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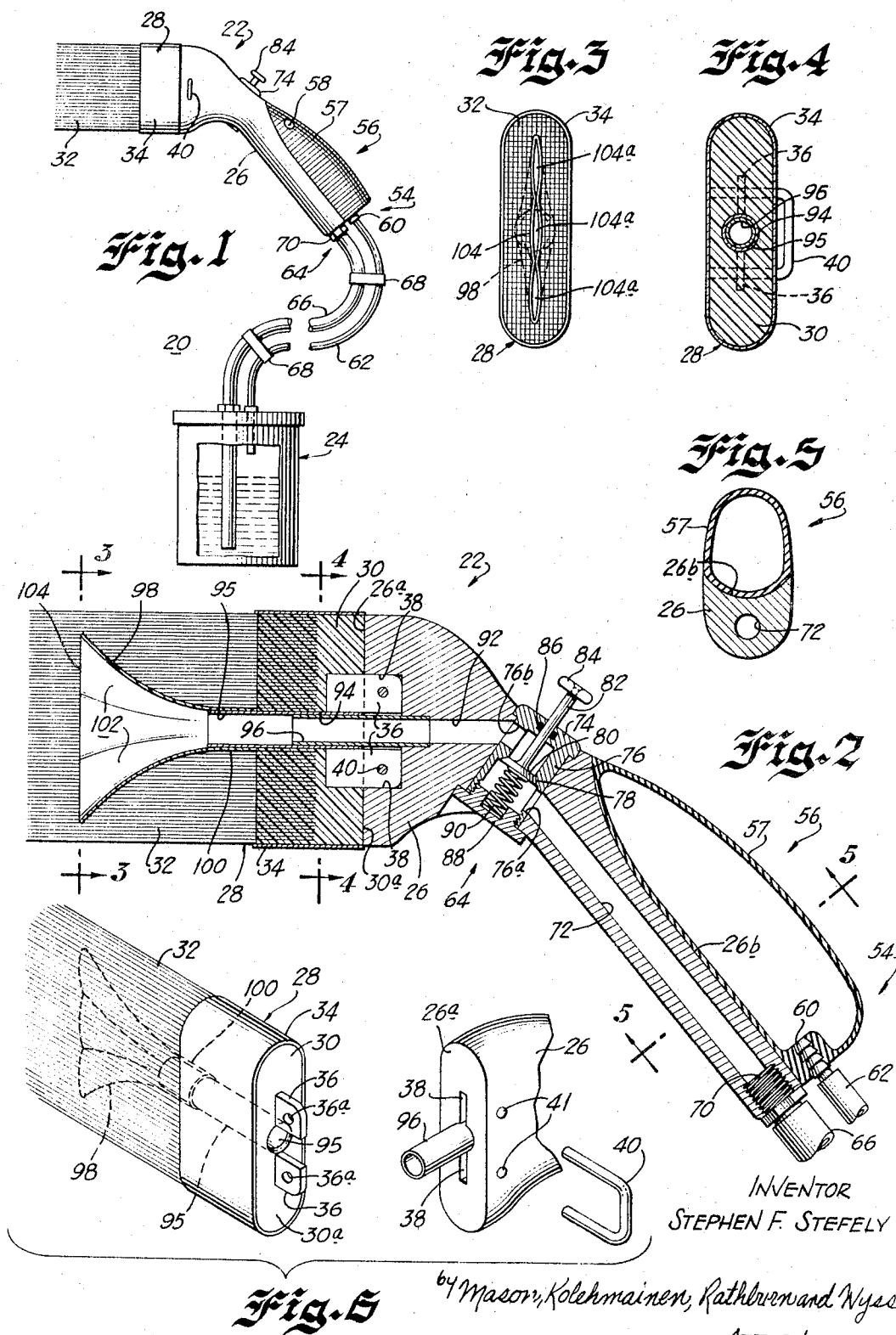
S. F. STEFELY

