

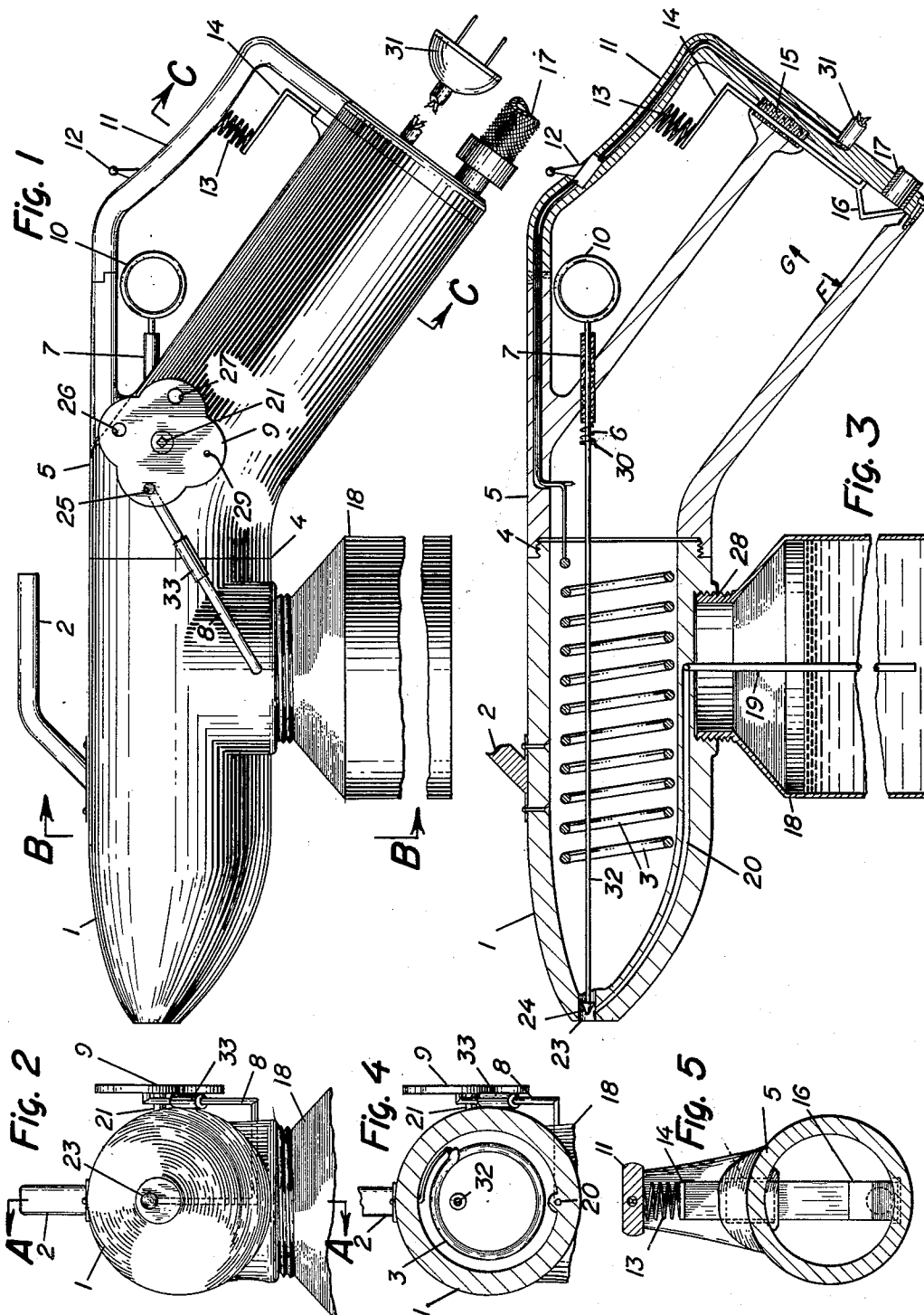
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HYDRO-ELECTRIC SPRAY GUN

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HYDRO-ELECTRIC SPRAY GUN

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The present invention generally relates to an apparatus useful for applying a jet or stream of liquid and/or vaporous materials to objects that need cleaning. More particularly, this invention relates to a spray gun type of device useful for applying, with the aid of a jet of steam, a detergent or solvent solution to an article needing cleaning. By way of background, devices utilizing steam alone or steam in conjunction with other solutions for cleaning objects are known in the art. For the most part, such devices are both complex, heavy and expensive. Most prior art devices are stationary or semi-stationary in character and do not possess the mobility which is often required by users. In many cleaning operations it is desirable for the cleaning apparatus to be sufficiently light and mobile to permit the operator to readily move it adjacent to and around the object to be cleaned and to freely manipulate it in such area.

