Aug. 18, 1931. J. J. PREBLE ET AL 1,819,117

APPARATUS OR TOOL FOR APPLYING COATING MATERIAL

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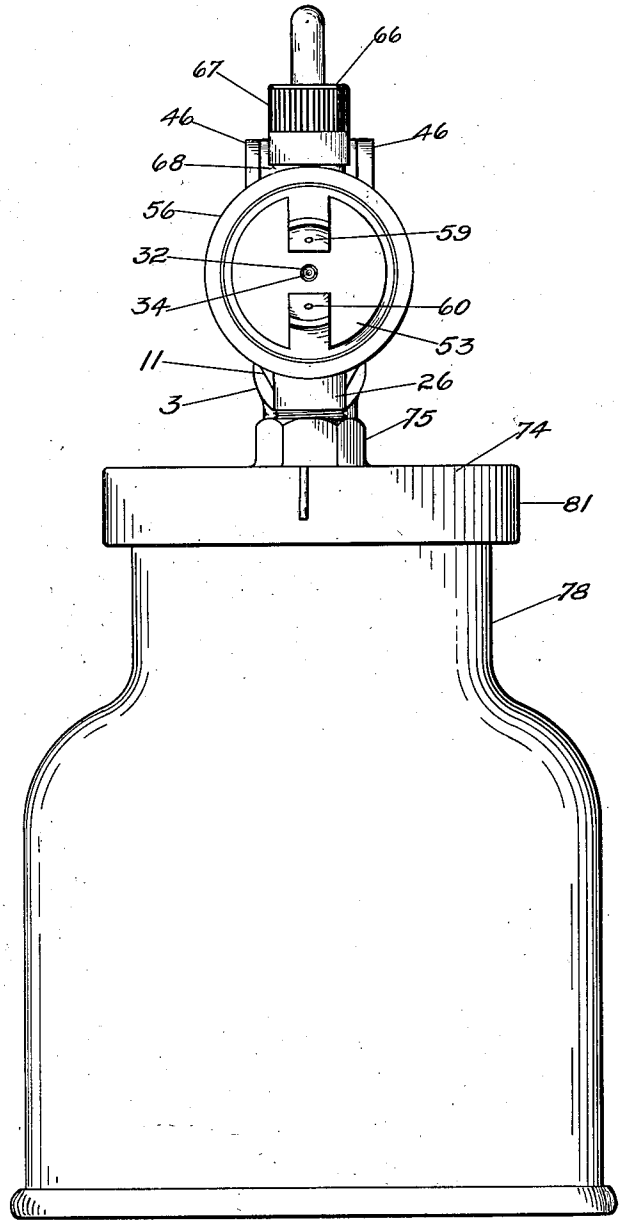


