TRIGGER ASSEMBLY FOR MANUALLY OPERABLE SPRAY APPARATUS

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Filed: Jan. 3, 1974

Appl. No.: 430,535

U.S. Cl........... 239/338, 137/209, 222/402.23, 239/372, 239/373, 239/375, 239/526, 239/579, 251/350, 251/350;353;354

Int. Cl........................... B65d 83/14


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ABSTRACT

A trigger assembly for a manually operable paint spray gun is provided. The paint spray gun includes a container for holding paint and pressurized air, an upright handle on the container which supports an aerosol valve provided with a displaceable actuator for controlling the flow of paint from the container, and a paint spray head mounted on the actuator in fluid communication with the aerosol valve. The trigger assembly comprises a cup-shaped trigger saddle mounted on the handle and a manually operable, hood-shaped trigger member pivotally mounted on the trigger saddle for engaging and moving the paint spray head to displace the actuator to open the aerosol valve. The trigger saddle and trigger member provide a protective housing which surrounds the paint spray head and aerosol valve.

20 Claims, 9 Drawing Figures
TRIGGER ASSEMBLY FOR MANUALLY OPERABLE SPRAY APPARATUS

The present invention relates to a liquid spray apparatus and, more particularly, to a manually operable trigger assembly for a liquid spray apparatus such as a paint spray gun operable by pressurized air.

In the air of paint spray apparatus, paint spray guns have been developed which are driven by pressurized air to eject a paint spray. Generally, the prior art paint spray guns have been complicated in structure and, therefore, difficult and expensive to manufacture. The paint spray guns have typically included intricate nozzle structures for combining paint and pressurized air to produce a paint spray and complex valve and trigger arrangements for controlling the flow of paint to the nozzles. The complicated nozzles, valves, and trigger mechanisms have normally been exposed to possible damage by accidental dropping of the paint spray guns. In addition, because of the complex designs, the prior art paint spray guns have been difficult to handle and operate. Further, the complicated structure of the paint spray guns has made it extremely difficult to disassemble the guns for cleaning after painting operations are completed.

It has been common in the prior art to construct paint spray guns of metal. The metal components of the guns have been expensive to manufacture because of the various metal working operations required to produce the components. For example, multiple drilling operations have been required to fabricate the nozzles, while welding operations have been required to fabricate other components.

In addition, the prior art paint spray guns have employed direct fluid connections for connecting the nozzles to sources of pressurized air. These direct connections have required external fluid conduits extending from the nozzles which have been susceptible to inadvertent separation from the nozzles with consequent undesirable interruption of paint spray operations.

In view of the recent development of inexpensive compressed air sources for general use, it has become desirable to provide paint spray apparatus operable by pressurized air for general applications, including home use. To avoid the disadvantages occurring in the prior art resulting from the complex structure of previous paint spray guns and to provide paint spray apparatus suitable for general use, particularly for use in home workshops, it is necessary to provide a paint spray gun which is inexpensive to manufacture and convenient to handle and operate by an inexperienced operator. It is also extremely desirable to provide a paint spray gun which is compact in size, readily assembled and disassembled, and constructed of easily interchangeable functioning components. It is particularly advantageous to provide a spray gun which avoids the requirement of an external pressure line from the pressurized air to the spray nozzle and which protects the nozzle and valve against accidental damage and inadvertent separation. It is further desirable to provide a paint spray apparatus which can be made of easily moldable material, such as plastic, and which strongly resists internal pressure.

It is an object of the present invention to provide a paint spray gun including a manually operable trigger mechanism and adjustable stop therefor which is convenient to handle and operate.

It is also an object of the present invention to provide a trigger assembly for a paint spray gun which constitutes a protective housing around its paint spray nozzle and valve to minimize the possibility of accidental damage to these components and inadvertent separation of the nozzle from the valve or other fluid conduits.

It is a further object of the present invention to provide a paint spray gun which is compact in size, readily assembled and disassembled, and constructed of easily interchangeable components.

It is a still further object of the present invention to provide a paint spray gun incorporating components which can be formed of plastic material by inexpensive manufacturing techniques, such as molding, and which are strongly resistant to internal pressure.

The present invention provides a trigger assembly for a spray gun including a handle which supports a valve provided with a displaceable actuator and a spray head mounted on the actuator in fluid communication with the valve. The trigger assembly comprises a cup-shaped trigger saddle mounted on the handle and provided with an open top end surrounding the valve and a manually operable, hood-shaped trigger member for engaging and moving the spray head to displace the actuator.

The trigger member includes a base end shaped to mate with the open top end of the cup-shaped trigger saddle. In accordance with the invention, means are provided for pivotally mounting the trigger member on the trigger saddle to permit movement of the trigger member into engagement with the spray head upon manual operation of the trigger member to displace the spray head and actuator to open the valve.

In a preferred embodiment, a paint spray gun includes an upright handle which supports an aerosol valve provided with the displaceable actuator and a paint spray head mounted on the actuator in fluid communication with the aerosol valve. The trigger saddle comprises a hollow, cup-shaped base having a bottom opening and a split front face to permit the base to be fitted around the handle and an open top end surrounding the aerosol valve. The trigger member comprises a hollow, hood-shaped cover having an open bottom end shaped to be received in the open top end of said cup-shaped base and including a manually engageable lever extending downwardly from the cover and received in the split front face of the base. The trigger saddle includes a plurality of spaced, integral support ribs formed at the rear of the trigger saddle and provided with notches, while the trigger member includes a support member provided at its rear end to be received in the notches to support the trigger member for pivotal movement relative to the trigger saddle.

