

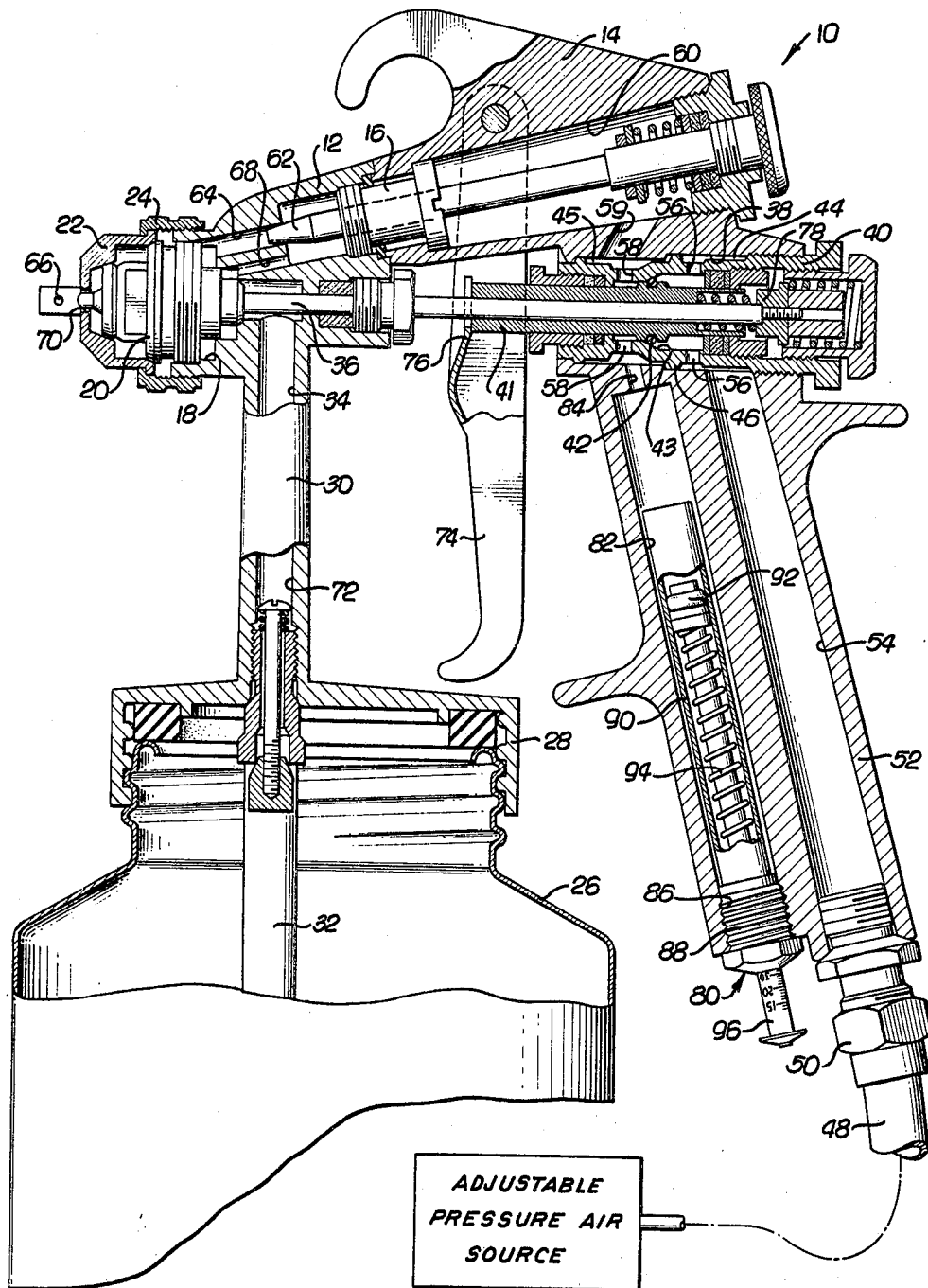
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K. B. SHARPE

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SPRAY GUN WITH PRESSURE GAUGE FEATURE

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INVENTOR.
KENNETH B. SHARPE
By *Flann and Flann*
ATTORNEYS.

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3,482,781 SPRAY GUN WITH PRESSURE GAUGE FEATURE

Kenneth B. Sharpe, Los Angeles, Calif., assignor to Sharpe Manufacturing Company, Los Angeles, Calif., a corporation of California

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7 Claims

ABSTRACT OF THE DISCLOSURE

A paint spray gun 10 has a nozzle 20 to which material is supplied via the passage 34. Compressed air is supplied to the nozzle via ports 64 and 68. The flow of pressurized air is controlled by a valve including a closure 42 and a seat 43. A gauge 80 continuously communicates with the outlet side of the valve via a port 84. The port 84 continuously communicates with the inlet port 68. Accordingly, the gauge 80 directly reads the pressure of air applied to the nozzle 20.

This is a continuation of application Ser. No. 527,324, filed Feb. 14, 1966, now abandoned.

