H. O. DAVIS.

MEANS FOR APPLYING COATING.

APPLICATION FILED MAR. 8, 1919.

1,332,544.

Patented Mar. 2, 1920.

2 SHEETS—SHEET 1.

Fig. 1.

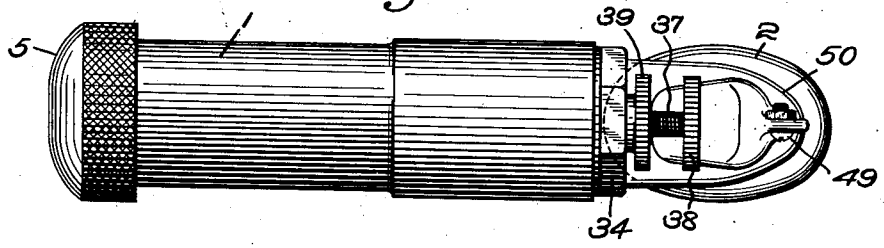
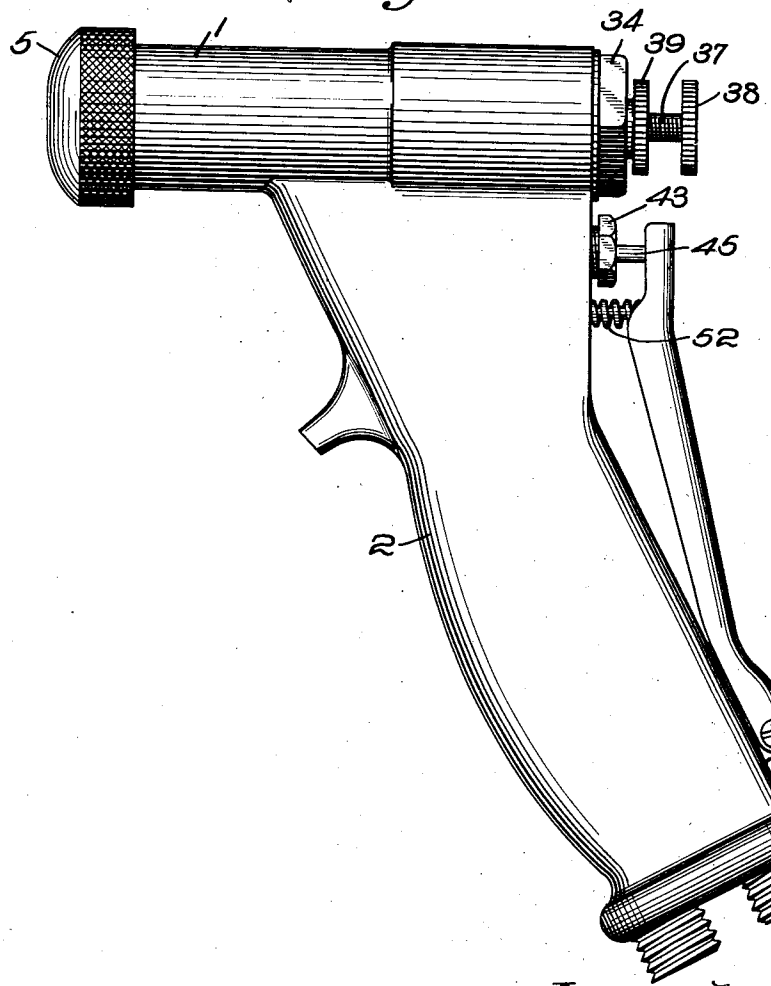


