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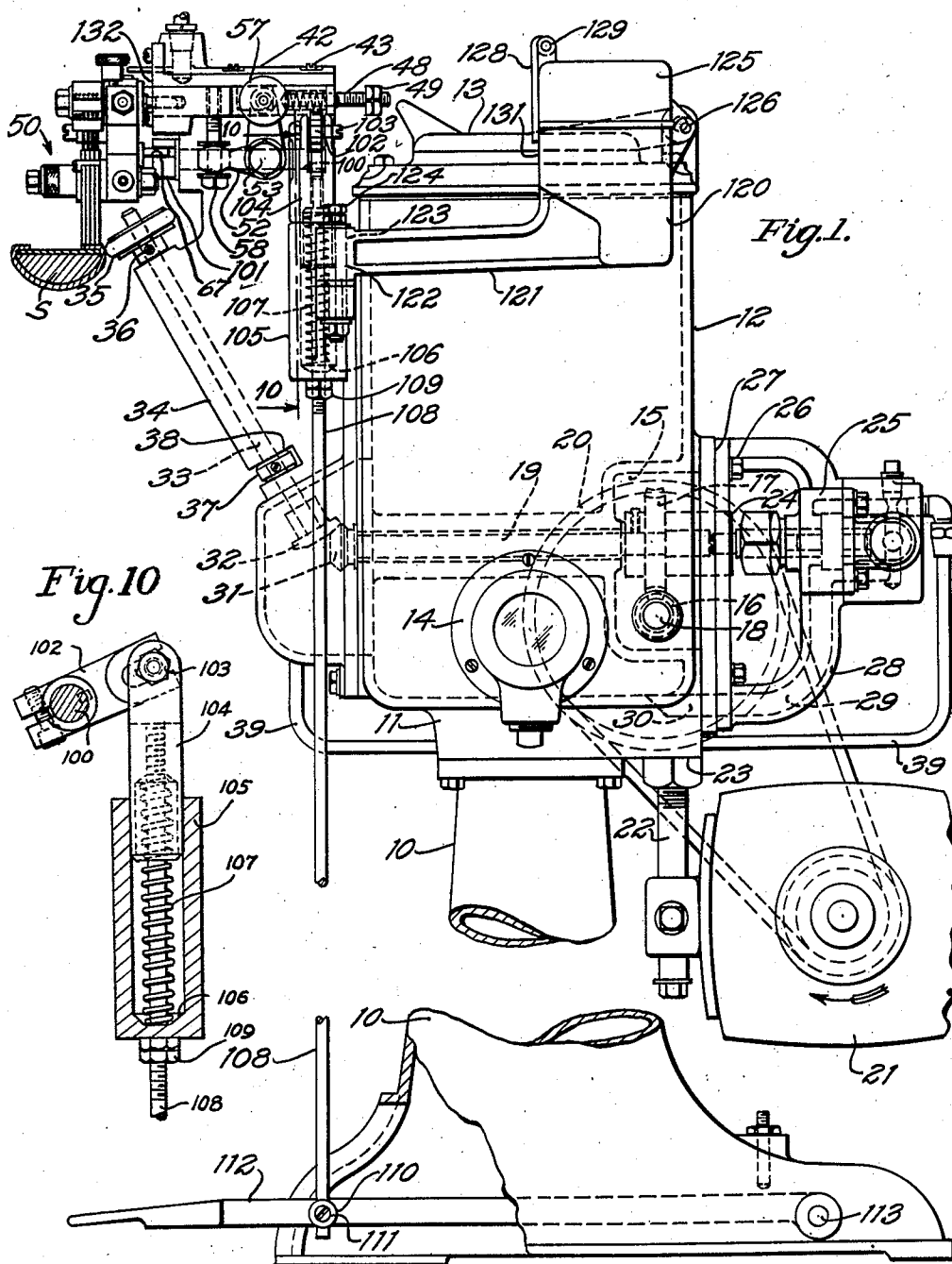
J. F. SMITH

