H. W. DAY.

TOOL FOR APPLYING COATING.

APPLICATION FILED JULY 9, 1919.

1,380,866.

Patented June 7, 1921.

2 SHEETS—SHEET 1.

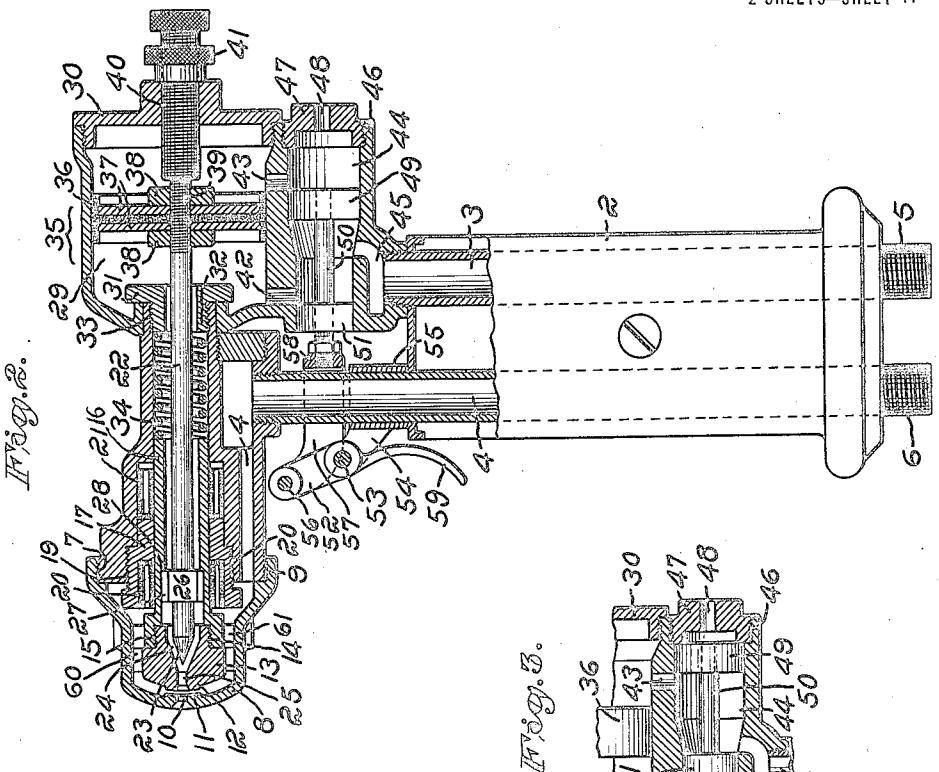


Fig. 2.

Fig. 3.

