United States Patent [19]

Wagner

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[54] **SPRAY GUN**

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[52] **U.S. Cl.** **239/372,** 239/415, 239/528, 239/576

[51] **Int. Cl.** **B05b 7/02,** B05b 1/30

[58] **Field of Search** 239/372, 415, 528, 239/576

[56] **References Cited**

UNITED STATES PATENTS

3,122,324	2/1964	Lee	239/415 X

FOREIGN PATENTS OR APPLICATIONS

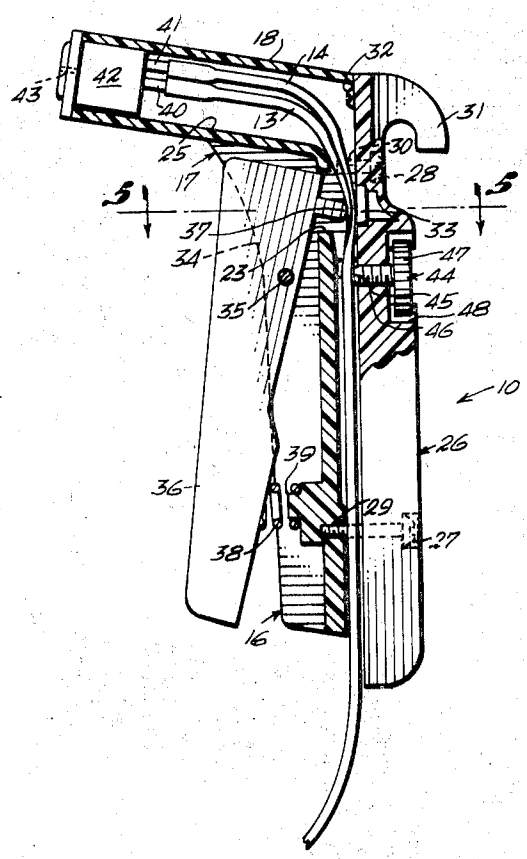
37,314	5/1969	Finland	239/576
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Primary Examiner—Robert S. Ward, Jr.
Attorney—Ernest H. Schmidt

[57] **ABSTRACT**

A spray gun for applying hair-setting fluids and the like and in which pressurized air and fluid are separately fed through flexible conduits for mixing in a mixing chamber prior to discharge through a nozzle, and including cut-off mechanism operative first to shut off the flexible fluid conduit and then shut off the pressurized air conduit to ensure that all fluid is blown out of the nozzle at the discontinuance of spraying, the shut-off mechanism comprising an anvil member and a relatively movable abutment member adapted to sequentially squeeze to shut-off condition the flexible fluid conduit and the pressurized air conduit, the conduits being superposed in series between the anvil member and the abutment member with the pressurized air conduit adjacent the anvil.