Preferably, the trigger saddle includes a first, outer pair of integral support ribs formed at its rear end and provided with transversely aligned notches and a second, inner pair of integral support ribs located adjacent to the first, outer pair of ribs and provided with upper hook ends normally in alignment with the notches. The trigger member includes a pilot bar extending transversely across its rear end to be received in the notches to support the trigger member for pivotal movement relative to the trigger saddle and to be retained in the notches by the hook ends. The inner pair of support ribs is resiliently mounted on the trigger saddle to permit the hook ends of the ribs to be moved out of alignment with the notches to allow the transverse bar to be
inserted into and removed from the slots to permit easy assembly and disassembly of the trigger mechanism.

The present invention provides a paint spray gun which is inexpensive to manufacture, compact in size, readily disassembled to permit easy access for cleaning, and comprised of easily interchangeable components. The trigger assembly of the paint spray gun is particularly convenient to handle and operate. The trigger saddle and trigger member provide a protective housing around the paint spray head and aerosol valve to minimize the possibility of accidental damage to these components. In addition, the protective housing prevents inadvertent separation of the spray head from the valve or other fluid conduits. The trigger assembly is readily disassembled to permit access to the paint spray head, valve, and fluid conduits for cleaning or other purposes. In addition, it is possible to fabricate the components of the paint spray gun, including the trigger saddle and trigger member, from plastic by conventional molding techniques to minimize the cost of manufacture.

The accompanying drawings illustrate a preferred embodiment of the invention and, together with the description, serve to explain the principles of the invention.

Of the drawing:

FIG. 1 is an overall perspective view of a paint spray gun constructed according to the principles of the present invention;

FIG. 2 is an enlarged vertical section, partially cut-away, of the paint spray gun of FIG. 1 illustrating a container for holding paint and pressurized air, a cover for the container including an integral hollow handle, a paint spray head for receiving paint and pressurized air from the container, an aerosol valve for controlling the flow of paint from the container to the paint spray head, and a manually operable trigger assembly for actuating the aerosol valve to permit the flow of paint to the paint spray head;

FIG. 3 is an enlarged side elevation, partially cut-away, of the paint spray head, aerosol valve, and trigger assembly of FIG. 2;

FIG. 4 is an enlarged vertical section of the paint spray head;

FIG. 5 is an enlarged, exploded perspective view of the trigger assembly illustrating a trigger saddle which is attached at the upper end of the handle and a trigger member which is pivotally mounted on the trigger saddle;

FIG. 6 is a rear view of the trigger saddle illustrating a cutout portion provided on the rear wall of the saddle to define a resilient finger capable of inward movement relative to the rear wall;

FIG. 7 is a top view of the trigger saddle illustrating an opening provided at its bottom end to enable the trigger saddle to fit around the handle;

FIG. 8 is a side elevation of the trigger saddle illustrating its resilient finger moved inwardly relative to its rear wall; and

FIG. 9 is a rear view of the trigger member.

Referring to FIG. 1, the paint spray gun comprises, in general, a container 20 for holding paint and pressurized air, a cover 22 for closing the container, an integral handle 24 extending upwardly from cover 22 to enable the paint spray gun to be manually gripped, and a manually operable trigger mechanism or assembly 26 mounted at the top of handle 24 to enable the paint spray gun to be manually operated. As shown in FIGS. 1 and 2, container 20 comprises a generally cylindrical canister-like base including a cylindrical side wall 28 with an open top end for receiving paint and a closed bottom end 30 having an elliptical contour to resist forces generated by pressurized air supplied to the container. As indicated in FIG. 2, cylindrical wall 28 of the canister-like base is slightly tapered. A set of external threads 32 is provided on the exterior of cylindrical side wall 28 near the top of the container.

As shown in FIG. 1, container 20 is provided with an exterior knurled portion 33 formed at its bottom edge to facilitate manual turning of the container relative to cover 22. Referring to FIG. 2, the elliptical contour of closed end 30 of the container provides a hollow area at the container bottom. A pair of radially disposed ribs 34 (one shown in FIG. 2) extend inwardly from cylindrical wall 28 and downwardly from bottom end 30 of the container in this hollow area. The ribs can be manually engaged to facilitate turning of the container relative to the cover.

Referring to FIG. 2, cover 22 comprises a dome-shaped upper wall 35 provided with an annular rim 36 extending downwardly from the circular periphery of the cover. Annular rim 36 is provided with a set of external threads 38 for engaging external threads 32 on the canister-like base to secure the cover to the base.

In the preferred embodiment, external threads 32 on container 20 are buttress threads. Each thread includes a flat, horizontal lower edge and an upwardly and inwardly inclined upper edge. Similarly, threads 38 on annular rim 36 of cover 22 are buttress threads. Each thread includes a flat, horizontal upper edge and a downwardly and outwardly inclined lower edge. The buttress threads provide a threaded connection between the container and cover of increased strength, in comparison with conventional threads, to provide substantially greater resistance to forces on the threads generated by pressurized air supplied to the container.

An O-ring seal 40 is provided at the top of cylindrical wall 28 of container 20. As shown in FIG. 2, the outer edge at the top of cylindrical wall 28 is tapered to provide an upwardly and inwardly inclined exterior surface 41 for engaging the interior of O-ring seal 40. Preferably, exterior surface 41 is inclined at approximately 30°to the vertical. Upon threading of container 20 into annular rim 36 of cover 22, O-ring seal 40 is compressed radially and axially into engagement with the interior of the cover to provide an air-tight seal. Since the edge of container 20 is in angular contact with the O-ring seal, the axial movement of the container required to achieve an adequate seal is increased relative to the corresponding movement of a conventional apparatus in which the O-ring seal rests directly on top of the container with the advantage that the torque necessary to effect the seal is substantially reduced.

