July 7, 1925. 1,544,773

J. A. PAASCHE

PNEUMATIC PAINTBRUSH

Filed April 6, 1917 2 Sheets-Sheet 1

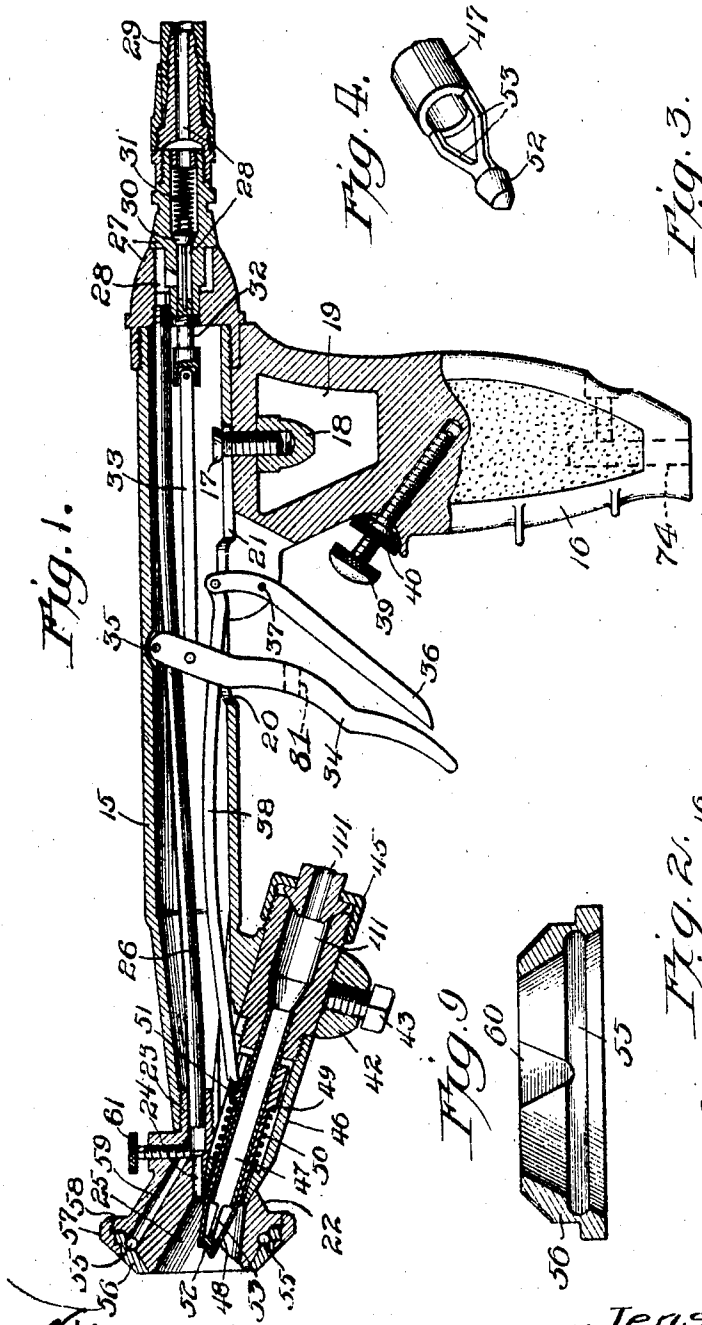


Fig. 1.

Fig. 4.

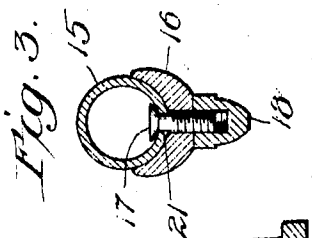


Fig. 3.

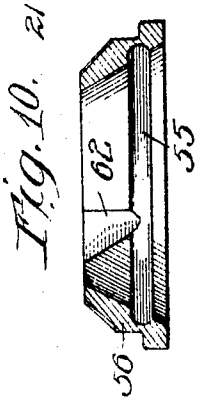


Fig. 10.

