Nov. 4, 1952 G. E. MILLER 2,616,761

APPLYING FLUID TO FABRICS

Filed Nov. 23, 1948 2 SHEETS—SHEET 1

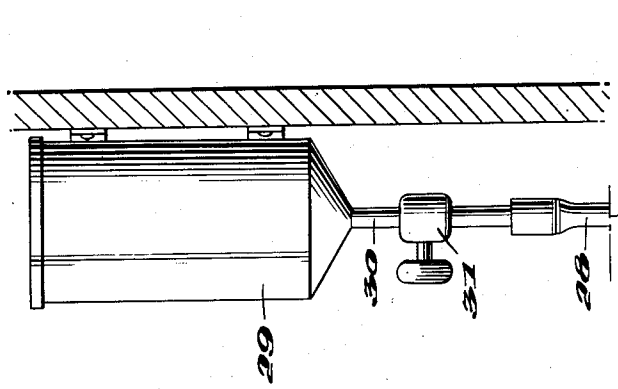


Fig. 3.

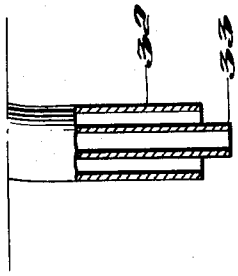
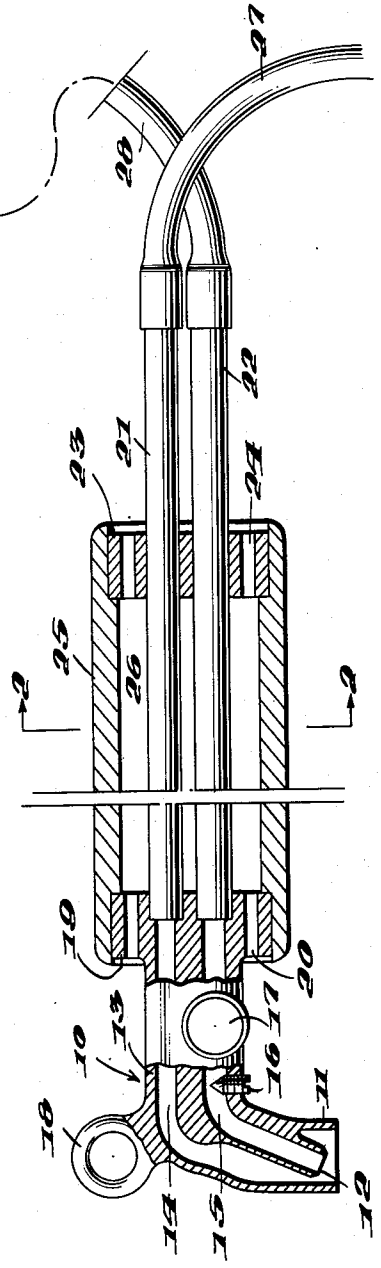


Fig. 1.



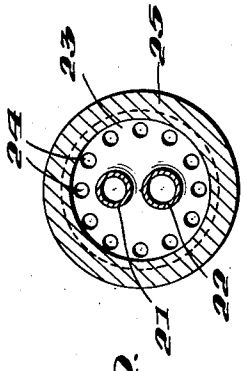


Fig. 2.

