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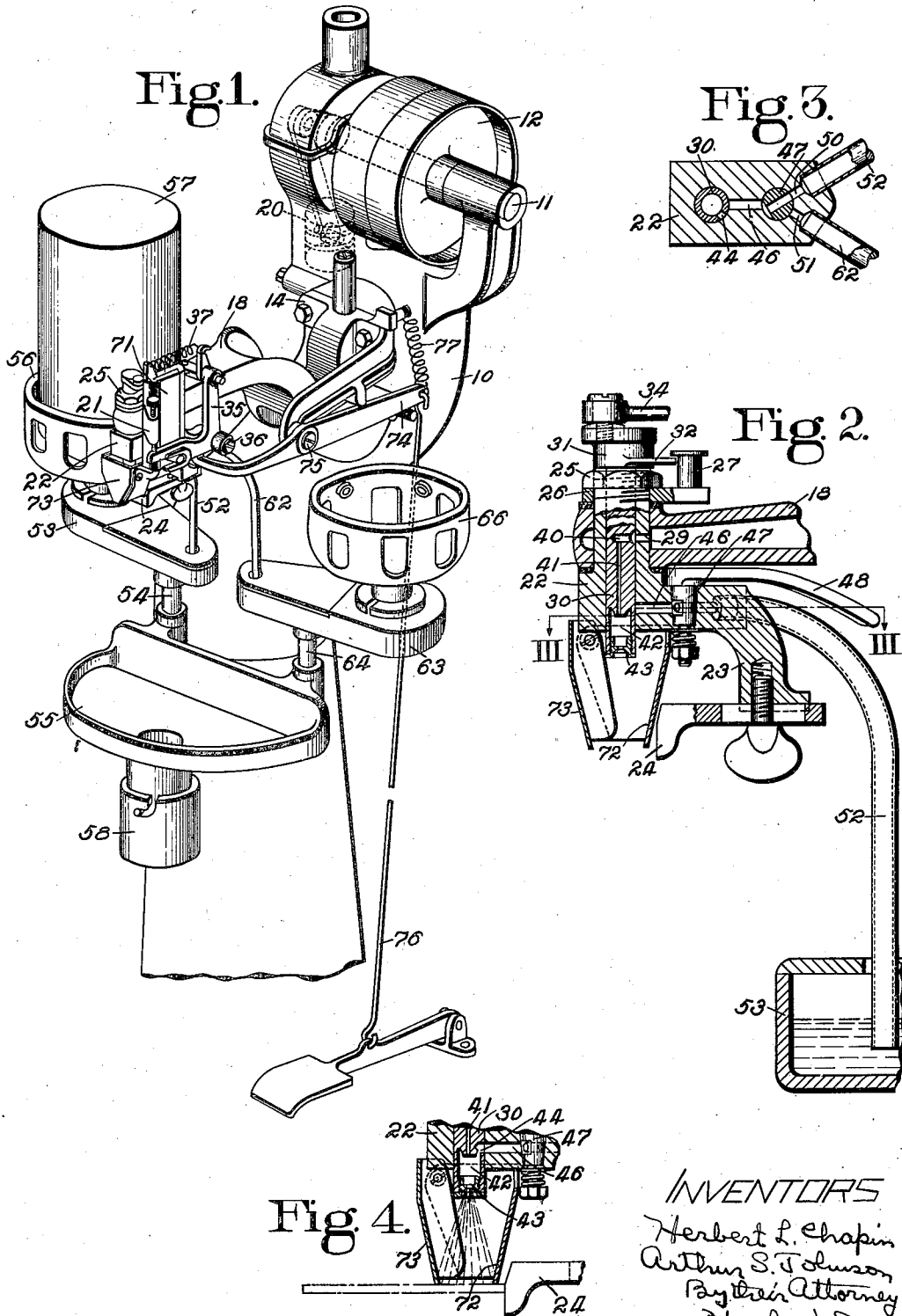
H. L. CHAPIN ET AL