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

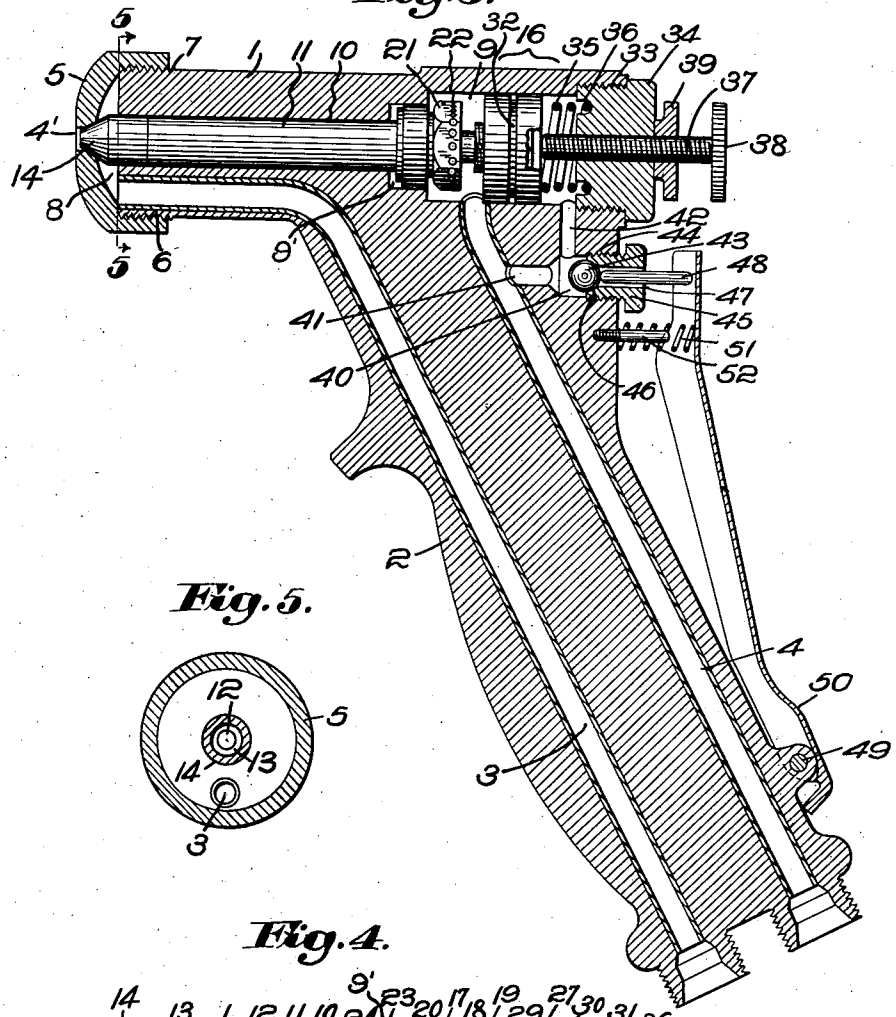
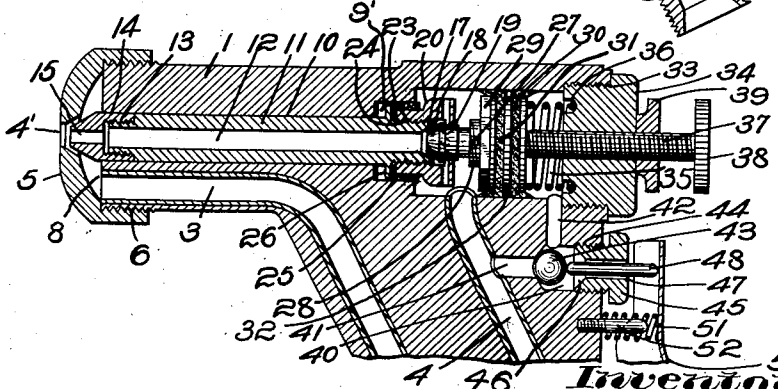


Fig. 5.

Fig. 4.



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UNITED STATES PATENT OFFICE.

HARRY O. DAVIS, OF IPSWICH, MASSACHUSETTS, ASSIGNOR TO SPRAY ENGINEERING COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

MEANS FOR APPLYING COATING.

1,332,544. Specification of Letters Patent. Patented Mar. 2, 1920.

Application filed March 8, 1919. Serial No. 281,423.

To all whom it may concern:

Be it known that I, HARRY O. DAVIS, a citizen of the United States, and a resident of Ipswich, in the county of Essex and State of Massachusetts, have invented an Improvement in Means for Applying Coating, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to means for applying coating to surfaces. The coating, if a liquid, may be a paint, japan, varnish or other suitable coating material, but it may be a solid in powder form, and the material to which it is to be applied may be of any suitable character, such, for example, as wood or metal.