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APPLYING FLUID TO FABRICS

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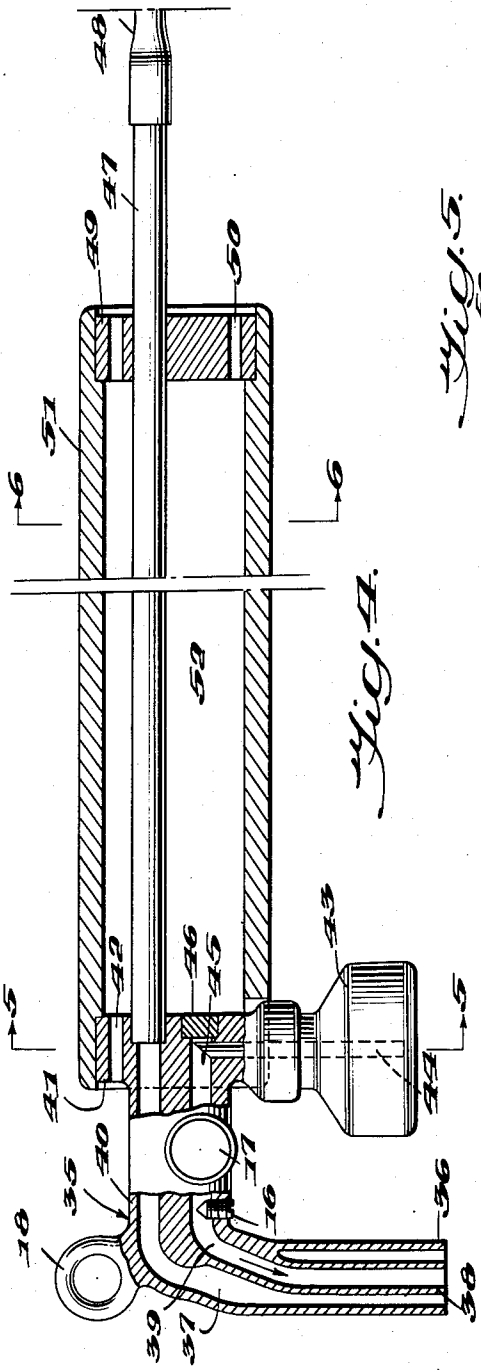


Fig. 4.

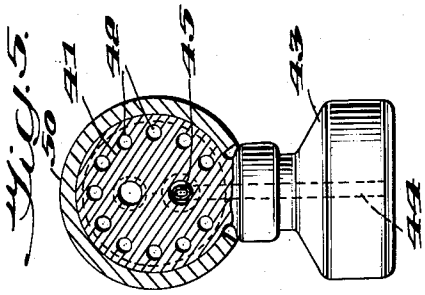


Fig. 5.

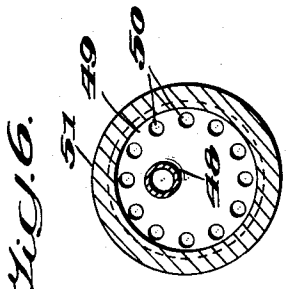


Fig. 6.

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APPLYING FLUID TO FABRICS

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3 Claims. (Cl. 299—87)

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This invention relates to improvements in apparatus for applying fluid to fabrics, and particularly to an improved spotting gun for alternately or simultaneously applying steam and a cleaning agent or a dye to fabrics for the purpose of removing spots, stains or the like from a constricted localized area thereof.

Heretofore, in removing spots, stains and the like from fabrics, the wetting, spotting or cleaning agent customarily is applied to a small rag or brush and then in turn is applied to the spot on the fabric. The agent is then rubbed into the threads of the fabric to soften or dissolve the substance causing the spot. This causes the spot to be loosened or dissolved by the agent. Subsequently the wetting or spotting agent and the substance causing the spot is removed from the fabric by brushing or wiping it away. As is obvious, this method is very unsatisfactory at its best because it is difficult to brush or wipe away all of the substance which caused the spot, even though it were thoroughly softened or dissolved by the cleaning fluid.

Accordingly, it is one object of this invention to provide a spotting gun or apparatus for applying fluid to fabrics which first softens or dissolves the substance causing the spot and then subsequently with the same apparatus to remove both the cleaning fluid and the softened or dissolved substance causing the spot by means of a stream of high pressure fluid such as steam.

Another object of this invention is to provide an apparatus for removing spots from fabrics which alternately or simultaneously applies steam or the like to a spot on a fabric and then applies a wetting or spotting fluid thereto.

It has been found further that, in the common way of removing spots from fabrics, usually an area much larger than the spot is wetted by the agent, and this frequently causes the substance creating the spot to spread further over the fabric and in many instances will aggravate and enlarge the spot rather than actually remove the same.

It is, accordingly, another object of this invention to provide an apparatus which confines the cleaning agent to a definite area in such a manner that the spreading of the spot is made almost impossible.

A further object of this invention is to provide a spotting gun which can be held in the operator's hand and still have the nozzle of the gun applied to a flat surface.