Fig. 9

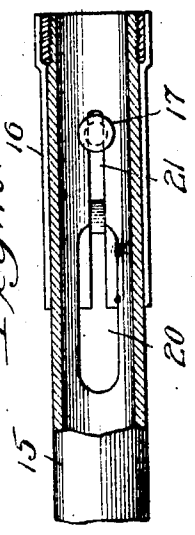


Fig. 2.

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Fig. 8.

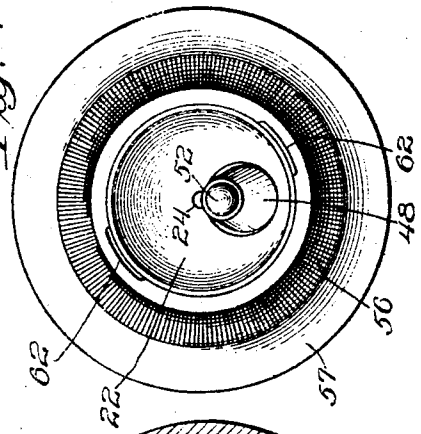


Fig. 12.

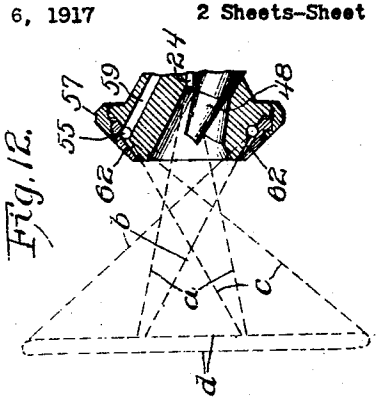


Fig. 7.

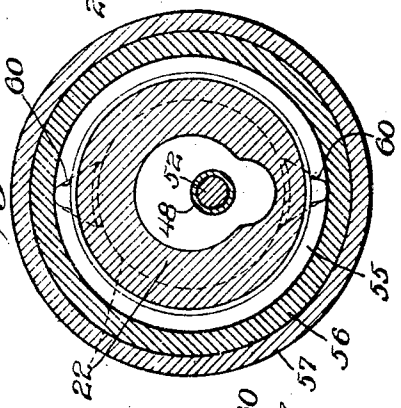


Fig. 11.

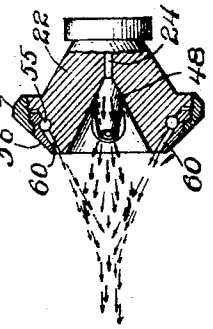


Fig. 6.

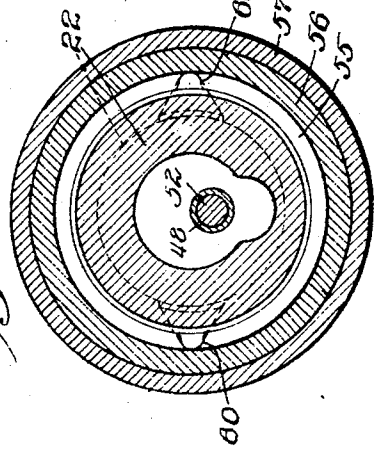
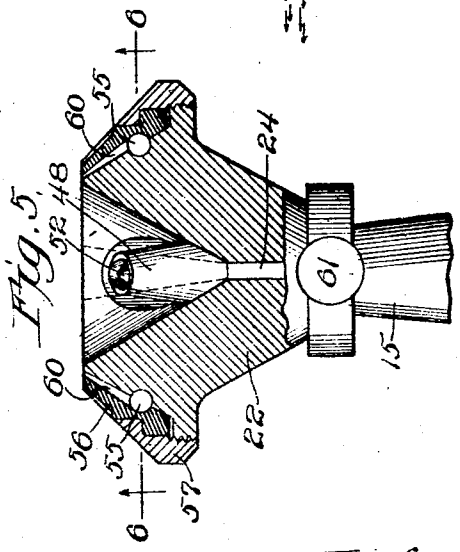


Fig. 5.



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UNITED STATES PATENT OFFICE.

JENS A. PAASCHE, OF CHICAGO, ILLINOIS.

PNEUMATIC PAINTBRUSH.

