

[54] **SPRAY GUN**  
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239/419.5, 239/528  
[51] Int. Cl. .... **B05b 7/30**  
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239/353, 409, 415, 416, 416.1, 416.4, 417.3,  
419.5, 302

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*Primary Examiner*—Allen N. Knowles  
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[57] **ABSTRACT**  
A spray gun with a hollow handle has a trigger that opens a valve in the handle to admit compressed air. Lateral openings adjacent the handle feed secondary air by the venturi effect. The trigger also retracts a plunger in the spray head that controls liquid flow, with the valve opening slightly before the plunger. The spray head includes a sleeve with converging orifices for compressed air, and this sleeve is movable axially relative to the plunger to control the spray pattern.

**5 Claims, 6 Drawing Figures**

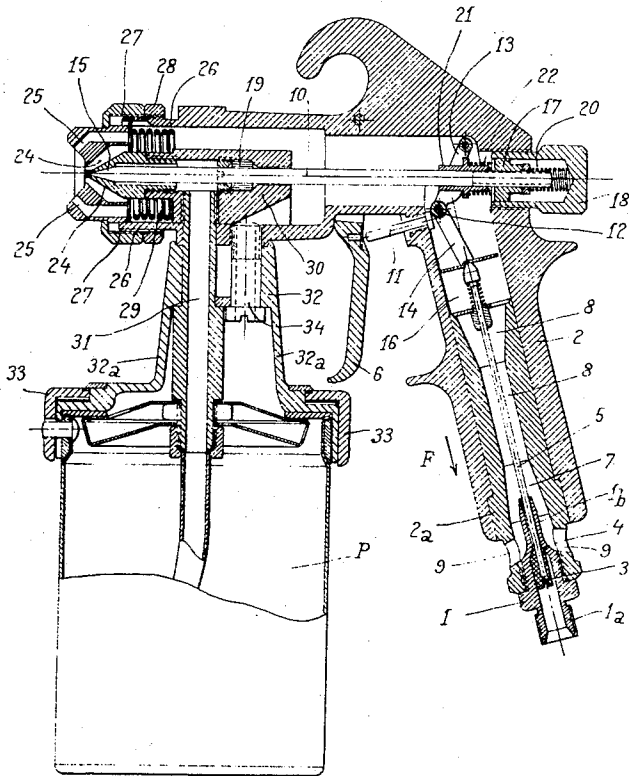


Fig.1

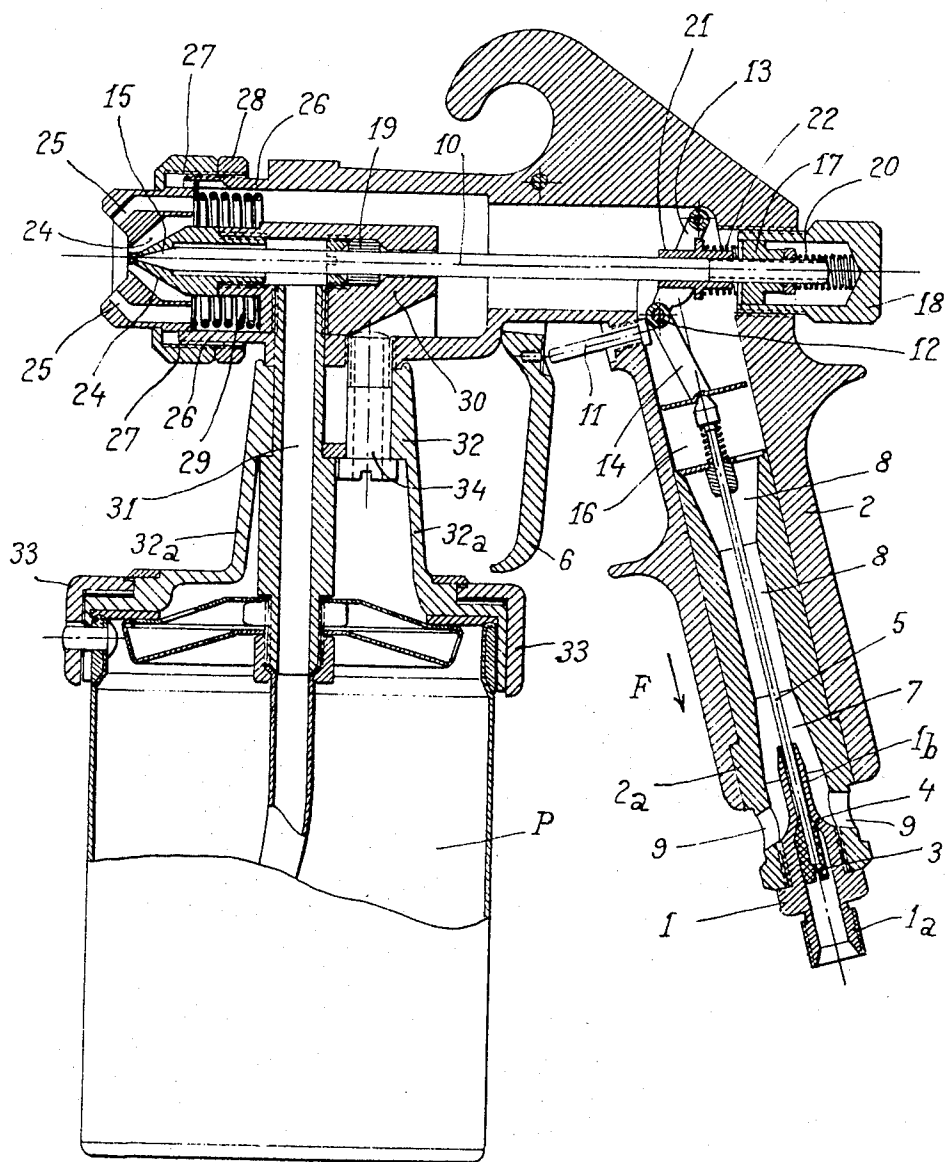


Fig.2

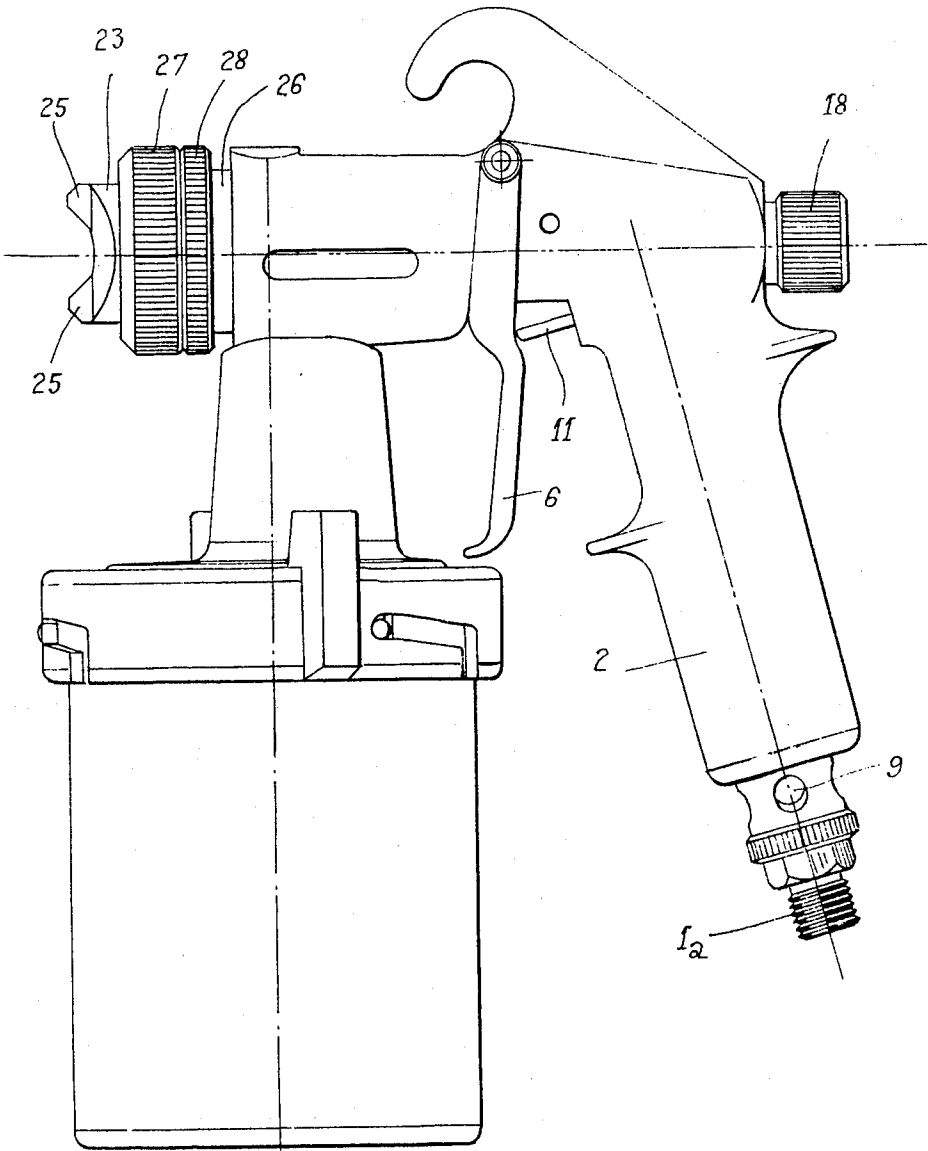