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LIQUID COATING EQUIPMENT

Filed Nov. 26, 1963

2 Sheets-Sheet 1



Feb. 21, 1967

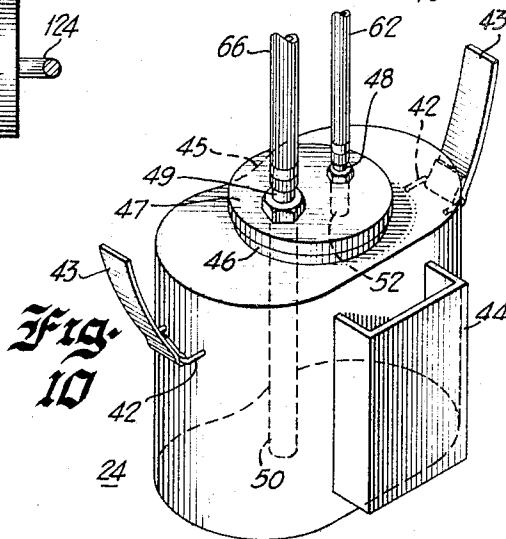
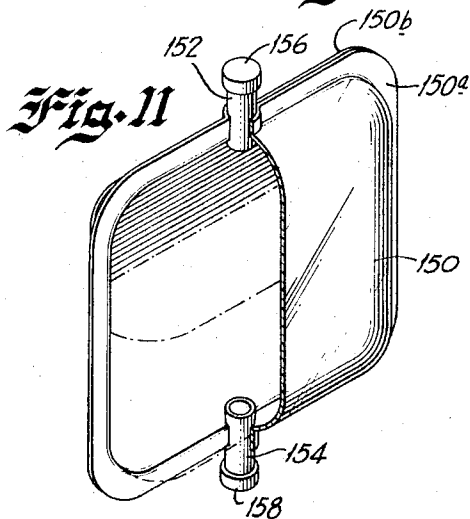
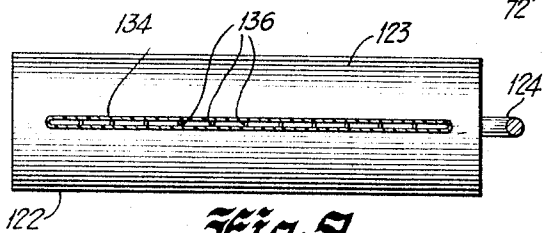
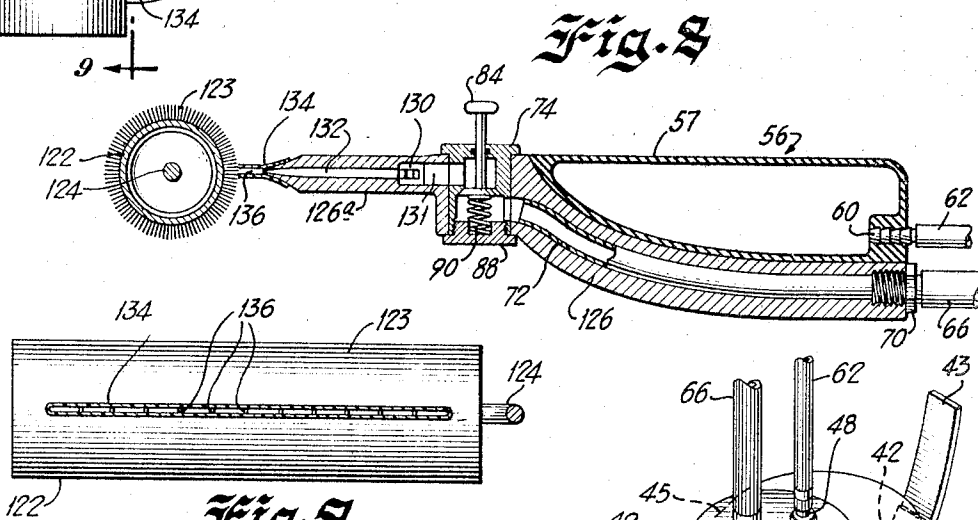
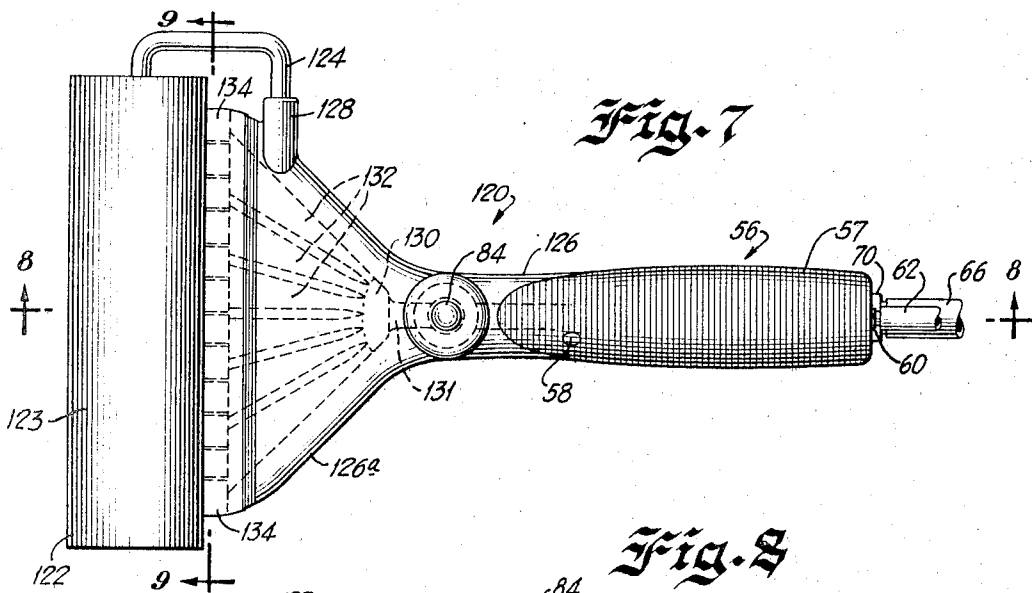
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2 Sheets-Sheet 2



