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PAINT GUN.

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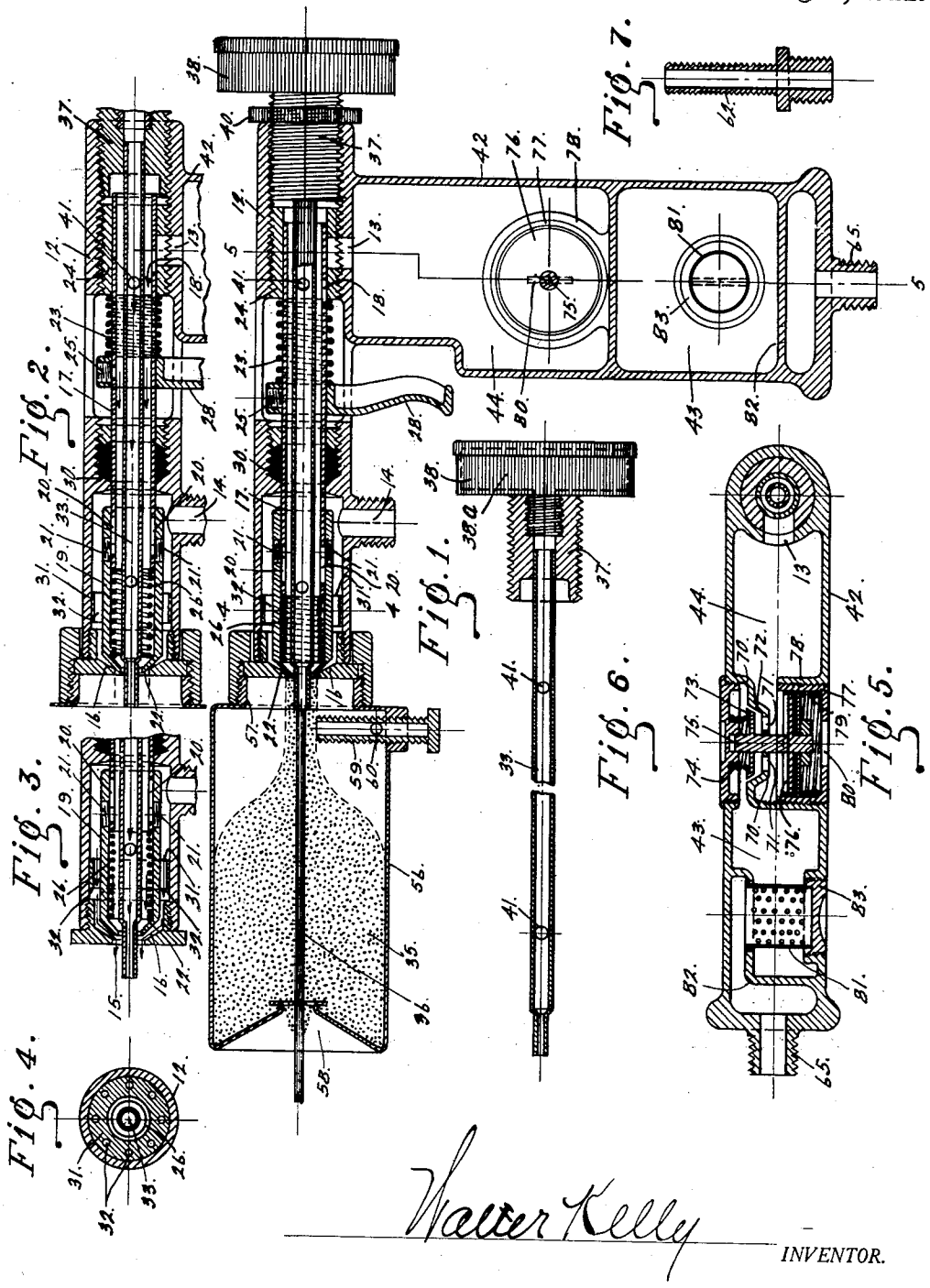

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

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PAINT-GUN.

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To all whom it may concern:

Be it known that I, WALTER KELLY, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Paint-Guns, of which the following is a specification.