Fig.3

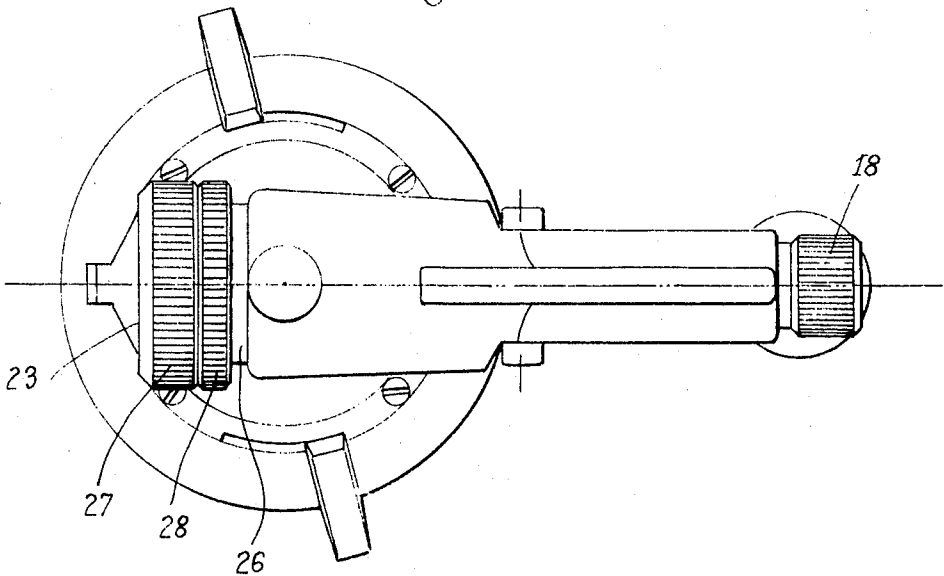


Fig.4

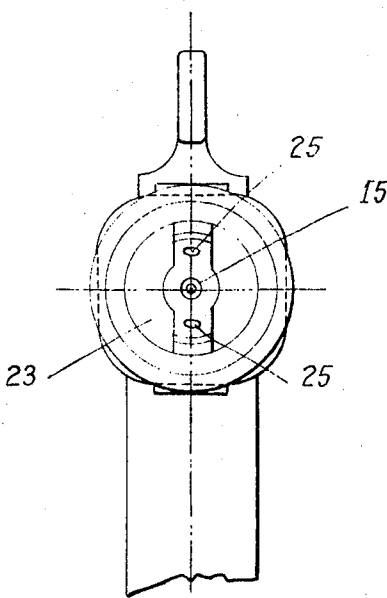


Fig.5

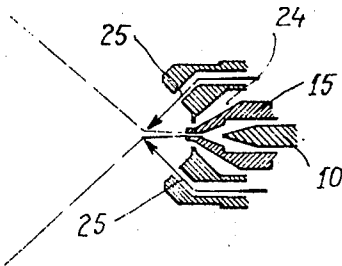
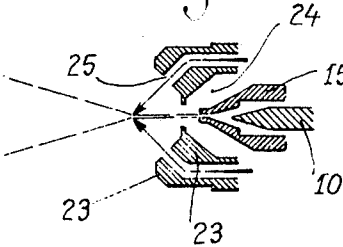


Fig.6



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## SPRAY GUN

The present invention relates to spray guns, more particularly of the type in which a liquid such as paint is sprayed by the action of compressed air that arrives through the hollow handle of the spray gun to entrain and atomize the liquid.