1,985,482

MACHINE FOR APPLYING CEMENT

Filed June 13, 1931

2 Sheets-Sheet 1



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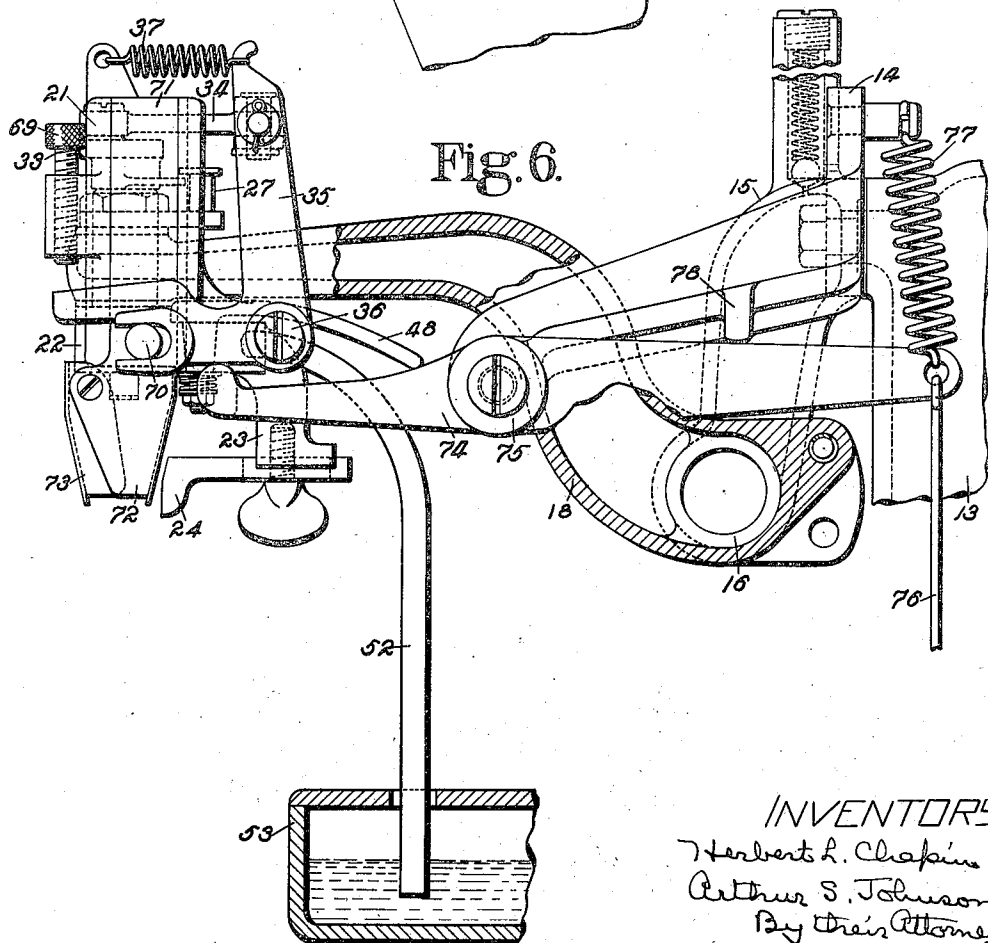
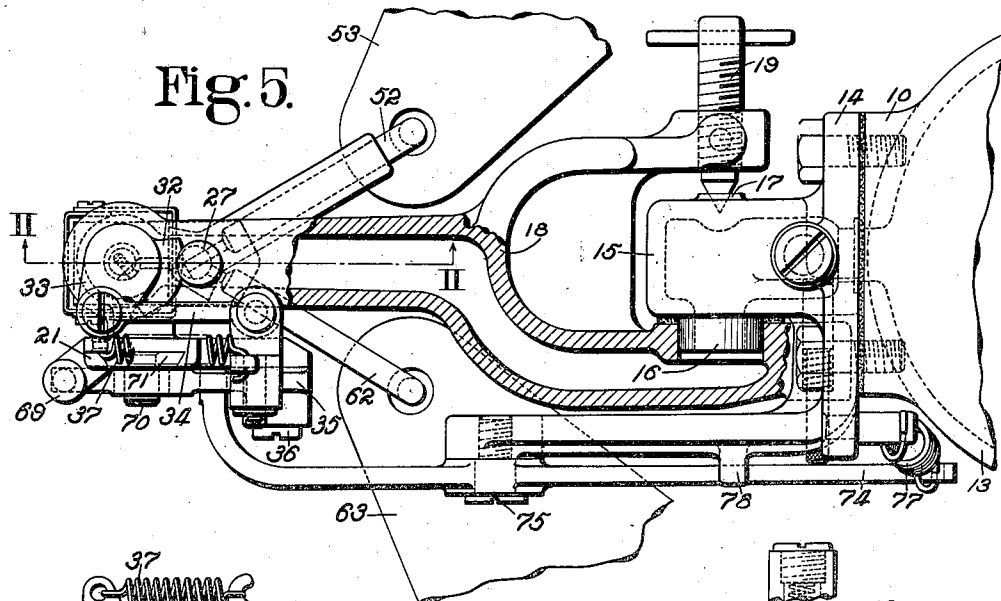
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## UNITED STATES PATENT OFFICE