Referring to FIGS. 1 and 2, cover 22 includes an air inlet 42 through which pressurized air is supplied to the interior of container 20. As shown in FIG. 2, air inlet 42 comprises a hollow cylindrical stem extending outwardly from annular rim 36 of the cover. An air inlet opening 44 extends through annular rim 36 to provide fluid communication between air inlet 42 and interior of container 20. A coupling member 46 is threadably received in the hollow cylindrical stem. The outer end of coupling member 42 is threaded to facilitate connec-
tion of the coupling member to a tube 48 coupled to a source of pressurized air (not shown).

As shown in FIG. 2, handle 24 integrally formed on cover 22 is hollow and extends vertically upward from dome-shaped upper wall 35 of the cover. Handle 24 terminates at its upper end in a hollow cylindrical portion 30 provided with a top, circular opening.

In the preferred embodiment of the paint spray gun, a paint spray head or nozzle, generally 50, is provided. Referring to FIGS. 3 and 4, the paint spray head or nozzle comprises an elongated body 54, a cap 56, a plug 58, and a plug retainer 60. Body 54 is provided with a first set of external threads 62 (FIG. 4) adjacent to its front end. Cap 56 is generally cylindrical in shape and provided with internal threads for engaging external threads 62 to secure the cap to the body. Cap 56 has a knurled exterior surface, shown in FIGS. 1-3, to facilitate manual threading of the cap on external threads 62. In addition, body 54 is provided with a second set of external threads 64 (FIG. 4) adjacent to its rear end. Plug retainer 60 is generally annular in shape and provided with internal threads for engaging external threads 64 to secure the plug retainer to body 54 and to hold plug 58 against the rear end of the body. Plug retainer 60 also has a knurled exterior surface, shown in FIGS. 1-3, to facilitate manual threading of the plug retainer on external threads 64.

Referring to FIG. 4, elongated body 54 includes a first fluid passage 66 and a second fluid passage 68 extending therethrough for receiving paint and pressurized air, respectively. A recess 70 is provided at the rear end of body 54. Fluid passage 66 extends from a first, enlarged opening formed in the recess and gradually tapers as it extends toward the front end of body 54. Similarly, fluid passage 68 extends from a second, enlarged opening formed in the recess and tapers gradually as it extends toward the front end of the body.

The front end of body 54 comprises a flat, circular face 72 provided with a cone-shaped extension 74 projecting forward from the face. Cone-shaped extension 74 is centrally located on circular face 72 of the body and terminates in a cylindrical tip 76. Fluid passage 66 extends from its larger opening in recess 70 through body 54 to a smaller exit opening in cylindrical tip 76. Similarly, fluid passage 68 extends from its enlarged opening in recess 70 to a smaller exit opening in circular face 72.

In addition, body 54 is provided with a stem 78 projecting downwardly from the body. A passageway 80 extends through stem 78 into fluid communication with fluid passage 66 and constitutes a first inlet of the paint spray head. Passageway 80 includes an enlarged diameter section 82 which extends inwardly from the outer end of stem 78 and a reduced diameter section 84 which begins approximately midway between the outer end of the stem and fluid passage 66 to provide an annular ledge 86.

Cap 56 is mounted on the front end of elongated body 54 and has a hollow interior to provide a mixing chamber for paint and pressurized air adjacent to the front end of the body. The cap includes a tapered front wall 88 provided with a cone-shaped interior surface 90 which, in cooperation with flat, circular face 72 and cone-shaped extension 74 of body 54, provides a mixing chamber for paint and pressurized air. The front wall of cap 56 includes a central opening 92 in axial alignment with the exit opening of fluid passage 66 in cylindrical tip 76 of the cone-shaped extension to form a paint spray from paint and pressurized air supplied to the mixing chamber. Spray opening 92 constitutes the outlet of the paint spray head.

Plug 58 includes a front face 94 which is received in recess 70 at the rear end of body 54 to cover the enlarged openings of fluid passages 66 and 68. A cylindrical inlet member 96 extends rearwardly from the plug. A passageway 98 extends through the cylindrical inlet member into fluid communication with the enlarged opening of fluid passage 68. This passageway constitutes a second inlet of the paint spray head. In addition, plug 58 includes a plug-like projection 100 extending forwardly from its front face 94. Plug-like projection 100 is tapered in shape to be received in the enlarged opening of fluid passage 66 to seal the opening.

Plug retainer 60, which is generally annular in shape, includes a rear wall 102 provided with a circular opening 104 to permit inlet member 96 to extend beyond the plug retainer. Rear wall 102 of plug retainer 60 engages the outer edge of plug 58 to retain the plug in engagement with the rear end of body 54.

Referring to FIGS. 2 and 3, the preferred embodiment of the paint spray gun is provided with a conventional aerosol valve, generally 105, mounted within the top circular opening of cylindrical portion 50 of handle 24. The aerosol valve comprises a hollow generally cylindrical valve body 106 supported in an annular support member of metal ring 107. The ring includes a rounded annular rim 108 which rests on the top of hollow cylindrical portion 50 of the handle. A removable cap or valve retainer 109 is threadably received on external threads provided on cylindrical portion 50 of the handle to retain the rim of metal ring 107 firmly in engagement with the upper edge of the cylindrical portion to provide an air-tight seal.