Application filed April 6, 1917. Serial No. 160,161.

To all whom it may concern:

Be it known that I, JENS A. PAASCHE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Pneumatic Paintbrushes, of which the following is a specification.

This invention relates to a pneumatic paintbrush of the general character disclosed in my prior Patent No. 1,104,217, issued July 21, 1914.

One of the objects of the invention is to provide improved air discharge means whereby, in addition to the main central stream of air, two opposite circumferential or side streams of air may be provided, if desired, said side streams being discharged at oblique angles to the main stream and converging toward the main stream so as to flatten the latter into a thin wide spray.

Another object is to improve the paint discharge means by providing a paint tube or needle-valve of improved construction.

Further objects and advantages of the invention will be set forth in the following detail description.

In the accompanying drawings, Figure 1 is a longitudinal central section through a pneumatic paintbrush embodying the features of my invention, Fig. 2 is a horizontal sectional view through the body illustrating the means for securing the primary handle to the body. Fig. 3 is a transverse section further illustrating said handle-securing means. Fig. 4 is a detail perspective view showing the improved paint-conveying needle or tube. Fig. 5 is an enlarged horizontal sectional view through the air-discharging means. Fig. 6 is a transverse section taken in the plane of line 6—6 of Fig. 5 and looking in the direction of the arrows. Fig. 7 is a view similar to Fig. 6 but showing the adjustable annulus turned 90 degrees to position the circumferential air outlets at the top and bottom of the head instead of at horizontally opposite sides, as in Fig. 6. Fig. 8 is a front end elevation of the brush showing a slightly modified form of circumferential air outlets. Figs. 9 and 10 (Sheet 1) are sectional detail views of the adjustable annulus embodied in the forms of air discharge heads shown in Figs. 1 to 7 and in Fig. 8, respectively. Fig. 11 is a horizontal or plan section through the form of head shown in Figs. 1 to 7 illustrating the flattening action of the side air streams on the main or central stream. Fig. 12 is a sectional elevation through the form of head shown in Fig. 8 and illustrating in side view the action of the circumferential air streams upon the central stream.

I will herein describe in detail the preferred embodiment of my invention which is illustrated in the drawings, but it should be understood that I do not limit myself to the exact form disclosed, but aim to cover in the appended claims all modifications and equivalents falling within the scope of the invention.

The form of brush disclosed is adapted to be held in the hand like a pistol and comprises a tubular body or barrel 15 and a depending handle 16 approximately perpendicular thereto. The preferred means for securing the handle to the body comprises a headed bolt 17 passing through the upper portion of the handle and a nut 18 threaded on the lower end of said bolt and occupying an open space 19 in the handle. The body is provided with a slot 20 through which the trigger levers, to be later described, extend and a narrower slot 21 runs rearwardly from the slot 20. In attaching the handle to the body, the head of the bolt 17 is passed through the slot 20 and then slipped rearwardly into the narrower slot 21 and the handle 16 and nut 18 are then applied, so that when the nut is tightened up the handle will be firmly clamped to the body. The slot 21 is of less width than the diameter of the head and the bolt, and the bolt is preferably provided with opposite flattened faces directly beneath the head which fit snugly in the slot 21 so as to prevent rotation of the bolt in the slot.

On the forward end of the body 15 is mounted an air discharge head 22 which preferably has a shank 23 threaded into the tapered forward end of the body. Said air head has a central passage 24, the forward end of which is flared at 25. An air supply pipe 26 within the body has its forward end fitting snugly in the rear of the passage 24, the rear end of said pipe engag-