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## MACHINE FOR APPLYING CEMENT

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Application June 13, 1931, Serial No. 544,178

8 Claims. (Cl. 91—45)

This invention relates to machines for applying a coating of cement or other quick-drying material to parts of boots and shoes. One important field of use is in connection with machines for applying to soles or shoe bottoms rubber cement or celluloid cement which is rendered plastic or semi-fluid by the addition of a quick-drying solvent, and for purposes of illustration our invention will be herein described in its application to such machines.

In manufacturing shoes of certain types it is the practice to apply a cement of the character discussed to the bottom of a lasted shoe and to the inner surface of a sole, particularly about the margin thereof. The machine of our invention is well adapted for spraying shoe parts in that it maintains the cement substantially out of contact with the air until discharged upon the surface of the work, thereby preventing losses by evaporation and the fire hazard incident to the use of cements containing volatile solvents. Difficulty has been encountered heretofore in machines of this type by reason of the tendency of the cement to dry and harden in the discharge nozzle and in the connections thereto so that after any interruption in the use of the machine the free flow of the cement is impeded and it is difficult to apply to the work a uniform coating of cement from the more or less obstructed discharge nozzle. An object of our invention is to eliminate this difficulty and insure an even and uniform delivery of cement to the surface of the work under all conditions of use of the machine. As shown, the machine is provided with a reservoir or other source of supply for a liquid solvent together with suitable connections and controlling means for flushing the discharge nozzle and its connections with the solvent at the conclusion of the cement-applying operation. In this way cement remaining undelivered within the nozzle and the supply passages adjacent thereto is dissolved and carried out of the machine, leaving the latter in readiness to handle a new charge of cement without obstruction and always under uniform conditions of discharge.

While the provision of a solvent supply in the machine for the purpose of flushing the discharge connections is of value in the respects noted, it also permits the use of the machine for the purpose of applying solvent to the cemented surface of a piece of work whenever it is desired to soften previously applied and hardened cement preparatory to the operation of bringing the cemented surfaces together to unite them. Thus the illustrated machine has a discharge nozzle

associated with separate cement and solvent containers together with a single valve for selectively admitting cement or solvent to the nozzle.

It is important in applying cement or other material to parts of boots and shoes that the material be confined accurately to the area which it is desired to coat. Our invention includes as an important feature a shield of novel construction and adjustable characteristics which is associated with the discharge nozzle and is effective to confine the applied material accurately to those portions of the work which are to be coated and to protect the remainder of the work from being soiled thereby. Preferably and as herein shown, the work contacting shield is arranged for bodily movement with respect to the discharge nozzle to control the flow of material therefrom by connections to a rotary valve member. Accordingly, upon presentation of the work by the operator, the discharge of cement or solvent, as the case may be, is initiated over a defined area, and upon the removal of the work from contact with the shield the discharge is immediately cut off without requiring further attention on the part of the operator.

While the control of the discharge nozzle by the presentation of the work is convenient in most cases, we provide also treadle-operated mechanism which may be employed alternatively and when the conditions require for controlling the discharge of cement or solvent independently of the shield.