Fig. 1

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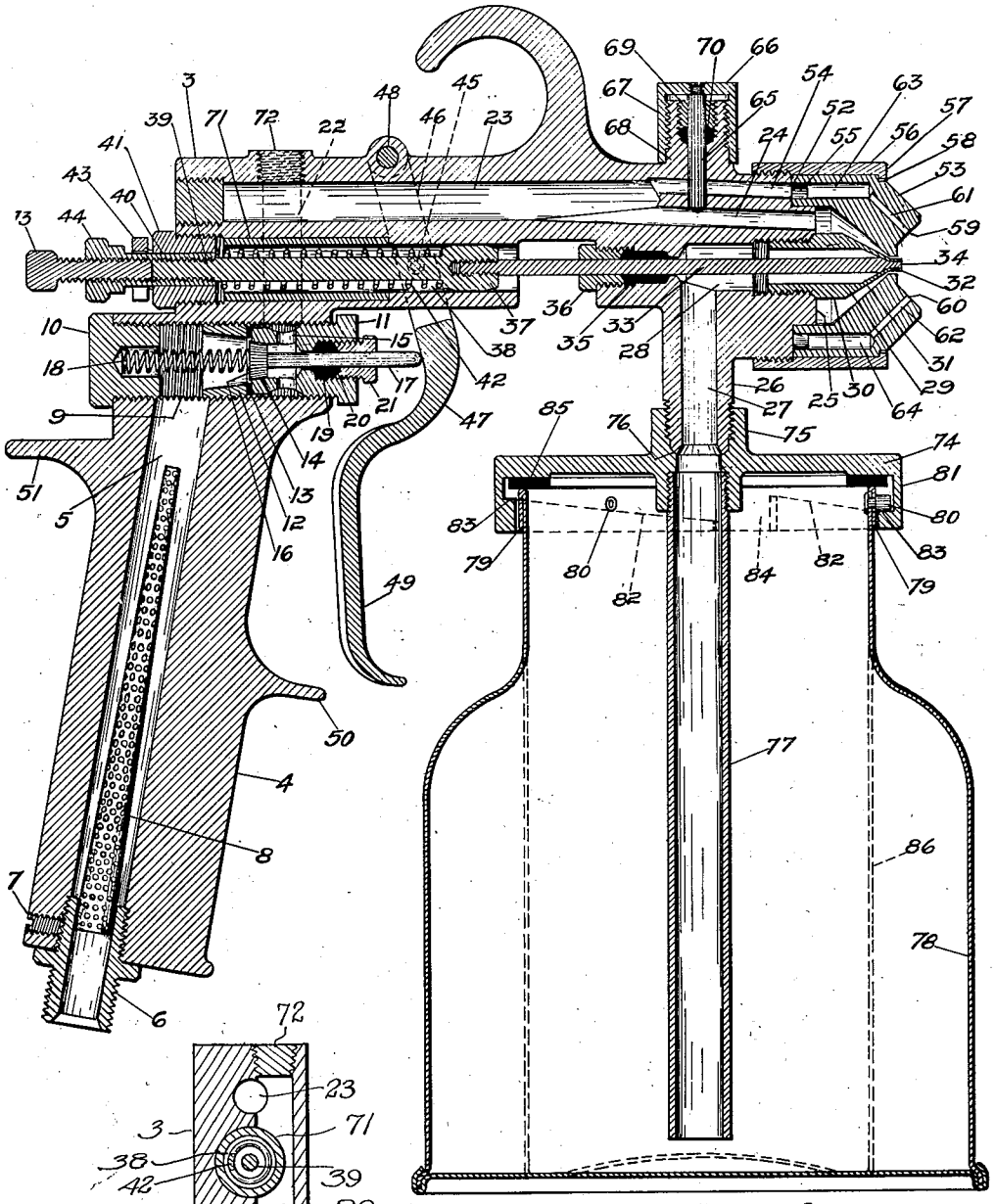


Fig. 2

Fig. 3

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UNITED STATES PATENT OFFICE

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APPARATUS OR TOOL FOR APPLYING COATING MATERIAL

Application filed December 26, 1924. Serial No. 758,055.

The present invention relates to coating apparatus and more particularly to spray guns.

Spray guns are used extensively in the painting of buildings, in the finishing of factory products including automobiles as a step in the manufacture thereof, and in the repainting of used automobiles. Spray guns used in the painting of buildings and the finishing of manufactured products usually receive the coating material through flexible piping under air pressure, although sometimes in the case of industrial finishing equipment the coating material is supplied under the influence of gravity. In repainting used cars, however, only a relatively small quantity of the same colored coating material is used at a time so that it is preferable to provide the spray gun with a coating material container not under pressure, the coating material being withdrawn from the container through the suction created by a stream of compressed air rushing through the gun.

The object of the present invention is to produce a spray gun which will be adapted to receive the coating material either under pressure or not under pressure as the occasion demands and thus be available for universal painting use.

To the accomplishment of this object, and such others as may hereinafter appear, the features of the present invention relate to certain devices, combinations and arrangements of parts hereinafter described and then set forth broadly and in detail in the appended claims which possess advantages which will be apparent to those skilled in the art.

The various features of the present invention will be readily understood from an inspection of the accompanying drawings illustrating the best form of the invention at present devised, in which,

Figure 1 is a front elevation of the paint or spray gun;

Fig. 2 is a left side sectional elevation, and

Fig. 3 is a sectional elevation on the line 3—3, Fig. 2.