The principal object of this invention is to provide a cleaning apparatus which is very versatile in use and which does not possess stationary containers, switches, pedals, etc. which fail to move when the spray gun moves.

Another object of this invention is to provide a simple and inexpensive steam spray gun for use in the home or small shops where larger apparatus for cleaning is not economically feasible or practically useful.

A still further object of this invention is to provide a small, compact apparatus that is easily maneuverable yet effective in operation.

Further objects and advantages of the invention will appear more fully from the following description, especially taken in conjunction with the accompanying drawings which form a part hereof.

In the drawings:

FIGURE 1 shows a side view of a unit in accordance with this invention;

FIGURE 2 is an end view of FIGURE 1;

FIGURE 3 is a view along A—A of FIGURE 2;

FIGURE 4 is a view along B—B of FIGURE 1;

FIGURE 5 is a view along C—C of FIGURE 1.

In its broadest conception, the present invention can be characterized by the following features:

(a) The introduction of water into the interior of a spray gun chamber where it comes into contact with and is vaporized by electric heating elements;

(b) A container for a cleaning or solvent solution integrally attached to said spray gun;

(c) Said cleaning or solvent solution being drawn from the container by means of venturi action and thereafter passed to a nozzle area;

(d) Emission of the steam and cleaning or solvent solution through the nozzle area with subsequent application to the fabric or article to be cleaned;

(e) The entire apparatus being capable of being manipulated with one hand and operable over a wide area.

Referring now to the drawings, a specific embodiment of the present invention is shown. It will be seen that the spray gun unit of the invention essentially comprises a main housing having a front half 1 and a rear half 5, said halves being threaded at 4 so that the two halves can be threadably engaged. The front half 1 is provided with a front handle 2 and the rear half 5 is provided with a slightly different type of rear handle 11. When the front and rear halves are threadably

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engaged they form within their interior a steam generating chamber. Steam is formed within this steam generating chamber by virtue of the water introduced through hose connection 17 and by virtue of the heat supplied by heating element 3 (of the immersible type). A valve 16 is provided adjacent to the inlet end of hose connection 17 so that the user can control the amount of water that is introduced. Valve 16 is shown as being of the simple sliding type (moving in the directions of arrows F and G whenever the water flow control trigger 14 is moved by finger pressure in the same direction). A spring 13 is shown, having one of its ends connected to the control trigger 14 and its other end connected to the rear handle 11. At the location where the control trigger 14 passes through the rear half of the spray gun a suitable packing 15 is provided to prevent the escape of steam or water. In this fashion it can be seen that the operator of this invention can control the amount of water introduced into the gun for conversion to steam. When he sees that the amount of steam issuing from the gun is insufficient he need merely open the valve 16 to admit more water.

The previously described electrical heating element 3 may be arranged within the interior of the spray gun in any desired fashion. The lead-in wires for the electrical heating element 3 may pass through any desired portion of the apparatus (i.e. either the handle or the body of the spray gun) and the heating element itself can even be imbedded in the body of the spray gun. Electrical energy is supplied to the heating element by an electrical cable and plug 31 and the energy in the line can be cut on or off by means of switch 12.

It will also be seen that the gun in accordance with this invention is provided with a mechanism to control the outlet of steam from the spray gun. As shown, outlet 23 serves as a steam nozzle 23 and the flow of steam through the nozzle 23 is controlled by jet control head 24. A rod 32 connects the jet control head 24 with a trigger device 10 located in the rear of the unit. A packing gland 7 surrounds the rod 32 at the point where the rod passes through the rear half of the spray gun housing. The rod is also shown as being provided with a spring 6 located between a retaining pin or washer 30 and the packing gland 7 in order to bias the jet control head 24 to a forward (closed) position except when the trigger 10 is pulled to a rearward position.

To review then, water enters the rear section of the spray gun housing through the hose connection 17 and when the appropriate amount of water has been introduced a supply of steam is generated within the spray gun. When the operator desires to have some of the steam within the spray gun to issue he merely needs to pull the trigger 10 in a rearward direction against the force of spring 6.