Also at times it is found desirable to apply a dye to the fabric either to cover up a spot or to bring

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the color back to the fabric after the spot has been removed. Accordingly, it is a further object of this invention to provide a spotting gun which is capable of applying a dye to a very small confined area of the fabric.

Inasmuch as steam is used in the operation of this spotting gun, it has been found necessary to insulate the handle of the gun so as to prevent burning of the operator's hand.

Accordingly, it is a further object of this invention to provide a spotting gun which has an insulated handle.

Certain embodiments of the invention are illustrated in the accompanying drawings, in which:

Fig. 1 is a longitudinal sectional view of one form of this invention;

Fig. 2 is a cross sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a partial sectional view showing a modified form of nozzle for the spotting gun embodied in this invention;

Fig. 4 is an elongated sectional view of one modification of the spotting gun embodied in this invention;

Fig. 5 is a cross sectional view taken through the head on the line 5—5 of Fig. 4; and

Fig. 6 is a partial cross section through the handle on the line 6—6 of Fig. 5.

Referring now to the drawings, the numeral 10 designates a head of the spotting gun embodied in this invention which has a nozzle 11 with a tubular jet 12 axially extending therein and disposed at a slight angle to the nozzle 11, as shown in Fig. 1. Both the nozzle 11 and the jet 12 are formed at substantially a right angle to a throat 13, which is provided with tubular passages 14 and 15. The passage 14 is in open communication with the nozzle 11 and the passage 15 is in open communication with the jet 12.

A fluid control needle valve 16, provided in the passage 15, as shown, permits a fine adjustment of the quantity of fluid delivered to the jet 15. Also located in the passage 15 is a thumb or finger controlled valve 17, which is manually opened and spring closed. The particular structure of this valve is immaterial to the operation of the gun embodied by this invention, and it may be of any well known type of valve, such as a spring loaded needle or ball valve which may be opened manually. However, this valve 17 should be such that the fluid passing through the passage 15 can be shut off quickly and positively by one finger of the operator, and may be positioned on either side of the head.

An eye 18 may be provided on the head of the

gun, as shown in Fig. 1, if desired, and forms a hook for suspending the gun from a hook or the like when not in use.

Formed on the end of the throat 13 opposite the nozzle 11 is a fitting or circular spacer 19. This spacer 19 preferably should be of a material of low heat conductivity, and may be cast integral with the head 10, or may be welded to, sweated on or threaded in any suitable manner on the head, as desired. Circumferentially disposed around and adjacent the circumference of the spacer 19 is a series of ports or holes 20.

Connected into the passage 14 is a rigid tube 21, which preferably should be of a material capable of withstanding rigorous steam pressures and temperatures, such as copper or the like. A second tube 22, of a material which may be similar to the tube 21, is connected into the passage 15 and extends substantially parallel to the tube 21. The tubes 21 and 22 may be affixed in the passages 14 and 15 in any manner desired, but they should be sufficiently rigid so as to withstand considerable abuse and should be pressure tight. The length of the tubes 21 and 22 may vary but they should not be of a length greater than will permit easy manipulation of the gun by one hand.

A second spacer 23 is provided on the tubes 21 and 22, and is shown in more detail in section in Fig. 2. The spacers 19 and 23 are similar in structure and serve a similar purpose. Circumferentially disposed around and adjacent the circumference of the spacer 23 is a series of ports or holes 24.

Connecting the spacers 19 and 23 together is an elongated tubular member 25, which entirely surrounds both the spacers 19 and 23 and the tubes 21 and 22 to form a handle. As will be seen from Fig. 1, the tubular member 25 forms the side wall of a chamber 26 and the spacers 19 and 23 form the ends thereof. The ports or holes 20 and 24 are in open communication with the chamber 26 and permit the free passage of air from the atmosphere through this chamber. The tubular member 25, which forms the handle for the gun embodied in this invention, may be made of wood or other heat insulating material, and may be affixed to the spacers 19 and 23 in any suitable manner as by bonding or the like.

While the connections of the handle and spacers need not necessarily be particularly tight, it is preferred that, because of continual manual handling of this apparatus, and because the weight of the nozzle is supported therefrom, these connections be adequately rugged and substantial.