7 Claims, 5 Drawing Figures



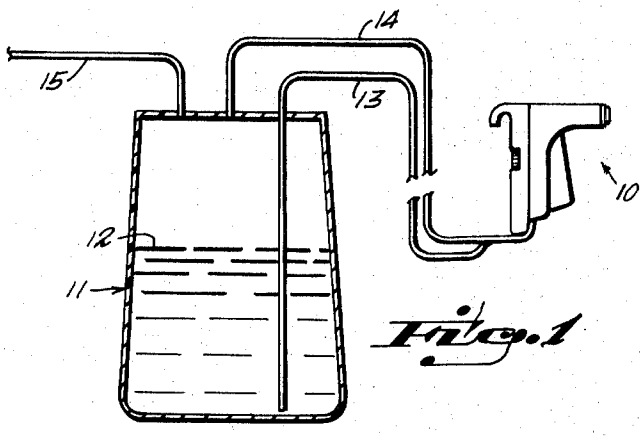


Fig. 1

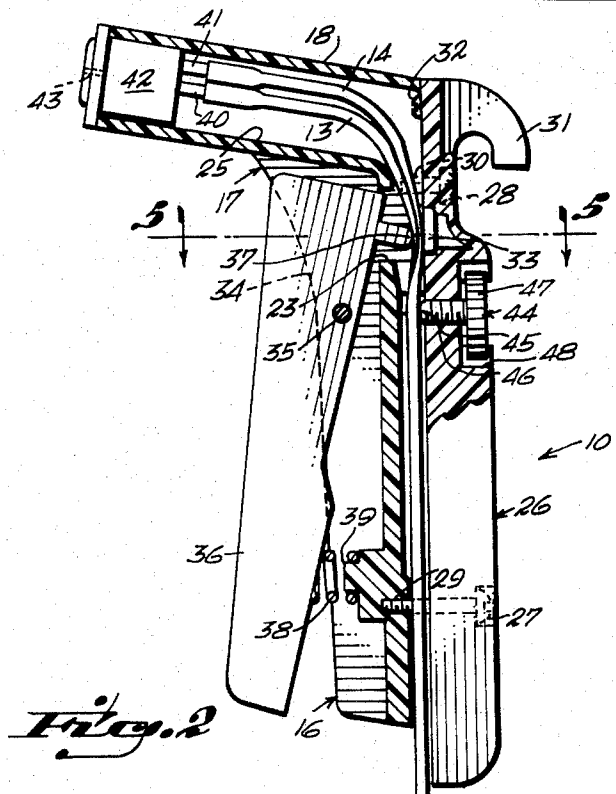


Fig. 2

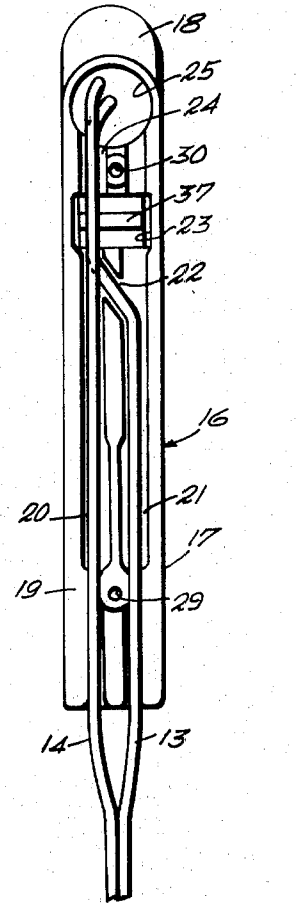


Fig. 3

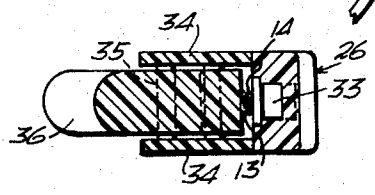


Fig. 5

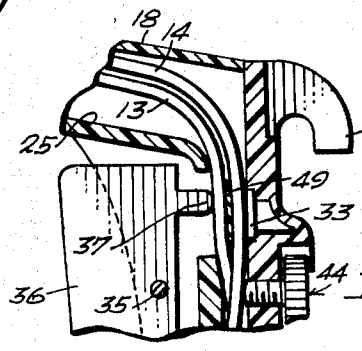


Fig. 4

SPRAY GUN

This invention relates to spray guns, and particularly to spray guns of the type used to spray hair-setting fluids and the like in hairdressing procedures.

The use of spraying apparatus for efficiently and economically applying hair-treating and hair-setting fluids in beauty parlors is known. Such apparatus include a hand-gun connected by flexible conduits to a stationary container containing the fluid to be dispensed and supplied with a source of air under pressure adapted to supply pressurized air and the fluid under pressure through the gun nozzle. Such spray guns, moreover, include a manually actuated trigger-like mechanism operative normally to shut off the supplies of pressurized fluid and air to the gun nozzle and operative, when actuated, to spray the atomized fluid through the nozzle during use of the apparatus. Such a spray gun is described in U.S. Pat. No. 3,122,324 issued Feb. 25, 1964 to Aaron Lee. In that patent the spraying shut-off mechanism, in order to effect shut-off of pressurized fluid to the gun nozzle before shut-off of the pressurized air conduit so as to purge the nozzle apertures of residual fluid prior to complete shutoff in a spraying operation, comprises a planar anvil face against which the conduits are disposed in side-by-side relation and a movable abutment member having a relatively inclined surface portion movable in clamping engagement against the conduits so that the pressurized fluid conduit is squeezed to shut-off condition prior to shut-off of the pressurized air. This shut-off arrangement is deficient in various respects, principally in that the fluid supply conduit not only must be collapsed to shut-off condition, but thereafter further squeezed to effect shut-off of the pressurized air conduit in operation of the device, thereby rapidly stressing the fluid conduit at the zone of shut-off to such a degree that frequent repair or replacement becomes necessary.

It is, accordingly, the principal object of this invention to provide a novel and improved shut-off mechanism for spray guns of the character described wherein shut-off of the pressurized fluid conduit is effected before shut-off of the pressurized air conduit, but wherein the clamping stresses imposed are substantially uniformly distributed through each of the conduits, thereby effecting substantially longer life and better shut-off control than heretofore possible.

A more particular object of this invention is to provide a spray gun shut-off mechanism of the above nature wherein the pressurized fluid and air conduits, instead of being arranged side-by-side, are mutually superposed in series between an anvil member and a relatively movable abutment member operative to clampingly squeeze the pressurized conduits in unison during the shut-off operation.