Aerosol valve 105 includes a displaceable actuator 110 (FIG. 3) mounted within valve body 108 and extending upwardly through a central opening in metal ring 107. An annular gasket 111 interposed between the upper end of valve body 108 and metal ring 110 surrounds a reduced diameter portion 112 of actuator 110. The actuator is normally urged upwardly by a coil spring 113 located between an internal shoulder 114 provided within valve body 106 and an enlarged cylindrical portion 115 formed on actuator 110. The actuator includes a passageway 116 extending axially therethrough which terminates at its reduced diameter portion 112. A plurality of inlet orifices 118 is formed at the reduced diameter portion of actuator 110 in fluid communication with passageway 116.

Actuator 110 is normally urged upwardly by coil spring 113 to maintain enlarged cylindrical portion 115 in sealing engagement with gasket 111 to preclude fluid communication between the interior of valve body 106 and inlet orifices 118. When actuator 110 is displaced by downward forces against the compression of coil spring 113, cylindrical portion 115 of the actuator is moved out of sealing engagement with gasket 111, and reduced diameter portion 112 is moved downwardly to permit fluid communication between the interior of valve body 106 and passageway 116 of the actuator through inlet orifices 118. At the same time, a tapered surface 119 of the actuator moves downwardly into sealing engagement with the gasket 111. Upon release of the downward forces on actuator 110, coil spring 113 returns the actuator to its normally upward posi-
As shown in FIG. 5, trigger saddle 130 includes upwardly and outwardly extending side walls 137 which define an open top end of the trigger saddle surrounding the upper end of handle 24 and aerosol valve 105. Side walls 137 of the trigger saddle and the lower portion of handle 24 provide a hand grip which is conveniently and comfortably grasped by an operator with one hand. At the front end of each side wall 137 is provided an integral front wall 138. The front walls are separated by a gap (FIGS. 5 and 7) to establish the split front face of the trigger saddle.

In addition, trigger saddle 130 includes an upwardly extending rear wall 142 extending above side walls 137. As shown in FIG. 6, rear wall 142 includes a generally rectangular cutout portion 144 which defines a manually engageable finger 146. In the preferred embodiment, the trigger saddle is constructed of resilient material, e.g., plastic, so that finger 146 is flexible and manually movable inward relative to rear wall 142.

Referring to FIG. 5, trigger member 128 comprises a pair of opposite side walls 148 joined by a front wall 150 and a roof 152 extending over paint spray head 52. Gripping member 136 is centrally located on the underside of roof 152 to engage the paint spray head. Trigger member 128 also includes a finger engageable lever 154 extending downwardly from its front wall 150. Handle 24 is provided with a front recess 156 formed adjacent to its upper end for receiving lever 154.

Trigger member 128 includes an open bottom end shaped to mate with the open top end of trigger saddle 130 defined by its side walls 137 and front walls 138. As shown in FIG. 5, the lower edge of each side wall 148 is offset inwardly to provide a flange 158 which is received within the open top end of trigger saddle 130. Front wall 150 of the trigger member is provided with lower chamfered edges 159 which fit inside front walls 138 of the trigger saddle.

Hood-shaped trigger member 128 and cup-shaped trigger saddle 130 provide a protective housing at the upper end of handle 24 which surrounds paint spray head 52, aerosol valve 105, and tube 122. The protective housing prevents inadvertent disconnection of paint spray head 52 from actuator 110 of the aerosol valve. In addition, the housing protects the paint spray head and valve against accidental damage by dropping of the paint spray gun.

In accordance with the invention, the trigger assembly includes means for pivotally mounting the trigger member on the trigger saddle to permit movement of the trigger member into engagement with the spray head upon manual operation of the trigger member to displace the spray head and actuator to open the valve. In the preferred embodiment, the trigger saddle includes a plurality of spaced, integral support ribs formed at the rear of the trigger saddle and provided with notches, and the trigger member includes a support member provided at its rear end to be received in the notches to support the trigger member for pivotal movement relative to the trigger saddle.

Referring to FIG. 5, trigger saddle 130 includes a first, outer pair of integral support ribs 160 extending inwardly from rear wall 142 of the trigger saddle. Each outer support rib 160 includes a notch 162 extending downwardly from its upper end. As shown in FIGS. 3 and 5, the notches are inclined downwardly and rearwardly from the upper ends of support ribs 160.
In addition, trigger saddle 130 includes a second, inner pair of integral support ribs 164 extending inwardly from flexible finger 146. Each inner support rib 164 includes an upper hook end 166 provided with an inclined cam surface 168. As shown in FIG. 3, notches 162 in outer support ribs 160 are in horizontal alignment transversely across trigger saddle 130. Upper hook ends 166 of inner support ribs 164 are normally in alignment with notches 162.

Referring to FIG. 9, trigger member 128 includes support member or pilot bar 170 at the rear of the trigger member extending transversely between its opposite side walls 148. As shown in FIG. 3, transverse bar 170 is received in notches 162 of outer support ribs 160 and supported by the outer pair of support ribs for pivotal movement relative to trigger saddle 130. Upper hook ends 166 of support ribs 164 normally extend over bar 170 to retain the bar in notches 162.

Resilient finger 146 of a trigger saddle 130 is capable of inward movement relative to rear wall 142 of the trigger saddle to permit trigger member 128 to be easily attached to and removed from the trigger saddle. As shown in FIG. 8, finger 146 can be manually moved inward from rear wall 142 to move upper hook ends 166 of support ribs 164 out of alignment with notches 162 in outer support ribs 160. Thus, transverse bar 170 can be freely moved out of the notches by lifting trigger member 128 relative to trigger saddle 130 to disassemble the trigger mechanism. When it is desired to reassemble the trigger mechanism, transverse bar 170 is aligned with notches 162 in the outer support ribs, and the trigger member is forced downwardly relative to trigger saddle 130. Transverse bar 170 engages cam surfaces 168 of the hook ends to move inner support ribs 164 and resilient finger 146 inward relative to rear wall 142 to allow the transverse bar to move downward into notches 162. When transverse bar 170 is moved completely into the notches, resilient finger 146 returns to its normal position to move hook end 166 over the transverse bar to retain it in the notches.