2,336,042

FLUID COATING MACHINE

Filed May 3, 1941

3 Sheets-Sheet 1



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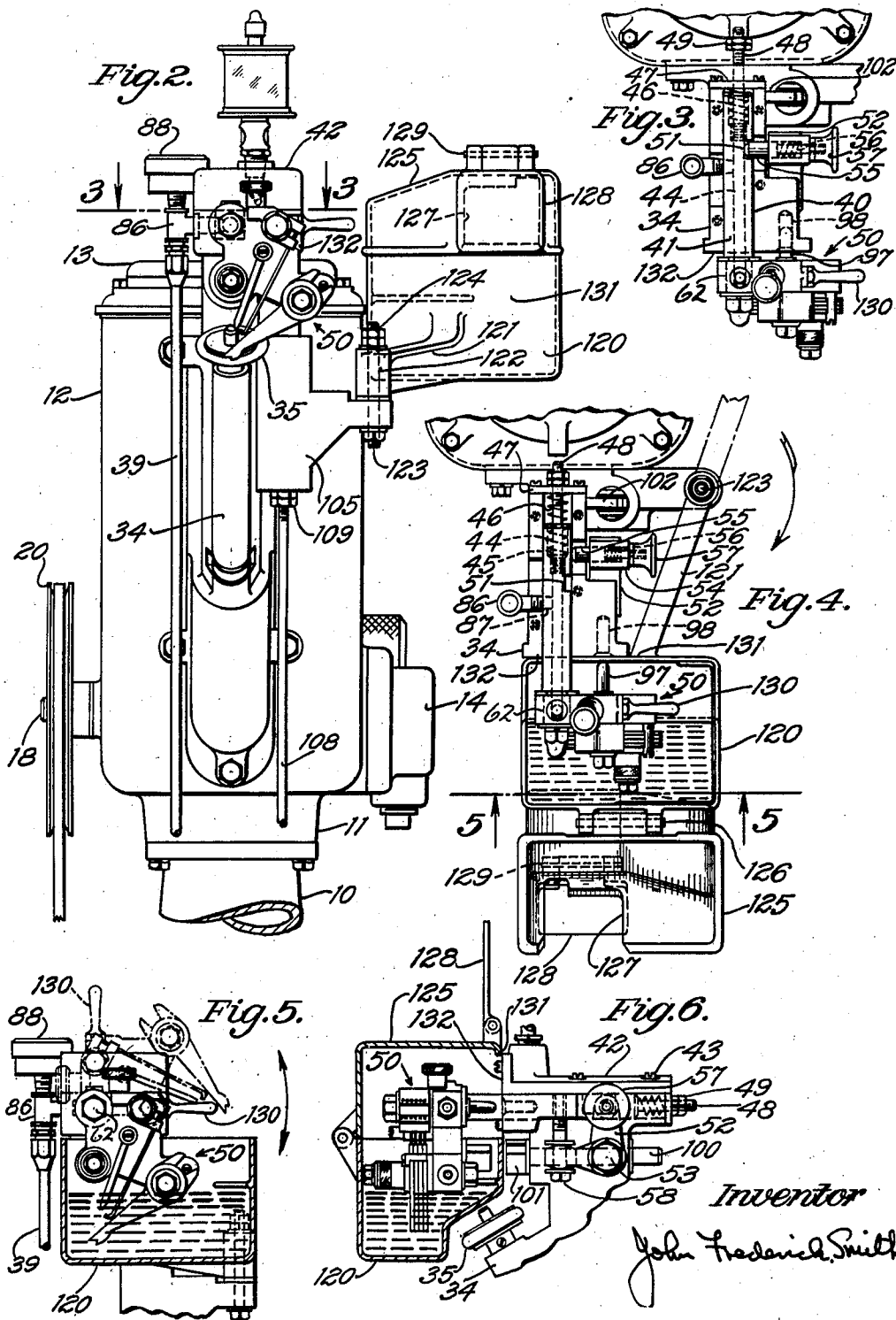
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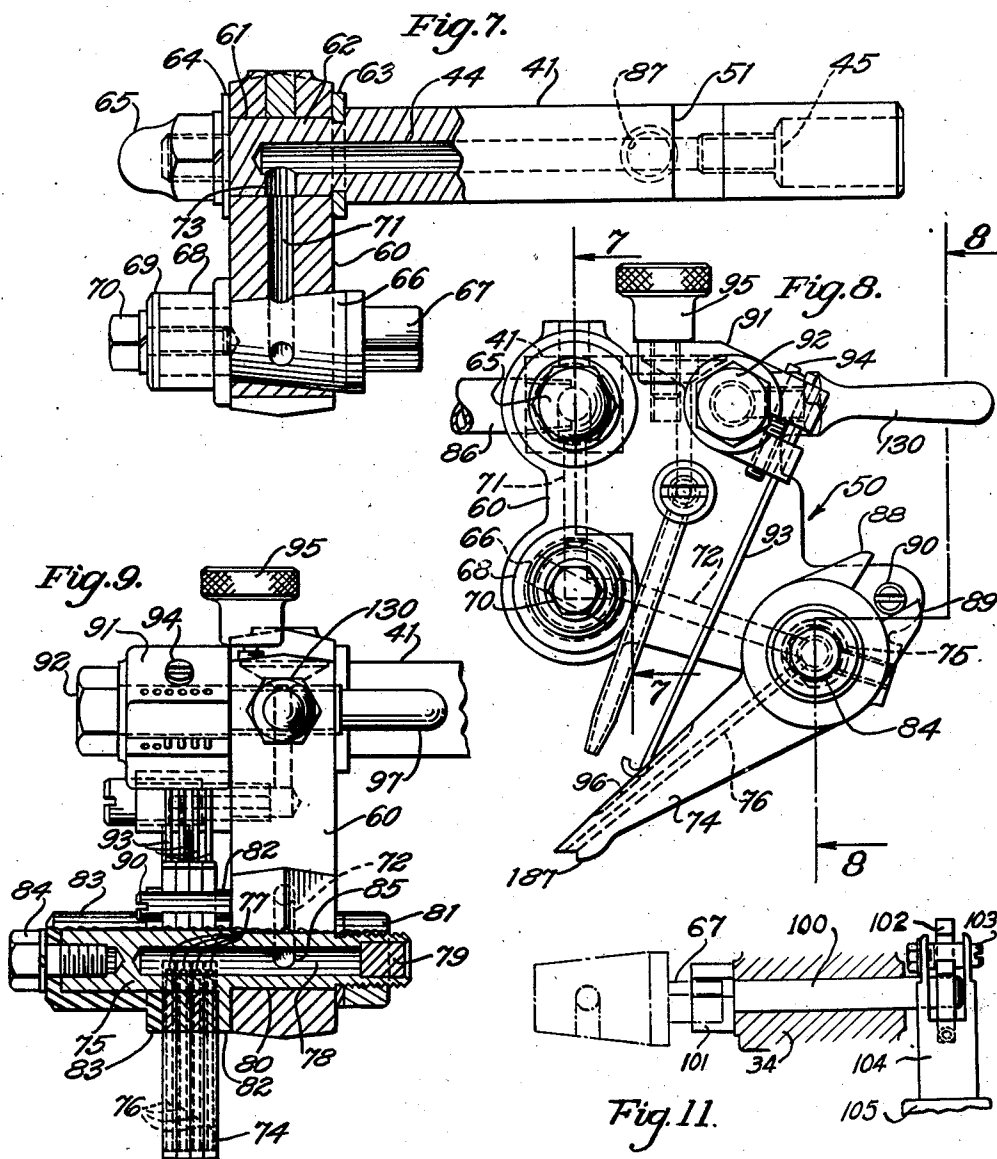