This invention relates to a portable paint gun, adapted to force air and liquid paint in the form of a jet through a delivering orifice, the delivery of paint and air by the device being manually controlled and the device being flexibly connected with sources of supply of paint and compressed air.

One object of the invention is to provide a paint gun having improved means for controlling the delivery of paint and air, in such manner that in starting the operation, the delivery of the air precedes that of the paint, so that no paint can be delivered without being atomized.

Another object is to enable the pressure of the paint entering the gun to close the paint outlet when the operator desires to stop the operation of the gun.

Other objects of the invention will be rendered apparent by the following specification.

Of the accompanying drawings forming a part of this specification,—

Figure 1 is a longitudinal section of a paint gun embodying the invention, the gun being closed.

Fig. 2 is a view similar to Fig. 1, parts being broken away, and the gun being partly prepared for operation.

Fig. 3 is a fragmentary sectional view, showing the gun fully prepared for operation.

Fig. 4 is a section on line 4—4 of Fig. 1.

Fig. 5 is a section on line 5—5 of Fig. 1.

Fig. 6 is a sectional view of the inner tube and its holder.

Fig. 7 is a sectional view of an adjunct hereinafter described.

The same reference characters indicate the same parts in all of the figures.

In the drawings, 12 represents a tubular barrel having a lateral air inlet 13, a lateral paint inlet 14, and a combined air and paint outlet 15, best shown by Fig. 3, said outlet being surrounded by an annular valve seat 16. 17 represents a longitudinally movable tube within and coaxial with the barrel, and provided with an air port 18, adapted to register with the inlet 13, as shown by Fig. 2.

19 represents a nozzle, coaxial with the tube 17, and movable longitudinally on the latter to a limited extent, the nozzle and tube being provided with interengaging means permitting a partial endwise movement of the tube, while the nozzle remains stationary, for a purpose hereinafter described, said means being preferably embodied in slots 20 in the tube, and studs 21 fixed to the nozzle and entering the slots.

The tube 17 and nozzle 19 form an air conduit, and their external surfaces coöperate with the internal surface of the barrel in forming an annular paint conduit surrounding the air conduit.

One end of the nozzle 19 is contracted and forms an annular valve 22, adapted to bear on the valve seat 16, to prevent the delivery of paint to the barrel outlet.

23 represents a relatively strong tube-projecting spring engaged with the barrel by being seated on an abutment formed by the end of a fixed tube guide 24 within the barrel, and engaged with the tube 17 by being seated on a shoulder or collar 25 fixed to the tube.

26 represents a weaker nozzle-projecting spring engaged with the tube 17, by being seated on one end of the latter, and with the nozzle by being seated on the valve portion 22 thereof.

The springs 23 and 26 normally hold the tube 17 with its air port 18 out of registration with the barrel air inlet 13, as shown by Fig. 1, and the nozzle with its valve portion 22 seated on the barrel valve seat 16.

The tube 17 is provided with means such as a projecting trigger arm 28, formed on the collar 25, whereby the tube may be manually retracted. The initial retraction of the tube does not affect the nozzle 19, the latter remaining in its projected position until the port 18 registers with the air inlet 13, and the forward ends of the slots 20 in the tube strike the studs 21 on the nozzle. After this a further retraction of the tube 17 causes the retraction of the nozzle 19, as shown by Fig. 3.

The initial or independent retraction of the tube causes a delivery of air to the barrel outlet 15, and the retraction of the nozzle separates the nozzle valve 22 from the seat

16, and causes the delivery of paint to the barrel outlet 15. The delivery of the air, therefore, precedes that of the paint, so that no paint can pass unatomized through the outlet 15.

The tube 17 is guided in its movements by the above-mentioned guide 24, and by another guide 30 constituting a stuffing-box, to prevent paint from passing between the guide 30 and the tube 17.

The nozzle 19 is provided with an enlargement or collar 31, constituting a piston, having a sliding fit on the interior of the barrel, and provided with paint-conducting orifices 32. The rear edge of the collar or piston 31 constitutes a face against which paint, entering the paint conduit, acts to press the nozzle valve 22 against its seat, when the operator releases the trigger 28.