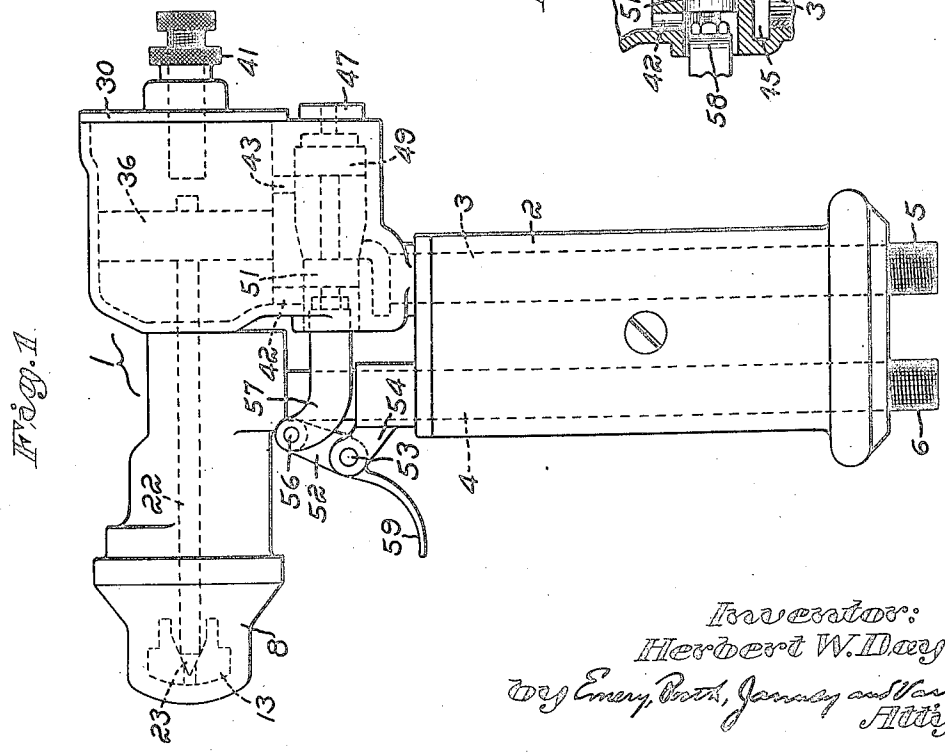


Fig. 4.

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2 SHEETS—SHEET 2.

Fig. 4.

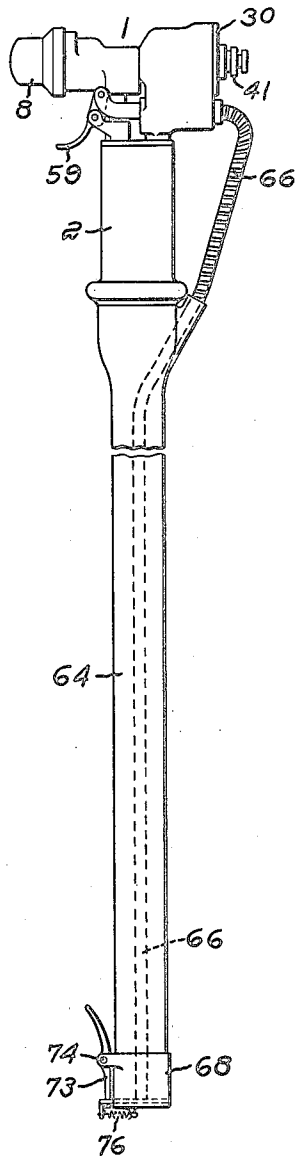


Fig. 6.

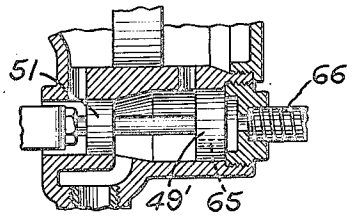
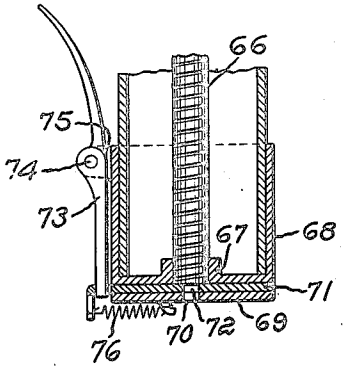


Fig. 5.



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Herbert W. Day,
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UNITED STATES PATENT OFFICE.

HERBERT W. DAY, OF WOLLASTON, MASSACHUSETTS, ASSIGNOR TO SPRAY ENGINEERING COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

TOOL FOR APPLYING COATING.

1,380,866. Specification of Letters Patent. Patented June 7, 1921.

Application filed July 9, 1919. Serial No. 308,691.

To all whom it may concern:

Be it known that I, HERBERT W. DAY, a citizen of the United States, and a resident of Wollaston, in the county of Norfolk and State of Massachusetts, have invented an Improvement in Tools 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 tools or appliances for applying coating to surfaces, and in certain aspects thereof is an improvement upon the construction shown and the invention disclosed in my Patent No. 1,172,233, dated February 15, 1916.

The coating, if a liquid, may be a paint, japan, varnish or any other suitable coating medium, or it may be a solid in powdered form, and the material or surface to which it is to be applied may be of any character, such, for example, as wood, metal or other material.

An important object of the invention is to provide an industrial tool which may be used not only in rough work not requiring a great nicety of manufacture or costly and delicate parts, but which may be used satisfactorily in fine work. Other objects of the invention may be set forth hereinafter.