In the known spray guns of this type, in which compressed air arrives at a relatively high pressure of, for example, 50 to 60 lbs/in<sup>2</sup>, a good deal of liquid tends to become vaporized and forms an undesirable fog.

Accordingly, it is an object of the present invention to provide a spray gun that overcomes the above disadvantage.

Another object of the present invention is the provision of a spray gun with a hollow handle and means for adding secondary air to the stream of compressed air which is supplied to the hollow handle of the spray gun.

Still another object of the present invention is the provision of a spray gun with a plunger that controls the liquid flow, in which the plunger actuation is regulated in a novel way with respect to the action of the valve admitting compressed air through the hollow handle of the spray gun.

Still another object of the present invention is the provision of such a spray gun, having a spray head in which the air supply is adjustable relative to the liquid supply so as to regulate the spray pattern.

Finally, it is an object of the present invention to provide a spray gun which will be relatively simple and inexpensive to manufacture, easy to adjust, operate, maintain and repair, and rugged and durable in use.

Other objects and advantages of the present invention will become apparent from a consideration of the following description, taken in connection with the accompanying drawings, in which:

FIG. 1 is a side cross-sectional view of a spray gun according to the present invention;

FIG. 2 is an elevational view of the spray gun of FIG. 1;

FIG. 3 is a top plan view of the spray gun of FIG. 2;

FIG. 4 is a front end view of the spray gun; and

FIGS. 5 and 6 are somewhat diagrammatic fragmentary cross-sectional views showing two different adjusted positions of the spray head of a spray gun according to the present invention.

Referring now to the drawings in greater detail, and first to FIG. 1 thereof, there is shown a spray gun having a valve 1 carried in the hollow handle 2 of the spray gun by means of insert 2a that has a central passageway therethrough forming a venturi. The exposed end 1a of valve 1 is adapted to be connected to the fitting of an air pressure hose (not shown) leading to a compressor (not shown) for the supply of compressed air to the spray gun. A valve member 3 is axially slidably disposed in valve 1 and is surrounded by a passage for compressed air but is movable upwardly as seen in FIG. 1 into contact with a valve seat 4 so as to close the compressed air passage. Opening of the valve member 3 is under the control of a rod 5 which moves in the opening direction shown by the arrow F in FIG. 1 when the trigger 6 is depressed, that is, moved to the right as seen in FIG. 1.

Valve 1 has a slightly tapered extension 1b through which rod 5 passes with space on all sides, extension 1b

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defining with the internal side walls of insert 2a a conical annular passageway 7 of the internal passageway 8 of the handle 2 of the spray gun. The passageway 7 forms a venturi for the entrainment of atmospheric air which freely enters through the openings 9. The secondary air entering through openings 9 may be four or five times the quantity of compressed air from the compressor, and as a result, the spray is relatively free from undesirable vapor and fog at the same time that a saving is effected both of compressed air and of the liquid sprayed.

The valve member 3 and the plunger 10 which controls the flow of the liquid (e.g., paint) through the spray gun are both under control of the trigger 6 which bears against a pin 11 which in turn bears against the elbow 12 of two pivotally interconnected levers 13 and 14, the lever 13 controlling the plunger 10 to open and close a liquid outlet 15 and the lever 14 being connected to and controlling the rod 5. A coil compression spring 16 surrounds rod 5 and tends to maintain valve member 3 against its seat 4 when trigger 6 is released.

The guidance of the plunger 10 at its rear end is provided by a collar 17 which is screw-threaded on the plunger 10 and which slides in a hollow plug 18 that is externally screw-threadedly disposed in the body of the spray gun. Toward the forward end of plunger 10, a stuffing box 19 slidably guides the plunger in liquid-tight relationship.

A coil compression spring 20 surrounds the tail of plunger 10 and acts between plug 18 and collar 17 to urge plunger 10 forwardly to close liquid outlet 15. Plunger 10 is urged rearwardly, when trigger 6 is depressed, by the lever 13 swinging against a collar 21 that slides on plunger 10 and that compresses a coil compression spring 22 between itself and collar 17. It is to be noted that the action of trigger 6 on valve member 3 is direct and immediate, but that the action of trigger 6 on plunger 10 is delayed by the compression of spring 22: only when spring 22 has been somewhat compressed is plunger 10 moved to the rear to open liquid outlet 15, and so the valve member 3 opens to admit compressed air before liquid outlet 15 is opened. This prevents dripping or dribbling at the onset of operation and ensures that the spray will start quickly and cleanly.

