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SPRAY HEAD

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This invention relates to spray heads adapted for use in spray guns and particularly to a spray head having an improved mounting for the final orifice member or spray tip.

In spray coating operations such as airless spray painting, the final discharge or spray orifice is extremely small and is subject to clogging, and in order to enable the orifice to be quickly and easily opened or cleaned apparatus has heretofore been used wherein the orifice member might be reversed when such cleaning is required. As applied to airless spray painting where extremely high pressures are employed, such reversal of the orifice member or spray tip requires a reversing or reversible mounting which, although well sealed or packed to withstand the pressures encountered, must nevertheless be readily and quickly shiftable between its spray position and a reversed or cleaning position.

In view of the foregoing it is the primary object of the present invention to provide a new and improved spray head wherein the spray tip may be quickly and easily reversed for purposes of cleaning, and objects related to the foregoing are to provide such a spray head in which the parts are simple in character and may be quickly and easily disassembled and reassembled for purposes of cleaning and the like.

Another important object of this invention is to provide such a reversible spray head wherein the spray tip or orifice member may be quickly and easily replaced without disassembly of the spray head.

Other and further objects of the present invention will be apparent from the following description and claims, and are illustrated in the accompanying drawings, which, by way of illustration, show preferred embodiments of the present invention and the principles thereof, and what is now considered to be the best mode in which to apply these principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the invention.

In the drawings:

FIG. 1 is a longitudinal sectional view through a spray head embodying the features of the invention;

FIG. 1A is a side elevational view taken along the line 1A-1A of FIG. 1, the handle being removed to show details of a stop mechanism;

FIG. 2 is a view of a portion of the structure shown in FIG. 1 and a different capacity spray orifice member mounted therein;

FIG. 3 is a view similar to FIG. 1 and showing another embodiment of the invention wherein the orifice insert member may be mounted in its usual association with an orifice adapting member; and

FIG. 4 is a view showing a portion of FIG. 3 with an adapter member and an orifice insert member of larger capacity mounted therein.

For purposes of disclosure the invention is herein illustrated as embodied in two basically similar spray heads 20 and 20 adapted for high pressure airless spray painting, and in both of these spray heads, provision is made for quickly and easily reversing the final spray orifice for purposes of cleaning. Thus the spray head 20 has an elongated main body 21 with an axial bore 22 extended into its rear or left end, as viewed in FIG. 1, and the axial bore 22 at its forward end intersects and terminates in a relatively large diameter transverse bore 23 that extends

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into one side of the body 21 but which terminates in a shoulder 24 short of the opposite side opening 25 there-through. The transverse bore 23 serves as a mounting chamber for a cylindrical mounting body 26 that is inserted endwise into the chamber or bore 23 into engagement with the shoulder 24, and in this position an actuating hub 27 on the cylindrical body 26 projects through the opening 25. The hub 27 has a squared outer end 27S that is centered on the axis of the cylinder 26 so that a handle 28 with a complementary squared opening 29 therein adjacent one end 28M thereof may be placed on the squared end 27S to be held removably in position by a head 30H of a screw 30 threaded into an axial socket in the hub 22 and the body 26. The handle may of course be placed in any one of four different radial positions on the squared end 27S, as determined by the preference of the user. The handle 28 is held by the screw 30 against a shoulder provided by an enlarged rectangular portion 27R that is located within the opening 25 and forms part of a stop means as will be described. The handle 28, at its end 28M, is located quite close to the adjacent side of the body 21 so that attachment of the handle 28 to the hub 27 serves to hold the cylindrical body 26 in its proper axial location in the mounting chamber 33.

Spaced from the axis of the cylinder 26, the handle is offset at 28A and has a parallel portion 28B that is parallel to the axis of the passage 22, and at the end of the parallel portion a laterally projecting hand piece 28H is provided so that the handle may be grasped and rotated between its two positions.

Such positions are determined by a stop means which is formed in part by the rectangular portion 27R of the hub 27, the opening 25 having an enlarged portion 25E terminating in shoulders 33 that may be alternately engaged by opposite sides of the portion 27R so as to limit the movement of the cylinder 26 to a range of 180°.

The body has a diametric bore 35 formed therein that is disposed substantially on the axis of the bore 22 of the body 21 and in the two limiting positions of the cylinder body 26, this alignment of the bore 35 is obtained. The bore 35 is utilized to receive an orifice insert member 36 in a manner to be described hereinafter, it being noted that the forward portion of this orifice insert member extends into a reduced counterbore 37 at one end of the bore 35. When the orifice insert 36 is located in its spray position, as shown in FIG. 1, it discharges through the reduced counterbore 36 and through an opening 38 in the forward end wall 21W of the body 21, and this relationship will be described in some detail hereinafter.