These and other features of the invention will be best understood and appreciated from the following description of a preferred embodiment thereof, selected for purposes of illustration and shown in the accompanying drawings, in which

Fig. 1 is a view in perspective of the machine;

Fig. 2 is a view of the machine in longitudinal section on the line II—II of Fig. 5;

Fig. 3 is a fragmentary view in cross section of the head containing the discharge nozzle on the line III—III of Fig. 2;

Fig. 4 is a fragmentary view of parts shown in Fig. 2 when in operative relation to the sole of the shoe;

Fig. 5 is a plan view with certain portions broken away; and

Fig. 6 is a view in side elevation with parts broken away.

The head frame 10 of the machine is supported at a convenient height upon a column and is provided with brackets in which is journaled a driving shaft 11 carrying a driving pulley 12. The frame 10 is shaped to provide a compressed air

reservoir 13 and the air in this is maintained under pressure by an air pump 20 driven continuously from the shaft 11 while the machine is in use.

6 To the front of the head casting 10 is bolted an outlet plate 14 having a downwardly and forwardly-extending hollow bracket 15 upon which the operative parts of the machine are mounted. Upon one face the bracket 15 is provided with a  
10 projecting journal ring 16 and concentrically disposed with respect thereto upon its other face is a boss 17 having a conical socket. A curved hollow arm 18 is removably supported upon the bracket 15 and to this end is forked and provided  
15 with a hollow branch arranged to fit upon the bearing ring 16 and with a solid branch carrying a cone pointed screw 19 which is adapted to fit into the socket of the boss 17 and draw the hollow branch with an interposed washer into an air-tight union with the hollow bracket 15. The  
20 hollow branch of the arm 18 is provided with a rearwardly-extending projection which fits beneath a portion of the bracket 15 and so holds the arm 18 in substantially horizontal position. By  
25 the construction heretofore described the arm 18 may be readily assembled in the machine or detached to facilitate cleaning or otherwise.

The forward end of the arm 18 is provided with a hub or enlargement having a vertical bore  
30 therein to receive the hollow stem of a head 22 (Fig. 2) comprising a block portion (Fig. 3) and an upwardly extending hollow stem. The head is also provided with a rearwardly and downwardly-extending bracket 23 upon the lower end  
35 of which is adjustably mounted an edge gate 24. The hollow stem of the head 22 extends upwardly through the bore in the end of the arm 18, being threaded at its upper end to receive a clamping nut 25 beneath which is located a washer 26. A  
40 pair of felt washers disposed upon the upper and lower faces of the arm 18 make an air-tight connection between the arm and the stem of the head 22 when the clamping nut 25 is turned down, to draw the stem into tight engagement  
45 with the bore of the arm. The stem has a port 29 leading through its wall and communicating with the air passage of the hollow arm 18. Disposed concentrically within the hollow stem of the head 22 and extending downwardly through  
50 the lower face of the head is a cylindrical valve member 30 having a head 31 secured to its upper end and provided with a thin projecting segmental flange 32 which underlies the flanged head of a stud 27 projecting upwardly from the washer  
55 26. The member 30 is thus prevented by the engagement of the flange 32 with the stud from being lifted bodily out of the stem in which it is journaled. The head 31 is provided with a crank arm 33 and this in turn is connected through a  
60 horizontally-disposed link 34 to the upper end of a bell crank lever 35 fulcrumed upon a stud 36 which projects from the head 22. By the oscillation of the bell crank lever 35 the member 30 is rocked, for purposes which will presently be described.

65 The cylindrical member 30, which has the function both of a valve and of an atomizing nozzle, is provided with an inlet port 40 (Figs. 2 and 5) which registers with the port 29 in the stem of the head 22 and communicates with a central  
70 axially-extending passage 41. This extends downwardly and opens into a mixing chamber 42 located in the member 30 above an atomizing nozzle 43 which is fitted into its lower end. The  
75 port 40 extends partially around the circumfer-

ence of the member 30 (Fig. 5) so that in all operating positions of the latter an open air connection is maintained with the air passage of the arm 18. Accordingly, whenever the machine is  
5 in operation, a blast of air is continually flowing from the compressed air reservoir 13 through the hollow bracket 15, the hollow arm 18 and out through the discharge nozzle 43, regardless of the angular position of the member 30.