Referring to the drawings, the apparatus or tool for applying coating material is preferably provided with a metallic body 3 which has integral therewith or suitably attached thereto a handle or extension 4. The motive agent, which may be air under pressure, is preferably introduced into the body portion 3 through the handle 4 and for that purpose we have herein shown an air passage 5 which is connected to an air hose (not shown) through an air-hose coupling 6 fitted to the lower end of the passage 5 and held in place on the handle 4 by a set screw 7. To remove particles of dirt or other foreign matter from the inflowing motive agent and prevent their entrance into the body of the tool, the coupling carries a perforated conical member 8, which extends into the passage 5.

At its upper or leading end the air passage 5 communicates with a horizontal passage 9 extending completely through the upper portion of the handle 4. The passage 9 is interiorly threaded to receive three parts, namely, a plug 10 which closes one end of the passage, a valve casing 11 which closes the other end of the passage, and a central hollow stop 12 which determines the operative position of the valve casing 11 within the passage. The interior of the stop 12 is frusto-conical in shape in order to permit the insertion into the stop of an expanding tool which expands the stop to wedge its exterior threads into the threads in the passage 9 and thus lock the stop in a fixed position. Interposed between the valve casing 11 and stop 12 is a lead washer 13 which prevents the air leaking out between the casing and the stop into the threads between the casing 11 and passage 9. The valve casing 11 is provided with a valve seat 14 and with transverse air passages 15. The valve seat 14 is adapted to receive and seat a suitable air valve 16 having a spindle 17. The valve 16 is normally held upon the seat 14 by a coiled spring 18 interposed between the valve 16 and the plug 10. Near its outer end the spindle 17 passes through suitable packing shown as a bland packing 19, mounted in a cavity 20, formed in the valve casing 11, and held in place therein by a gland or plug 21 threaded into the cavity 20. The motive agent, such as air under pressure entering through the passages 5 and 9, passes through the air valve 16 when open, and enters a pas-

sage 22 which conducts the air to a longitudinal chamber 23 having a passage 24 which opens on the front face 25 of the body portion.

The coating material, such as paint, lacquer, and the like, may be introduced into the body 3, under pressure, by threading a hose coupling (not shown) to a pipe 26 depending from the body portion. The pipe 26 is provided with a passage 27 which conducts the coating material into a chamber 28 opening upon the face 25 of the body portion. With this construction the air chamber 23 and the paint chamber 28 are always out of communication with each other within the body of the gun.

The forward or discharge end of the chamber 28 is internally threaded to receive a threaded nozzle 29 through which the coating material is discharged from the gun. The nozzle 29 is provided with a substantially hexagonal surface 30, a tapered portion 31, and a cylindrical or conical discharge tip 32.

Extending longitudinally through the chamber 28 and substantially axially thereof is a needle or spinde 33 having a tip 34 formed on its forward end provided with surfaces shaped to engage the surfaces 31 and 32, respectively, and thus act as a valve to shut off the discharge of coating material.

The rear end of the chamber 28 is closed by packing 35 through which the spindle 33 extends. The packing 35 is held in place by a packing or gland plug 36 threaded into the body 3. The spindle 33 may be withdrawn from or inserted into the chamber 28 while the packing 35 is in place as the reduced end of the spindle passes through the packing without picking up strands thereof. The rear end of the spindle 33 is secured to a guide 37 arranged to move in a longitudinal bore or spring chamber 38 formed in the body 3. The guide 37 is provided with a stem 39 threaded at its free end to engage threads on an adjusting sleeve 40 rotatably mounted in a plug 41 threaded into the body 3. The spindle 33 is actuated in a direction to keep the coating material discharge orifice normally closed by a spring 42 coiled about the stem 39 and interposed between the inside faces of the plug 41 and guide 37.

In order to move the spindle 33 in a direction to open the coating material discharge orifice against the tension of the spring 42 the central portion of a strap yoke 43 is loosely interposed between an adjusting nut 44, on the sleeve 40, and the plug 41. The free ends of the yoke extend along the opposite sides of the body portion and are connected by pivot pins 45 to the arms 46 of a yoke or lever arm 47 embracing the body 3 and pivoting on a horizontal pin 48 carried by the body 3.