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

Figure 1 is a side elevation of a tool constructed in accordance with my invention;

Fig. 2 is a view mainly in vertical section and representing the parts in open position;

Fig. 3 is a detail representing one of the valves in a different position;

Fig. 4 is a side elevation of a slightly modified form of my invention;

Fig. 5 is a detail of a valve mechanism thereof in vertical section, and

Fig. 6 is a detail in vertical section of a portion of the valve mechanism of such modified form of my invention.

The tool or appliance may be of any suitable material, but is preferably metallic. The body 1 thereof may be of any suitable form, and preferably it is provided with a handle or extension 2 which may be integral therewith. The body and said handle are provided with a passage 3 for air or other suitable fluid under pressure and constituting the motive agent, and with a passage 4 for the paint or other coating liquid or powder, and which may also be supplied under suitable pressure, if desired, or through gravity.

To this end, I have provided supply pipes 5, 6 tapped into the passages 3, 4 respectively.

The body 1 near its outer end is threaded as represented at 7 for the reception of a cap 8 internally threaded at 9 and provided with a discharge orifice 10 for the motive agent and the coating material. Preferably I provide interchangeable caps having different sizes or characters of opening 10 in accordance with the type of work upon which it is desired to use the tool.

In my said Patent No. 1,172,233, I have disclosed means for forming a film of the coating material which is broken up and discharged by the air or other motive agent, the film being constantly renewed by capillarity. In accordance with my present invention, I provide and maintain a film in substantially the same manner between the inner surface of the cap 8 as at 11, and the outer surface 12 of a nipple 13 externally threaded at its inner end as indicated at 14 and received upon the internally threaded end 15 of a sliding sleeve 16. For sake of clearness, I have somewhat exaggerated the space between the surfaces 11, 12 when the parts are in open position. It is to be understood that the surfaces are in open position in such relation to each other as to secure the formation and re-formation of a film substantially as disclosed in my said patent. The sliding sleeve 16 is positioned with a suitable sliding fit within a nut-like member 17 threaded as indicated at 18 into the inner threaded surface 19 of the body 1. If desired, I may provide packing between the member 17 and the sleeve 16 as indicated at 20, 21, the packing here shown consisting of annular strips of leather folded upon themselves into substantially U-shape in cross section and so positioned that fluid tending to enter between the folds of the material operates to effect a tighter relation between the packing and the metallic surfaces adjacent thereto.

Within the sliding sleeve 16 I position the spindle valve 22 having a tapered forward end 23 adapted to enter the tapered

portion 24 of the axial opening 25 extending through the nipple 13 and to close said passage 25 when the spindle 22 is in its forward position. The spindle 22 is provided with an integral formation or attached part 26 having longitudinal passages 27 permitting the flow of air along the spindle 22. This construction may be secured by forming the part 26 as a collar having in effect radiating teeth.

At some suitable point, the inner surface of the sliding sleeve 16 is provided with an annular shoulder 28 against which the part or collar 26 is adapted to take when in the position shown in Fig. 2.

The body 1 at its rear end is shown as having an air chamber 29, preferably of relatively large diameter and closed at the outer end by a threaded cap 30. The chamber 29 which may be formed separately from the main part of the body 1 is secured thereto by means of a nut 31 externally threaded as indicated at 32 to engage the interiorly threaded part 33 of the body 1, as clearly indicated at Fig. 2. Between the inner end of the nut 31 and the adjacent end of the sliding sleeve 16 is a coiled spring 34 tending constantly to move the sliding sleeve forward or toward the left, viewing Fig. 2, and therefore through the engagement of the shoulder 28 with the part or collar 26 to move the spindle 22 in the same direction.

Suitably secured upon the spindle 22 within the chamber 29 is a piston-like member 35 herein shown as consisting of a middle leather disk 36 and outer metallic disks 37, all held in face to face relation by nuts 38, 38 upon the threaded end 39 of the spindle 22.

Threaded into the cap 30 of the chamber 29 is a screw 40 having a lock nut 41. The screw 40 constitutes a lock when moved inward sufficiently to hold the spindle 22 in closed position and in such position of the parts the tool or appliance cannot be operated. The screw 41 also constitutes a limiting means for the movement toward the right of the spindle 22.