The member 30, as shown in Fig. 3, is also provided with an inlet port 44 which communicates with the mixing chamber 42 and with a horizontal passage 46 in the body of the head 22. The passage 46 communicates with a two-way  
15 valve 47 mounted in the head 22 and provided with an operating lever 48 by which the valve may be turned in one of three positions in accordance with the requirements of the work in hand. A pair of converging inlet passages 50 and 51 in the head 22 lead to the valve 47. The passage  
20 50 is in communication with a pipe 52 extending rearwardly and downwardly from the head 22 and entering a cement reservoir 53 supported from the column of the machine by a stem 54 adjustably received in a bracket member 55,  
25 which is shaped as a tray to receive waste from the discharge nozzle. The cement reservoir 53 is provided with a holder 56 for an inverted container 57 for cement. The can in which the cement is commercially distributed may serve for  
30 this purpose, being arranged to discharge into the reservoir 53 by the barometric principle as cement is drawn from the reservoir by the action of the air current in flowing passed the end of the passage 46. It will be understood that  
35 cement is thus drawn from the supply, mixed in the chamber 42, and atomized from the discharge nozzle 43 upon the surface of work presented thereto.

The other inlet passage 51 communicates with  
40 a pipe 62 which extends outwardly and downwardly, as shown in Figs. 1 and 5, to a solvent reservoir 63 supported by a stem 64 mounted in the tray 55. The reservoir 63 is provided with a holder 66 for a solvent container, which may  
45 be arranged to supply the reservoir in the same manner that cement is supplied to the reservoir 53 but which is omitted from the drawings for the sake of clearness. The controlling valve 47, when positioned as shown in Fig. 3, that is to say,  
50 in registration with the inlet passage 50, renders the cement supply effective so that cement is discharged from the spray nozzle 43. By turning the handle 48 to an intermediate position, communication with both the cement reservoir  
55 and solvent reservoir may be shut off, and by turning the handle further to bring the valve into registration with the inlet port 51 an effective communication is established with the supply of solvent, so that the latter is drawn through the  
60 discharge nozzle 43, and whatever cement may remain in the passage 46, the mixing chamber 42 or the nozzle, is dissolved and flushed from these parts of the machine. The valve 47 and its handle 48, therefore, constitute manually-controlled means for selectively rendering effective  
65 either the cement supply or the solvent supply at the option of the operator and, moreover, the construction is such that when one supply is rendered effective the other is shut off without further attention on the operator's part.

Extending laterally and upwardly from the block portion of the head 22 is a bracket portion  
70 21 in which are formed vertical undercut ways for a movable slide 71. At its lower end the slide  
75

is provided with a combined gage and shield member which substantially encloses the discharge nozzle 43 and is utilized for three important functions. In the first place, it defines the area coated by the discharge from the nozzle; in the second place, it determines the distance from the nozzle to the surface to be coated, ensuring maximum efficiency in this respect; and, in the third place, it is utilized, when lifted by pressing work up against it, to control the supply of material to the nozzle. In association with the edge gage 24 it also determines the location of the coated area with respect to the edge of the work.

The gage and shield member comprises a rigid section 72 having a side with end flanges and which is secured to the lower end of the slide 71 and a hinged section 73 having a side and end flanges overlapping those on the section 72. The section 73 is pivotally connected to the section 72 and may be adjusted toward and from the latter and held in any desired position of adjustment according to the effective width required in the shield. The end flanges are cut back to allow the escape of air and thus to prevent the air within the shield from pushing the work away from the shield. Movement of the work is in such a direction that the cut back portions pass over the freshly applied cement without contact. A pin 70 projects outwardly from the slide 71 and is engaged between the forks of the horizontal arm of the bell crank lever 35, already referred to. This arm is extended forwardly so that it comes within the range of an adjustable stop screw 69 threaded into a boss upon the upwardly-extending bracket portion 21 of the head. By engaging the end of the bell crank lever the adjustable stop regulates the lifting movement of the slide 71 and the shield carried thereby. A tension spring 37 connected between the upper end of the bell crank lever 35 and an ear projecting from the stationary portion 21 of the head tends normally to swing the bell crank lever in a counter clockwise direction, yieldingly holding the shield in its lowermost position and, through the link 34, holding the rotary member 30 in the position indicated in Fig. 3, that is to say, with the inlet port 44 closed. The screw 69 may be positioned to control the degree of opening of the port 44 in the valve member 30 and hence the quantity of fluid ejected.