ing in a plural-part head 27 which closes the rear end of the body. This head may be of similar construction to that shown in my prior patent above referred to and need be herein only briefly described. The pipe 26 communicates with a passage 28 which runs through the head structure and is supplied with air from a flexible hose, a fragment of which is indicated at 29. A valve 30 is normally held by a spring 31 in position to close the air passage to the head, said valve being arranged to be opened rearwardly by a plunger 32 slidable in the head. This plunger is connected by a link 33 to a trigger lever 34 pivoted at its upper end at 35 in the body and passing downwardly through the slot 20. A second trigger lever 36 is pivoted at 37 to the handle 16 rearwardly of the first trigger 34, and the ends of the two triggers are normally spaced apart to allow the air valve to be opened before the rear trigger 36 is engaged. A rod 38 pivoted to the upper end of the rear trigger 36 extends forwardly through the body and is associated at its forward end with the paint discharge means to be presently described. When the trigger 34 is drawn rearwardly, the link 33 and rod 38 are moved longitudinally in opposite directions so as to open the air valve 30 and the color discharge means. A stop-screw 39 threaded in the handle is arranged to be set in any desired position to limit the rearward movement of the triggers. A lock-nut 40 on said stop-screw is adapted to fix the set-screw in any desired position.

The paint discharge means comprises a sleeve 41 which passes through an opening in a lug 42 depending from the body 15, the sleeve being rigidly fixed in the opening by a set-screw 43. 44 indicates a portion of a conductor which communicates with a supply of paint and is attached to the sleeve 41 by a collar 45. On the forward end of the sleeve 41 is threaded a sleeve 46. A paint-conveying needle-valve or tube 47 has its rear end fixed in the forward end of the sleeve 41 and on this tube is slidably mounted a nozzle 48 having an annular shoulder 49 on its rear end which is engaged by a coiled spring 50 surrounding the nozzle so as to normally press the nozzle rearwardly. The forward end of the rod 38 is arranged to engage a shoulder 51 on the nozzle to move the latter forwardly against the action of the spring 50.

The forward end of the nozzle 48 is tapered and the needle or tube 47 is provided at its forward end with a tapered portion or valve member 52 (Fig. 4) which fits snugly in the forward end of the nozzle to close the latter. This valve member is carried at the forward end of a connecting portion 53 which is in the form of a letter U or V, the base of which carries the valve member 52 and the arms of which are fixed to the sides of the tube 47. In the present instance the tube, valve member and connecting portion are formed of an integral piece of metal. The connecting portion 53 is relatively thin and occupies but a small portion of the cross-sectional area of the nozzle 48, so that said connecting portion offers a minimum amount of obstruction to the escape of the paint from the nozzle when the latter is moved forwardly to open it, and also eliminates the tendency of the parts to stick, caused by the paint collecting in the forward portion of the nozzle when closed.

The air head 22 is provided with a hole in its lower side through which the forward portion of the paint discharge structure projects so that the tip of the nozzle 48 is positioned well within the air stream issuing from the central passage 24 in the head.

In the operation of the structure as thus far described rearward pressure of the trigger 34 will open the air valve 30 and continued movement will push the trigger 36 back and move the paint nozzle forwardly, whereupon the stream of air issuing from the central passage 24 in the head will draw particles of paint out from the nozzle 48 and carry such particles against the article to be painted. The stream of mixed air and paint from the passage 24 and nozzle 48 will expand somewhat, but normally would retain its rounded or conical form. It is sometimes desirable, however, to have the stream of mixture take the form of a widened and flattened spray, so that a greater space on the article being painted can be covered with one sweep of the brush. This is particularly advantageous in painting large articles or surfaces, such as furniture, walls and various other structures. I provide means to accomplish the result mentioned by causing two opposed circumferential air streams to issue from the head 22 at oblique angles to the central stream and converging toward the latter, whereby the central stream of mixed air and paint will be flattened in one direction and widened in a perpendicular direction so that the resultant stream is broad and thin. I have herein illustrated two forms of structure for effecting this end, one form being illustrated in Figs. 1 to 7, 9 and 11, and the other form in Figs. 8, 10 and 12. The two forms are identical, except as to the location and shape of the circumferential air outlets.

Referring to Fig. 1, it will be noted that the head is provided with an annular air passage 55 which is formed by complementary grooves in the external periphery of the head and in the internal periphery of an annulus 56 which surrounds the head. The mentioned external and internal peripheries of the head and annulus are tapered for-

wardly so as to provide a tight fit between the two. The annulus is held in close contact with the head by means of a collar 57 engaging a shoulder on the annulus and being threaded onto a radial flange 58 on the head 22. By turning up the collar 57 tightly the annulus may be clamped in air-tight relation to the head.