Another feature of the invention is that the spray pattern can be regulated by manipulation of the spray head. Thus, the spray head comprises a sleeve 23 that forms with the external surface of the liquid outlet 15 an annular conical air outlet 24 which entrains the liquid and ensures that the liquid will be atomized to form a generally conical spray pattern. Two relatively small air passageways 25 also traverse the sleeve 23 radially outwardly from outlet 24 and, as seen in FIG. 4, are diametrically opposed and converge toward each other. The sleeve 23 is displaceable axially with respect to the liquid outlet 15; and to this end, the sleeve 23 is slidably but not rotatably supported in a forward tubular extension 26 of the body of the spray gun. An internally screw-threaded collar 27 is screw-threadedly received on extension 26 and retains sleeve 23 in adjusted position in extension 26, and an oppositely screw-threaded collar 28 is also screw-threadedly received on extension 26 and locks collar 27 in adjusted position. Coil compression spring 29 acts between a portion 30 of the body of the spray gun and the sleeve 23 to maintain the

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sleeve 23 against a forward, radially inwardly directed flange on collar 27.

FIGS. 5 and 6 show the effect of adjustment of sleeve 23 axially of the spray direction. When the forward end of outlet 24 is about at the level of or somewhat behind the forward end of the liquid outlet 15, then the spray pattern is quite wide, as shown in FIG. 5. But when the sleeve 23 is moved to a more forward position, as in FIG. 6, the spray cone is considerably more slender.

Moreover, the passageways 25 direct air on opposite sides of the spray cone to flatten the spray pattern.

In known fashion, the container P for the liquid is suspended from the body of the spray gun. FIG. 1 shows an arrangement in which, in the portion 30 of the spray gun body, not only is the liquid outlet 15 screw-threadedly received, but also the liquid inlet in the form of a tube 31 is screw-threadedly received and carries a support 32 on which in turn is rotatably received a collar 33 having ears or fingerpieces extending from diametrically opposite sides thereof, as best seen in FIG. 3. The suspension of the container P from collar 33 is effected by a bayonet-type joint, as best seen in FIG. 2, the container carrying pins that are received in inclined slots in collar 33 when the container P is pushed up and rotated to insert those pins in the slots. The support 32, in turn, is releasably secured to the body of the spray gun by a bolt 34.

From a consideration of the foregoing disclosure, therefore, it will be evident that all of the initially recited objects of the present invention have been achieved.

Although the present invention has been described and illustrated in connection with a preferred embodiment, it is to be understood that modifications and variations may be resorted to without departing from the spirit of the invention, as those skilled in this art will readily understand. Such modifications and variations are considered to be within the purview and scope of the present invention as defined by the appended claims.

Having described my invention, I claim:

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1. A spray gun having a handle having a passageway therethrough for compressed air, said passageway having the shape of a venturi comprising a converging cone and a diverging cone, and means upstream of said venturi with respect to the direction of compressed air flow therethrough for admitting to said venturi secondary air from the adjacent atmosphere by the action of the compressed air passing through the venturi.

2. A spray gun as claimed in claim 1, and a valve member in the handle to close the handle to the passage of compressed air therethrough, a rod extending through the venturi to operate said valve member, spring means urging the rod in a direction to close the valve member, and a manually operable trigger to move the rod in a direction to open the valve member.

3. A spray gun as claimed in claim 1, in which said venturi extends lengthwise of said handle.

4. A spray gun as claimed in claim 1, having means to supply liquid thereto having a liquid inlet and a liquid outlet, a spray head comprising a sleeve, said sleeve defining with said liquid outlet an annular converging conical air passageway for air to atomize said liquid, and means mounting said sleeve for axial movement relative to said liquid outlet to regulate the degree of pulverization and the amount of liquid that leaves the gun through said outlet.

5. A spray gun having a hollow handle, means to supply to the gun liquid to be sprayed, means to supply compressed air to the gun through the hollow handle to entrain and atomize liquid to be sprayed, venturi means in the handle to entrain secondary air from the adjacent atmosphere by the action of the compressed air passing through the hollow handle, a valve member in the hollow handle to close the handle to the passage of compressed air therethrough, a rod extending through the hollow handle to operate said valve member, spring means urging the rod in a direction to close the valve member, and a manually operable trigger to move the rod in a direction to open the valve member.

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