The inner face of the lever arm 47 engages the spindle 17 of the air valve 16. The yoke arm 47 thus operates to open both the air and coating material valves when the arm 47 is actuated against the tensions of the springs 18 and 42 which close the valves when the yoke-arm 47 is released. As sufficient play is provided for the yoke 43 before it engages the nut 44 the air valve will be opened before the coating material valve opens and the air valve will be closed after the coating material valve is closed.

In order to actuate the yoke arm 47 its lower end is curved to form a grip 49 for a plurality of the fingers of the hand of the operative grasping the tool handle, which is provided with a conveniently located finger rest and positioning member 50. The tool handle is also provided with a smooth under face 51 which is adapted to seat upon the hand of the operative grasping the handle to assist him in supporting the tool. From an inspection of Fig. 2 it will be apparent that the handle 4 below the finger rest 50 is wider than the portion of the handle above the rest by substantially the width of the grip 49. This construction is provided so that when the grip 49 is drawn towards the handle 4 in actuating the valves 16 and 34 the combined handle and grip engaged by the index and second finger will have substantially the same width or girth as the portion of the handle engaged by the little and adjacent fingers.

In order to provide a discharge nozzle for the air the front face of the body 3 is provided with a vertical seat 52 of reduced diameter forming a cylindrical surface upon which a main air discharge nozzle 53 is seated concentric with the inner nozzle 29. The nozzle 53 has an internal surface spaced from the external surface of the nozzle 29 throughout its length so that air can pass out of the passage 24 and be discharged from the gun.

The spray gun embodying our present invention preferably includes means for supplementally discharging air under pressure upon the discharged mist or cloud of material and main discharged air to effect the flattening, spreading or fan-shaping thereof when desired and accordingly there is formed in the body 3 a supplemental air passage 54 leading from the chamber 23 and terminating at the seat 52. In the rear-end face of the nozzle 53 is a continuous annular groove constituting, with the adjacent portion of the body, a circular air passage 55, the construction being such that some portion of the latter always lies opposite the forward end of the supplemental air passage 54 irrespective of the angular positions of the nozzle 53 with relation to axis of the tool body.

The rear end face of the nozzle 53 is adjustably held in place flatwise against the forward end of the tool body by a suitable locking means shown as an internally

threaded collar or nut 56 having an inturned flange 57 to engage a circular seat 58 formed in the outer face of the nozzle 53. The outer face of the nozzle 53 is provided with a pair of diametrically opposed jet members 59 and 60 having the inwardly directed air passages 61 and 62 in communication with the air passage 55 through the passages 63 and 64 in any position of angular adjustment of the nozzle 53. The nozzle 53 is assembled with the body merely by placing it flatwise against the seat 52 and screwing on the nozzle lock. When it is desired to adjust the plane of the sprayed material this may be readily effected merely by backing off the nozzle lock slightly, turning the nozzle 53 upon the cylindrical seat to bring the supplemental jets 59 and 60 to the desired position, and again tightening the nozzle lock. As the locking ring 56 always positions the nozzle 53 against the vertical seat 52 the point where the supplemental jet converge upon the main discharge, which point may be described as the focus of the suplemental jets, remains constant in any position of adjustment of the nozzle 53.

The supplemental air discharge is desirably readily controllable and for this purpose we have provided a valve 65 arranged to completely close the supplemental air passage 54. The valve 65 is secured at its upper end to a valve operating member 66 shown as a cap having a knurled exterior 67 and interiorly threaded to engage a thread upon a boss 68 on the body 3. The boss 68 is interiorly threaded to receive a plug 69 securing in place a suitable packing 70.

The passage 22 through which the air is conducted from the valve 16 to the chamber 23 is formed by an off center vertical bore passing through a portion of the wall of the spring chamber 38. In order to seal this breach in the wall of the spring chamber 38 and thus prevent the air under pressure from passing into the spring chamber 38 during the passage of the air to the chamber 23 the body portion carries a tube 71 which covers the breach in the wall of the spring chamber 38. The off center hole in the top of the body 3 made by the boring tool in forming the passage 22 is closed by a plug 72.