Other objects, features and advantages of the invention will be apparent from the following description when read with reference to the accompanying drawings. In the drawings, wherein like reference numerals denote corresponding parts throughout the several views:

FIG. 1 illustrates spray gun apparatus including a spray gun embodying the invention;

FIG. 2 is a side elevational view, partially in section, of a spray gun embodying the invention;

FIG. 3 is a rear elevation view of the spray gun illustrated in FIG. 2, shown with the handle cover member removed to reveal interior construction;

FIG. 4 is a fragmentary enlarged view, partly in vertical section, illustrating a modified form of the invention; and

FIG. 5 is a vertical cross-sectional view taken along line 5—5 of FIG. 2 in the direction of the arrows.

Referring now to the drawings, reference numeral 10 designates, generally, a spray gun embodying the invention, the same being shown connected with a container 11 containing spray fluid 12 through flexible liquid and pressurized air conduits 13 and 14, respectively. The spray paparatus of FIG. 1 also comprises a pressurized air supply line 15 fed from an air compressor or other source of air under pressure (not illustrated) and serving to force feed pressurized air and fluid to be sprayed to the spray gun 10 through flexible conduits 13 and 14.

Referring to FIGS. 2 and 3 of the drawings, reference numeral 16 designates a body member 16 comprising the spray gun 10, the same preferably being integrally formed of a tough synthetic plastic material. The body member 16 has a handle portion 17 from the upper end of which extends a slightly upwardly inclined tubular nozzle barrel portion 18. The body member 16 is formed along the back with a flat, planar face portion 19 which, as best illustrated in FIG. 3, is provided with laterally spaced, vertically extending slots or recesses 20 and 21 for the reception of liquid and pressurized air conduits or lines 13 and 14, respectively, as is herein below more particularly described. The slot 21 extends somewhat short of the slot 20, and at its upper end communicates with slot 20 through an inclined slot portion 22. The upper end of the slot 20 opens into a substantially rectangular, through opening in the body member 16, for the purpose hereinafter appearing. An enlarged recess or slot 24 formed in the body member 16 communicates between the upper end of the recess opening 23 opposite the slot 20, and the interior bore 25 of the nozzle barrel portion 18, said enlarged recess being provided for the through free passage of the liquid and air conduits or lines 13 and 14, respectively.

The spray gun 10 further comprises a handle cover member 26, also preferably fabricated of a tough synthetic plastic material and having a flat inner surface of such size and configuration as to seat in face-to-face covering relation against the flat face portion 19 of the body member 16, whereat it is removably secured in place as by a pair of machine screws 27, 28 extending through said handle cover member and being received in respective tapped openings 29, 30 provided in said body member. The handle cover member 26, at its upper end, is preferably fitted with a rearwardly and downwardly extending hook member 31, secured in place as by a machine screw 32 extending through the inside of said handle cover member, for hangingly supporting the spray gun when not in use. Embedded within the inner face of the handle cover member 26, for the purpose hereinafter appearing, is a metal anvil member 33, said anvil member having an exposed anvil face flush with the inner flat surface of said handle cover member and being positioned centrally of the rectangular opening 23 of the body member 16 when said anvil cover member and said body member are assembled to one another.

The body member 16 is further integrally formed with a pair of laterally spaced, vertically extending sidewall members 34, 34 carrying a transversely extending pivot pin 38 journalling an integrally formed trigger

member 36, which trigger member also is preferably formed of a tough synthetic plastic material. As illustrated in FIGS. 2 and 3, the upper end portion of the trigger member 36 has a rearwardly or inwardly extending, rounded abutment portion 37 which projects through the rectangular opening 23. A compression spring 38 is constrained between an attachment boss 39 extending centrally outwardly over the body member 16 near the lower end thereof and similar attachment means (not illustrated) inside of the trigger member 36. The trigger member 36 is thereby resiliently urged in the clockwise direction with respect to the body member 16, as illustrated in FIG. 2, whereby its rounded abutment portion 37 will normally forcefully clamp the superposed fluid and pressurized air conduits or lines 13 and 14 against the flat surface of the metal anvil member 33. It is to be noted that the rotational force imparted the trigger member 36 by the compression spring 38 is such as will cause the rounded abutment portion 37 to press the conduits 13 and 14 together in clamping abutment against the anvil member 33 so that both pressurized air in air conduit 14 and pressurized fluid in fluid conduit 13 are completely shut off. As illustrated in FIG. 2, the pressurized fluid and air conduits 13, 14 extend loosely through the interior bore of the nozzle barrel portion 18, wherein they connect with supply connector tubes 40, 41 leading to a nozzle member 42 press-fitted within the open end of said barrel portion. The nozzle member 42, being of known construction, is not described in detail herein, it being deemed sufficient to state that the pressurized air and fluid supplied thereto are mixed and atomized for spraying through a spray orifice 43 at the outer end thereof.