Connected to the tube 21 is a flexible high pressure hose 27, which in turn is connected to any suitable fluid pressure supply, such as steam or the like (not shown). If desired, a suitable control valve (not shown) may be interposed in the hose 27 between the tube 21 and the source of fluid or steam supply for the purpose of controlling the flow of steam or the like to the nozzle 11. While any type valve may be used, it has been found satisfactory to use a foot controlled valve.

Connected to the tube 22 is a second flexible hose 28, which in turn is connected to a reservoir 29 by means of a nipple 30. A valve 31 may be located in the nipple 30 for the purpose of cutting off the line 28 at the reservoir. The reservoir 29 is provided with any suitable cleansing fluid, wetting agent, detergent or dye, such as the operator of the gun may find desirable for use on any particular fabric.

A modified form of the cleaning nozzle proper is shown in Fig. 3, wherein there is a nozzle 32 similar to the nozzle 11 of the principal embodiment of this invention. Axially disposed within the nozzle 32 is a jet 33, which extends beyond the end of the nozzle 32, as shown. The extent to which the jet 33 extends beyond the end of the nozzle 32 is not critical but should be a sufficient distance so as to permit pressing the jet 33 firmly into a fabric without bringing the nozzle 32 thereagainst.

Another modified form of this invention is shown in Fig. 4, in which the numeral 35 designates generally the head of the spotting gun; and 36, a tubular nozzle, having a passage or conduit 37 therein. Centrally disposed in the passage 37 is a jet 38, which is axially located in respect to the nozzle 36 and terminates just flush with the nozzle 36, although it may be disposed in other relations thereto, as described above. The jet 38 is connected with passage or conduit 39. As in the principal embodiment of this invention, the nozzle 36 and jet 38 terminate in a throat 40 which is disposed at right angles thereto, as shown. The disposition of the nozzles at right angles to the throat 40 is of material importance in this invention for reasons which will become apparent during the explanation of the operation of this apparatus.

The needle valve 16, the thumb valve 17 and the eye 18 of the principal embodiment of Fig. 1, are also incorporated into the head of this modification and are for the utility applicable thereto.

The throat 40 of the head 35 is provided with a fitting or circular spacer 41, which, in turn, is provided with a series of ports or holes 42 disposed circumferentially about the spacer, as shown in Fig. 6. As in the case of the spacer 19 of the principal embodiment of this invention, the spacer 41 preferably should be of a material having a low heat conductivity, and may be cast integral with the throat 40 or may be welded, sweated or threaded thereon in any suitable manner.

Depending from the head 35 and attached to the spacer 41, as shown, is a receptacle 43 into which the liquid agent for removing the spot, or other treating liquid, is placed, and which receptacle is detachably connected to the spacer 41 by means of a screw thread, bayonet joint or the like (not shown). The container, as shown in Fig. 4, is made shorter than the nozzle in order to permit pressing the nozzle 36 and jet 38 squarely against the fabric under treatment. A tube 44 extends from just off the bottom of the receptacle 43 up into the passage 39 and forms a fluid connection from the receptacle to the passage. The end of the tube 44 is shown as beveled at 45 to permit a ready flowing of the fluid from the receptacle 43 into the passage 39. Ordinarily fluid will be sucked out of the receptacle 43 by the suction created around the end of the jet 38 by the pressure discharge therearound of steam under high pressure through the nozzle 36.

The conduit 39 is provided with a plug 46 which may be of any suitable material, and is made easily detachable to permit cleaning of the passage 39.

A rigid tube 47, comparable to the tube 21 of the principal embodiment of this invention, is inserted into the passage 37, as shown in Fig. 4, and like the tube 21 preferably should be of a material capable of withstanding rigorous steam pressures and temperatures, such as copper or the like. The tube 47 may be affixed into

the passage 37 in any manner desired, but should be sufficiently rigid so as to withstand considerable abuse and should be pressure tight. Also the length of the tube 47 may vary but it should not be longer than will permit of easy manipulation by one hand. A flexible high pressure hose 48 is affixed to the end of the tube 47 and functions in the same manner when connected to a source of steam or high pressure fluid, as the hose 27.

