United States Patent

Beck

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[54] AIRLESS SPRAY GUN EXTENSION

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[52] **U.S. Cl.** **239/526,** 239/280, 239/532
[51] **Int. Cl.** **B05b 11/00**
[58] **Field of Search**...239/532, 280, 280.5, 281, 525, 239/526, 527, 528

[56] **References Cited**

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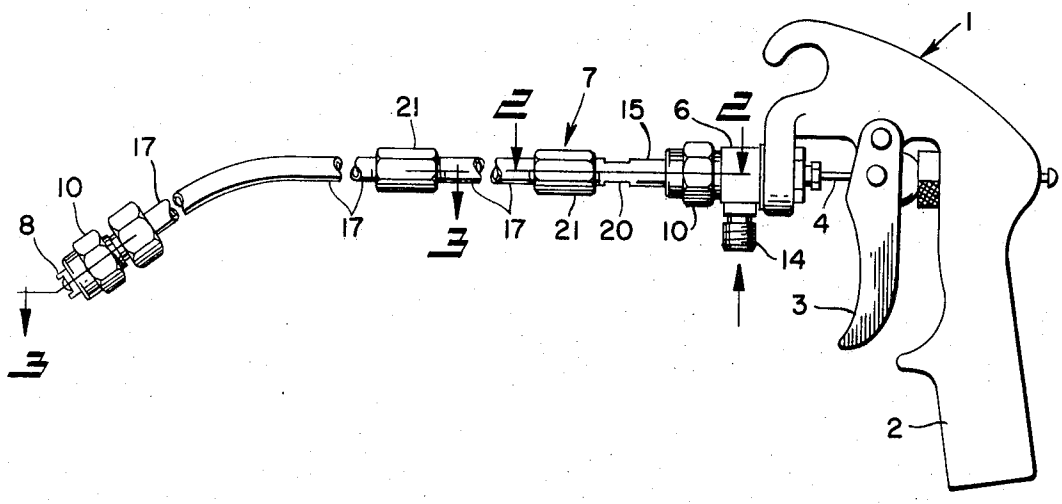
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[57] **ABSTRACT**

An extension for an airless paint spray gun of the type wherein a flanged spray nozzle or tip is clamped to the gun body by means of a cap having threaded engagement with the spray gun body, the extension being characterized in that a flanged fitting at one end is thus clamped to the spray gun body by means of the cap aforesaid, and in that a fitting at the other end has the spray nozzle clamped thereto by another cap which is the same as the cap which threads onto the spray gun body. Between the fittings aforesaid the extension includes one or more tubular sections which are coupled to each other and to the end fittings to define an extension assembly having a smooth wall bore without pockets or radial enlargements. The extension assembly is further characterized in that the fittings and tubular sections are of thick wall construction so as to substantially avoid radial and lineal expansion even under very high paint spray pressures.