33 represents an inner tube within and coaxial with the tube 17, and adapted to deliver a jet of air to the center of a jet of atomized paint projected from the outlet 15, as indicated by Fig. 1, where 35 indicates a jet of atomized paint, and 36 indicates a jet of air delivered by the inner tube 33. Said inner tube is supported by a holder 37, which is an externally threaded plug, engaged with an internally threaded portion of the barrel 12, and provided with a milled head 38, whereby it may be rotated to longitudinally adjust the inner tube and vary the relative positions of the delivering end of said tube and the barrel outlet 15. In case paint becomes caked or hardened between the valve portion 22 and seat 16, it may be removed by adjusting the inner tube rearwardly, thus causing air forced through the inner tube to dislodge the hardened paint. The inner tube may be secured in any adjusted position by a lock-nut 40, bearing on one end of the barrel. An air passage 41, in the inner tube 33, receives air from the tube 17.

The barrel 12 is provided with an air-conductor, here shown as an air-conducting hand grip 42, having an air-receiving conduit portion 43, and an air-delivering conduit portion 44, communicating with the barrel inlet 13, said portions being separated by a partition 70, in which are air ports or passages 71, surrounded by a seat 72, for a pressure-regulating valve 73. Said valve is normally pressed toward the seat 72 by a relatively weak spring 74. The valve is fixed to a stem 75, which is movable in suitable guides, and projects through the partition 70, and is held by the spring 74 against a piston 76 of greater area than the valve, and fitted to slide in an adjustable screw-threaded cylinder 77, engaged with an internally threaded socket 78, fixed to one wall of the hand grip 42. A spring 79, which is stronger than the spring 74, presses the piston 76 against the stem 75, and tends to open the valve 73. When the pressure of the entering air acting on the piston 76, is sufficient to overcome the spring 79, the valve 73 is moved toward its seat by the spring 74, and reduces the pressure of the air passing to the barrel inlet 13. When the entering air pressure is decreased, the valve 73 is moved away from its seat by the spring 79 and piston 76. The force and resistance of the spring 79 may be varied by turning the cylinder 77 in the socket 78, the cylinder being adapted by a slot or opening 80 to be turned and adjusted. An adjustable pressure-regulating means is thus provided, adapted to be adjusted by the operator to compensate for variations of pressure of the air supplied.

The head 38 may be the casing of a pressure-gage of any suitable construction, adapted to indicate the pressure of air admitted to the inner tube 33. Said gage may include a Bourdon tube 38^a, conventionally shown by dotted lines in Fig. 6, adapted to be moved in one direction by an increase of air pressure, and in the opposite direction by its own resiliency, and a suitable pointer movable by said tube.

Foreign matter such as dust carried by the air entering the hand grip 42, may be arrested by a strainer 81, which is preferably a tube of finely perforated sheet metal, or wire gauze, inserted at one end in an orifice in a partition 82, formed to cause the air entering the hand grip through the nipple 65 to pass through the strainer before entering the conduit portion 43. The opposite end of the strainer is inserted in a threaded cap 83, which is screwed into a tapped orifice in one wall of the hand grip, and is removable with the strainer to permit the removal of foreign matter arrested by the strainer.

To concentrate the jet 35, I provide a muffler, composed of a casing 56, having an annular inner end 57, attached to the barrel 12, and surrounding the outlet 15, and a contracted outer end 58, formed to deliver a concentrated jet.

Any paint accumulating in liquid form in the lower portion of the casing 56, enters a stand pipe 59, through an orifice 60. The open upper end of the stand pipe is in the path of the jet 35, so that an outward flow of paint entering the stand pipe is induced by the jet, the paint being atomized at the same time.

Fig. 7 shows a tube 62, which may be substituted for the stand pipe 59, and may be connected with a source of paint supply.

The hand grip 42 has a nipple 65 for engagement with a flexible tube, connected with a source of air supply. The paint inlet 14 is formed as a nipple for engagement

with another flexible tube connected with a source of paint supply. The trigger 28 projects beside the hand grip 42, so that it may be pressed by a finger of the hand grasping the grip. A movement of the trigger toward the hand grip first moves the tube 17 to connect the air port 18 with the air inlet 13, as shown by Fig. 2, and then moves the nozzle 19 to open the valve 22, as shown by Fig. 3.