INVENTOR
STEPHEN F. STEFELY

by
Mason, Kolehmainen, Rathbun and Wyse
ATTORNEYS.

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3,304,573

LIQUID COATING EQUIPMENT
Stephen F. Stefely, 1729 N. Lotus Ave.,
Chicago, Ill. 60639

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5 Claims. (Cl. 15—553)

This invention relates to liquid coating equipment, and more particularly to apparatus for applying liquid coating material to a surface including a hand-held applicator fed from a remote reservoir.

The terms "liquid coating material" or "coating material," when used in this specification, are intended to encompass any liquid which might be spread on a surface in a thin layer, or coating. Thus the terms include, but are not necessarily limited to, paints, varnishes and enamels, as well as glues or adhesives in liquid form.

Customary methods of applying liquid coating material to a surface include using a brush or roller which is first dipped into a container of the liquid to be applied, and then moved along the surface to be coated. This method of applying coating material is highly unsatisfactory due to the fact that the brush or roller must be repeatedly dipped into the coating material. Thus, one who is applying the coating must frequently bend down to dip the brush or roller, and must carry an open container with him constantly. When it is necessary to paint from a ladder or scaffolding or the like, it is often quite difficult and dangerous to carry the brush or roller as well as a container of coating material.

As a result of these disadvantages, attempts have been made to use other means to supply the brush or roller with coating material. One method which has been suggested is to provide a reservoir for the liquid coating material which is remote from the brush or roller, and to provide a pressure feed device to force the coating material out of the reservoir to the brush or roller under pressure. Another method has been to provide a vacuum pump for pulling the coating material from the reservoir to the brush or roller.