Fig. 11.

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FLUID COATING MACHINE

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15 Claims. (Cl. 12—80)

This invention relates to fluid coating machines of the kind used in the manufacture of footwear, and more particularly to a machine for coating a lasted shoe bottom with a cement prior to the sole affixing operation.

A general object of the invention is to provide a fluid coating machine having improved features of construction which will greatly reduce operating costs and which will keep the machine in an operating condition with minimum attention.

A further object of the invention is to provide an improved coating applicator of the flexible extrusion nozzle type in which the degree of flexibility may be varied at will to suit a particular operator and the work at hand.

A further object of the invention is to provide an improved enclosure for the complete extruding nozzle and its associated operating parts which will allow same to be emersed in a suitable solvent or in contact with the fumes therefrom during periods of non-operation for the purpose of keeping cement at the extruding outlets from hardening and to remove any deposits of cement which may accumulate on the various nozzle parts during the cement coating operation.

A still further object of the invention is to provide simple yet effective supporting mechanism for the extruding nozzle which will allow an operator to release same from its operating position for movement to a position where it is disconnected from its operating devices so that it can be placed in the solvent enclosure without removing either the nozzle or the solvent enclosure from its support, and without the exercise of any great mechanical skill or knowledge.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts, which will be exemplified in the description hereinafter set forth and the scope of the invention will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is a side elevation of the machine, part of the support being broken away;

Fig. 2 is a front elevation of the machine, part of the support being broken away;

Fig. 3 is a partial plan view taken along lines 3—3 of Fig. 2, the nozzle being shown in the operative position and parts being omitted for clarity;