The volume of coating material discharged from the inner nozzle 29 may be regulated by turning the adjusting nut 44. The adjusted position is maintained through a locking device 73 which is threaded into the sleeve 40 and which is arranged to engage the end of the stem 39.

When it is desired to admit coating material not under pressure to the spray gun the material hose (not shown) is disconnected and a vented closure 74 is threaded on the lower end of the pipe 26. To this end the closure 74 is provided with a central hollow boss 75 threaded interiorly on opposite sides of the closure. The lower end of the pipe 26 is shaped to fit a seat 76 formed on the boss 75 to insure a tight joint. The lower threads on the boss 75 are engaged by outer threads on a pipe 77 extending down towards the bottom of a container 78 which contains the coating material.

In order to attach the container 78 to the closure 74 we have provided a turned over or otherwise reinforced portion 79 at the upper end of the container whereon are provided a plurality of preferably equally spaced, laterally projecting lugs 80. The lugs 80 are shown as rivets or may be formed integrally with the container, if desired, and are adapted to cooperate with a suitable receiving formation on the closure 74. To this end the closure 74 is provided with a circumferentially depending skirt 81 having a series of partial threads, wedge formations or the like 82, forming slightly inclined tracks or grooves 83 in which the lugs 80 may be received. The grooves 83 terminate at their lower ends in a downwardly open notch or recess 84, spaced similarly to the lugs 80 and of a dimension to receive the same. The tracks 83 may be formed by a thread the continuity of which is broken by the recesses 84. The thread may therefore be what is usually called a mutilated thread.

To secure the container to the closure 74 it is necessary merely to insert the container within the skirt of the closure with the lugs 80 positioned in the respective notches 84 and then relatively to rotate slightly the container and closure in a direction to cause the lugs 80 to ride up the tracks or grooves 83, whereby the mouth of the container is wedged up against a gasket 85 on the under side of the closure 74. Removal of the container may be subsequently readily effected by a similar but reverse operation. The gasket 85 has a larger diameter than the smallest diameter of the skirt 81 so that the gasket 85 may not drop out of position when the container is removed.

To avoid changing the closure 74 or pipe 77 when interchanging pint and quart sizes of containers all the pint and quart containers are constructed with the same diameter mouths or necks and the same heights. As shown in Fig. 2 the dotted lines represent a pint container 86 having the same mouth or neck diameter and height as the container 78. With this construction a pint or a quart container may be used with the spray gun without making any accommodating change in either the size of the closure 74 or the length of the pipe 77.

Automobiles are now being painted with a lacquer which has the property of drying rapidly. In spraying lacquer the whole exposed end face of the nozzle 53 becomes covered with a fine mist of lacquer. When the spray gun is shut off this lacquer mist has a tendency to flow into the annular air orifice

between the nozzles 29 and 53 and dry therein and thus clog the annular air orifice. To prevent this tendency of the lacquer to clog the annular air orifice the end of the coating material nozzle 29 protrudes a fraction of an inch beyond the annular air orifice opening on the exposed end face of the nozzle 53. With this construction the lacquer remaining on the exposed end face of the nozzle 53 collects on the protruding end of the nozzle 29 where it can do no harm.

It will be apparent to those skilled in this art that changes may be made in the details of construction, the described and illustrated embodiment of the invention being intended as an exploitation of its underlying essentials, the features whereof will be definitely stated in their true scope in the claims hereto appended.

What is claimed as new, is:

1. An apparatus or tool for applying coating material comprising a body having means to admit coating material and a motive agent, an inner nozzle through which the coating material is discharged, an outer nozzle through which the motive agent is discharged, means for supplementally discharging motive agent upon the main discharge to flatten or spread the same including a supplemental motive agent passage in said body, said outer nozzle having a continuous annular groove in one end face and adapted to communicate with said supplemental passage, a pair of opposed supplemental jet members upon its opposite face and communicating with said groove, and locking means for said outer nozzle.