Retraction of the nozzle during the initial retraction of the tube 17, and until the forward end of the tube slot 20 engages the nozzle stud 21, is prevented partly by the spring 26, and partly by the pressure of paint against the piston 30. When the operator releases the trigger, the spring 23 projects the tube 17, and the latter acts through the spring 21 to project the nozzle 19 and close the valve 22, the projection of the nozzle being aided by pressure of paint against the piston 31.

It will be seen that the air conductor or air-delivering conduit portion 44, having the automatic air pressure regulating means, is attached directly to, and is movable with the portable gun, so that the operator of the gun, who is often at a considerable distance from the source of air supply, and not infrequently stands on a ladder or on an elevated staging remote from said source, which is usually on the ground or on a floor, is enabled to inspect, control, and adjust said means without leaving his station. The pressure gage 38 attached to and movable with the gun, enables the operator to ascertain the existing air pressure, and to regulate the same, if necessary, without leaving his station.

I claim:

1. A paint gun comprising a tubular barrel having a lateral air inlet, a lateral paint inlet, and an air and paint outlet, coinciding with the axis of the barrel, and surrounded by an annular valve seat, a longitudinally movable tube within and coaxial with the barrel, and having an air port adapted to register with the air inlet of the barrel, a nozzle carried by the tube and having an annular valve adapted to bear on said seat, said tube and nozzle forming an air conduit and coöperating with the barrel in forming an annular paint conduit surrounding the air conduit, said annular valve and annular valve seat being adapted to prevent the delivery of paint to the barrel outlet, a spring which normally projects the tube and barrel to close the tube air port and the nozzle valve, and means for manually retracting the tube and nozzle to open said air port and valve.

2. A paint gun comprising a tubular barrel having a lateral air inlet, an air-conducting hand grip communicating with said inlet, a lateral paint inlet, and an air and paint outlet coinciding with the axis of the barrel, and a longitudinally movable tube within and coaxial with the barrel, and having an air port adapted to register with the air inlet of the barrel, a nozzle carried by the tube and having an annular valve adapted to bear on said seat, said tube and nozzle forming an air conduit, and coöperating with the barrel in forming an annular paint conduit surrounding the air conduit, said annular valve and annular valve seat being adapted to prevent the delivery of paint to the barrel outlet, a spring which normally projects the tube and barrel to close the tube air port and the nozzle valve, and a trigger arm fixed to said tube and projecting from the barrel beside the hand grip, whereby the tube and nozzle may be manually retracted.

3. A paint gun comprising a tubular barrel, having a lateral air inlet, a lateral paint inlet, and an air and paint outlet coinciding with the axis of the barrel and surrounded by an annular valve seat, a longitudinally movable tube within and coaxial with the barrel, and provided with a port adapted to register with the air inlet of the barrel, a nozzle coaxial with the tube, said tube and nozzle forming an air conduit and coöperating with the barrel in forming an annular paint conduit surrounding the air conduit, one end of the nozzle forming an annular valve adapted to bear on said annular valve seat to prevent the delivery of paint to the barrel outlet, a relatively strong tube-projecting spring engaged with the barrel and the tube, a weaker nozzle-projecting spring engaged with the tube and with the nozzle, said springs normally holding the tube with its air port out of registration with the barrel air inlet, and the nozzle with its annular valve seated on the barrel valve seat, and means for manually retracting the tube, the tube and nozzle being provided with interengaging means, permitting an initial retraction of the tube alone, and then causing a retraction of the nozzle with the tube, the said initial retraction registering the tube port with the barrel air inlet, and causing a delivery of air to the barrel outlet, and the retraction of the nozzle separating the nozzle valve from its seat and causing a delivery of paint to said outlet, the delivery of air preceding that of the paint.

4. A paint gun substantially as specified by claim 1, the said nozzle being provided, within the said paint conduit, with a paint-conducting piston having a face, against which paint entering the paint conduit acts to press the nozzle valve against its seat when the operator releases the tube and nozzle.

5. A paint gun substantially as specified

by claim 1, comprising also an inner tube coaxial with said longitudinally movable tube and projecting therefrom to deliver air within a jet of spray issuing from said outlet, said inner tube having an air inlet, receiving air from the longitudinally movable tube.