As illustrated in FIGS. 2 and 3, an adjustment screw 44 is threaded in an internally threaded opening 45 of the handle cover member 26 at a central transverse position opposite the inclined recess 22, whereat the rounded inner end portion 46 of said adjustment screw bears against an inner surface portion of the pressurized fluid line 13. The cylindrical head 47 of the adjustment screw 46 is recessed in a circular opening 48 at the outside of the handle cover member 26, which circular opening is of such diameter as to be open at each side of said handle cover member to facilitate screw adjustment by use of the thumb and forefinger. It will be understood that inward adjustment of the adjustment screw 46 serves to compress the fluid line 13 against the bottom of the inclined recess 22 comprising the handle portion 17 for controlling the ratio of fluid to air being sprayed as required by the operator.

In operation, it will be understood that the outer end of the rounded abutment portion 37 will exert its pressure over a relatively small area of the fluid conduit 13 as compared with pressure being exerted through said liquid conduit against the adjacent pressurized air conduit 14. Thus, as the trigger member 36 is squeezed, the air conduit 14 will first open, whereafter, upon further movement of said trigger member, the pressurized fluid line will open to begin the spraying operation effected by mixing of the pressurized air and fluid in the nozzle member 42 and its discharge through the spray orifice 43. When spraying is to be discontinued, gradual release of the trigger member 36 serves first to shut off the fluid conduit 13, and thereafter shut off the pressurized air line 14. During the interval that the pressurized air only is thus being discharged through the nozzle 42, it serves to purge residual fluid from said nozzle member and its spray orifice 43 to prevent clogging between spraying operations. In this connection it is to be noted that many hair-treating and hair-setting fluids to be used with the spray gun contain lacquer or the like substances which harden when exposed to air, thereby having a tendency to clog the nozzle member orifices if not purged therefrom after each spraying operation.

FIG. 5 illustrates a modified form of the invention differing only from that illustrated in FIGS. 1 through 4 described above in that a thin pressure plate 49 is fitted between the pressurized fluid line 13 and the pressurized air line 14, opposite the metal anvil member 33. The pressur plate 49 is preferably of a thin, somewhat flexible metal of sheet plastic material, and serves to more widely distribute the pressure being applied to the pressurized air conduit 14 through the pressurized fluid conduit 13 as imparted by the trigger abutment portion 37. It will be understood that because of such distribution of pressure as applied to the pressurized air conduit 14, the interval between shut-off of the pressurized fluid conduit 13 and the pressurized air conduit 14 will be increased, for a given rate of trigger release and a given size or relative sizes of said pressurized conduits. It is further to be understood that the shut-off intervals and characteristics of the pressurized fluid and air conduits can also be altered by changing the relative sizes of the conduits, or their relative elasticity. Thus, while I have illustrated and described herein only two forms in which the invention can conveniently be embodied in practice, it is to be understood that these forms are presented by way of example only and not in a limiting sense. The invention, in brief, comprises all the embodiments and modifications coming within the scope and spirit of the following claims.

What I claim as new and desire to secure by Letters Patent is:

1. A spray gun for the spray-dispensing of fluids comprising, in combination, a hand gun having a hand grip portion and a nozzle member, a first tubular conduit for supplying pressurized air to said nozzle member and leading through said hand grip portion, a second tubular conduit for supplying pressurized fluid to be sprayed through said nozzle member and leading through said hand grip portion, an actuating member movably supported with respect to said hand grip portion and movable between a first position and a second position, said actuating member being operative, when moved to said second position, to sequentially clamp into shut-off condition against a relatively fixed anvil portion said pressurized liquid conduit and said pressurized air conduit, said conduits being mutually superposed between said actuating member and said anvil portion with said pressurized air conduit adjacent said anvil portion.

2. A spray gun as defined in claim 1 wherein said movably supported member comprises a trigger member pivotally journalled intermediate its ends with respect to said hand grip portion, said trigger member having an abutment portion adapted to move into clamping engagement with respect to said conduits.

3. A spray gun as defined as in claim 2 including resilient means normally urging said trigger member in said one direction.

4. A spray gun as defined in claim 3 including a thin, flexible pressure plate disposed between said first and second tubular conduits in alignment with said abutment portion and said anvil portion.

5. A spray gun as defined in claim 3 wherein said hand grip portion comprises a body member having a handle portion and a nozzle barrel portion, said nozzle member being secured at one end of said barrel portion, a handle cover member, and means removably securing said handle cover member to said handle portion.

6. A spray gun as defined in claim 5 including a pair of recesses formed in said handle portion for the passage of said conduits, an inner end of one of said recesses communicating with the other recess to provide for mutual superpositioning of said conduits between said abutment member and said anvil portion.

7. A spray gun as defined in claim 6 including means for adjustably collapsing said tubular conduit for controlling the feed of pressurized fluid therethrough.

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