One important object of my invention is to provide an industrial tool which may be readily used in rough work not requiring a great nicety of manufacture, nor costly and delicate parts. Obviously, however, the invention is adapted to fine work. While my invention is not restricted in its application, the disclosed embodiment thereof constitutes an improvement upon the construction shown in my co-pending application Serial No. 268,919, filed December 30, 1918.

Referring more particularly to the drawings, wherein I have represented a single embodiment of my invention,—

Figure 1 is a plan view of a tool constructed in accordance with my invention;

Fig. 2 is a side elevation thereof;

Fig. 3 is a vertical, central, sectional view thereof;

Fig. 4 is a view similar to Fig. 3, but representing the parts as differently positioned; and

Fig. 5 is a vertical transverse section upon the line 5—5 of Fig. 3 and looking toward the right in said figure.

The tool or appliance of my invention may be of any suitable material, but preferably it is metallic. The body 1 thereof may be of any suitable form and preferably is provided with a handle or extension 2 integral therewith and having a passage 3 for the coating material, such, for example, as paint, and a passage 4 for the propelling agent, which preferably is a fluid under pressure, such, for example, as air.

The coating material and the motive fluid under pressure may be received from any suitable source of supply, it being desirable that in this embodiment of the invention the coating material be supplied under pressure.

In the disclosed form of my invention, the tool is of a general pistol form having an elongated body or handle portion 1, but the construction may be widely varied within the scope and purpose of the invention.

If desired, I may provide a valve for the paint or other coating supply passage 3 between the source and the point 4′ of final discharge. Preferably, however, I do not employ such a valve, but control the passage of the coating material wholly through the admission of the air or other motive fluid. Therefore I extend the coating passage 3, which herein is shown as lined, to substantially the forward end of the tool to which I apply a cap 5 internally threaded as indicated at 6 and received upon the threaded end 7 of the body or barrel portion of the tool. Preferably I provide a series of caps 5 each having an opening of a size differing from the others and corresponding to the bore or opening through the air supply member hereinafter described and which is made interchangeable with other like parts, so as to provide for an air stream of any desired area in cross section.

Preferably the coating material which is supplied through the passage 3 is forced under suitable pressure in any suitable manner into the chamber 8 of the cap 5. Obviously, however, my invention is not limited in this respect.

The compressed air passage 4, also herein shown as lined, leads into the head or barrel of the tool and preferably into a valve chamber or cylinder 9 having a prolongation or tubular passage 10 extending to the cap 5 so as to admit the air or other motive fluid to the cap in a manner hereinafter more fully described.

While any suitable valve means may be employed, I have herein represented a spindle 11 having a sliding or working fit within the passage 10. This spindle is provided with a preferably axial passage 12 and at its forward end the spindle is reduced in diameter and externally threaded as indicated at 13 for the reception of an internally threaded tip 14 provided with a suitable sized axial opening 15 therethrough. The tip 14, here shown as removable, and

the spindle 11 constitute a valve means or valve.

The tips 14 and caps 5 are preferably made in pairs with axial openings of the proper relative size, the parts being correspondingly numbered, so that when a tip 14 with a different sized opening 15 is employed, the proper cap 5 will be also employed. The spindle 11 is provided with a preferably piston like member 16, but instead of connecting said member rigidly with the spindle as in my said application Serial No. 268,919, I interpose a valve herein represented as carried by but having movement relative to the spindle 11 and controlling the flow of air or other motive fluid through the passage 12 of the said spindle. While for this purpose any suitable construction may be provided, I preferably employ the following organization of parts.