The head is provided with a passage 59 leading from the central passage 24 to the annular passage 55. In the inner periphery of the annulus 56 at opposite sides thereof are formed two grooves 60 which merge at their inner ends into the annular groove forming part of the passage 55, said side grooves becoming wider and shallower toward their forward ends. The flow of air to these circumferential air outlets may be controlled or cut off entirely by means of a suitable valve member 61 seated in the head and arranged to close the supply passage 59. When this valve is open and the brush is being used, a part of the air will escape through the central passage 24 and a part will pass through the lateral passage 59 and will escape through the opposite circumferential outlets 60 in the form of thin flaring streams of air which converge toward the central stream and act upon the latter to flatten and widen it.

When the outlet grooves 60 are in a horizontally opposed position the central stream will be flattened, as indicated by the arrows in Fig. 11, so that it lies in a vertical plane. If it be desired to flatten the stream in a horizontal direction, the collar 57 is loosened sufficiently so that the annulus 56 may be turned to position the outlet grooves 60 above and below the central outlet, as shown in Fig. 7. The annulus 56 is preferably corrugated or knurled on its external periphery to facilitate gripping the same by the fingers in turning it.

In the modified construction shown in Figs. 8, 10 and 12, the outlet grooves 62 in the annulus have one side straight and the other side sharply inclined, the grooves being so positioned that the air streams issuing therefrom will flow in oppositely inclined directions, but will not be directly opposed to each other so that the two side streams will exert a "wiping" action on opposite sides of the central stream of mixture and will not interfere with each other to a material extent. Referring to Fig. 12, *a* indicates the outline or shape of the central stream as it would normally be, while *b* and *c* designate the two circumferential air streams, which as shown cross each other along opposite sides of the central stream and extend the latter in opposite directions. The resultant flattened stream is indicated at *d*. With this arrangement the increase in width of the resultant stream is greater than with the modification first described, in which the two circumferential streams are directly opposed to each other, or, in other words, meet and merge at directly opposite sides of the central air stream.

In the relation of parts shown in Fig. 8, the annulus 56 is set to position the outlet grooves 62 adjacent to the upper and lower sides of the head, but laterally offset in opposite directions from a vertical plane passing through the head. The position of the grooves 62 may be adjusted from that shown in Fig. 8 by loosening the collar 57 and turning the annulus 56 as before described so as to change the angle which the flattened stream of mixture assumes with relation to the brush.

It will be noted that the collar 57 and the annulus 56 are readily removable from the head so as to facilitate cleaning of the air passages. By loosening the screw 43 and raising the rod 38 out of engagement with the paint nozzle the entire paint discharge unit may be withdrawn from the lug 42, whereupon the head 22 may be unscrewed from the body 15. All parts of the air and paint discharge means are therefore readily accessible for cleaning purposes.

It will be apparent that many modifications and alternative arrangements not herein disclosed may be provided without departing from the spirit and scope of my invention. The foregoing description has been made detailed merely for the sake of lucidity and is not intended as a limitation of the invention to the embodiment herein disclosed.

I claim as my invention:

1. A pneumatic paint brush having, in combination, an air discharge head provided with a small central air passage which is outwardly flared at its forward end, the head further having a hole through one side communicating with said flaring portion, a paint discharge structure located outside of said head and projecting through said hole and having its tip within said flaring portion, said head having two circumferential air outlets arranged to direct lateral streams of air in a direction oblique to and converging toward the central stream, and said head having means communicating with said central passage for supplying air to said circumferential outlets.

2. A pneumatic paint brush having a head which is provided with a central air outlet passage and converging circumferential air outlets, and paint discharge means extending at an angle to the central air passage and having its tip located in front of said central pasage and between said circumferential outlets.

3. A pneumatic paint brush having a two-part head, the parts of which are provided with contacting outer and inner tapered

peripheries, one of the parts having a continuous annular air passage arranged to communicate with a source of air and one of the parts having a plurality of outlets leading from said annular passage, and means for controlling the flow of air through said last mentioned outlets.

