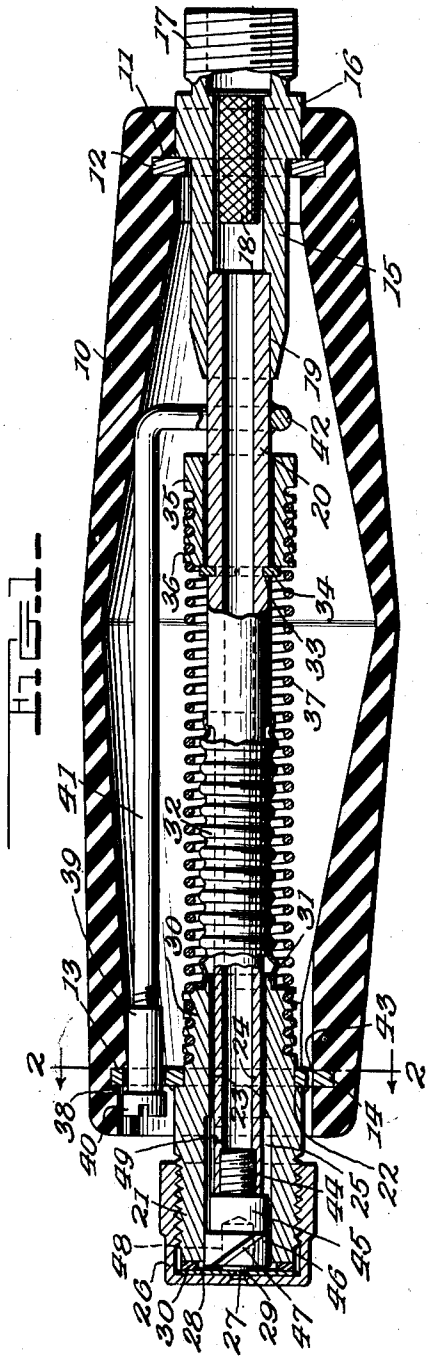
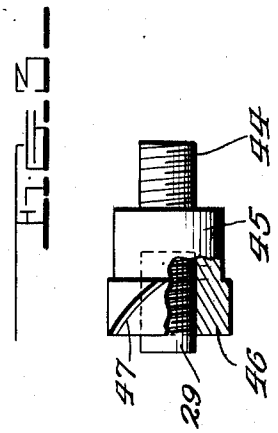
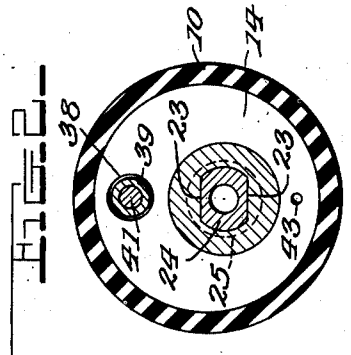
Dec. 30, 1952 N. SMITH 2,623,790

SPRAY GUN

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## SPRAY GUN

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Application April 4, 1950, Serial No. 153,938

13 Claims. (Cl. 299—150)

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This invention relates to spray guns and has special reference to valve control for such guns.

As pointed out in my copending application for patent filed April 4, 1950, Serial No. 153,939, the valve control in most spray guns includes a manually operable trigger or lever and a linkage connecting the same to the valve.

One object of the present invention is to provide a novel form of spray gun wherein the usual trigger or lever and linkage controlling the valve will be entirely eliminated.

Another object of this invention is to provide a novel spray gun having a rubber-like tubular body so shaped as to produce longitudinal extension upon the middle portion of the body being circumferentially compressed.

A further important object of the invention is to provide a novel arrangement of parts whereby elongation and contraction is length of the gun body will effect respectively the unseating and seating of the valve controlling the emission of the spray.

With the above and other objects in view, as will be presently apparent, the invention consists in general of certain novel details of construction and combinations of parts hereinafter fully described, illustrated in the accompanying drawings and particularly claimed.