6. A paint gun substantially as specified by claim 1, comprising also an inner tube coaxial with said longitudinally movable tube and projecting therefrom to deliver air within a jet of spray issuing from said outlet, said inner tube having an air inlet, receiving air from the longitudinally movable tube, the inner tube and barrel being provided with means for longitudinally adjusting the inner tube to vary the relative positions of its delivering end and the barrel outlet.

7. A paint gun substantially as specified by claim 1, comprising also an inner tube coaxial with said longitudinally movable tube and projecting therefrom to deliver air within a jet of spray issuing from said outlet, said inner tube having an air inlet, receiving air from the longitudinally movable tube, the barrel being provided with an internally threaded portion, and the inner tube with an externally threaded holder, engaging said internally threaded portion, and with a lock-nut adapted to bear on one end of the barrel.

8. A paint gun substantially as specified by claim 1, comprising also an air-conducting hand grip, projecting from one side of the barrel, and communicating with the barrel air-inlet, the means for manually retracting the longitudinally movable tube being embodied in a trigger fixed to said tube and projecting beside said hand grip.

9. A paint gun substantially as specified by claim 1, comprising also an air-conducting hand grip, communicating with the air inlet of the barrel, and automatic air-pressure regulating means in said hand grip.

10. A paint gun substantially as specified by claim 1, comprising also an air-conducting hand grip, communicating with the air inlet of the barrel, and automatic air-pressure regulating means in said hand grip, said means being adjustable.

11. A paint gun substantially as specified by claim 1, comprising also an air-conducting hand grip, communicating with the air inlet of the barrel, air-pressure regulating means in said hand grip, and a pressure gage adapted to indicate the air pressure.

12. A paint gun substantially as specified by claim 1, the said barrel being provided with an air-conducting hand-grip, having an air-receiving conduit portion, an air-delivering conduit portion communicating with the air inlet of the barrel, a partition between said conduit portions having an air-conducting passage and a valve seat, a valve in the air-receiving conduit portion controlling the admission of air to said passage, and provided with a spring tending to close said valve, and with a stem projecting into the delivering conduit portion, a cylinder in the delivering conduit portion, a piston in said cylinder, and a stronger spring pressing the cylinder against the stem of said valve, said piston being movable by its spring to open the valve, and by air pressure in the delivering conduit portion to close the valve.

13. A paint gun substantially as specified by claim 12, the said cylinder being adjustably connected with the hand grip.

14. A paint gun substantially as specified by claim 1, said barrel being provided with an air-conducting hand grip, communicating with the air inlet of the barrel, said hand grip having a strainer in the path of air passing through the hand grip to arrest foreign matter carried by the entering air, and means removably connecting the strainer with the hand grip.

15. A paint gun comprising a barrel having an outlet, and means for projecting a jet of atomized paint through said outlet, and a muffler composed of a casing, having an inner end attached to the barrel and surrounding the outlet, and a contracted outer end formed to concentrate the jet.

16. A paint gun substantially as specified by claim 15, the said casing being provided with a stand pipe having a lateral opening communicating with the lower portion of the casing, and an open end in the path of said jet, the arrangement being such that a flow of paint outward from the stand pipe is induced by the jet.

17. A portable paint gun comprising a barrel having an air inlet, a paint inlet, an air and paint outlet, and manually controlled means for separately conducting air and paint from said inlets to said outlet, an air conductor attached to and movable with the gun, and communicating with the air inlet of the barrel, and automatic air-pressure regulating means movable with said conductor and gun.

18. A portable paint gun comprising a barrel having an air inlet, a paint inlet, an air and paint outlet, and manually controlled means for separately conducting air and paint from said inlets to said outlet, an air conductor attached to and movable with the gun, and communicating with the air inlet of the barrel, and automatic air-pressure regulating means in said conductor, said means movable with said conductor and gun, and having provisions for adjusting said means.

19. A portable paint gun comprising a barrel having an air inlet, a paint inlet, an

air and paint outlet, and manually controlled means for separately conducting air and paint from said inlets to said outlets, an air conductor attached to and movable with the gun, and communicating with the air inlet of the barrel, automatic air pressure-regulating means movable with said conductor and gun, and a pressure gage attached to and movable with the gun, and adapted to indicate the air pressure.

In testimony whereof I have affixed my signature.

WALTER KELLY.