Leading into the air chamber 29 are two passages 42, 43 extending from an air chamber 44 in communication with the air passage 3 through the port 45. The air chamber 44 is internally threaded as indicated at 46 and receives a threaded plug 47 having an opening 48 for the escape of air from the chamber 44 to the atmosphere.

Within the chamber 44 is a valve 49 mounted upon a suitable stem 50 and adapted to govern the port or passage 43. Also mounted upon said stem 50 is a valve 51 controlling the port or passage 42.

In order to operate the valves 49, 51, I provide any suitable means, as, for example, a lever 52 pivoted at 53 upon the arm 54 herein shown as extending from a collar 55 fast upon the upper part of the air passage 4. At the upper end of the lever 52 is pivoted at 56 a yoke or other suitable member 57 herein shown as having a threaded connection 58 with the stem 50. The lever 52 is provided with an operating handle 59 permitting convenient manipulation by a finger or thumb of the user of the tool. When the tool is in closed position, the surface 12 of the nipple 13 is in contact with the inner surface 11 of the cap 8, thus entirely cutting off the flow of the paint or other coating material at substantially the point of ultimate discharge and destroying the film formation for the time being. The tapered end 23 of the spindle 22 is at the same time seated against the inner tapered surface 24 of the axial opening 25 in the nipple 13, thus cutting off the supply of the compressed air or other motive fluid. When it is desired to open or operate the tool, the lever 52 is pressed by the finger or thumb of the operator into the position shown in Fig. 2, thus cutting off the flow of air through the passage 43 and opening the passage 42 to the flow of air against the left hand face of the piston 35. The air which was in the air chamber 29 to the rear of the piston 35 at the same time escapes through the orifice 48 to the atmosphere. The spindle 22 is thereupon moved to the right into the position shown in Fig. 2, and thus the passage 25 for the air is opened, the air passing thereto along the collar or part 26. The movement of the spindle 22 to the right brings the part or collar 26 into engagement with the shoulder 28, and thereupon the sliding sleeve 16 is moved to the right, viewing Fig. 2, against the tension of the coil spring 34. The further movement to the right of the spindle 22 causes a movement in the same direction of the sliding sleeve 16 through the engagement of the said part or sleeve 16 and the shoulder 28, and thus the paint or coating passage between the adjacent surfaces of the cap 8 and the nipple 13 is opened. The nipple 13 may be guided in its sliding movement by spaced projections 60 permitting the flow therebetween of the paint or other coating material. Similarly, if desired, the adjacent end of the sliding sleeve 16 may be provided with spaced guiding projections 61. So long as the parts are maintained in the position shown in Fig. 2, a film of the coating material is constantly formed between the adjacent surfaces 11 and 12, and is constantly broken by the stream of air passing through the axial passage 25. When it is desired to stop the operation of the tool, the pressure of the thumb or finger upon the lever 52 is released, so that the air pressure moves the valves 49, 51 into the position shown in Fig. 3, and thereupon the spring 34 forces the

sliding sleeve 16 forward or toward the left viewing Fig. 2, so as to close the paint or other coating passage between the surfaces 11 and 12. The spindle 22 is caused to move with the sliding sleeve 16, because of the engagement of the part 26 and the shoulder 28, the sliding sleeve and spindle moving as a unit until the paint or coating passage is closed. The valves 49, 51 having been moved into the position shown in Fig. 3, the passage of air through the port 42 is cut off and the air enters through the port 43, and acting upon the right hand face of the piston 35, viewing Fig. 2, it forces the spindle 22 farther forward until the tapered end 23 thereof comes into engagement with the tapered inner surface 24 of the air passage 25 through the nipple 13 thus closing said air passage 25.

Thus it will be observed that both the coating material and the motive fluid are cut off at substantially the point of ultimate discharge, and that the coating material is cut off before the flow of the motive agent is cut off. In moving the parts of the tool into operative or open position, the air passage 25 is opened first and very shortly thereafter the paint or coating passage is opened, and the formation of the film is instituted and continued as already described. The motive fluid tends to cut off the flow of such fluid when directed against the right hand face of the plunger 35, and it tends, with the coöperation of the spring 34, as already set forth, to cut off the flow of the coating material. The paint passage is opened against the action of the spring 34, but the initial opening of the air passage is not opposed by the said spring.