The trigger member is preferably provided with a manually adjustable stop mechanism mounted on the finger engageable lever to permit adjustment of the amount of pivotal movement available to the lever to control the extent of downward displacement of the paint spray head and valve actuator. As shown in FIG. 3, a knob 172 is fixed to a shaft 174 rotatably mounted in an opening provided in lever 154. The knob is manually rotatable to control the position of an adjustable stop member 176 threadably mounted on shaft 174. Stop member 176 is slidable and non-rotatably disposed between walls 173, 175 on lever 154, and is engageable with a wall surface 177 on handle 24 to limit allowed pivotal movement of lever 154. The shaft includes an enlarged head 182 to limit the extent of outward movement of the stop member 176 relative to the shaft and lever. The position of adjustable stop member 176 is varied by manually turning knob 172 to control the extent of pivotal movement available to lever 154. Inward movement of stop member 176 is limited by cooperative engagement with a rear wall 178 on lever 154.

The knob 172, shaft 174, and stop 176 are provided with a slip clutch arrangement to prevent the shaft 174 from pulling out of the knob 172 when stop 176 is moved inwardly against lever wall 178. Thus, a flat washer 181 and a wavy washer 179 are positioned between lever wall 178 and a shoulder 180 on shaft 174, and is engageable with stop 176. When the shaft 174 is turned to position stop 176 against washer 179, the last thread on shaft 174 is engaged with the first thread on stop 176. Continued turning of shaft 174 through knob 172 compresses washer 179 and, at the same time, disengages the threads on shaft 174 and stop 176. This releases the pulling force between shaft 174 and stop 176 and prevents shaft 174 from pulling out of knob 172.

Reverse turning of shaft 174 through knob 172 reengages the threads on shaft 174 and stop 176.

In the operation of the paint spray gun, container 20 is unthreaded from cover 22 and filled with paint. Container 20 is then threaded into annular rim 136 of the cover to force O-ring seal 40 into engagement with the interior of the cover to provide an air-tight seal. Next, the paint spray gun is connected to a source of pressurized air (not shown) via tube 48.

Referring to FIG. 2, pressurized air is supplied to the interior of container 20 and handle 24 through inlet opening 44. The pressure within the container and handle builds up to a level substantially equal to the pressure level of the source. At the same time, a small amount of air continuously flows through passageway 126 of cylindrical outlet member 124 and through tube 122 to inlet member 96 of the paint spray head.

Referring to FIG. 4, the pressurized air supplied to inlet member 96 flows through passageway 98 and fluid passage 68 into the mixing chamber provided at the front end of the spray nozzle. From the mixing chamber, the air exits through spray opening 92. Thus, by virtue of the pressurized air supplied to container 20 and handle 24, there is a continuous flow of air through the paint spray head.

Because the flow of air from the container and the handle is restricted by the small size of exit passageway 126, a back pressure is maintained within the container and handle on the paint in the container. This back pressure results in the paint being supplied through tube 120 to aerosol valve 105 under pressure.

When it is desired to produce a paint spray, lever 154 is manually depressed to pivot trigger member 128 about transverse bar 170 to move gripping member 136 downward into engagement with body 54 of the spray head. This downward movement of gripping member 136 is transmitted to body 104 and stem 78 of the paint spray head to actuator 110 of the aerosol valve. Upon downward displacement of actuator 110, the aerosol valve is opened to supply paint under pressure to the paint spray head. Referring to FIG. 3, the paint flows from tube 120 through the interior of valve body 106 and around enlarged cylindrical portion 115 of actuator 110 into inlet orifices 118 to passageway 116 in the actuator. The flow of paint continues through passageway 116 in actuator 110 and passageway 80 (FIG. 4) in the stem into fluid passage 66. The paint is then driven through fluid passage 66 and out of the exit opening in cylindrical tip 76 of cone-shaped extension 74 into the mixing chamber. It is mixed in the chamber with the continuous flow of pressurized air and is ejected with the air through spray opening 92 to produce a paint spray.

The flow rate of paint to the paint spray head is controlled by the amount of pivotal movement manually imparted to trigger member 128. The maximum amount of pivotal movement available to trigger member 128 is limited by stop member 176 which engages
handle wall 177 upon pivotal movement of lever 154 into recess 156 of the handle. The position of stop member 176 relative to lever 154 is adjustable by manual turning of knob 172 to set the maximum amount of pivotal movement available to the trigger member at various limits.

The container, cover, paint spray head, trigger assembly and valve retainer are preferably formed of a suitable plastic material to which paint does not readily adhere, e.g., an acetal polymer. This type of material enables the components of the paint spray gun to be readily cleaned. The trigger is easily disassembled from the trigger saddle to permit access to the paint spray head. In addition, the removable plug and plug retainer of the paint spray head permits easy access to the tapered passages in the body and the removable cap permits easy access to the mixing chamber to facilitate cleaning of the paint spray head.

Each of the plastic components of the paint spray gun can be manufactured by molding techniques rather than expensive drilling or welding operations. The capability of manufacturing these components of the paint spray gun by molding permits the trigger assembly, paint spray nozzle, handle and container to be manufactured at minimum cost. In addition, the aerosol valve is conventional in structure and inexpensively fabricated to minimize the cost of manufacture of the paint spray gun.