Fig. 4 is a partial plan view similar to Fig. 3, but the nozzle is shown in the inoperative position and is placed in the solvent cup;

Fig. 5 is a front elevation of Fig. 4, the solvent cup being in section taken along lines 5—5 of Fig. 4, and swinging movement of the nozzle indicated in dotted lines;

Fig. 6 is a fragmentary side elevation of Fig. 5, the solvent cup being in section to show position of the nozzle;

Fig. 7 is a part sectional detail of the nozzle and its support taken along lines 7—7 of Fig. 8;

Fig. 8 is a front elevation of the nozzle showing parts in greater detail;

Fig. 9 is a sectional side elevation of Fig. 8 taken along lines 8—8.

Fig. 10 is a fragmentary sectional view taken along lines 10—10 of Fig. 1; and

Fig. 11 is a fragmentary view partly in section showing the valve operating shaft as viewed from the right of Fig. 10.

Referring to the drawings, there is shown a fluid coating machine for applying cement to shoe bottoms which comprises a support 10 having a frame 11 bolted to its upper end. Preferably a fluid receptacle 12 is cast as an integral part of the frame, and may have a filler cap 13 and a sight level indicator 14 attached to the frame for communication with the receptacle. The frame has a recess 15 cast in its rear face which serves as a housing for a worm 16 and a worm wheel 17, which are in turn suitably mounted and keyed to shafts 18 and 19 respectively, which are journaled in proper relation in the frame.

At one end of the worm shaft 18 a pulley 20 is affixed and arranged to be belted to a motor and pulley 21 (Fig. 1) which is adjustably mounted on studs 22 secured to the frame at 23. The worm wheel is provided with an extension 24 which serves as a coupling to drive a gear pressure pump 25 removably secured to the frame by the screws 26, while the flange 27 of the pump serves as a cover for the gear housing 15. The lower supporting arm 28 of the pump 25 has a hollow core 29 extending from the face of the flange to the suction side of the gear pump, and this core communicates with a similar core 30 in the frame leading from the fluid receptacle to the pump flange face.

The end of the worm wheel shaft 19 opposite to the pump has secured thereto a bevel gear 31 which meshes with a feed wheel driving bevel gear 32. The feed wheel gear is keyed to the shaft 33 which is suitably journaled in the bracket

et 34 secured to the frame with screws. The upper end of shaft 33 has adjustably secured thereto by means of a set screw 36 a feed wheel 35 which is adapted to transport a shoe 8 held thereagainst, the driving gears 31 and 32 being kept in proper mating relation by the shoulders of the gears 31 and 17 confining the lateral movement of the shaft 19, and by a collar 37 set-screwed to the shaft 33 being confined between opposite faces of a slot 38 in the bracket 34.

In general operation of the machine, the motor 21 runs constantly, driving the pulley 20 and the worm 16, which in turn imparts rotation to the shaft 19, thus driving the feed wheel 35 through the bevel gears 31 and 32, and also the pump 25. The pump is equipped with the usual by-pass valve, so that a constant pressure is maintained in the discharge conduit 39 which supplies fluid to the extruding nozzle hereinafter described.

The front end of the bracket 34 is provided with a milled groove 40 (Fig. 3) in which a nozzle support 41 preferably in the form of a square bar is slidably mounted, and it is retained in position by the side walls of the groove, and also by a cap or cover plate 42 secured to the top of the side walls of the groove by the screws 43 (Fig. 6). A bore 44 extending from the rear end of the support and almost entirely throughout the length of same is shouldered at 45 (best shown in Fig. 7) which serves as a seat for a compression spring 46 located within the bore. The opposite end of the spring seats against a stop plate 47 secured to the bracket 34, thus the spring urges the support away from the stop plate. A portion of the bore which is reduced in diameter beyond the shoulder is threaded to receive a stud 48 which passes through a hole in the stop plate 47, while the opposite end of the stud is threaded to receive nuts 49 which act as a stop to limit forward movement of the nozzle support under the pressure of the spring.

When the nuts 49 contact the stop plate 47, the inoperative position of the nozzle (generally designated 50) is defined.

To locate and define the operative position of the nozzle 50, its support 41 is provided with a slot 51 to receive a detent plunger. The detent plunger 55 is mounted in a form of bell crank lever 52 pivoted on the bracket at 53, the vertical arm of the lever terminating in a boss 54 having a bore therein to receive the detent plunger 55, the body of which is reduced in diameter to pass through a reduced bore on one face of the lever. A spring 56 is positioned between the shoulder in the bore of the lever boss and a shoulder formed on the detent plunger which serves to give the detent plunger a bias towards the nozzle support, and a suitable hand knob 57 is threaded to an extension of the detent plunger to retain same and to serve as a convenient operating knob.