The construction shown in Figs. 4, 5 and 6 is essentially similar to that shown in Figs. 1, 2 and 3, with the exception that the tool is mounted upon an elongated handle or support 64 whereby otherwise inaccessible parts may be readily treated in accordance with my invention. Having so mounted the tool upon an elongated support, it is necessary or highly important that means be provided within the ready access of the operator for operating the tool. While to that end, I may provide any suitable mechanism, I have herein shown the following construction. I have provided the stem 50 with valves 49′, 51, and through the valve 49′ I have provided a small opening or leak 65. Instead of providing the plug 47 with the opening 48 to the atmosphere, I have connected to said plug a flexible tube 66 herein shown as extending into the handle 64 and preferably to the lower end thereof as indicated in Fig. 5, where the tube 66 is seated at 67 in a cap 68 fast upon the lower end of the handle 64. Forming a part of the cap 68 is a plate or member 69 having a port 70 and between the plate 69 and the base of the cap 68 is a sliding plate or valve 71 having a port 72 therein adapted to register with the port 70. Any suitable means may be provided to operate the plate or valve 71. Herein for the purpose I have represented a hand operated lever 73 pivoted at 74 upon a lug or bracket 75 extending from the cap 68, said lever being suitably connected to the plate or valve 71. Preferably I employ a coiled spring 76 tending to move said valve into open position, as indicated in Fig. 5. In the construction of parts represented in Figs. 4, 5 and 6, when the valve 71 is moved to close the port 72, and hence to prevent the escape of compressed air through the tube 66, pressure will build up in the chamber 44 until the pressure is equalized upon opposite faces of the valve 49′, and with the position of parts shown in Fig. 2 the pressure is equalized upon opposite faces of the piston 35. The compressed air will, however, pass through the port 42 so as to act upon the left hand face of the piston 35, as hereinbefore stated, and move the parts into the position shown in Fig. 2. When, however, the valve 71 is moved to the position shown in Fig. 5, the compressed air escapes through the tube 66, so that the pressure upon the left hand face of the valve 49′ moves the valve into the closed position similar to that represented in Fig. 3. Any other suitable means may, however, be provided for operating the tool or implement of my invention from a position more or less remote from that portion of the tool represented in Figs. 1 and 2.

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 means including two coating surfaces for maintaining therebetween a film of coating material, said surfaces having film discharge openings, means whereby a motive agent may break through said film and discharge it through said openings, said means including a valve controlling the flow of motive agent through said openings, and means for providing first a flow of motive agent through said openings by movement of said valve and then for producing, through the motive agent and by relative movement of said surfaces, a free movement of the coating material for film formation and maintenance.

2. Means for applying coating comprising means for maintaining a film of coating material, and means for causing a motive agent to break through and discharge said film, together with means for cutting off both the coating material and the mo-

tive agent at substantially the point of ultimate discharge non-simultaneously.

3. Means for applying coating comprising means for maintaining a film of coating material, and means for causing a motive agent to break through and discharge said film, together with means for cutting off at substantially the point of ultimate discharge first the discharge of the coating material and then the flow of the motive agent.

4. Means for applying coating comprising means including two coating surfaces for maintaining therebetween a film of coating material, said surfaces having film discharge openings, means whereby a motive agent may break through said film and discharge it through said opening, said means including a valve controlling the flow of motive agent through said openings, and for stopping first the movement of the coating material and destroying the film formation, and for then stopping the flow of the motive agent.

5. Means for applying coating comprising means including two coating surfaces for maintaining therebetween a film of coating material, said surfaces having film discharge openings, means whereby a motive agent may break through said film and discharge it through said opening, said means including a valve controlling the flow of motive agent through said openings, together with means for causing relative movement of said co-acting surfaces to effect the cutting off of the coating material with destruction of the film formation, non-simultaneously with the cutting off of the motive fluid through said discharge openings.

6. Means for applying coating comprising means including co-acting film establishing surfaces for maintaining a film of coating material, and means for causing a motive agent to break through and discharge said film, together with means for causing relative movement of said co-acting film-establishing surfaces to effect the cutting off non-simultaneously of the flow of the motive fluid and the coating material with destruction of the film formation.