Although the invention has been described in the context of a paint spray gun, it will be apparent that the spray gun can be used for other liquids, e.g., stains, varnishes, and water solutions such as garden sprays. Thus, the utility of the invention is not intended to be confined to the field of paint spray apparatus.

The invention in its broader aspects is not limited to the specific details shown and described, and modifications may be made in the details of the trigger assembly without departing from the principles of the present invention.

What is claimed is:

1. A trigger assembly for a spray gun including a handle which supports a valve provided with a displaceable actuator and a spray head mounted on the actuator in fluid communication with the valve, comprising:
   a) a cup-shaped trigger saddle mounted on the handle and provided with an open top end surrounding the valve;
   b) a manually operable, hood-shaped trigger member for engaging and moving the spray head to displace the actuator, said trigger member including an open bottom end shaped to mate with said open top end of said cup-shaped trigger saddle; and
   c) means for pivotally mounting said trigger member on said trigger saddle to permit movement of said trigger member into engagement with the spray head upon manual operation of said trigger member to displace the spray head and actuator to open the valve.

2. A trigger assembly as claimed in claim 1 and further including a manually adjustable stop on said trigger member engageable with said handle upon pivotal movement of said trigger member to permit adjustment of the amount of pivotal movement available to said lever to control the extent of said displacement of said spray head and said actuator.

3. A trigger assembly for a paint spray gun including an upright handle which supports an aerosol valve provided with a displaceable actuator and a paint spray head mounted on the actuator in fluid communication with the aerosol valve, comprising:
   a) a trigger saddle mounted on the handle, said trigger saddle comprising a hollow, cup-shaped base having a bottom opening and a split front face to permit said base to fit around the handle and an open top end surrounding the aerosol valve;
   b) a trigger member for engaging and moving the paint spray head to displace the actuator, said trigger member comprising a hollow, hood-shaped cover having an open bottom end shaped to match said open top end of said cup-shaped base, said cover including a manually engageable lever extending downward therefrom and received in said split front face of said base; and
   c) means for pivotally mounting said trigger member on said trigger saddle so that upon manual engagement of said lever said cover is moved into engagement with the paint spray head and actuator to open the aerosol valve.

4. A trigger assembly for a paint spray gun including an upright handle which supports an aerosol valve provided with a displaceable actuator and a paint spray head mounted on the actuator in fluid communication with the aerosol valve, comprising:
   a) a trigger saddle mounted on the handle, said trigger saddle comprising a hollow, cup-shaped base having a bottom opening and a split front face to permit said base to fit around the handle and an open top end surrounding the aerosol valve;
   b) a trigger member pivotally mounted on said trigger saddle for engaging and moving the paint spray head to displace the actuator, said trigger member comprising a hollow, hood-shaped cover extending over the paint spray head and having an open bottom end shaped to be received in said open top end of said cup-shaped base, said cover including a manually engageable lever extending downward therefrom and received in said split front face of said base for pivoting said cover into engagement with the paint spray head to displace the paint spray head and actuator to open the aerosol valve.

5. A trigger assembly for a paint spray gun including an upright handle which supports an aerosol valve provided with a displaceable actuator and a paint spray head mounted on the actuator in fluid communication with the aerosol valve, comprising:
   a) a trigger saddle mounted on the handle, said trigger saddle comprising a hollow, cup-shaped base having a bottom opening and a split front face to permit said base to fit around the handle and an open top end surrounding the aerosol valve, said base including a plurality of spaced, integral support ribs formed at its rear end saddle and provided with notches; and
   b) a trigger member pivotally mounted on said trigger saddle for engaging and moving the paint spray head to displace the actuator, said trigger member comprising a hollow, hood-shaped cover extending over the paint spray head and having an open bottom end shaped to be received in said open top end of said cup-shaped base, said cover including a support member provided at its rear end to be received in said notches to support said cover for pivotal movement relative to said base, said cover including a manually engageable lever extending down-
ward therefrom and received in said split front face of said base for pivoting said cover into engagement with the paint spray head to displace the paint spray head and actuator to open the aerosol valve.

6. A trigger assembly for a paint spray gun including an upright handle which supports an aerosol valve provided with a displaceable actuator and a paint spray head mounted on the actuator in fluid communication with the aerosol valve, comprising:
   a trigger saddle mounted on the handle, said trigger saddle comprising a hollow, cup-shaped base having a bottom opening and a split front face to permit said base to fit around the handle and an open top end surrounding the aerosol valve, said base including a first pair of spaced, integral support ribs formed at its rear end and provided with transversely aligned notches and a second pair of spaced, integral support ribs located adjacent to said first pair of support ribs and provided with upper hook ends in alignment with said notches; and
   a trigger member pivotally mounted on said trigger saddle for engaging and moving the paint spray head to displace the actuator, said trigger member comprising a hollow, hood-shaped cover extending over the paint spray head and having an open bottom end shaped to be received in said open top end of said cup-shaped base, said cover including a bar extending transversely across its rear end to be received in said notches to support said cover for pivotal movement relative to said base and to be retained in said notches by said hook ends, said hook ends being movable out of alignment with said notches upon manual movement of said resilient finger inwardly relative to said rear wall to allow said bar to be inserted into and removed from said slots, said cover including a manually engageable lever extending downward from its front end and received in said split front face of said base for pivoting said cover into engagement with the paint spray head to displace the paint spray head and actuator to open the aerosol valve.

7. The trigger assembly of claim 6, wherein:
   said second pair of support ribs is resiliently mounted on said base to permit said hook ends of said second pair of support ribs to be moved out of alignment with said notches to allow said bar to be inserted into and removed from said slots.