The inner or rear end of the spindle 11 is internally beveled as indicated at 17 for the reception of the tapered head 18 of the air valve 19, herein represented as a short plunger loosely received within a thimble-like member 20, the rear end of which may be polygonal in shape, as indicated at 21 in Fig. 3, and is provided with preferably a series of openings 22 for admitting the air from the air supply passage 4. Obviously any suitable number of air admission openings 22 may be provided, but by providing a plurality of such openings and making them small in diameter, I may prevent the admission of foreign matter. The provision of air openings peripherally about the member or thimble 20 is further regarded as of advantage in that air is admitted at all points about the head 18 of the plunger air valve 19.

The thimble 20 is internally threaded as indicated at 23 and is received upon the externally threaded end 24 of the piston 11, which is here shown as having a rubber, leather or other washer 25 of cup shape and held in place, if desired, by a suitable collar, washer or integral formation 26.

The rear or inner end of the air valve or plunger 19 extends inwardly beyond the thimble member 20 and is there pinned or otherwise suitably secured as indicated at 27 to the forward end of the piston 16. Such forward end is herein shown as reduced in diameter and as threaded at 28 for the reception of a nut 29 that holds in position the leather, rubber or like washers 30, 31 and the interposed metallic washer or collar 32. The said piston 16 is of the same general structure as that shown in my said application and performs a similar purpose.

The rear end of the chamber 9 is internally threaded as indicated at 33 for the reception of a threaded nut 34 closing the piston chamber. Interposed between the piston 16 and the nut 34 is a coiled spring 35, one end of which is herein shown as received within an annular groove 36 in the inner face of the nut 34.

Preferably I provide an axial screw 37 having a knurled adjusting head 38 and I preferably provide a lock nut 39. By adjusting the screw 37, I limit the extent of movement of the spindle 11 under the influence of the compressed air supply, as is clearly evident from the position of the parts in Fig. 4. The screw 37 also serves as a lock wholly to prevent the operation of the apparatus, this being effected by rotating the screw until its inner end contacts with the inner end of the spindle 11 when the latter is in the position indicated in Fig. 3.

In accordance with my invention and if desired substantially as indicated in my said application, I provide means whereby the air or other motive fluid may be supplied to one or both sides of the piston 16 according as it is desired to discharge the coating material or to prevent its discharge. For this purpose, I have herein represented a valve chamber 40 which communicates by means of a passage 41 with the main air supply passage 4 and by means of a passage 42 with the valve chamber 9 between the piston 16 and the nut 34. Within the valve chamber 40, I position a ball or other suitable valve 43. The valve chamber 40 is tapped, as indicated at 44, for the reception of a screw plug 45 having a beveled inner face 46 receiving the ball or other valve 43. The screw plug 45 is provided with an axial passage and air port 47 within which is slidably received a spindle 48.

The spindle 48 is controlled in any suitable manner, and preferably by means under the control of the hand of the user of the apparatus. For this purpose, I have herein represented the body 1 of the tool as having pivoted thereto at 49 a lever 50 which may be engaged by the palm of the hand, so as to press it inward against the outer end of the spindle 48. When the pressure of the palm is relaxed, the lever 50 is moved outward in any suitable way, as by means of a coiled spring 51 held in position upon a pin 52 tapped into the handle 2 of the tool.

When the parts are in the position shown in Fig. 3, the compressed air or other motive fluid is admitted to both faces of the piston 16, but since there is a larger effective area exposed at the right hand face of said piston, viewing Fig. 3, the spindle 11 and parts connected therewith are forced forward, thereby cutting off the discharge of the paint or other coating material, it being observed that at the same time the pressure upon the parts 20 and 25 forces the spindle 11 toward the cap 5 until the said spindle—that is, the tip 14 thereof—seats against the cap 5.

When pressure is applied to the lever 50, the parts assume the position shown in Fig. 4, the air moving the piston valve 16 into the position shown in said figure, thereby permitting the air to enter the openings 22 in the thimble 20, and thence to pass along the tapered surface 18 of the air valve 19, and thence into the passage 12 of the spindle 11. The construction is such that the air valve 19 is opened fully before the spindle 11 is pulled from its seat in the cap 5 by the action of piston 16. When the air reaches the forward end of the passage 12, it meets the paint or other coating material, which is forced forward through the passage 3, and it picks up and discharges the same in a finely comminuted or divided condition through the opening 4′ in the cap 5, and thence onto the surface to be coated.