7. A tool for applying coating comprising a body having inner and outer cap-like members each perforated and having surfaces in juxtaposition, means to move said inner cap-like member to control the flow of one of said agencies, and a valve positioned at and controlling the flow of the other of said agencies through said perforations.

8. A tool for applying coating comprising a body having inner and outer cap-like members each perforated and having surfaces in juxtaposition, means to move said inner member, and a valve within the inner member controlling the flow of the motive agent.

9. A tool for applying coating comprising a body having inner and outer cap-like members each perforated and having surfaces in juxtaposition, means to admit coating material between said members, means to admit the motive agent through the inner member, means to move the inner member to cut off the flow of the coating material, and a valve within the inner member to cut off the flow of the motive agent.

10. A tool for applying coating comprising a body having inner and outer cap-like members each perforated and having surfaces in juxtaposition, a passage for supplying coating material between said surfaces, a passage to supply a motive agent through the inner member, a valve within the inner member controlling the flow of the motive agent, and means to move the inner member and the valve non-simultaneously to cut off and to permit the flow of the coating material and the motive fluid.

11. A tool for applying coating comprising a body having inner and outer members each perforated and having surfaces in juxtaposition, means to supply motive agent through said perforations, means to supply coating material between said surfaces for discharge through said outer perforation, and means for effecting through the motive agent the relative positioning of said members.

12. A tool for applying coating comprising a body having inner and outer members each perforated and having surfaces in juxtaposition and between which a film is adapted to be established, means to supply motive agent through said perforations, means to supply coating material for said film, means for effecting through the motive agent the relative positioning of said members, and means for controlling the supply of the motive agent.

13. A tool for applying coating comprising a body having inner and outer cap-like members each perforated and having surfaces in juxtaposition, a valve positioned at and controlling the flow of motive fluid through said inner member, means for operating said valve, and an operative connection between said valve and said inner member, thereby to operate said inner member to cut off the flow of coating material between said inner and outer members.

14. A tool for applying coating comprising a body having inner and outer cap-like members each perforated and having surfaces adapted to be placed in juxtaposition and between which a film is adapted to be formed and maintained, a valve at and controlling the flow of motive fluid through said inner member, a piston carried by said valve, and means to admit motive fluid to opposite faces of said piston, thereby to bring said surfaces into substantially con-

tacting position for the destruction of said film and into substantially spaced relation to permit the re-formation and re-maintenance of a film.

15. A tool for applying coating comprising a body having inner and outer cap-like members each perforated and having surfaces in juxtaposition, a valve located at and controlling the flow of motive fluid through said inner member, a piston carried by said valve, means for admitting motive fluid to opposite faces of the piston, thereby to operate said valve, an extension carried by said inner member and interengaging formations upon said valve and said extension, thereby to effect movement of the inner member by movement of the valve.

16. A tool for applying coating comprising a body having inner and outer cap-like members each perforated and having surfaces in juxtaposition, a spindle valve located at and controlling the flow of the motive agent through said inner member, a piston carried by said valve, manually operated means to admit the motive agent to either face of said piston, thereby to operate said valve, and a sliding part carrying said inner member.

17. A tool for applying coating comprising a body having inner and outer cap-like members each perforated and having surfaces in juxtaposition, a spindle valve located at and controlling the flow of the motive agent through said inner member, a piston carried by said valve, manually operated means to admit the motive agent to either face of said piston, thereby to operate said valve, a sliding part carrying said inner member, and a spring acting upon said sliding part and tending normally to move said inner member into position to cut off the flow of coating material.

18. A tool for applying coating comprising a body having inner and outer cap-like members each perforated and having surfaces adapted to be placed in juxtaposition and between which a film may be established and maintained, a spindle valve located at and controlling the flow of the motive agent through said inner member, means to cause the motive fluid to operate said valve, and means whereby the motive fluid acts through said valve to control the flow of the coating material between said inner and outer members by so relatively positioning said cap-like members as to permit the establishment of a film therebetween.

19. A tool for applying coating comprising a body having inner and outer cap-like members each perforated and having surfaces in juxtaposition, a spindle valve at and controlling the flow of the motive agent through said inner member, a piston carried by said spindle, means for admitting the motive agent to opposite faces of said piston, a movable part carrying said inner member, and provisions for effecting the movement of said movable part through movement of said valve.