The pressure feed devices designed thus far have been unsatisfactory due to the fact that they have either required the use of a powder driven pump with the expense and lack of mobility associated therewith, or have used a hand pump of inconvenient design. On the other hand, the vacuum pump devices designed in the past have been unsatisfactory due to the fact that in a vacuum device the liquid coating material is of necessity drawn through the vacuum pump. As a result, the vacuum pump often becomes clogged with the coating material and is difficult to clean.

Another problem which has been encountered in previous roller devices has been the method of depositing the coating material onto the roller before the material is transferred from the roller to a wall or other surface. One method which has been suggested is to use a hollow roller having a rigid inner wall with perforations therethrough. According to this method, the coating material is forced into the hollow rolling cylinder and seeps through the perforations onto the surface of the roller. This method has proven unsatisfactory due to the fact that when the roller is not held in a horizontal position, the coating material is not evenly distributed along the surface of the roller. In addition, such a device requires a specially made roller.

Accordingly, it would be advantageous to provide equipment for applying liquid coating material to a surface wherein the coating material could be forced from a remote reservoir to the brush or roller by means of air pressure generated by a pump associated with the handle of the brush or roller. Additionally, it would be desirable

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to provide a pump for this purpose of convenient size and in a convenient position.

It would also be highly desirable to provide a new and improved method of depositing liquid coating material onto a roller by means of a disperser external to the roller.

Accordingly, it is an object of this invention to provide new and improved apparatus for spreading liquid coating material onto a surface with a brush or roller characterized by the fact that it is not necessary to dip the brush or roller into a container of the liquid coating material.

It is another object of this invention to provide new and improved apparatus for applying liquid coating material to a surface which may easily be transported from place to place without the need to use hands to carry the apparatus.

It is another object of the present invention to provide new and improved apparatus for applying liquid coating material to a surface of the type having a hand-held applicator unit and a remote reservoir which does not require power driven pumping means for forcing a liquid coating material from the reservoir to the hand-held applicator.

It is a further object of the present invention to provide new and improved apparatus for applying liquid coating material to a surface including an air pressure pump associated with the handle of a brush or roller.

It is a further object of the present invention to provide a new and improved disperser for depositing liquid coating material onto the surface of a roller.

It is yet another object of the present invention to provide improved means for forcing liquid coating material from a reservoir to a hand-held applicator.

It is another object of the present invention to provide new and improved apparatus for applying liquid coating material to a surface adapted to use a standard roller.

Yet another object of the present invention lies in the provision of new and improved apparatus for applying liquid coating material to a surface wherein the material is fed evenly to the brush or roller in any position.

It is another object of the present invention to provide new and improved apparatus for applying coating material characterized by the fact that the operator has convenient and complete control over the flow of coating material to the brush or roller.

These and further objects and advantages of the present invention will appear from the following description, taken with the accompanying drawings, in which:

FIG. 1 is a side plan view in partial section of a first embodiment of a device for applying liquid coating material to a surface in accordance with the present invention;

FIG. 2 is an enlarged sectional view of a hand-held applicator forming a part of the device shown in FIG. 1;

FIGS. 3, 4 and 5 are cross-sectional views of the applicator shown in FIG. 2 taken, respectively, along the lines 3—3, 4—4 and 5—5 of FIG. 2;

FIG. 6 is an exploded perspective view of the applicator of FIG. 2;

FIG. 7 is a plan view of a roller applicator embodying the present invention;

FIGS. 8 and 9 are sectional views of the roller applicator of FIG. 7 taken, respectively, along the lines 8—8 and 9—9 of FIG. 7;

FIG. 10 is a perspective view of a reservoir used with the applicators of the present invention; and

FIG. 11 is a perspective view in partial section of another reservoir embodying the present invention.

As this description proceeds, two embodiments of the present invention will be illustrated. The first embodiment, illustrated in FIGS. 1 to 6, uses a brush applicator,

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while the second embodiment, illustrated in FIGS. 7 to 9, uses a roller applicator. In addition, two alternative forms of reservoirs are illustrated in FIGS. 10 and 11.