To variably position the detent plunger along the path of the slidable nozzle support, the horizontal arm of the lever 52 is forked to locate between flanges turned integral with an adjusting screw 58 which is threaded in the bracket 34, and rotation of the screw 58 turns the lever 52 on its pivot to vary the position of the detent plunger with respect to its engaging slot 51.

Referring to Figs. 7, 8, and 9, there is shown an extruding nozzle assembly 50 comprising a body 60 having a bore 61 therein which is adapted to fit snugly but rotatably on a shaft 62 turned on the support 41 and is secured from lateral motion by being positioned between collars 63 and 64,

which are securely held in position by the cap nut 65. Located directly below the pivotal connection of the nozzle body to its support 41 is a valve 66 having a flattened projection 67. A suitable collar 68 located between the face of the body 60 and a washer 69 locked to the valve by a screw 70 prevents movement of the valve away from its seat in the tapered bore, but yet allows the valve to be rotated between on and off positions to connect or disconnect the fluid passages 71 and 72 which connect with a passage 73 in the nozzle support affording communication with the bore 44 in the support.

A series of extruding fingers 74 are pivotally mounted on a stud 75 which is snugly fitted in a bore 80 in the body and is locked in place by a nut 81 threaded to the stud. The fingers are kept in lateral relation by being confined between a collar 82 which is a part of the stud and a collar 83 secured to the stud by a screw 84, sufficient clearance being provided to allow the fingers to freely turn on the pivot stud. Each finger has a fluid passage 76 extending throughout the length thereof, and these passages are in registry with similar passages 77 leading from the periphery of the stud to an internal passage 78 which is provided with a suitable plug at the end 79. Another bore 85 is provided in the side wall of the stud and is in registry with the fluid passage 72 leading from the valve 66.

Fluid is supplied to the nozzle by the pressure gear pump 25 through the conduit 39 to a T 86 which has its horizontal leg passing through a cored slot in the bracket and threaded in a bore 87 which leads to the bore 44 in the nozzle support, thence to the passages 73 and 71 where the valve 66 controls flow of the fluid to the extruding nozzle. If desired, a suitable pressure gage 88 may be connected to the vertical leg of the T 86, or it may be placed anywhere in the discharge line from the pump.

Referring to Fig. 8, the fingers 74 are provided with work contacting feet 187 and at the opposite end of the pivot they terminate with protruding ears 88 and 89 which limit the flexing or angular movement of the fingers on the pivot stud 75 by engaging a stop pin 90 which is threaded into the nozzle body.

To keep the fingers biased towards the work, a lever 91 is pivoted on a stud 92 which is threaded in the body 60, one end of the lever being provided with a series of holes to receive the springs 93 and being split at right angles to the spring holes so that the clamp screw 94 pulls the split parts together, cramping the springs in the holes. The opposite end of the lever is arranged to contact the underface of an adjusting screw 95 which is threaded in the nozzle body, so that rotation of the screw 95 causes the lever to turn on its pivot and accordingly increase or decrease the tension of the springs 93 which ride in grooves 96 cut in the edge of the fingers.

To prevent rotation of the nozzle on its support 41 when in the operative position, an extension 97 is provided on the spring lever pivot stud 92, and this extension locates within a bore 98 drilled in the bracket 34. (Figs. 3 and 4.)

In line with the nozzle valve 67, there is journaled in the bracket 34 a valve operating shaft 100 having a forked end 101 adapted to fork over the flatted end 67 of the nozzle valve. An operating lever 102 is secured to the opposite end of the shaft for connection by means of a clevis pin 103 to a forked plunger 104. This plunger

is slidably engaged in a bore provided in a boss 105 on the bracket 34, the boss having a shoulder 106 which retains a compression spring 107, the other end of which locates in a counterbore in the plunger 104. A treadle connecting rod 108 is threaded into the plunger 104 and passes through the core of the spring and through a clearance hole provided in the boss 105, check nuts 109 serving to limit the upward movement of the treadle rod against its spring bias. The treadle rod at its lower end terminates in a clevis 110 and is connected by a pin 111 to a treadle 112 pivoted to the support 10 at 113.