8 Claims, 3 Drawing Figures



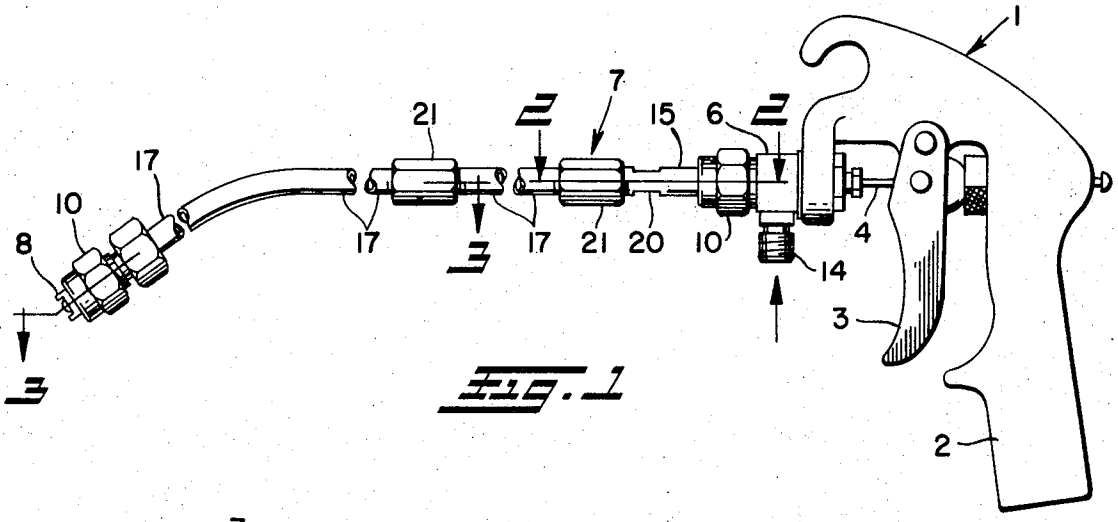


Fig. 1

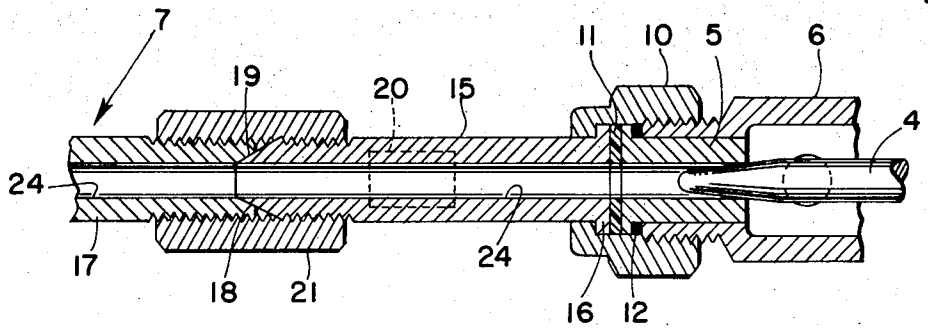


Fig. 2

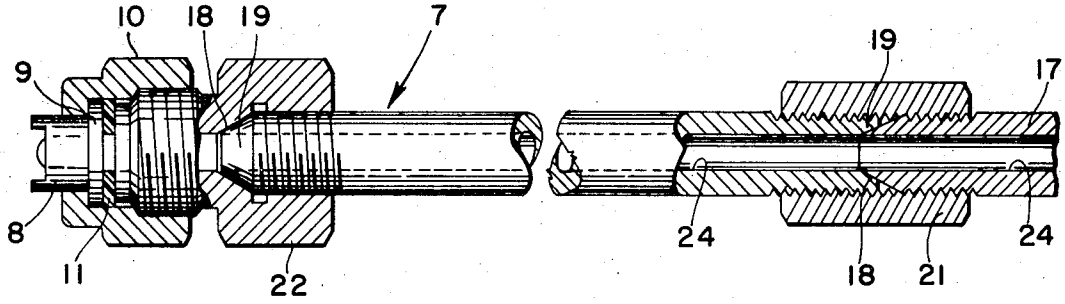


Fig. 3

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AIRLESS SPRAY GUN EXTENSION

BACKGROUND OF THE INVENTION

Airless spray guns which are now in prevalent use generally comprise an expansion chamber between a first orifice and the spray nozzle orifice, there being a lever operated or power operated valve upstream of the first orifice to permit or prevent flow of paint under high pressure through said first orifice, chamber, and nozzle orifice. An airless spray gun of this type having an expansion chamber between a first orifice (or so-called "pre-orifice") and the spray nozzle orifice generally comprises a plurality of juxtaposed and/or telescoped parts to provide a valve seat upstream of the pre-orifice with the valve body threaded into the gun body including a pre-orifice member or plate, one or more rings forming the expansion chamber, and a nozzle holder, the parts being clamped to the gun body as by means of a cap engaging the nozzle holder and having threaded engagement with the gun body. When it is desired to employ this type of airless spray gun for painting floors, ceilings, or high wall surfaces, for example, the embodiment of the spray nozzle at the end of an extension assembly entails complexities in the fittings at both ends of the extension tube assembly, and, in addition, it has been found necessary to extend the valve to engage the seat which is upstream of the pre-orifice. Moreover, the valve extension requires the provision of a valve guide since in many cases the extension will be provided with a curved section so that the nozzle orifice may be perpendicular to the surface being sprayed while holding the gun at a downwardly or upwardly inclined angle at convenient working height to the operator. Furthermore, if the valve seat is left at the gun it has been found that when the valve is closed at the end of a pass of the gun there will be after dribble or wisping which causes improper atomization and poor quality of finish on the work being sprayed.

SUMMARY OF THE INVENTION

Contrary to the foregoing the airless spray gun extension herein is of simple inexpensive construction which involves the use of a conventional spray nozzle having a single discharge orifice therethrough which is normally clamped by its flange to the spray gun body by means of a cap or nut engaging the flange of the nozzle and clamping it against a suitable gasket at the end face of the gun body. Moreover, in the present invention the extension has a fitting at the outlet end thereof which has a formation corresponding to the end of the gun body whereby the spray nozzle may be clamped to such fitting using the same construction of cap as is used to assemble the inlet end of the extension to the spray gun body and employing the same gasket as is normally employed in conjunction with the assembly of the spray nozzle to the gun body.

Moreover, the extension herein comprises one or more tubular sections which are provided with seats at their ends to engage complementary seats of the fittings at the ends of the extension and with each other when there are a plurality of such sections, the fittings and sections defining a smooth bore throughout the length of the extension without any pockets or radial enlargements and the wall thickness of the sections and fittings is relatively thick so that in the case of high pressure spraying, viz. up to 2,500 psi or more, there will be no

perceptible radial expansion or elongation of the extension thus to eliminate such after dribble or wisping as aforesaid.