In providing a passage or path for the paint forwardly through the body 21, means are provided for connecting the body 21 to a spray gun of conventional form that includes the usual needle valve means for starting and stopping the flow of paint or the like through the apparatus. Thus the body 21, at the left hand end of the bore 22, as shown in FIG. 1, has an enlarged counterbore that is screw threaded at 22T to receive an adapter plug 40. The adapter plug 40 has two sets of internal threads 40T and 140T, the threads 40T being adjacent the inner or small end of the adapter plug 40. The other internal threads 140T that are adjacent the outer or left hand end of the adapter 40 are arranged to receive one element 41 of a union 42, the other member of which constitutes a cap 43 that is adapted for association with a conventional spray gun.

The screw threads 40T of the adapter member 40 are arranged to receive a packing nut 45 that has a passage therethrough, one portion of the passage 46 being of a non-circular cross section that is shown in FIG. 1 has a hexagonal section 47 whereby the packing nut 45 may be tightened. The packing nut 45 is utilized to tighten a packing sleeve 50 against the cylindrical surface of the

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member 26, the packing sleeve 60 having one end formed in a convex semi-cylindrical surface to engage the opposed surfaces of the cylindrical member 26, while the other end of the member 50 is formed perpendicular to the axis of the packing sleeve 50 and is engaged by a resilient ring 51 which may be compressed against the packing sleeve 50 by the packing nut 45 to provide an effective seal against the cylindrical surface of the member 26 and about the passage 35 that is formed in the cylindrical member 26.

The tip or orifice insert 36 is of the kind conventionally used in airless spray nozzles, and it is positioned within the bore 35 of the cylindrical member 26 with its outer end surface engaging the gasket 55 that bears against a shoulder 37S that is provided about the opening 37. The orifice insert 36 is held in place by a lock nut 56 that is threaded into the bore 35, the lock nut 56 having a non-circular axial passage 57 therein whereby the lock nut 56 may be either tightened or removed as required.

With the structure that has thus been described, it will be evident that the cylindrical member 26 may be quickly and easily shifted between its spray position that is shown in FIG. 1 and a reverse position where the orifice insert 36 may be cleaned by a reverse flow of paint or other liquid therethrough.

It will be observed in particular that the orifice insert member 36 may be removed and replaced in a convenient manner merely by reversing the position of the cylindrical member 26, removing the lock nut 56 by insertion of a suitable tool through the opening 38 and then removing and replacing the orifice insert 36.

It has been pointed out that the orifice insert 36 may be readily and easily removed for cleaning or replacement, and in such replacement orifice inserts of different capacities may be utilized. Thus, as will be evident in FIG. 2 of the drawings where a larger capacity orifice insert 36L is in position in the cylindrical member 26, such larger capacity orifice insert 36L has a greater length than the orifice insert 36 shown in FIG. 1. In such an instance, it is desirable to locate the final discharge orifice in substantially a predetermined position axially of the bore 35, and this is accomplished through the use of a somewhat longer gasket 55L which preferably is relatively stiff in nature so that it will maintain the orifice insert 36L in the proper longitudinal position when the lock nut 56 is tightened.

In FIGS. 3 and 4 of the drawings another embodiment of the invention is illustrated as constituting a spray head 120 in which the orifice insert member is carried in the usual adapter ring or tip holder that is employed in mounting the orifice insert in position in the spray tip of a conventional spray head. This arrangement is desirable because the orifice inserts vary in diameter and in length and the user who maintains a relatively large assortment of different capacity orifice inserts usually keeps these orifice inserts in an assembled relationship with respect to appropriately rigid tip holders that are to be used in mounting the orifice inserts in the spray head of a spray gun.

Thus as shown in FIGS. 3 and 4, the spray head 120 has a body 121 with a transverse bore 123 near its forward end, and this bore 123 is intersected by a longitudinal bore 122. The transverse bore 123 is arranged to receive a mounting cylinder 126 that is similar in some of the constructions heretofore described, and this cylinder is held in its proper longitudinal position within the transverse bore 123 by associating the handle 128H herewith in the manner hereinbefore described. Similar limiting means are provided for restricting the movement of the cylinder 126 between spraying position and cleaning position. The cylinder 126 has a longitudinal bore 137 therethrough that is shouldered at 137S and which is screw threaded at 137T near its other end to receive a lock nut 156. The left hand or rear end of

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the body 121 in this instance has external screw threads thereon to receive a union 142 for associating the spray head 120 with the valved portion of a spray gun. The internal screw threaded left end portion of the body 121 has a packing nut 145 therein which serves through a resilient ring 151 to hold a packing sleeve 150 against the cylindrical surface of the cylinder 126. The packing nut 145 has an axial passage 147 therethrough, a portion 147S thereof being non-circular in form so that the packing nut may be tightened or removed as required.