The spring 35 acts to force the spindle 11 and its piston 16 forward or toward the left viewing Fig. 3 when the supply of air is cut off, thereby closing the air passage between the air valve 18 and the piston 11, and also closing the material port between the piston 11 and the cap 5.

When, however, the air supply is on and the hand pressure is released from the lever 50, the parts assume the position shown in Fig. 3; that is to say, the air pressure through the passages 4 and 41 forces the ball valve 43 to the right viewing Fig. 3 into the position there shown, and thereby admits the air supply through the air passage 42 to the rear or right hand face of the piston 16, viewing Fig. 3, and also closes the air port 47. The air pressure continues to act upon the left hand face of the piston 16, viewing Fig. 3. The air pressure continues upon the exposed or right hand face of the thimble 20. The effect of this air pressure upon the thimble 20 is to force the said thimble toward the left, viewing Fig. 4, and thereby to retain contact between the same and the air valve 19 through the instrumentality of the collar upon said air valve. The effective pressure upon the piston 16 due to the difference in area between the two faces thereof tends to drive said piston to the left, viewing Fig. 4, the spindle 11 moving as a unit with the said piston 16 and the air valve 19 until the spindle 11 seats on cap 5, closing the paint opening therein.

After the spindle 11 has reached the described final position at the left, viewing Fig. 3, thus closing the paint port in the cap 5, the piston 16 continues to travel toward the left, thereby seating the air valve 19 upon the inner end 17 of the spindle 11, thus closing the air port about the head 18 of the air valve 19. It will be observed that the chamber 9 is of an intermediate diameter between the main part thereof and the extension 10, as indicated at 9′, so as to receive with a sliding or working fit the washer 25 upon the thimble 20.

It will be evident that in assembling the parts, the air valve 19 is preferably first placed inside the thimble 20 and the latter is then screwed onto the rear threaded end of the piston 11. The piston 16 is then placed upon the rear end of the air valve 19 and is pinned or otherwise suitably secured thereto. The valve 19 I term the primary air valve, and the valve 43 I term the secondary or hand operated valve. Obviously other forms of these valves may be employed, and my invention is not restricted to that embodiment herein illustrated.

Having thus described one illustrative embodiment of my invention, I desire it to be understood that although specific terms are employed, they are used in a generic and descriptive sense and not for purposes of limitation, the scope of the invention being set forth in the following claims.

Claims:

1. Means for applying coating comprising a body member having passages for coating material and for a motive fluid under pressure, a valve substantially at the point of ultimate discharge, means whereby the flow of motive fluid under pressure operates said valve, and a valve between said first mentioned valve and said means.

2. Means for applying coating comprising a body member having passages for coating material and for a motive fluid under pressure, means controlling the flow of both the motive fluid and the coating material, and a valve between the said means and the point of ultimate discharge, and movable with respect to the said means.

3. Means for applying coating comprising a body member having passages for coating material and for a motive fluid under pressure, means controlling the flow of both the motive fluid and the coating material, and a plurality of valves between said means and the point of ultimate discharge and controlled by the means.

4. Means for applying coating comprising a body member having passages for coating material and for a motive fluid under pressure, a piston controlling the passage of the coating material and the motive fluid, and a separate motive fluid valve controlled by the piston valve.

5. Means for applying coating comprising a body member having passages for coating material and for a motive fluid under pressure, a spindle valve controlling the discharge of the coating material, and piston 16 and primary air valve 19 to control the movement of said spindle valve.

6. Means for applying coating comprising a body member having passages for coating material and for air under pressure, a spindle controlling the ultimate discharge

of the coating material, a piston in alinement with the spindle, an air valve in alinement with the spindle and piston, and a manually controlled valve for governing the positions of said spindle, air valve and piston.

7. Means for applying coating comprising a body member having passages for coating material and for air under pressure, a spindle 11 having an air passage 12, an air valve 19 in operative relation to said spindle, a piston 16 controlling the position of said air valve, and valve means for controlling the position of said spindle, air valve and piston.