The first embodiment of the invention includes a hand-held brush unit for applying liquid coating material onto a wall or other surface and a remote reservoir, adapted to be carried on one's person, for carrying a supply of the liquid coating material. The brush unit is provided with a handle which includes a flexible bulb type of air pressure pump which, in turn, is connected to the reservoir by means of a length of flexible tubing. The pump provides air pressure in the reservoir and forces the liquid coating material out through a second length of flexible tubing, which terminates in a passageway in the handle of the brush applicator unit. A dispenser is provided in association with the brush, and is connected to the passageway in the handle of the brush unit. The dispenser serves the function of depositing the liquid coating material evenly in the brush and contains a plurality of conduits leading from the passageway in the handle to the brush. The dispenser is of flexible construction and flexes with the brush bristles. In addition, a valve is provided in the handle passageway to regulate or to stop the flow of liquid coating material through the handle.

More particularly, having reference to the drawings, FIG. 1 illustrates a liquid coating applying device 20 having a hand-held brush applicator 22 and a remote storage reservoir 24.

The brush applicator 22 includes an offset pistol grip handle portion 26 and a brush head 28. The brush head 28 includes a mounting block 30 to which a plurality of brush bristles 32 are mounted by means of a retaining collar 34 in the conventional manner.

The brush head 28 is detachably mounted to the handle 26 by means of mounting tabs 36 carried by a rear face 30a of the brush mounting block 30, which are received by mounting slots 38 in a mounting face 26a associated with the handle 26. When the opposed faces 30a and 26a are joined, the mounting tabs 36 will be received by the mounting slots 38. The handle 26 and the brush head 28 are held together by means of a mounting fastener 40 which is inserted through holes 41 in the handle 26 and through the aligned holes 36a in the mounting tabs 36.

In accordance with the present invention, the remote reservoir 24 is provided for the storage of liquid coating material. The reservoir 24, best illustrated in FIG. 10, is an airtight structure which may be formed of rigid or semi-rigid walls. Handles 42 are provided for carrying or supporting the reservoir 24. A suitable strap or belt 43, shown in part in FIG. 10, may be associated with the handles 42, so that the reservoir 24 may be supported on the person of one applying the coating material. To further facilitate this purpose, a concave side 45 is provided so that the reservoir may comfortably rest against the user's body.

To even further facilitate the mobility of the apparatus, carrying bracket 44 is provided for the purpose of supporting the applicator 22 when not in use. Thus, it should be appreciated that when the user is moving from place to place, or climbing a ladder or the like, he may use both hands since the entire apparatus may be supported on his shoulder by means of the strap 43.

The reservoir 24 is provided with a large mouth opening 46 at its upper surface through which liquid coating material may be poured when the reservoir is to be filled. The size of the opening 46 is large enough to accommodate the filling operation. A removable cap 47 is provided for closing off the opening 46, and fittings 48 and 49 are provided in the cap 47 for a purpose which will be described.

Extending downwardly from the fittings 48 and 49 into the interior of the reservoir 24 are a long length of tubing 50 and a short length of tubing 52. The short length 52 terminates adjacent the top of the reservoir 24, while

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the long length of tubing 50 terminates adjacent the bottom of the reservoir. The purpose of the tubing lengths 50 and 52 is to provide for air pressure evacuation of the contents of the reservoir 24, as shall be described.

The liquid coating applying device 20 is equipped with a manually operated air pressure pumping system 54, which includes a pump 56 comprised of a flexible compressible bulb 57 which is associated with the handle 26. As can best be seen in FIGS. 2 and 5, the bulb 57 fits into a concave recess 26b at the top of the pistol grip handle 26 to form an integral part thereof. The bulb 57 may be glued or otherwise suitably secured in place.

The pump 56 also includes a flutter valve 58 which allows intake of air when the bulb 57 is expanding, but prevents the outgo of air when the bulb is compressed. The bulb 57 is connected to an output nozzle 60, in turn adapted to be connected to a length of flexible tubing 62. The flexible tubing 62 extends to the fitting 48 in the top of the reservoir cap 47.