While in most cases it is convenient to initiate the spray discharge from the nozzle 43 by the presentation of the work through the lifting of the shield member, we also provide treadle-operated means which may be employed if desired, as for example when especial accuracy is required in locating the work. To this end a bracket projects forwardly from the outlet plate 14 and is provided with a fulcrum stud 75 (Figs. 1 and 5) for a treadle lever 74 which, at its forward end, is rounded and bears against the lower arm of the bell crank lever 35. A tension spring 77 tends always to swing the other end of the lever 74 upwardly into engagement with a limiting stop 78 formed on the bracket and a treadle rod is provided for swinging the lever in opposition to the spring 77. When the treadle rod is depressed, the bell crank lever 35 is rocked in the manner already explained against the tension of the spring 37 to turn the rotary member 30 to open port position.

The manner in which the machine is operated will be apparent from the foregoing description but may be summarized as follows. Cement in

more or less fluid form is supplied to the reservoir 53 and solvent to the reservoir 63. The shaft 11 is then set in motion from any suitable source of power and the pump 20 actuated to maintain the air in the reservoir 13 under pressure of suitable degree. An air current thereupon flows continuously through the hollow arm 18 to the rotary member 30 and out through the discharge port 43. Since the supply port 44 is closed, however, neither cement nor solvent is permitted to reach the nozzle and air only is discharged therefrom. If it is now desired to coat a shoe bottom or other piece of work with cement, the operator will swing the handle 48 of the controlling valve 47 to the position shown in Fig. 3, establishing communication with the cement reservoir. The work is now presented in position beneath the nozzle 43 and in contact with the end of the shield member, as suggested in Fig. 4, the dot and dash lines indicating a sole or similar piece of work. The operator may now lift the shield member by pressing the work upwardly or he may depress the treadle to effect the same result and the bell crank lever 35 is thereupon rocked to turn the rotary member 30 to open port position. The action of the air current in rushing past the supply port 44 when the latter registers with the passage 46 is to bring cement by suction into the mixing chamber 42, from which it is atomized downwardly from the nozzle 43 and reaches the surface of the work in a band or zone determined by the shield member. The work is then advanced in a position with respect to the nozzle determined by the contact of the work with the sides of the shield until the desired area has been completely coated, and in this operation it will be noted that the edge of the work runs against the edge gage 24 so that the coated area is definitely located with respect to the edge of the work. At the conclusion of the cement-applying operation the work is lowered or the treadle released, whereupon the spring 37 at once rocks the bell crank lever reversely and returns the rotary member 30 to closed port position, as shown in Fig. 3.

If the machine is now to be left for any appreciable interval, there is a serious danger that the cement remaining within the discharge nozzle and its adjacent passages will harden by evaporation therefrom of its contained solvent. The operator, however, will now swing the handle 48 of the controlling valve 47 from the position shown in Fig. 3 to one in which the valve registers with the inlet passage 51 and having done so will depress the treadle or lift the shield to swing the rotary member 30 again into open port position. Under these circumstances, the air current flowing past the passage 46 will cause solvent to flow upwardly through the pipe 62 and the valve 47, flushing the communicating passages and the discharge nozzle with solvent, thereby dissolving the residue of cement and leaving these parts clean for a new cement-applying operation. The solvent used in the flushing operation and any other waste, as drippings from the inside of the shield member, are collected in the tray 55 and are drained into a container 58 detachably connected thereto.