A second spacer 49, shown in detail in Fig. 6, is provided with a series of holes or ports 50 disposed circumferentially therearound, and is carried upon the tube 47 and spaced from the spacer 41. Interconnecting the spacers 41 and 49 is a tubular member 51, which encloses a chamber 52. The tubular member 51 also serves as a handle for the spotting gun and may be affixed to the spacers in any suitable manner. The chamber 52 is in open communication through the ports of holes 42 and 50 with the atmosphere and permits ready flow of cooling air through the handle.

The operation of the spotting gun embodied in this invention is as follows: Steam or other high pressure fluid, is connected to the hose 27 or 48, and the cleaning agent is placed in the container 29 or receptacle 43. Steam is ejected from the nozzle 11, 32 or 36 depending upon which type of gun is being used, and is directed against the fabric to be cleaned.

In the principal embodiment of this invention the cleaning fluid or agent is introduced onto the spot through the jet 12. The gun is held by the handle 25 in the operator's hand and is addressed to the fabric with the nozzle pressed firmly against the fabric over the spot to be removed. The flow of the cleaning fluid or agent is controlled by the valve 17.

In cleaning or removing a spot from a fabric with the spotting gun embodying this invention, the cleaning fluid first may be introduced onto the spot, and allowed to stand a length of time necessary for the fluid to soften or dissolve the substance causing the spot. The cleaning fluid then is shut off by means of the valve 17, and a jet of steam is forced against the spot causing the dissolved substance and the cleaning fluid to be forced away from the fabric and blown through the material. If the spot is not completely removed in the first operation, the process may be repeated until the spot is removed.

It will be apparent from the foregoing that by using the spotting gun embodying this invention, it will be possible to remove completely the entire substance causing the spot from the threads of the fabric, inasmuch as the pressure of the steam gives a washing action to the softened or dissolved substance causing the spot. It is unnecessary to rub or brush the spot and it is likewise unnecessary to adsorb the cleaning fluid and the substance causing the spot from the fabric.

When the nozzle embodied in the form illustrated in Fig. 1, is used, the cleaning fluid and steam, if desired, may be applied to the fabric simultaneously and in a mixed state, or they may be applied separately and in any order desired by simply controlling the valve 17 and the foot or control valve in the steam line 27 or 48.

In the modified form of my nozzle illustrated in Fig. 3, the inner fluid jet 33 being extended below the outer nozzle 32, there will be no appreciable mixing of the cleaning fluid and steam before applying the same to the spot, but a concentrated application of the cleaning agent to a small restricted area of the fabric is possible. As in the principal embodiment of this invention, the steam may be applied to the fabric either previous or subsequent to the application of the cleaning fluid.

In the modification of my invention shown in Figs. 4 to 6, the inner jet 38 being made flush with the outer nozzle 36, the cleaning fluid and steam may be applied in any sequence desired, but there will be no mixing of the steam and cleaning fluid prior to the application thereof to the material. The advantage of this nozzle lies in the fact that a more definitely controlled area of the cleaning fluid can be obtained and the spotting gun can be applied to a flatter surface than is possible in the modification shown in Fig. 3.

A further utility of the modification shown in Fig. 4, is that the cleaning fluid is self-contained in the receptacle 43 thus making it unnecessary to have two hoses extending from the handle of the gun and small amounts of cleaning fluid may be used without the necessity for having the large quantity of cleaning fluid necessary to be used with the large container 29. The use of the small container 43 would also enable the operator to try out a plurality of cleaning fluids on a fabric in order to determine which fluid was the most desirable for removing the particular substance causing a particular spot.

The fluid will be drawn from the receptacle 43 by means of the jet of high pressure steam passing from the nozzle 36, or will be forced out by pressure of a by-pass from the passage 37 if provided.

Inasmuch as the spotting gun is operated by steam, it is necessary to provide an insulated handle to prevent burning of the hand of the operator of the gun. This insulated handle, as has been described above, is provided with an air chamber 29 or 51 and the ports in both ends of the handle permit a free circulation of air therethrough, from the atmosphere, thus carrying away a major portion of the radiated heat from the steam line extending therethrough.