4. A pneumatic paint brush having a head, an annulus surrounding the head, said annulus and head having internal and external tapered peripheries respectively, a collar threaded on said head and engaging said annulus to hold said tapered peripheries on the annulus and head in close contact, the said peripheries having complementary grooves forming a continuous annular air passage, the head having a supply passage leading to said annular passage, and the annulus having closed grooves leading forwardly from said annular passage and providing converging outlets for the air, and means for controlling the flow of air to said annular passage.

5. A pneumatic paint brush having, in combination, a head provided with a central air outlet passage and flared at its forward end, paint discharge means having its tip projecting into the flaring portion of said passage, an annulus surrounding said head, said annulus and head being provided with forwardly tapering internal and external peripheries respectively, a collar threaded on said head and engaging said annulus to hold said tapered peripheries in air-tight contact, said annulus and head having complementary grooves forming an annular air passage, the head having a supply passage leading from said central air outlet to said annular passage and said annulus having two opposed internal grooves leading forwardly from said annular passage and providing converging air outlets arranged to direct streams of air against opposite sides of the central stream.

6. A pneumatic paint brush having, in combination, a tubular nozzle tapered at its forward end, a paint tube fitting slidably within said nozzle, a tapered valve member within said nozzle arranged to close the forward end thereof, and two spaced bars connecting said valve member with the forward end of said paint tube, said bars being of small cross section whereby they occupy but a small portion of the cross-sectional area of the nozzle.

7. A pneumatic paint brush having, in combination, a tubular body, a handle depending from said body, the body having a large slot through which a trigger lever may depend in front of said handle and the body having a narrower communicating slot extending rearwardly from the first slot, a bolt having a head which is insertable into the body through the first mentioned slot, said bolt then being slidable into the narrower slot through the open end of the latter, the head of the bolt overlying the sides of said narrower slot, and the bolt passing through a portion at the upper end of said handle, and a nut threaded on the lower end of said bolt and arranged to clamp the handle to the body.

8. A pneumatic paint brush having, in combination, an air discharge head provided with a small central air passage which is outwardly flared at its forward end, a paint discharge structure operatively associated with said head, means for supplying air to said head, the air through said central passage acting to induce a flow of paint from said paint-discharge structure, said head having two circumferential air outlets arranged to direct lateral streams of air in a direction oblique to and converging toward the central stream, and said head having a passage communicating with said central passage for supplying air to said outlets.

9. A pneumatic paint brush having, in combination, a tubular body having an opening, a handle projecting from said body at said opening and having a fastening member projecting therefrom through said opening into said body to hold said handle in assembled relation thereto, said body being provided with an enlarged opening, and trigger means operating therein to control the operation of said brush, said enlarged opening being adapted to permit the insertion of said fastening member therethrough into said opening provided therefor.

10. A pneumatic paint brush having, in combination, a tubular body, a handle therefor having a trigger for controlling the operation of said brush, said body having an enlarged opening to admit and permit the operation therein of said trigger and a slot extending from said opening, and a fastening for said handle having a head thereon to hold said handle to said body, said opening being adapted to receive said head to permit the entry of said fastening into said slot.

11. A pneumatic paint brush having, in combination, a head provided with a main air outlet outwardly flared at its forward end, means for supplying paint to said outlet, the flow of air through said outlet serving to induce a flow of paint, a rotary member secured to said head and having a pair of diametrically opposite side air outlets inclined to direct two supplemental streams of air against opposite sides of said stream of paint in a manner to cause a wiping action, and means for supplying air to said outlets.

12. A pneumatic paint brush having, in combination, a head provided with a central air passage outwardly flared at its forward end, a paint supply means associated with said air passage, the flow of air through

said passage serving to induce the flow of a stream of paint out of said flared portion, a rotary member secured to said head and co-operating therewith to define an annular air passage, two side air outlets communicating with said annular passage, said head having a passage connecting said annular passage with said central passage, means for supplying air to said air passage, and means for controlling the flow of air through said side outlets.

In testimony whereof, I have hereunto set my hand.

JENS A. PAASCHE.