The pump 20, which is driven by the shaft 11 and which maintains the air pressure of the reservoir 13, constitutes power-operated means for delivering cement to the discharge nozzle and where cement of a substantially fluid character is employed the actual delivery of cement to the nozzle is caused by suction created by the passage

of air past the supply port 44. It is within the scope of our invention, however, to employ cement of plastic rather than fluid characteristics and under such circumstances the power-operated means for delivering the cement to the discharge nozzle may be suitably modified. The details of the construction of the pump are not herein shown since they form no part of the present invention. Such a pump as that disclosed in United States Letters Patent 1,311,161, granted July 29, 1919, on an application of F. M. Furber, is satisfactory for the service of the illustrated machine.

While the machine herein described is intended and may be used with particular advantage in applying rubber cement or pyroxylin cement, it may be used with equal advantage in applying any liquid coating of finish or the like to parts of boots and shoes and similar work. If, for example, it should be desired to apply a coating comprising a first or priming coat and then a finish coat, these materials may be supplied to the discharge nozzle from the reservoirs above described.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A coating machine having a discharge nozzle, a work-contacting gage associated therewith and movable toward and away from the discharge opening of the nozzle in the general direction of the path of coating material discharged from the nozzle, means for limiting the movement of said gage thereby to determine the distance from the nozzle of the surface to be coated, and a valve for controlling the discharge from the nozzle connected to the gage and arranged to be positioned thereby.

2. A coating machine having a discharge nozzle, a movable shield for determining the area to be coated by the nozzle, and a valve for controlling the discharge from the nozzle connected to the shield and arranged to be positioned thereby.

3. A coating machine having a rotary member in which is incorporated a discharge nozzle and a supply valve therefor, a shield member mounted for limited vertical movement adjacent to the nozzle, and connections between the shield and said rotary member for turning the same to open the supply valve when the shield is lifted by the presentation of the work to the machine.

4. A coating machine having a rotary member in which is incorporated a discharge nozzle and an inlet port, a spring acting to hold said member normally in position to close said port, a shield mounted adjacent to the nozzle and arranged to be moved by engagement with the work, a bell

crank lever connected to the shield, and connections between said lever and the rotary member for turning the latter into position to open said inlet port.

5. A coating machine having an air operated spray nozzle, means for supplying fluid coating material thereto to be discharged as a spray, a shield forming a substantially closed passage surrounding the nozzle and having relatively adjustable sides with overlapping end flanges for defining the band of coating material upon the surface of a piece of work as the latter is brought into contact with the edges of said sides, said end flanges being cut back from the work to avoid disturbance of the coating applied and an adjustable edge gage for determining the location of the coated band with respect to the edge of the work.

6. A coating machine having a base, an air-operated spray nozzle secured thereto, means for supplying fluid coating material to said nozzle to be discharged as a spray upon pieces of work manually presented to the machine, a shield forming a substantially closed passage surrounding the nozzle and having relatively adjustable sides with overlapping end flanges for defining the band of coating material upon the surface of the work, said end flanges being cut back from the work to avoid disturbance of the coating applied, the sides of said shield contacting with the work to determine the distance between the work and the nozzle outlet, and an adjustable gage against which the edge of the work may be held to determine the location of the coated band applied through said shield with respect to the edge of the work.

7. A coating machine having a discharge nozzle, supply connections for fluid coating material leading thereto and including a supply-controlling valve, a shield located adjacent to the nozzle, being connected to said valve and arranged to be moved by engagement with the work to open the valve, and treadle-operated means for operating the valve independently of pressure applied by the work to the shield.

8. A coating machine having a head, a rotary member mounted therein and having a spray nozzle and an inlet port, a vertically-movable slide mounted in said head and carrying a shield member disposed adjacent to the nozzle to define the spread of its discharge, spring mechanism for holding said rotary member initially in position to close said inlet port, and connections between said slide and rotary member arranged to be operated when said shield is engaged by the work to turn the rotary member to open-port position.

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**CERTIFICATE OF CORRECTION.****Patent No. 1,985,482.****December 25, 1934.****HERBERT L. CHAPIN, ET AL.**

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 9, before "angular" insert the word operating; page 3, first column, line 42, before "portion" insert the word bracket; and page 4, second column, line 15, claim 5, after "applied" insert a comma; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 25th day of June, A. D. 1935.

Bryan M. Battey

Acting Commissioner of Patents.

(Seal)