Thus, it can be seen that when the bulb 57 is pumped by periodic compression of the hand, air will be forced through the flexible tubing 62 and into the reservoir 24. The pump 56 and the handle 26 are designed to be of a convenient shape for this pumping action to be accomplished by a squeezing motion with the same hand which is holding and guiding the brush applicator 22.

The air pressure built up in the reservoir 24 by means of the pumping system 54 is sufficient to evacuate the liquid coating material contained in the reservoir through the long length of tubing 50 and through the fitting 49. In accordance with the present invention, a feed system 64 is provided to carry the liquid coating material from the reservoir to the brush bristles 32. The feed system 64 includes a length of flexible tubing 66, one end of which is secured to the fitting 49. It should be noted that the flexible tubing 66 and the flexible tubing 62 both lead from the brush applicator to the remote reservoir and, consequently, are of approximately the same length. Therefore, the two tubes may be held together at various points along their lengths by suitable tube holding elements 68, which prevent tangling of the tubing.

The end of the tubing 66 remote from the reservoir 24 is connected to a suitable fitting 70 on the butt of the handle 26. Coating material from the reservoir 24 is forced past the fitting 70 and into a longitudinal passageway 72 provided internally of the handle 26. Alternatively, the fitting 70 might be omitted, and the tubing 66 could extend into and be frictionally held by the passageway 72.

As can best be seen in FIG. 2, the passageway 72 terminates in a valve 74, which includes a valve body 76 having an annular valve seat 78. A valve member 80 having a shank 82 and a button 84 cooperates with the valve body 76 and the valve seat 78. The shank 82 is journaled in a seal 86 to prevent escape of the coating material. The lower portion of the valve 74 is sealed by a lower valve plate 88 which carries a spring 90 which biases the valve member 80 to its normally closed position.

Thus, it can be seen that when sufficient pressure is built up to force the coating material through the tubing 66 and through the passageway 72, the valve may be used to regulate or halt the flow of the coating material out of the passageway. The valve may be depressed to any extent to allow a large or small flow of the coating material out of the handle 26. It should be appreciated that the valve button 84 is positioned conveniently for operation by the thumb of a hand grasping the pistol grip handle 26.

When the valve 74 is open, the coating material will pass through an opening 76a in the valve body 76 below the valve seat 78 and will pass out of the valve through an opening 76b above the valve seat 78.

A second passageway 92 is provided in the handle member 26 which interconnects the opening 76b and the face 26a. The mounting block 30 contains a passageway 94 which mates with the passageway 92 when the handle 26

and the block 30 are in assembled relation. A length of tubing 95 is held in the passageway 94. An additional connecting tubing 96, tightly held in the passageway 92 of the handle 26, is adapted to slide into the tubing 95 when the handle 26 and the block 30 are connected together. It should be noted that the tubing 95 extends forwardly of the block 30 into the center of the brush bristles 32.

A flexible disperser 98 fits on the end of the tubing 95 midst the brush bristles 32. The disperser 98 includes an annular inlet portion 100 which slips over the tubing 95, and a plurality of individual smaller channels 102 which open out to a wide flat outlet 104 having a plurality of outlet openings 104a. It has been found that this type of flexible disperser is highly effective in delivering the coating material to the brush bristles in an even and effective fashion. The flexibility of the disperser 98 allows it to bend back and forth with the bristles as the liquid coating material is applied to a surface.

Reviewing the operation of the applying device 20, it can be seen that when the air pressure is built up in the reservoir by means of the pumping system 54, liquid coating material will be driven through the tubing 66, the passageway 72, the valve 74, the passageway 92, the coupling tubing 96, the tubing 95, and through the flexible disperser 98 to the brush bristles 32, from which it may be deposited on a surface to be coated. The valve 74 regulates or stops the flow of the coating from the reservoir to the brush. Due to the unique handle of the brush applicator 22, one hand is sufficient to move the brush across the surface, to pump the air into the reservoir, and to operate the valve button 80, thus controlling the flow of coating material. Thus, a difficulty involved with many prior devices, wherein it was necessary to use two hands to pump the pressure and to operate the applicator, is entirely eliminated. In addition, it should be noted that since an air pressure pump is used instead of a liquid suction pump, the mechanism of the pump does not become clogged with the coating material. It should additionally be noted that this device is entirely manually operated and does not require connection to a power output. For this reason, and because of its light weight and convenient structure, the apparatus of the present invention is highly mobile and may be carried to precarious positions with great ease. It should be appreciated that due to the unique mounting arrangement of the present invention, the brush head 28 may be replaced with other brush heads of any desired size.