In the drawings, like characters of reference indicate like parts in the several views and

Figure 1 is a longitudinal median section of the invention with certain parts shown partly in elevation;

Figure 2 is a section on the line 2—2 of Figure 1; and

Figure 3 is an enlarged detail assembly showing the valve and associated parts, the view being partly in side elevation and partly in longitudinal section.

In the embodiment of this form of the invention, there is provided a body 10 of rubber or other material having the rubber-like characteristics through which compression in one direction or plane causes elongation in a direction at right angles to such compression. The body 10 is of tubular spindle shape and the ends of the body wall are relatively thick while the wall at the middle is relatively thin. Also, the wall gradually increases in thickness from the middle of the body to each thick end.

The thick portion of the wall at one end is provided with an internal groove 11 wherein is fitted a washer 12. In the thick portion of the wall at the remaining end of the body there is provided an internal groove 13 wherein is fitted a washer

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14. Extending through the washer 12 is a nipple 15 having a circumferential rib 16 engaging against the outer face of the washer 12. The outer end of this nipple is threaded as at 17 or otherwise formed for attachment of a hose or the like for supplying fluid to the nipple. Within the nipple is a strainer 18 for preventing passage of undesirable material. The bore of the nipple at its inner end is enlarged to form a seat 19 for the inlet end of a fluid supply tube 20 extending into the outlet end of the gun. Extending through the washer 14 is a nipple 21 having a shouldered portion 22 resting against and welded to the outer face of the washer 14. The bore of the nipple 21 is, at its inner end portion, provided with flattened oppositely disposed faces 23 and the terminal portion 24 of the tube is reduced and similarly shaped to fit in the nipple 21 and be held against rotation with respect thereto. The outer part 25 of the bore of the nipple 14 is circular in cross-section to provide a longitudinal channel 25 between each flat face of tube portion 24 and the wall of the bore. The outer end of the nipple 21 is externally threaded and screwed on this threaded end is a cap 26 having a centrally disposed spray opening 27 formed in its outer end. Fitted against the inner face of this outer end is a disk 28 having an opening 29 therein registering with the opening 27. A gasket 30 is seated between the periphery of the disk 28 and the outer end of the nipple 21. The size of the opening 29 controls the quantity of spray delivered from the gun, regard being had to the viscosity of the material being sprayed and the pressure under which it is delivered. The disk is thus arranged for interchange with others of different hole sizes.

The inner end of the nipple 21 is spirally grooved at 30 for a portion of its length but terminates in a reduced extremity 31. Surrounding and welded to this extremity is one end of metallic bellows-like housing or Sylphon 32 which has its other end surrounding and welded to the cylindrical portion of the tube 20. The tube 20 is grooved at 33 to receive a snap-ring 34 forming a collar on the tube. Fitted on the tube 20 is a nut 35 which engages against the collar 34. This nut has the portion adjacent the collar provided with a spiral groove 36. A coiled tension spring 37 has one end fitted in the grooved portion of the nipple 21 and its other end fitted in the groove 36. The tension of this spring may be varied by rotating the nut 35 on the tube to control the spray.

The washer 14 is provided with an opening 38

through which extends a slidable and rotatable elongated nut 39 having a head 40 on its outer end to form a limit stop to the movement of this nut through the washer. This nut has screw engagement with one end of a rod 41 which, at its other end, is provided with a loop 42 surrounding and welded to the tube 26. Also, the washer 14 is provided with a vent opening 43 so that air may pass freely in and out of the body 10.

The end of the tube 26 which enters the nipple 21 is closed by a plug 44 carrying a head 45 having an enlarged portion 46 fitting closely in the nipple 21 and provided with spiral grooves 47 in its periphery to permit the passage of fluid. Screwed into the head is a valve 48 which normally closes the opening 29. The tube 26 has communication to the bore of the nipple 21, the housing 32 preventing escape of liquid into the body 10.