8. A trigger assembly for a paint spray gun including an upright handle which supports a valve provided with a displaceable actuator and a paint spray head mounted on the actuator in fluid communication with the valve, comprising:
   a trigger saddle mounted on the handle, said trigger saddle comprising a hollow, cup-shaped base having a bottom opening and a split front face to permit said base to fit around the handle and an open top end surrounding the valve, said base including a rear wall provided with a cutout section to define a resilient finger capable of manual movement inwardly relative to said rear wall, said base including a first, outer pair of support ribs integrally formed on said rear wall and provided with transversely aligned notches and a second, inner pair of support ribs integrally formed on said resilient finger adjacent to said outer pair of support ribs and provided with upper hook ends normally in alignment with said notches; and
   a trigger member pivotally mounted on said trigger saddle for engaging and moving the paint spray head to displace the actuator, said trigger member comprising a hollow, hood-shaped cover extending over the paint spray head and having an open bottom end shaped to be received in said open top end of said cup-shaped base, said cover including a bar extending transversely across its rear end to be received in said notches to support said cover for pivotal movement relative to said base and to be retained in said notches by said hook ends, said hook ends being movable out of alignment with said notches upon manual movement of said resilient finger inwardly relative to said rear wall to allow said bar to be inserted into and removed from said slots, said cover including a manually engageable lever extending downward from its front end and received in said split front face of said base for pivoting said cover into engagement with the paint spray head to displace the paint spray head and actuator to open the aerosol valve.

9. A trigger assembly for a paint spray gun including an upright handle which supports an aerosol valve provided with a displaceable actuator and a paint spray head mounted on the actuator in fluid communication with the aerosol valve, comprising:
   a trigger saddle mounted on the handle, said trigger saddle comprising a hollow, cup-shaped base having a bottom opening and a split front face to permit said base to fit around the handle and an open top end surrounding the aerosol valve, said base including a rear wall provided with a cutout section to define a resilient finger capable of manual movement inwardly relative to said rear wall, said base including a first, outer pair of support ribs integrally formed on said rear wall and provided with transversely aligned notches and a second, inner pair of support ribs integrally formed on said resilient finger adjacent to said outer pair of support ribs and provided with upper hook ends normally in alignment with said notches; and
   a trigger member pivotally mounted on said trigger saddle for engaging and moving the paint spray head to displace the actuator, said trigger member comprising a hollow, hood-shaped cover extending over the paint spray head and having an open bottom end shaped to be received in said open top end of said cup-shaped base, said cover including a bar extending transversely across its rear end to be received in said notches to support said cover for pivotal movement relative to said base and to be retained in said notches by said hook ends, said hook ends being movable out of alignment with said notches upon manual movement of said resilient finger inwardly relative to said rear wall to allow said bar to be inserted into and removed from said slots, said cover including a manually engageable lever extending downward from its front end and received in said split front face of said base for pivoting said cover into engagement with the paint spray head to displace the paint spray head and actuator to open the aerosol valve.

10. A manually operable trigger assembly for a paint spray gun including an upright handle which supports an aerosol valve provided with a displaceable actuator and a paint spray head mounted on the actuator in fluid communication with the aerosol valve, comprising:
   a trigger saddle comprising a hollow, cup-shaped base mounted on the handle;
   said cup-shaped base having upwardly and outwardly extending side walls, a bottom opening and a split front face to permit said trigger saddle to fit around said handle, and an upstanding rear wall extending above said side walls, said rear wall including a cutout portion which defines a flexible finger manually movable inwardly relative to said rear wall;
   said cup-shaped base including a first, outer pair of integral support ribs extending inwardly from said rear wall, each rib including a downwardly extending notch formed therein in transverse alignment with the notch in the other rib;
said cup-shaped base also including a second, inner pair of integral support ribs extending inwardly from said flexible finger, each rib including an upper hook end normally in alignment with said notches; and

a trigger member pivotally mounted on said trigger saddle for engaging and moving the paint spray head to displace the actuator;

said trigger member comprising a hollow, hood-shaped cover having opposite side walls with lower edges shaped to be received between said side walls of said cup-shaped base, a front face provided with a window to permit the paint spray head to project outward therefrom, and a pivot bar at the rear of said cover extending transversely between said opposite side walls to be received in said notches in said first pair of support ribs and retained therein by said hook ends of said second pair of support ribs to support said cover for pivotal movement relative to said base;

said hood-shaped cover including a gripping member mounted at the top thereof for engaging the paint spray head and a manually engageable lever extending downward from said front face of said cover and received in said split front face of said base for pivoting said cover relative to said base to move said gripping member into engagement with the paint spray head to displace the paint spray head and actuator to open the aerosol valve.

11. The trigger assembly of claim 10, which includes:
a manually adjustable stop mechanism mounted on said lever and engageable with said handle upon pivotal movement of said lever to permit adjustment of the amount of pivotal movement available to said lever to control the extent of downward displacement of said paint spray head and actuator.