An alternative embodiment embodying the present invention, illustrated in FIGS. 7 to 9, uses a roller applicator 120 in place of the brush applicator 20. Since the two embodiments are similar in various aspects of their operation, parts described in connection with the brush applicator embodiment, and which appear in the roller applicator embodiment, will be given the same reference numerals, and will not again be described in detail.

In brief, the roller applicator of the second embodiment includes a handle having an air pressure pump, internal passageway and valve. The handle also supports a bracket on which is rotatably mounted a roller applicator. Liquid coating material is applied to the roller by means of a unique disperser including a plurality of internal channels terminating in a flexible tip of novel design. The roller applicator is adapted to be connected to a reservoir in the same manner as the brush applicator.

More specifically, having reference to the drawings, FIG. 7 illustrates a roller applicator designated as 120. The roller applicator 120 includes a roller 122 which may be of any common type. One type which has been found to work satisfactorily is a rigid wall cylinder covered with suitable material 123 which adsorbs and holds coating material, and deposits the material on a wall or other surface when rolled thereon. As will be understood by those skilled in the art, the material 123 may comprise bristles, lamb's wool or the like. The roller

122 is suitably mounted to rotate on a roller bracket 124 held in a mounting socket 128 on a handle 126. As will be understood by those skilled in the art, the roller 122 may be detachably mounted so that different rollers may be used for different materials and surfaces. The handle 126 includes a valve 74, a pump 56, and suitable fittings 60 and 70.

The evacuation of the liquid coating material from the reservoir by means of air pressure is accomplished in the same manner as in the brush applicator embodiment previously described. The grip portion of the handle 126 is similar in design to the pistol grip handle 26 of the brush applicator embodiment.

The handle 126 includes a flat extended portion 126a, as best seen in FIGS. 7 and 8. The flat portion 126a fans out to a generally triangular shape having a width nearly as wide as that of the roller 122. An internal passageway 130 is provided within portion 126a and includes an inlet 131 which is fed through the valve 74. The inlet 131 forks into a plurality of small divergent passageways 132 which fan out towards the wide, flat end of the handle 126. The end of the handle 126 is provided with a flexible lip member 134 adapted to lightly contact the surface of the roller 122.

In accordance with a novel feature of the present invention, the lip member 134 includes a plurality of small transverse flexible guide members 136 which are supported within the lip member 134. The guide members 136 are free to flex back and forth within the lip member 132, and thus effectively guide the coating material over the entire surface of the roller 122.

It has been found that this unique apparatus for dispersing the coating along the surface of a roller is highly effective in supplying a constant and even amount of coating material over the entire width of the roller. The difficulty encountered with the prior internal type dispersers, wherein the liquid material would be unevenly distributed whenever the roller was not horizontal, has been eliminated. In addition, the provision of an external disperser allows a less expensive nonperforated type of roller, identical to the standard rollers readily available for nonautomatic feed applications, to be used on the roller applicator 120.

It should be understood that the applicator 120 may be connected to the reservoir 24 in the same fashion as the brush applicator 22.

Having reference now to FIG. 11, there is illustrated another type of reservoir which may be used with either of the applicators illustrated. More specifically, there is provided a reservoir 150 formed by heat sealing together the edges of two layers 150a and 150b of thermoplastic material. One or both of the layers 150a and 150b may be transparent so that the coating material may be seen therethrough. The reservoir 150 is provided with openings 152 and 154 which may comprise rigid tubing lengths secured between the adjacent layers 150a and 150b. Removable caps 156 and 158 are provided to seal the openings 152 and 154.