In operating this device the body 10 is grasped in one's hand at its middle portion and compressed by squeezing. This causes the end portions of the body to move apart. The valve 48 being supported from the washer 12 moves away from the opening 29 against the action of the spring 37, the housing 32 expanding to permit such movement. Upon release of the squeezing pressure on the body 10, the ends of the body will, assisted by the spring, move toward each other and the valve will close.

What is claimed is:

1. In a spray gun, an elongated tubular body of rubber-like material, said body being longitudinally extensible when circumferentially compressed, a pair of washers located one at either end of said body, a spray nozzle secured to one of said washers, a rigid fluid supply tube secured to the other washer and extending through said washer into said body, a normally closed valve for controlling the supply of fluid from said tube to said nozzle, one coacting member of said valve being fixed to said nozzle and another such member being fixed to said tube, and sealing means located within and spaced from said body for confining the flow of fluid between said tube and said nozzle and keeping the fluid out of contact with said body, whereby neither the dimensions nor the compressibility of said body are substantially affected by the fluid pressure and whereby said washers are supported at a normal longitudinal spacing corresponding to valve closure when the body is free and said washer spacing is increased to open said valve when the body is compressed.

2. A spray gun as claimed in claim 1 in which said sealing means is a bellows-like flexible housing having its ends hermetically sealed respectively to said tube and said nozzle.

3. A spray gun as claimed in claim 1 in which said sealing means is a bellows-like flexible housing having its ends hermetically sealed respectively to said tube and said nozzle, and in which said valve is normally held closed by a coil spring encircling said bellows-like housing.

4. A spray gun as claimed in claim 1 in which said body is of spindle shape having its wall gradually increasing in thickness from its center toward each end.

5. The combination of a circumferentially compressible and longitudinally extensible body, of a washer fixed in one end of said body, fluid conducting means extending through said body and terminating at the other end of said body, a second washer fixed in the last named end of the body, a nipple extending through and fixed to said second washer, said nipple surrounding the terminal portion of the fluid conducting means, said means having a lateral port opening into said nipple, an apertured diaphragm in said nipple, a valve carried by the fluid conducting means and normally closing the aperture, a collar on said fluid supply means and spaced from said nipple, a nut on said fluid supply means and engaging against the collar on the side remote from the spindle, the confronting ends of the nut and nipple being spirally grooved, and a coiled tensioning spring having its ends engaged in said grooves.

6. The combination of a circumferentially compressible and longitudinally extensible body, of a washer fixed in one end of said body, fluid conducting means extending through said body and terminating at the other end of said body, a second washer fixed in the last named end of the body, a nipple extending through and fixed to said second washer, said nipple surrounding the terminal portion of the fluid conducting means, said means having a lateral port opening into said nipple, an apertured diaphragm in said nipple, a valve carried by the fluid conducting means and normally closing the aperture, and a housing surrounding the fluid supply means and having its ends hermetically secured respectively to said fluid supply means and said nipple.

7. The combination of a circumferentially compressible and longitudinally extensible body, of a washer fixed in one end of said body, fluid conducting means extending through said body and terminating at the other end of said body, a second washer fixed in the last named end of the body, a nipple extending through and fixed to said second washer, said nipple surrounding the terminal portion of the fluid conducting means, said means having a lateral port opening into said nipple, an apertured diaphragm in said nipple, a valve carried by the fluid conducting means and normally closing the aperture, spring means urging said valve against said diaphragm, and a housing surrounding the fluid supply means and having its ends hermetically secured respectively to said fluid supply means and said nipple.