2. An apparatus or tool for applying coating material comprising a body having means to admit coating material and a motive agent, an inner nozzle through which the coating material is discharged, an outer nozzle through which the motive agent is discharged, means for supplementally discharging motive agent upon the main discharge to flatten or spread the same including a supplemental motive agent passage in said body, said outer nozzle being positioned flatwise against the forward face of the tool body for rotatable adjustment, opposed jet delivery means on the outer nozzle, and means to secure the external nozzle in the desired position of adjustment.

3. An apparatus or tool for applying coating material comprising a body having means to admit coating material and a motive agent, an inner nozzle through which the coating material is discharged, an outer nozzle through which the motive agent is discharged, means for supplementally discharging motive agent upon the main discharge to flatten or spread the same including a supplemental motive agent passage in said body, said outer nozzle being positioned flatwise against the forward face of the tool body for rotatable adjustment, opposed jet delivery means on the outer nozzle, means to secure the external nozzle in the desired position of adjustment, and valve means to control or shut off the supply of motive agent through said supplemental passage in the body.

4. An apparatus or tool for applying coating material comprising a body having means to admit coating material and a motive agent, an inner hollow member forming a discharge nozzle for the coating material, an outer hollow member concentrically mounted with relation to the inner hollow member and spaced therefrom to form a discharge nozzle for the motive agent, means for supplementally discharging motive agent upon the main discharge to flatten or spread the same including a supplemental motive agent passage in said body, a pair of opposite jet members on said outer member having continuous communication with said supplemental passage, a flat vertical seat on the forward face of the tool body upon which the outer member is angularly adjustable and locking means for said outer member.

5. An apparatus or tool for applying coating material comprising a body having means to admit coating material and a motive agent for discharge therefrom, a motive agent chamber, a coating material needle valve spring chamber, a motive agent valve chamber, a passage connecting the motive agent valve chamber with the motive agent chamber, said passage passing through one wall of the coating material needle valve spring chamber and means for sealing said wall to keep the motive agent out of said spring chamber.

6. In a tool for applying coating material, an unitary member having a central restricted orifice through which the coating material and motive agent are discharged, a continuous annular groove in one edge face, a pair of opposed supplemental motive agent jets upon the opposite edge face, and interior passages connecting the annular groove and supplemental jets.

7. An apparatus or tool for applying coating material comprising a body having means to admit coating material and a motive agent, an inner nozzle through which the coating material is discharged, an outer nozzle through which the motive agent is discharged, means for supplementally discharging motive agent upon the main discharge to flatten or spread the same including a supplemental motive agent passage in said body, said outer nozzle being positioned flatwise against the forward face of the tool body and provided with opposed supplemental jet delivery means in communication with said supplemental motive agent passage, and means to secure the outer nozzle on the body.

8. An apparatus or tool for applying coating material comprising a body having a

front face provided with a positioning means and having means to admit coating material and a motive agent, an inner nozzle, secured directly to said body, through which the coating material is discharged, an outer nozzle, independent of the inner nozzle, engaged with said positioning means, through which the motive agent is discharged, and means for supplementally discharging motive agent upon the main discharge to flatten or spread the same including a supplemental jet delivery means on the outer nozzle and angularly adjustable with said outer nozzle throughout a full circle upon said positioning means and having passages remaining in communication with the source of motive agent in any desired position of adjustment including a continuous annular groove on the outer nozzle.

9. An apparatus or tool for applying coating material comprising a body having a front face and having means to admit coating material and a motive agent, an inner nozzle, secured directly to the front face of the body, an outer nozzle, through which the motive agent is discharged, provided with an end face engaged with the front face of the body, and means for supplmentally discharging motive agent upon the main discharge to flatten or spread the same including a continuous annular groove on one of said faces in communication with the source of motive agent, supplemental jet delivery means on the outer nozzle, and passages connected with said jet delivery means with said groove.

In testimony whereof we have signed our names to this specification.

JAMES JARVIS PREBLE.
WAYNE B. THOMPSON.