Thus it can be seen that the reservoir 150 comprises a flexible pouch adapted to be filled with liquid coating material. It is anticipated that the reservoir 150 may be purchased already filled with coating material, or may be filled by the user. In either case, the reservoir 150 may be used with either of the applicators in the manner described in connection with the reservoir 24, it only being necessary to connect the tubing 66 and 62 to the openings 152 and 154 in a suitable manner.

Having reference once more to the reservoir 24, it should be understood that a flexible inner liner (not shown) may be provided for use therewith. The liner, which might comprise a thin-walled plastic bag, could be inserted into the reservoir 24 and connected to the fittings 48 and 49. In this manner the necessity for cleaning the reservoir 24 would be eliminated.

While the invention has been described by means of particular embodiments thereof, it will be understood that those skilled in the art may make many changes and modifications without departing from the invention. Therefore, it is intended in the appended claims to cover all changes and modifications which fall within the true spirit and scope of the invention.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. A coating applicator for fluid coating material comprising handle means, roller means extending generally transversely of the handle means, said roller means rotatably supported in a position spaced from the handle means, flexible fluid conveying means carried on the handle and extending generally parallel to the roller means and positioned adjacent the surface of the roller means, said flexible fluid conveying means including spaced flexible walls defining an elongated chamber for holding fluid coating material in contact with the surface of said roller means, flexible guide means supported between said walls for partitioning said chamber to impede movement of the fluid coating material within said chamber in a direction parallel to said roller means, and means for supplying fluid coating material to the flexible fluid conveying means, said fluid coating material supplying means including a plurality of spaced input passageways communicating with said chamber.

2. The coating applicator of claim 1 wherein said fluid coating material supplying means additionally includes an air pressure pump supported by said handle means.

3. The coating applicator of claim 2 wherein said air pressure pump comprises a compressible flexible bulb carried by said handle and forms a smooth continuous surface therewith.

4. Apparatus for one-handed application of liquid coating material from a remote reservoir to a surface, said apparatus comprising flexible adsorbent means adapted to engage and deposit liquid coating material on the surface, supporting means for said flexible material including a handle adapted to be held by one hand during the applying operation, air pressure pumping means mounted on said handle and including flexible wall means on the surface of said handle, a first flexible conduit for the passage of pressurized air from said pumping means to the remote reservoir for building up a supply of air pressure within the remote reservoir, a second flexible conduit for the passage of liquid coating material from the remote reservoir to said supporting means, means defining a passageway through said supporting means for the passage

of liquid coating material from said second conduit to said flexible adsorbent means, and a flow controlling valve in said last mentioned passageway having a valve adjusting member extending from said handle in a position to be engageable by a digit of the one hand holding said handle during the painting operation.

5. Apparatus for applying liquid coating material from a remote reservoir to a surface, said apparatus comprising flexible adsorbent means adapted to engage and deposit liquid coating material on the surface, a handle including supporting means for said flexible adsorbent means, said handle being substantially rigid and formed of rigid material, means defining a passageway through said handle for the travel of liquid coating material to said flexible adsorbent means, a first flexible conduit interconnecting said passageway and the remote reservoir for the travel of liquid coating material to said passageway, compressible bulb air pumping means arranged on said handle to form a continuous grasping surface, a second flexible conduit interconnecting said pumping means and said remote reservoir for building up a supply of air pressure within said remote reservoir to force liquid coating material through said first conduit and through said passageway to said flexible adsorbent means, and a flow regulating valve mounted in said handle to control flow through said first passageway and having a valve operating member extending outwardly from said handle, said member being positioned near said grasping surface and between said grasping surface and said supporting means.

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ROBERT W. MICHELL, *Primary Examiner*.

CHARLES A. WILLMUTH, P. R. ARVIDSON,
Assistant Examiners.