The foregoing constitute the principal objects of this invention, and as will hereinafter appear, other objects and advantages will become apparent.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation view of an airless spray gun having secured thereto an extension assembly constituting the present invention;

FIG. 2 is a longitudinal, cross-section view taken substantially along the line 2—2 FIG. 1; and

FIG. 3 is another longitudinal, cross-section view taken substantially along the line 3—3, FIG. 1.

DETAILED DESCRIPTION OF THE INVENTION

The reference numeral 1 denotes a conventional airless spray gun having a handle 2 by which the gun 1 may be conveniently held in the hand for manipulation back and forth with reference to a surface which is being painted and having pivotally connected thereto an operating lever 3 which opens and closes a valve comprising a valve member 4 actuated by lever 3 into and out of engagement with the tubular seat member 5 in the gun body 6. For normal usage, without the extension 7 constituting the present invention, a flanged spray nozzle 8 will be clamped by its flange 9 to the body 6 by means of the cap 10 which has threaded engagement with said body 6, there being a suitable gasket 11 as of nylon or the like between the nozzle 8 and the end of the valve seat member 5, the latter being sealed to body 6 by gasket 12. The body 6 is provided with a lateral inlet port 14 adapted for connection to a paint supply source from which paint is supplied under high pressure. As evident, when the valve member 4 is moved to the right as viewed in FIG. 2, paint under pressure will flow through the seat member 5 into the spray orifice in the nozzle 8 to issue therefrom in the form of a fine, uniform spray which usually is of fan or oval shape.

As known in the art of spray painting, the gun 1 will be held in the hand of the operator with the axis of the spray nozzle 8 orifice spaced say 6 to 10 inches from the surface being painted and perpendicular to the surface. As the stroking of the gun begins, the operating lever 3 will be squeezed to open the valve to thus initiate the spraying operation, and before the stroke is completed the operating lever 3 will be released to stop the flow of paint from the nozzle 8 orifice. Generally, the gun 1 will be shifted to an unpainted portion of the surface and stroked in the opposite direction, and again, the valve is alternately opened and closed at the beginning and before the end of the return stroke.

In order to paint surfaces which are either so low or elevated as not to be conveniently reached by direct spraying from the nozzle 8 at the end of the gun body 6, there is herein provided an extension 7 so that ceilings, floors, or high portions of walls may readily be painted by the operator standing on the floor with the gun inclined upwardly or downwardly as necessary. The extension assembly 7 herein comprises a universal fitting 15 which has a flange 16 corresponding to the flange 9 of the spray nozzle 8 and which is adapted to be clamped against the same gasket 11 as used for the

spray nozzle 8, the clamping means being the same cap 10 or an identical one which has threaded engagement with the body 6. The extension itself comprises one or more thick wall tubular sections 17 having threaded ends and concave and convex seats 18 and 19 at its respective ends. The fitting 15 aforesaid has a convex seat 19 at its threaded end and thereadjacent are provided suitable wrench flats 20 so that a threaded coupling member 21 may be screwed onto said fitting 15 and onto the concave seat end of the tubular section 17 to cause the seats 18 and 19 to be engaged in fluid-tight contact. The tubular sections 17 may be made in, say two and three foot lengths whereby an extension 7 of desired length may be assembled using couplings 21 to secure them together with seats 18 and 19 engaged in fluid-tight relation. Usually the tip section 17 will be of curved form as shown in FIG. 1 so that when painting a wall or floor the axis of the spray nozzle 8 orifice may be positioned perpendicular to the surface being painted simply by inclining the gun upwardly or downwardly without requiring that the gun be held in a horizontal or vertical position as when painting a high wall or floor surface.

The fitting 22 at the end of the extension is provided with a concave seat 18 which is complemental with the convex 19 seat at the end of the last extension section 17, said fitting 22 in addition having a threaded end 23 corresponding to the threaded end of the body 6 whereby the flanged spray nozzle 8 and gasket 11 may be clamped to the threaded end 23 of the fitting 22 by use of a cap 10 the same as the cap 10 which secures the universal fitting 15 to the body 6.

Although not shown herein, it is to be understood that the fitting 22 may be replaced by a swivel coupling assembly for pivoting of the nozzle 8 about a vertical axis as where it may be necessary to spray paint in a direction laterally of the longitudinal axis of the extension as in close quarters.

As shown in the drawing, the fitting 15, the tubular extension sections 17, and the fitting 22 provide a uniform bore 24 without any pockets or recesses therein to interfere with smooth flow of paint therethrough with minimum pressure drop and without rises in hydraulic gradient as is the case where a fluid stream comes to sudden enlargements in the passage through which it is flowing. Accordingly, as the paint flows through the extension 7 there is substantially uniform pressure drop without sudden changes as would be occasioned by pockets or recesses in the flow path.