8. The combination of a circumferentially compressible and longitudinally extensible body, of a washer fixed in one end of said body, fluid conducting means extending through said body and terminating at the other end of said body, a second washer fixed in the last named end of the body, a nipple extending through and fixed to said second washer, said nipple surrounding the terminal portion of the fluid conducting means, said means having a lateral port opening into said nipple, an apertured diaphragm in said nipple, a valve carried by the fluid conducting means and normally closing the aperture, spring means connecting said nipple and fluid supply means and urging the valve against the diaphragm, and a housing surrounding the fluid supply means and having its ends hermetically secured respectively to said fluid supply means and said nipple.

9. The combination of a circumferentially compressible and longitudinally extensible body, of a washer fixed in one end of said body, fluid conducting means extending through said body and terminating at the other end of said body, a second washer fixed in the last named end of the body, a nipple extending through and fixed to said second washer, said nipple surrounding the terminal portion of the fluid conducting

means, said means having a lateral port opening into said nipple, an apertured diaphragm in said nipple, a valve carried by the fluid conducting means and normally closing the aperture, a collar on said fluid supply means and engaging against the collar on the side remote from the spindle, the confronting ends of the nut and nipple being spirally grooved, a coiled tensioning spring having its ends engaged in said grooves, and a housing surrounding the fluid supply means and having its ends hermetically secured respectively to said fluid supply means and said nipple.

10. The combination of a circumferentially compressible and longitudinally extensible body, of a washer fixed in one end of said body, fluid conducting means extending through said body and terminating at the other end of said body, a second washer fixed in the last named end of the body, a nipple extending through and fixed to said second washer, said nipple surrounding the terminal portion of the fluid conducting means, said means having a lateral port opening into said nipple, an apertured diaphragm in said nipple, a valve carried by the fluid conducting means and normally closing the aperture, and a housing surrounding the fluid supply means and having its ends hermetically secured respectively to said fluid supply means and said nipple, said housing being of bellows-like form to constitute a Sylphon.

11. The combination of a circumferentially compressible and longitudinally extensible body, of a washer fixed in one end of said body, fluid conducting means extending through said body and terminating at the other end of said body, a second washer fixed in the last named end of the body, a nipple extending through and fixed to said second washer, said nipple surrounding the terminal portion of the fluid conducting means, said means having a lateral port opening into said nipple, an apertured diaphragm in said nipple, a valve carried by the fluid conducting means and normally closing the aperture, spring means urging said valve against said diaphragm, and a housing surrounding the fluid supply means and having its ends hermetically secured respectively to said fluid supply means and said nipple, said housing being of bellows-like form to constitute a Sylphon.

12. The combination of a circumferentially compressible and longitudinally extensible body, of a washer fixed in one end of said body, fluid conducting means extending through said body and terminating at the other end of said body, a



second washer fixed in the last named end of the body, a nipple extending through and fixed to said second washer, said nipple surrounding the terminal portion of the fluid conducting means, said means having a lateral port opening into said nipple, an apertured diaphragm in said nipple, a valve carried by the fluid conducting means and normally closing the aperture, spring means connecting said nipple and fluid supply means and urging the valve against the diaphragm, and a housing surrounding the fluid supply means and having its ends hermetically secured respectively to said fluid supply means and said nipple, said housing being of bellows-like form to constitute a Sylphon.

13. The combination of a circumferentially compressible and longitudinally extensible body, of a washer fixed in one end of said body, fluid conducting means extending through said body and terminating at the other end of said body, a second washer fixed in the last named end of the body, a nipple extending through and fixed to said second washer, said nipple surrounding the terminal portion of the fluid conducting means, said means having a lateral port opening into said nipple, an apertured diaphragm in said nipple, a valve carried by the fluid conducting means and normally closing the aperture, a collar on said fluid supply means and engaging against the collar on the side remote from the spindle, the confronting ends of the nut and nipple being spirally grooved, a coiled tensioning spring having its ends engaged in said grooves, and a housing surrounding the fluid supply means and having its ends hermetically secured respectively to said fluid supply means and said nipple, said housing being of bellows-like form to constitute a Sylphon.

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