8. Means for applying coating comprising a body having passages for coating material and for air under pressure, a spindle 11 having a passage 12, a thimble 20 upon said spindle, an air valve 19 in operative relation to said thimble, a piston 16, and a valve 43 to govern the position of said parts.

9. Means for applying coating material comprising a body member having passages for the coating material and air under pressure, a spindle controlling the ultimate discharge of the coating material, and primary and secondary air valves to control the movement of said spindle.

10. Means for applying coating comprising a body member having passages for coating material and for a motive fluid under pressure, a spindle and primary and secondary air valves coöperating to control the discharge of the coating material and the motive fluid.

11. Means for applying coating comprising a body member having passages for coating material and for a motive fluid under pressure, a valve at substantially the point of ultimate discharge, and primary and secondary motive fluid valves governing said valve.

12. Means for applying coating comprising a body member having passages for coating material and for a motive fluid under pressure, a valve at substantially the point of ultimate discharge, a piston and a primary motive fluid valve governing said first mentioned valve, and manually operated means for controlling the operation of all of said parts.

13. Means for applying coating comprising a body member having passages for coating material and for a motive fluid under pressure, a spindle valve at substantially the point of ultimate discharge, a piston and a primary motive fluid valve controlling said piston valve, and a manually operated valve governing the action of all of said parts.

14. Means for applying coating comprising a body member having passages for coating material and for a motive fluid under pressure, a valve at substantially the point of ultimate discharge, means whereby the flow of one of said agencies operates said valve, and a valve between the first mentioned valve and said means and controlled by one of them and itself governing the other.

15. Means for applying coating comprising a body member having passages for coating material and for a motive fluid under pressure, a valve at substantially the point of ultimate discharge, means whereby the flow of one of said agencies operates said valve, and a valve interposed between said first mentioned valve and said means and coöperating therewith.

16. Means for applying coating comprising a body member having passages for coating material and for a motive fluid under pressure, a valve at substantially the point of ultimate discharge, means whereby the flow of one of said agencies operates said valve, a valve interposed between said first mentioned valve and said means and coöperating therewith, and a manually operated valve for governing said means and said valves.

17. Means for applying coating comprising a body member having passages for coating material and for air under pressure, a spindle controlling the ultimate discharge of the coating material, a piston for operating the said spindle, an air valve in cooperation with said piston and said spindle, and a manually controlled valve for governing the position of said spindle, air valve and piston.

18. Means for applying coating comprising a body member having passages for coating material and for air under pressure, a valve operated by the flow of one of said agencies, means for governing the application of the flow of said agency to said valve, and valve means movable with respect to and governed by said valve.

19. Means for applying coating comprising a body member having passages for coating material and for air under pressure, a spindle 11, an air valve 19 operatively connected thereto, a piston 16 controlling said air valve, and means for governing the flow of one of said agencies to the piston 16.

20. Means for applying coating comprising a body member having passages for coating material and for air under pressure, a valve 11 at substantially the point of ultimate discharge, valve 19 and piston 16 controlling the same, and valve means governing the flow of one of said agencies to said piston 16.

21. Means for applying coating comprising a body member having passages for coating material and for a motive fluid under pressure, a spindle 11 having a passage 12, piston 16 and valve 19 controlling said spindle, and manually operated means to

govern the position of said piston and valve.

22. Means for applying coating comprising a body having passages for coating material and for air under pressure, a spindle 11 having a passage 12 for the air and controlling the coating material at substantially the point of ultimate discharge, and valve means for operating said spindle.

23. Means for applying coating comprising a body having passages for coating material and for air under pressure, a spindle 11 having a passage 12 for the air and itself controlling the coating material at substantially the point of ultimate discharge, and an air operated valve for said spindle 11.

24. Means for applying coating comprising a body having passages for coating material and for air under pressure, a spindle 11 having a passage 12 for the air and itself controlling the coating material at substantially the point of ultimate discharge, and a piston 16 to operate said spindle together with means for admitting air to one or both sides of said valve 16.

In testimony whereof, I have signed my name to this specification.

HARRY O. DAVIS.