The shouldered internal screw threaded portion of the bore 137 is arranged to receive an assembly consisting of a tip holder 160 within which an orifice insert 136 is positioned in engagement with the forward shoulder of the tip holder 160 with a spacing ring 161 within the tip holder and engaging a resilient packing ring 162 so that the orifice insert 136 is held in position against the shouldered forward end of the tip holder 160. Such an assembly of the tip and tip holder is conventional.

The tip holder 160 is engaged on its rear surface by the lock nut 156, and this lock nut has a non-circular passage 157 therein so that the lock nut may be tightened or removed as required in the manner hereinbefore described in respect to the other embodiment of the invention.

In FIG. 3, the orifice insert 136 is shown as being of a small capacity and relatively short axial length. This orifice insert may, however, be replaced as desired by one of a larger capacity and greater axial length as illustrated in FIG. 4, where a large capacity orifice insert or tip 136L is mounted in a companion tip holder 160L and is held in place by the lock nut 156 in the cylinder 126. In this instance the proper axial location of the orifice 136 is attained by the use of a spacing ring 170 interposed between the flange of the adapter ring 160L and the shoulder 137S.

From the foregoing description it will be apparent that the present invention provides a new and improved spray head in which the orifice member may be reversed as to position, thereby to enable obstructions in the discharge orifice to be cleared by flow of paint or other liquid in a reverse direction through the discharge orifice. It will also be apparent that the present invention enables this advantageous result to be accomplished through the use of a spray head where the orifice insert member may be quickly and easily removed merely by reversing the position of the orifice member. It will also be evident that the spray head of this invention is simple in character and may be taken apart and reassembled quite easily for purposes of inspection and cleaning.

Thus while preferred embodiments of the invention have been illustrated herein, it is to be understood that changes and variations may be made by those skilled in the art without departing from the spirit and scope of the appended claims.

I claim:

1. In a spray head, an elongated body having front and rear ends and a longitudinal passage extending axially to open through front and rear ends of the body, means at the rear end of the body for connecting the same to a spray gun, said body having a transverse cylindrical chamber near its front end opening through one side of the body and terminating short of the other side to provide a wall at said side, said wall having an opening therein centrally of said chamber, a mounting cylinder in said chamber having a hub projecting through said opening, a handle removably secured through said opening to said mounting cylinder for holding the cylinder in position in said chamber and for imparting rotative movement to define spraying and cleaning positions of said cylinder displaced 180° from each other, said cylinder having a diametric passage therethrough having a shoulder near one end thereof, said diametric passage being located in said cylinder in position to be coaxial with said longitudinal passage of the body when said cylinder

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is in its cleaning position or its spraying position, a spray orifice member in said diametric passage, a sleeve-like lock nut threaded into said diametric passage and holding said orifice member in position determined by said shoulder, and sleeve-like sealing means in said longitudinal passage for sealing engagement with the surface of the cylindrical member about said diametric passage.

2. In a spray head, an elongated body having front and rear ends and a longitudinal passage extending axially from end to end thereof, said body having a transverse cylindrical chamber near its front end opening through one side of the body and terminating short of the other side to provide a wall at said side, said wall having an opening therein centrally of said chamber, a mounting cylinder in said chamber having a hub projecting through said opening, a handle removably secured on the hub and holding the cylinder in position in said chamber, said cylinder having a diametric passage therethrough having a shoulder near one end thereof, a spray orifice member in said diametric passage, a lock nut threaded into said diametric passage and holding said orifice member in a working position determined by said shoulder, said lock nut having a passage therethrough, sleeve-like sealing means in said longitudinal passage for sealing engagement with the surface of the mounting cylinder about said diametric passage, and means at the rear end of said body for connecting said longitudinal passage with a spray gun.

3. A spray head according to claim 2 wherein said longitudinal passage at said front end is at least as large as said diametric passage for enabling the spray orifice member to be removed and replaced when the cylinder is in one rotative position.

4. In a spray head, the combination of an elongated body having a longitudinal passage extending axially therethrough and opening through the front and rear ends thereof, said body being formed with a transverse cylindrical chamber near the front end thereof, said chamber

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being open through at least one side of said body, a mounting cylinder disposed in said cylindrical chamber and adapted to be removable axially from the portion of said chamber opening through the one side of said body, releaseable means at the other end of said chamber, acting between said body and said cylinder, for holding the cylinder in position in said chamber, said cylinder being formed with a diametric passage therein, disposed in axial alignment with said longitudinal passage when said cylinder is mounted in said chamber, said diametric passage having a shoulder near one end thereof, a spray orifice member disposed in said diametric passage in abutting relationship with said shoulder, means removably holding said orifice member in said diametric passage against said shoulder, means for moving said cylinder and orifice member in said chamber between spray and cleaning positions, the front end opening of said body being so constructed that the smallest diameter thereof is greater than the greatest diameter of said diametric passage, so that when said mounting cylinder is moved to the cleaning position, said holding means and said orifice member may be removed through said opening in the front end of said body for cleaning and replacement.

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