BRIEF SUMMARY OF THE INVENTION

This invention relates to paint spray guns.

New acrylic and metallic paints now being extensively used require precise control of air pressure at the spray nozzle. Pressure gauges on the air supply tanks of course do not indicate air pressure at the spray gun. Elaborate charts and diagrams have been heretofore published so that the user can calculate the delivery pressure. Variables, such as hose length, hose diameter and tank pressure, all enter into the formulation. Furthermore, since the valve itself is ahead of the spray nozzle, the characteristic pressure drop through the valve must also be considered. Experience has shown that a painter's patience is easily exhausted when he is required to perform calculations. Various errors result due to inadvertence, etc.

The primary object of this invention is to provide a new and improved spray gun that obviates all calculations and references to charts, diagrams, etc. For this purpose, I provide a pressure gauge in the spray gun itself so arranged that its operative element is subject to the pressure of air at the nozzle itself. Accordingly, it is only necessary for the painter to operate the spray gun and directly read the nozzle pressure. If it is incorrect, the tank regulator is adjusted (without reference to actual tank pressure) until the specified nozzle pressure is provided.

Another object of this invention is to provide a spray gun in which a standard pressure gauge is conveniently accommodated in the grip portion of the spray gun.

This invention possesses many other advantages, and has other objects which may be made more clearly apparent from a consideration of one embodiment of the invention. For this purpose, there is shown a form in the drawings accompanying and forming a part of the present specification, and which drawings, unless as otherwise indicated, are true scale. This form will now be described in detail, illustrating the general principles of the invention; but it is to be understood that this detailed description is not to be taken in a limiting sense, since the scope of this invention is best defined by the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The single figure is an axial sectional view of a spray gun incorporating the present invention, a portion of the apparatus being shown in elevation, and the container being shown in an offset plane.

DETAILED DESCRIPTION

In the drawing there is illustrated a paint spray gun 10 generally of the type shown and described in Briggs Patent No. 2,880,940, issued Apr. 7, 1959, and entitled Paint Spray Gun. The spray gun 10 comprises a head part 12 and a body part 14 detachably secured together by the aid of a hollow nut 16. The head 12 provides a socket 18 for threadedly receiving a selected nozzle 20. The nozzle 20 and a spray gun tip 22 are held in place by the aid of a flanged nut 24.

In the present instance, the material to be sprayed is held in a container or cup 26. The cup 26 is detachably connected to a cap 28 formed at the end of a stem 30 attached to the head 12. A dip tube 32 conducts the material from the cup 26 into one of two passages 34 of the stem 30 and to the bottom of the nozzle socket 18. A needle valve 36 controls the flow of material through the nozzle. This needle valve 36 extends rearwardly into a through bore 38 formed in the body part 14. Accommodated in the bore 38 is a hollow air valve body 40.

A sleeve 41 mounting an O-ring closure 42 cooperates with an interior tapered seat 43 of the body 40 to control the passage of pressurized air to the nozzle 20. Thus, the interior of the valve body 40 on opposite sides of the closure 42 forms a serial part of the path of pressurized air to the nozzle 20.

The hollow body 40 defines, with its bore 38, annular inlet and outlet chambers 44 and 45. These chambers are separated by a peripheral flange 46. The ends of the bore 38 are sealed by suitable means.

Pressurized air is conducted to the inlet chamber 44 by the aid of a hose 48, a fitting 50 at the end of the grip portion 52 of the body 14, and a passage or cavity 54 in the grip portion 52 that at its upper end intersects the bore 38 at the inlet chamber 44. Radial ports 56 in the body 40 conduct pressurized air to the interior of the valve body. If the closure 42 is away from its seat, air then passes through the seat 43, then through radial ports 58 to the outlet chamber 45 and via port 59 to a large passage 60 in the upper part of the body 14. The passage 60 communicates via the hollow nut 16, a throttle valve 62, and port 64 to wing tip openings, as at 66. The large passage 60 also communicates with a port 68, and the interior of the cap 22 for flow of pressurized air past a restricted aperture 70 that surrounds the material outlet end of the nozzle. In a well-known manner, flow of the paint or other material is thus induced.

The passage 60 also communicates via a lateral port (not shown) with the second passage 72 of the stem 30, thus suitably pressurizing the cup 26. Optionally, a head may be used that provides a stem cooperable with a flexible hose or the like that conducts material from a remote pressurized source.

In order to retract the sleeve 41 and move the closure 42 carried thereby, a pivoted handle 74 is provided. The handle 74 has a part 76 engageable with the end of the sleeve 42. Upon sufficient retraction of the sleeve 42, the needle valve 36 is also retracted. This is accomplished by the aid of an abutment nut 78 mounted on the end of the needle valve 36.

The outlet chamber 45 is in substantially unrestricted communication with the spray tip 22 and the main tip passage 70. The air pressure supplied to the passage 70 determines the spray characteristics and must be carefully controlled.

