FIG. 3) and to a branch bore 71 of a combined control and check valve 72 (FIG. 8). In addition, a similar first hose 73 is attached at its respective ends to the branch portion 67 of the steam gun and to a branch bore 74 of a control valve 75 (FIG. 7).

The valve 75 comprises a body portion with an inlet bore 76 communicating with the dry steam supply conduit 12 (FIG. 2) upstream from the radiator and with an interior seat 77 between the inlet bore 76 and the branch bore 74. A valve stem 78 having a rounded end 79 adapted to engage the seat and to cut off steam flow is adjustable by means of knob 80, and the threaded engagement of the stem with the interior of the valve body permits various degrees of opening of the valve and various flow rates of dry steam into the hose 70 leading to the steam gun.

The valve 72, moreover, affords protection against the reverse flow of wet steam or condensate into the steam gun and comprises a body portion with an outlet bore 82 communicating with the steam and condensate return conduit 15 downstream from the reservoir connection 19. A valve stem 83 threaded for rotation in the valve body upon turning of knob 84 has a rounded end 85 adapted to engage a seat 86 intermediate the outlet bore 82 and the inlet bore 71 when communication with the steam gun is to be interrupted. The lower end of outlet bore 82 below seat 86 is enlarged and contains a lightweight ball 87, preferably made of teflon and of less diameter than the diameter of bore 82. A pin 88 extending across bore 82 serves to retain the ball in that bore and a seat 89 in the valve body above bore 82 permits the ball to close communication between the bores 82 and 71 when the ball is lifted by the pressure existing in return conduit 15.

As will now be apparent when the button 63 of the steam gun is pressed by the operator's thumb dry steam flows into and is discharged from the gun under pressure existing in the conduit 12 and the parallel connection from the return conduit 15 is interrupted by the forcing of the ball valve 87 against seat 89. Thus, no wet steam or condensate reaches the steam gun. As soon as the steam gun is closed by releasing button 63 the normal circulation of dry steam from the higher pressure supply conduit 12 through valve 75, conduit 70, steam gun 47, conduit 73, valve 72 and to lower pressure return conduit 15 is restored as the ball valve 87 drops back upon pin 88.

The liquid vaporizing gun 48 includes a cylindrical body portion 90 having a discharge nozzle 91 threaded into the bore 92 at one end of the body and sealed with a gasket 93. A reciprocable plunger 94 mounted in the bore has its upper end projecting outwardly from the body and includes a piston 95 with a portion serving as a valve and acting under the bias of a compression spring 96 and sealed with an O-ring 97. A crown nut 98 is threaded on the outer end of the plunger and engages a lever 99 pivotally mounted on the outer end of body 90 and having a button 100 at its distal end. As best seen in FIG. 6, this lever lies side by side with lever 62 and the respective buttons 63, 100, for the two guns are so located that the user while holding the handle 45 in one hand, can place his thumb upon either or both of the buttons.

The nozzle 91 has an end wall reduced in thickness at 101 and with a small central orifice suitable for effecting the vaporization of the condensate liquid into a fine mist. Preferably the lower end 102 of piston 95 reciprocates in the bore with a close fit and diagonal grooves such as 103 are formed in the sides of the lower end 102. A lateral tubular connection 104 communicating with the bore 92 upstream from the valve seat 105 is adapted to connect with the upper end of the third hose 21 leading from the conduit 20 under control of valve 22. As best seen in FIG. 3, each of the elongated flexible hoses 21, 70 and 73 are encased in a flexible tubular jacket 106 throughout a substantial portion of their length and form a bundle which avoids entanglement of the same and contributes to easy manipulation of the spray gun assembly.

With the foregoing description in mind, it will be apparent that after the finisher apparatus becomes heated a supply of condensate in reservoir 16 is constantly available to supply the gun 48 and a constantly circulating source of dry steam is available for gun 47. No purging of the steam gun is required and at any time during the finishing of the garment the user may apply dry steam, water mist, or both, to portions of the garment without interruption of the finishing being effected by the remainder of the apparatus.

Having thus described a preferred form of coordinated apparatus, it will be understood that the invention may also be embodied in forms other than that exemplified as the preferred form.

What is claimed is:

1. An easily manipulated dual fluid spraying device comprising a handle, a steam gun and a separate liquid vaporizing gun, each gun being mounted on said handle and containing spring-biased normally closed valves movable longitudinally within generally cylindrical gun bodies, each of said guns having a nozzle at one end thereof and a lever actuated valve-opening means at the other end thereof movable in opposition to the bias of the valve spring during its valve-opening operation, a third flexible hose attached to said liquid vaporizing gun body exteriorly of said handle and adapted to supply liquid constantly thereto upstream of the valve therein, and a tubular connection extending from said steam gun upstream from the valve therein and having a pair of branch conduits communicating with said connection and with each other, said branch conduits having attached thereto first and second flexible hoses respectively and being adapted to communicate with a moving supply of dry steam, said first, and second hoses being attached to said steam gun body exteriorly of said handle and providing for circulation of condensate in the steam supply and for preventing accumulation of condensate in said steam gun.

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2. A spraying device as defined in claim 1 including means for mounting said guns in side by side relation upon said handle, and means for encasing said hoses leading to said guns in the form of a bundle thereby to provide a compact arrangement adapted for ready manipulation by the user.

3. A spraying device as defined in claim 1 wherein each of said valves includes a valve stem projecting from said other

end of the body of the gun and each of said valve opening means includes a lever pivotally mounted on the body of the gun in engagement with said stem and having a member at its distal end readily engageable by the thumb of the user while holding said handle.

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