20. A tool for applying coating comprising a body having inner and outer cap-like members each perforated and having surfaces in juxtaposition, a spindle valve at and controlling the flow of the motive agent through said inner member, a piston carried by said spindle, means for admitting the motive agent to opposite faces of said piston, a movable part carrying said inner member, and means including a spring to effect the cutting-off movement of the inner member before the cutting off of the motive agent.

21. A tool for applying coating comprising a body having inner and outer cap-like members each perforated and having surfaces in juxtaposition, a spindle valve at and controlling the flow of the motive agent through said inner member, a piston carried by said spindle, means for admitting the motive agent to opposite faces of said piston, a movable part carrying said inner member, and means including a spring to effect the cutting-off movement of the inner member before the cutting off of the motive agent, and to effect the opening movement of said member subsequent to the discharge of motive agent.

22. A tool for applying coating comprising a body having inner and outer cap-like members each perforated and having surfaces in juxtaposition, a valve 22 controlling the flow of the motive agent, a movable part 16 carrying the inner member, means whereby the motive agent controls the movement of the valve 22, and interconnecting provisions between the valve 22 and the part 16.

23. A tool for applying coating comprising a body having inner and outer cap-like members each perforated and having surfaces in juxtaposition, a spindle valve 22, a piston 35 carried thereby, valves 49, 51 controlling the admission of motive fluid to the opposite faces of said piston.

24. A tool for applying coating comprising a body having inner and outer cap-like members each perforated and having surfaces in juxtaposition, a spindle valve 22 having a piston 35, means to admit motive fluid to the opposite faces of said piston, a sliding member 16 carrying said inner member, a spring 34 co-acting with the member 16.

25. A tool for applying coating comprising a body having inner and outer cap-like members each perforated and having surfaces in juxtaposition, a spindle valve 22 having a piston 35, means to admit motive fluid to the opposite faces of said piston, a sliding member 16 carrying said inner mem-

ber, a spring 34 co-acting with the member 16, and interengaging formations upon said sliding part 16 and said spindle valve 22.

26. Means for applying coating comprising perforated adjacent surfaces for maintaining a film of coating material therebetween and means for causing a motive agent to break through and discharge said film, together with a manually operated valve and associated means, including a valve governing said perforations, and means for effecting relative movement of said surfaces for providing first a free flow of the motive agent and then providing through said motive agent a free movement of the coating material by establishing such a relative position of said surfaces as permits the establishment of a film therebetween.

27. Means for applying coating comprising perforated adjacent surfaces for maintaining a film of coating material therebetween, and means for causing a motive agent to break through and discharge said film, together with a valve governing said perforations and means for effecting, through the motive agent, such a relative position of said surfaces as permits the establishment of a film therebetween.

28. Means for applying coating comprising means for maintaining a film of coating material, and means for causing a motive agent to break through and discharge said film, together with means for providing, through the motive agent, a free movement of the coating material, together with means for cutting off both the coating material and the motive agent at substantially the point of ultimate discharge non-simultaneously.

29. Means for applying coating comprising perforated adjacent surfaces for maintaining a film of coating material therebetween, and means for causing a motive agent to break through and discharge said film, together with means including a valve governing the said perforations for causing first the flow of the motive agent and then causing the movement of the coating material, by effecting such a relative position of said surfaces as permits the establishment of a film therebetween and conversely, stopping first, through the motive agent, the movement of the coating material by so relatively positioning said surfaces as to destroy said film, and then stopping the flow of the motive agent.

30. Means for applying coating comprising relatively movable film-establishing surfaces for maintaining a film of coating material, and means for causing a motive agent to break through and discharge said film, together with means for causing relative movement of said film-establishing surfaces to effect the cutting off non-simultaneously of the flow of the motive fluid and the coating material.

31. Means for applying coating comprising relatively movable film-establishing surfaces for maintaining a film of coating material, and means for causing a motive agent to break through and discharge said film, together with means for causing non-rotative relative movement of said film-establishing surfaces to effect the cutting off of the flow of the coating material.

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

HERBERT W. DAY.