It is to be understood that changes in material, types of cleaning fluid, heated fluid pressure, valve structure and the like may be adhered to without departing from the spirit of this invention.

I claim:

1. Apparatus for applying fluids under pressure to fabrics comprising an elongated nozzle including an integrally formed elongated throat portion having its longitudinal axis substantially at right angles to the longitudinal axis of said nozzle, said throat having a pair of substantially parallel passages extending longitudinally therethrough, one of said passages opening at its inner end into said nozzle adjacent the inner end of said nozzle, an elongated tubular jet integrally formed with said nozzle and having its longitudinal axis inclined at an angle with respect to said longitudinal axis of said nozzle, said jet having its outer end adjacent the outer end of said nozzle, the other of said passages having its inner end opening into the inner end of said jet, the outer end of said throat having an integrally formed annular spacer flange provided with a plurality of transversely extending circumferentially spaced apertures having axes substantially parallel to the longitudinal axis of said throat, an elongated rigid tubular element having one of its ends connected to the outer end of said one passage and its other end connected with a source of steam under pressure, a second elon-

gated rigid tubular element having one of its ends connected with the outer end of the other of said passages and its other end connected with a source of fluid cleaner under pressure, a circular spacer member mounted on said tubular elements intermediate their respective ends, said spacer member having a plurality of transversely extending circumferentially spaced apertures formed therein, the axes of said last named apertures being substantially parallel to the axes of said first named apertures, a hollow cylindrical handle mounted on said spacer members, a manually operated valve disposed in said other passage to control the flow of fluid cleaner therethrough, and a needle valve positioned in said other passage intermediate said jet and said manually operated valve for fine adjustment of the flow of fluid to said jet.

2. Apparatus for applying fluids under pressure to fabrics comprising a nozzle including an integrally formed throat portion having its axis inclined to the longitudinal axis of said nozzle, said throat having a pair of passages extending longitudinally therethrough, one of said passages opening at its inner end into said nozzle adjacent the inner end of said nozzle, a tubular jet rigidly formed with said nozzle and having its longitudinal axis extending in the direction of said longitudinal axis of said nozzle, said jet having its outer end adjacent the outer end of said nozzle, the other of said passages having its inner end opening into the inner end of said jet, the outer end of said throat having a spacer flange provided with a plurality of transversely extending apertures, a tubular element having one of its ends connected to the outer end of said one passage and its other end adapted to be connected with a source of fluid under pressure, a second tubular element having one of its ends connected with the outer end of the other of said passages and its other end adapted to be connected with a source of fluid cleaner under pressure, the spacer member mounted on said tubular elements intermediate their respective ends, said spacer member having a plurality of transversely extending apertures formed therein, a substantially hollow handle mounted on said spacer members, a valve disposed in said other passage to control the flow of fluid cleaner therethrough, and a second valve positioned in said other passage intermediate said jet and said first valve for fine adjustment of the flow of fluid to said jet.

3. Apparatus for applying fluids under pressure to fabrics comprising a nozzle including an integrally formed throat portion having its longitudinal axis at an angle to the longitudinal axis of said nozzle, said throat having a pair of passages extending longitudinally therethrough, one of said passages opening at its inner end into said nozzle adjacent the inner end of said nozzle, a tubular jet rigidly formed with said nozzle and having its longitudinal axis extending in the direction of said longitudinal axis of said nozzle, said jet having its outer end adjacent the outer end of said nozzle, the other of said passages having its inner end opening into the inner end of said jet, the outer end of said throat having a spacer flange provided with a plurality of transversely extending apertures, at least one tubular element having one of its ends connected to the outer end of said one passage and its other end adapted to be connected with a source of fluid under pressure, a second tubular element having one of its ends connected with the outer end of the other of said passages and its other end adapted to be connected with a source of fluid cleaner under pressure, the spacer member mounted on at least one of said tubular elements intermediate its respective ends, said spacer member having a plurality of transversely extending apertures formed therein, a substantially hollow handle mounted on and extending between said spacer members, a valve disposed in said other passage to control the flow of fluid cleaner therethrough, and a second valve positioned in said other passage intermediate said jet and said first valve for fine adjustment of the flow of fluid to said jet.

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