In order to measure the pressure in the tip 22 immediately in advance of the restricted aperture 70, a pressure gauge 80 is provided. This pressure gauge is of conventional type, such as used in tire inflation devices. This pressure gauge is accommodated in an elongate bore or cavity 82 that parallels the air passage 54 in the grip portion 52. The cavities 54 and 82 extend in side-by-side

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relationship and respectively posteriorly and anteriorly of the grip portion 52. The upper end of the bore 82 opens via a port 84 to the outlet chamber 45. The pressure in the outlet chamber and the bore 82 corresponds substantially to that in the spray gun tip 22 immediately in advance of the restricted aperture 70 since there is no substantial restriction therebetween. The lower end of the bore 82 is threaded, as at 86, in order to cooperate with the mounting screw 88 of the gauge 80.

The gauge 80 carries a sleeve 90 in which a piston 92 works. One side of the piston is subjected to the pressure at the end of the sleeve 90, namely, the interior of the bore 82. The opposite end of the sleeve 90 is exposed to the atmosphere. A compression spring 74 opposes movement of the piston 92. Coupled to the piston 92 is a slide 96 carrying suitable indicia for denoting pressure.

In operation, the user simply manipulates the trigger 74 and observes the pressure. The tank or regulator pressure is adjusted until a desired or specified value is achieved.

The inventor claims:

1. In a paint spray gun: a spray gun body having a grip portion, there being two separate longitudinally extending cavities in said grip portion, and both opening at the lower end of said grip portion; said body having a valve recess; a carrier gas valve body in said recess and having means defining with said recess an inlet chamber and an outlet chamber; said spray gun body being ported to establish communication between the inlet chamber and the upper end of one of said cavities, and between the outlet chamber and the upper end of the other of said cavities; a movable valve closure in the valve body and operative to control communication between said inlet and outlet chambers through the valve body; a nozzle carried by the body and having substantially unrestricted communication with said outlet chamber; a fitting at the lower end of said one of said cavities for conducting gas under pressure to said inlet chamber; and a pressure gauge accommodated in the other of said cavities for sensing the pressure therein.

2. The combination as set forth in claim 1 in which said pressure gauge has a slide type indicator positioned to extend axially within said second cavity in a retracted position corresponding to zero pressure and to project axially downwardly of said second cavity to indicate positive pressure.

3. The combination as set forth in claim 1 together with a source of gas connected to said fitting, and adjustable to vary the pressure thereof.

4. In a paint spray gun: a spray gun body; a nozzle carried by the body and having a material outlet opening; said nozzle having an aperture, said aperture having an open but restricted outlet end terminating adjacent said material outlet opening for high velocity passage of a carrier gas past said material outlet opening, said aperture having an inlet end in continuous open communication with said open outlet end; a gas control valve having an inlet cooperable with a carrier gas supply hose, an outlet and a closure; said body having first conduit means uninterruptedly conducting gas from said valve outlet to the said inlet end of said aperture whereby said gas control valve forms the last closure between the source of pressurized carrier gas and said aperture; and a pressure gauge rigidly carried by and attached to the gun body and

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having a sensing element as well as an indicator element operatively connected to said sensing element; said body having second conduit means continuously and uninterruptedly connecting said first conduit means to said sensing element whereby said indicator element indicates delivery pressure at said nozzle aperture.

5. The combination as set forth in claim 4 together with a source of gas; a hose connecting said source to said valve inlet; and means operative to vary the pressure of said source of gas.

6. In a paint spray gun: a spray gun body having a grip portion, there being two separate longitudinally extending side-by-side cavities in the said grip portion, one positioned posteriorly and the other positioned anteriorly of the grip portion, and both opening at the lower end of the grip portion; said body having a valve recess extending transversely to said cavities and intersecting the upper ends thereof at spaced positions along said valve recess; a valve body in the recess and having means defining with the recess inlet and outlet chambers extending peripherally of the valve body and communicating respectively with said cavities; a movable valve closure in the valve body; said valve body having ports on the inlet side establishing communication between said inlet chamber and one side of said valve closure, said valve body also having ports on the outlet side establishing communication between said outlet chamber and the other side of said valve closure; a nozzle carried by the body and having a material outlet opening; means forming an aperture about said material outlet opening for passage of carrier gas past said material outlet opening, said aperture having an inlet side and an outlet side; said body having ducts establishing substantially unrestricted and continuous communication between said outlet chamber and said inlet side of said aperture; a fitting at the lower end of said one cavity for conducting carrier gas to the inlet chamber via said one cavity; and a pressure gauge carried in the other of said cavities, having a slide indicator movable from a retracted zero pressure position within said other cavity to a downwardly projected positive-pressure position, said pressure gauge having an operative element exposed to the pressure in said other cavity whereby the pressure at the nozzle may be directly read.

7. The combination as set forth in claim 6 together with a source of gas connected to said fitting, and adjustable to vary the pressure thereof.

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EVERETT W. KIRBY, Primary Examiner

U.S. Cl. X.R.

239—419, 415, 411