12. A paint spray apparatus operable by a source of pressurized air, comprising:
a container for holding paint and pressurized air;
an upright handle projecting from said container to permit the paint spray apparatus to be manually gripped, said handle having a hollow interior in fluid communication with said container, a top opening at its upper end, and a front recess formed adjacent to its upper end;
a valve mounted in said top opening of said handle, said valve being normally closed and including a displaceable actuator for opening said valve;
a paint spray head mounted on said actuator for receiving paint and pressurized air and mixing the paint and pressurized air to produce a paint spray, said valve being in fluid communication with said paint spray head;
a first conduit extending from said valve through the interior of said handle into said container for supplying paint from said container to said valve;
a second conduit connected to said paint spray head and to the interior of said handle for supplying pressurized air from said container to said paint spray head;
a trigger saddle mounted at said upper end of said handle, said trigger saddle comprising a hollow cup-shaped base having a bottom opening and a split front face to permit said base to fit around said handle and an open top end surrounding said top opening of said handle and said valve;
a trigger member pivotally mounted on said trigger saddle for engaging and moving said paint spray head to displace said actuator, said trigger member comprising a hollow, hood-shaped cover having an open bottom end shaped to mate with said open top end of said cup-shaped base, said cover including a manually engageable lever extending downward therefrom and received in said split front face of said base and said recess of said handle for pivoting said cover into engagement with the said paint spray head to displace said paint spray head and actuator to open said valve; and

means for connecting said container to the source of pressurized air to cause paint to flow under pressure from said container through said first conduit to said paint spray head upon manual operation of said trigger member to open said valve and pressurized air to flow from said container through said handle and second conduit to said paint spray head to be mixed by said paint spray head to produce a paint spray.

13. The paint spray apparatus of claim 12, which includes:
a manually adjustable stop mechanism mounted on said lever and engageable with said handle upon pivotal movement of said lever into said recess to permit adjustment of the amount of pivotal movement available to said lever to control the extent of downward displacement of said paint spray head and actuator.

14. The paint spray apparatus of claim 12, wherein:
said base includes a plurality of spaced, integral support ribs formed at its rear end and provided with notches; and

said cover includes a support member provided at its rear end to be received in said notches to support said cover from pivotal movement relative to said base.

15. The paint spray apparatus of claim 12, wherein:
said base includes a first pair of spaced, integral support ribs formed at its rear end and provided with transversely aligned notches and a second pair of spaced, integral support ribs located adjacent to said first pair of support ribs and provided with upper hook ends in alignment with said notches; and

said cover includes a bar extending transversely across its rear end to be received in said notches to support said cover for pivotal movement relative to said base and to be retained in said notches by said hook ends.

16. The paint spray apparatus of claim 15, wherein:
said second pair of support ribs is resiliently mounted on said base to permit said hook ends of said second pair of support ribs to be moved out of alignment with said notches to allow said bar to be inserted into and removed from said slots.

17. The paint spray apparatus of claim 15, wherein:
said base includes a rear wall on which said first pair of support ribs is integrally formed, said rear wall including a cutout portion to define a resilient finger on which said second pair of support ribs is integrally formed, said resilient finger being capable of manual movement inwardly relative to said rear wall to displace said hook ends of said second pair of support ribs out of alignment with said notches in said first pair of support ribs.
18. A trigger assembly for a paint spray gun including an upright handle which supports an aerosol valve provided with a displaceable actuator and a paint spray head mounted on the actuator in fluid communication with the aerosol valve, comprising:
   a trigger saddle mounted on the handle, said trigger saddle comprising a hollow, cup-shaped base having a bottom opening and a split front face to permit said base to fit around the handle and an open top end surrounding the aerosol valve;
   a trigger member pivotally mounted on said trigger saddle for engaging and moving the paint spray head to displace the actuator, said trigger member comprising a hollow, hood-shaped cover extending over the paint spray head and having an open bottom end shaped to be received in said open top end of said cup-shaped base, said cover including a manually engageable lever extending downward therefrom and received in said split front face of said base for pivoting said cover into engagement with the paint spray head to displace the paint spray head and actuator to open the aerosol valve;
   a manually adjustable stop mechanism mounted on said lever and engageable with said handle upon pivotal movement of said lever to permit adjustment of the amount of pivotal movement available to said lever to control the extent of downward displacement of said paint spray head and actuator; and
   a slip clutch means between said adjustable stop and said trigger to prevent over adjustment of said stop relative to said trigger.

19. A paint spray apparatus operable by a source of pressurized air comprising:
   a container for holding a supply of paint under pressure;
   a handle positioned above and affixed to the top of said container;
   a nozzle means extending forwardly of said handle for spraying paint forwardly thereof;
   conduit means for supplying paint under pressure from said container to said nozzle;
   trigger means mounted on and extending from said handle in a position to be operated by the finger of an operator holding said handle, said trigger means including a finger engageable portion and a nozzle engaging portion;
   means pivotally mounting said trigger means on said handle between said finger engageable portion and said nozzle engaging portion so that said nozzle is depressed by rearward movement of said finger engageable portion; and
   valve means in said conduit arranged to be opened upon depression of said nozzle for permitting the flow of paint from said container through said nozzle.

20. A paint spray apparatus operable by a source of pressurized air comprising:
   a container for holding a supply of paint under pressure;
   a handle positioned above and affixed to the top of said container;
   a nozzle means extending forwardly of said handle for spraying paint forwardly thereof;
   conduit means for supplying paint under pressure from said container to said nozzle;
   trigger means mounted on and extending from said handle in a position to be operated by the finger of an operator holding said handle, said trigger means including a finger engageable portion and a nozzle engaging portion;
   means pivotally mounting said trigger means on said handle between said finger engageable portion and said nozzle engaging portion so that said nozzle is depressed by rearward movement of said finger engageable portion; and
   valve means in said conduit arranged to be opened upon depression of said nozzle for permitting the flow of paint from said container through said nozzle; and
   a manually adjustable stop member located on said finger engageable portion and engageable with said handle upon pivotal movement of said trigger means to permit adjustment of the amount of pivotal movement of said finger engageable portion to control the extent of downward movement of said nozzle.

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