When a jet of steam is permitted to issue from the steam nozzle it will at the same time (by virtue of a venturi effect) create suction in the adjacent passageway 20. Passageway 20 is, as shown, connected to the tube 19. Tube 19 dips down within a container or solution pot 18 (e.g. containing a detergent solution) which is threadably joined, as at 28, to the bottom portion of the front half of the spray gun. Accordingly, when steam issues from the steam nozzle 23 and creates suction in the passageway 20 the solution contained in solution pot 18 will be sucked upwardly through tube 19, through passageway 20 and will then intermingle with the steam being expelled through the nozzle area.

Depending upon the particular cleaning operation being conducted, one may desire to control the amount of cleaning solution being drawn from the container 18. In accordance with this invention this control can be achieved by the use of a solution metering valve 9 which

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is pivoted for rotation at 21. It will be seen that this solution metering valve 9 contains a plurality of orifices 25, 26, 27 and 29, each varying somewhat in size. A hollow tube 8 having an intermediate flexible coupling portion 33 has its lower end arranged so that it will open into a portion of the passageway 20 (see FIGURE 4). The other end of tube 8 is adapted to open into (and to be engageable with) one of the orifices 25, 26, 27 and 29. Each of the orifices is made to be different in diameter so that when the tube 8 is engaged therewith, the particular orifice with which it is engaged will govern the amount of air drawn through tube 8 by virtue of the aforementioned vacuum action. Member 9 therefore effectively serves as a solution metering valve. Any number of different sized orifices might be provided, and it can thus be seen that a fine or heavy spray may be achieved in this fashion.

Although the above-described unit is the preferred embodiment of the invention, if desired, part of the heating element may be suspended from the gun casing into the container 18 in order to preheat the cleaning solution.

The primary purpose of the described invention is to unite a cleaning solution with steam for the cleaning of fabrics. However, the inventor does not disclaim the use of his invention for other related purposes where the union of other solutions with steam would produce a useful function.

It is contemplated that the materials of construction for the various parts of the device of this invention shall be those generally available and commonly used. Thus the heating element may be Nichrome or any of the other commonly used electrical material. The parts may be produced by stamping or casting.

The unit is designed to be manufactured inexpensively so that home owners may purchase the spray gun for their own private use, as well as being available for small business establishments.

All switches, triggers, etc. for operating the spray gun and valve controls may be manipulated with the hand which holds the unit. For example, trigger 10 can be operated with the first finger, switch 12 with the thumb and trigger 14 with the other fingers. Thus the operator's other hand is free to move the garment or other objects being cleaned.

It would of course involve no invention to utilize one or more thermostats in conjunction with the present invention.

While a particular embodiment of this invention is shown above, it will be understood, of course, that the invention is not to be limited thereto since many modifications may be made and it is contemplated, therefore, by the appended claims, to cover any such modifications

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as fall within the true spirit and scope of this invention. I claim:

1. A portable hydro-electric spray gun comprising:
 - (a) a two-part housing and steam generating chamber which is provided with threaded junction means,
 - (b) a handle attached to the rear half of said two-part housing,
 - (c) an inlet conduit in the rear half of said two-part housing for introducing water into said steam generating chamber,
 - (d) a valve in the interior of the rear part of said two-part housing which is movable with respect to said inlet conduit to alternately permit and prevent the flow of water therethrough,
 - (e) a first trigger means located exterior to said housing and adjacent said handle,
 - (f) said valve being connected to said first trigger means so that movement of the trigger will move said valve with respect to said inlet conduit,
 - (g) electrical heating means within said steam generating chamber for converting said water to steam,
 - (h) nozzle outlet means from said steam generating chamber located on the front half of said two-part housing,
 - (i) a second trigger means having one end which terminates adjacent to said handle,
 - (j) said nozzle outlet means being controlled by said second trigger means,
 - (k) a container attached to the front half of said two-part housing which is adapted to contain a cleaning solution,
 - (l) a passageway from said container through a portion of said housing to said nozzle outlet means which permits the passage of liquid from the container into the nozzle area, and
 - (m) means for regulating the amount of material drawn through said passageway.
2. A spray gun according to claim 1 wherein said means for regulating the amount of material drawn through said passageway comprises a multiple orifice unit which regulates the amount of outside air being drawn into said passageway.

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