In airless spraying of paint it has been found desirable to employ very high pressures on the paint so that the velocity of the paint in passing through the spray orifice will be very high to achieve uniform atomization with desired spray pattern and preferably with feathered edges to enable overlapping of successive passes with the overlapped portions increasing the density of the spray to about the same as the uniform density spray within the feathered edges. Generally, the pressure of the paint as supplied to the gun 1 is several hundred psi and may be as high as 2,500 psi or even higher. When the extension 7 herein is in use with high pressure paint flowing therethrough, there is no perceptible radial or lineal expansion of the extension 7 due to the high paint pressure. Accordingly, when the valve member 4 is seated there is no perceptible longitudinal contraction nor radial contraction of the extension 7 whereby the supply of paint through the nozzle orifice will be arrested substantially immediately upon closing of the valve member 4. Most importantly, the absence of pockets or radial enlargements in the flow path of the paint through the extension 7 has eliminated after-dribble or wisping from the nozzle 8 because there are no compressed air or gas pockets between the valve 4 and the nozzle 8 which otherwise would expand to cause discharge of paint through the nozzle 8 after the valve 4 is closed.

In known extensions for guns of the single discharge orifice type, the bores therethrough have pockets or radial enlargements in which air will be trapped and thus compressed during high pressure spraying. Accordingly, when the paint supply is stopped, the compressed air will expand, for example, about 100 times in volume when the spraying pressure is 1,500 psi to cause continued paint discharge at decreasing pressure. This after-dribble and wisping is the cause of a poor finish on the work surface because of poor atomization of the paint as it is discharged through the nozzle under decreasing pressure.

In the case of airless spray guns of the type having a pre-orifice and expansion chamber ahead of the spray orifice, the location of the valve near the tip of the extension may eliminate the after dribble or wisping due to compressed air pockets in the extension but the expansion chamber may have a compressed air pocket therein. Moreover, when the valve at the tip of the extension is suddenly closed, high dynamic pressures (water hammer) may develop to cause spurts of paint to pass through the valve and through the pre-orifice and spray orifice with resulting poor and uneven atomization following the shut-off of the valve.

It has been found that this problem of after-dribble or wisping is eliminated in the present case, and moreover, good atomization and a good finish on the work surface does not require the provision of the pre-orifice arrangement wherein a stream of paint from the pre-orifice passes through an expansion chamber into the spray orifice. The smooth, uninterrupted bore in this extension further facilitates cleaning thereof when it is desired to change color of the painting composition, or to change the composition itself whereby there is no contamination of the new paint by any of the old paint which may remain trapped in recesses or pockets which are provided in known extensions.

I, therefore, particularly point out and distinctly claim as my invention:

1. An extension assembly for an airless paint spray gun having clamping means for securing a spray tip thereto and a valve means for opening and closing a paint supply passage upstream of said spray tip; said assembly comprising a tubular adapter adapted to be clamped by said clamping means to said gun in place of said spray tip; an elongated tubular extension member having a first coupling means at one end to provide a sealed joint with said adapter, and a second coupling means at the other end to seal that end of said member and to provide a seat for said spray tip; and another clamping means for securing said spray tip to said second coupling means whereby, upon opening of said valve means, paint flowing through the passage defined

by said adapter, extension member, and second coupling means will be sprayed from said spray tip; said assembly defining a paint flow passage therethrough which is of substantially uniform diameter from said gun to said spray tip and devoid of pockets or radial enlargements whereby, upon closing of said valve means, the discharge of paint from the spray tip is immediately discontinued.

2. The assembly of claim 1 wherein said adapter and said one end of said extension member have complemental tapered seats and have threaded engagement with said first coupling means.

3. The assembly of claim 1 wherein said other end of said extension member and said second coupling means have threaded engagement with each other and have complemental tapered seats.

4. The assembly of claim 1 wherein said clamping means and another clamping means comprise clamping nuts threaded onto said gun and second coupling means respectively; and wherein said adapter and spray tip have flanges by which they are clamped as aforesaid.

5. The assembly of claim 1 wherein said extension member has concave and convex tapered seats at its respective ends to engage complemental seats of said adapter and second coupling means.

6. The assembly of claim 1 wherein said adapter and extension member have a relatively thick wall so as to be substantially rigid against lengthwise and diametral expansion under the influence of paint pressures exceeding several hundred p.s.i. thus further to eliminate after-dribble at the time of closing of said valve means.

7. The assembly of claim 1 wherein said extension member comprises at least two sections coupled together by another first coupling means to form a sealed joint therebetween.

8. The assembly of claim 7 wherein said extension member sections, said adapter, and said second coupling means have complemental tapered seats; and wherein said sections have threaded engagement with said first coupling means, said another first coupling means, and said second coupling means.

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