Most cements used in connection with the type of machine described dry and harden very rapidly when exposed to the atmosphere, therefore a suitable solvent cup is provided to enclose the nozzle when the machine is not in use to prevent the cement in the extruding passages from hardening. This solvent cup preferably comprises a cup 120 having an arm 121 extending therefrom and terminating in a hub 122 having a bore therein to receive a stud 123 secured to the frame of the machine. The complete solvent cup is therefore swingably mounted for movement towards and from the nozzle location, and the check nuts 124 serve to hold the cup and its arm from vertical movement, and also supply sufficient friction to the hub of the arm so as to prevent movement thereof by vibration. The cup is provided with a cover 125 which is hinged to the cup at 126, and a slot 127 (Fig. 4) is cut in the cover to allow clearance for the nozzle support when the cover is closed in the nozzle-receiving position. A cap 128 is hinged to the cover at 129 to cover the slot 127 so as to exclude the atmosphere when the solvent cup is in the inoperative position as shown in Fig. 1.

In operation of the machine the motor is started to drive the pump and feed wheel as previously described, and the work is held against the feed wheel and against the nozzle. The treadle is then depressed, causing rotation of the valve lever which is in engagement with the nozzle valve, causing opening of the fluid delivery line to the nozzle, and as the work is transported past the nozzle, fluid is applied to the work.

Upon reaching the limit of the coating application desired, the treadle is released and the spring 107 causes the valve to close and the work is removed. Various types of work require that a different uncemented margin be left, and this can be controlled by simply turning the screw 58 which allows the nozzle to be spaced the desired distance from the periphery of the feed wheel.

Upon completion of the work at hand, the operator, in order to move the nozzle to its inoperative position, simply pulls the hand knob 57 which withdraws the detent plunger 55 from engagement with the slot 51 of the nozzle support 41 allowing the spring 46 to move the nozzle support 41 and the nozzle 50 forwardly until the nuts 49 contact the stop plate 47, thus the stud 97 is withdrawn from its locating bore 98 and the nozzle valve projection 67 is severed from its connection with the forked end 101 of the valve operating shaft 100. In this inoperative position the nozzle is rotated on its support shaft 62 in a counterclockwise direction as shown in dotted lines in Fig. 5 by means of the handle 130, and the solvent cup cover is then opened and the complete solvent cup is swung into position under the nozzle until the face 131 of the cup contacts the face 132 of the bracket. The nozzle is then

rotated in a clockwise direction to lower it into the cup and the cover 125 is closed.

To remove the nozzle from the cup and restore the nozzle to its operative position, the above manipulations are reversed, and then the nozzle is pushed toward the feed wheel until the detent 55 catches in slot of the nozzle support.

Since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A fluid coating machine comprising, in combination, a receptacle for fluid having an extruding nozzle and cement delivery means connected thereto, a support for said nozzle, means for elevating said nozzle upon said support, a solvent cup pivotally mounted for positioning under said nozzle in its elevated position, and means for inserting and totally enclosing said nozzle in said cup without removing same from its support.

2. A fluid coating machine comprising, in combination, a receptacle for fluid having an extruding nozzle and cement delivery means connected thereto, a support for said nozzle, a solvent cup pivotally mounted on said cement receptacle for movement into the position occupied by said nozzle, and means for elevating said nozzle upon said support and then inserting it in said cup without removing same from its support.

3. A fluid coating machine comprising, in combination, a frame, a receptacle for fluid, an extruding nozzle including a body and a valve pivotally mounted on a support slidable in said frame to an operative position and an inoperative position, valve operating means journaled in the frame for connection with said nozzle when in operative position, a solvent cup mounted on the frame for movement towards and from said nozzle, means for moving said support and nozzle from the operative to the inoperative position to disconnect said valve operating means, and means for inserting the complete nozzle in said solvent cup without removing same from its support.

4. A fluid coating machine comprising, in combination, a frame, a cement receptacle mounted thereon, an extruding nozzle, a support for said nozzle slidably mounted on the frame between operative and inoperative positions, a stop at one end of said support defining the inoperative position, and means urging said support towards said stop.

5. A fluid coating machine comprising, in combination, a frame having a fluid receptacle secured thereto, an extruding nozzle support slidably mounted on said frame for movement between operative and inoperative positions, an extruding nozzle rotatably mounted on said support, means for preventing rotation of said nozzle on said support when it is in the operative position, and means to deliver fluid from said receptacle through the support to the nozzle.

6. A fluid coating machine comprising, in combination, a frame, an extruding nozzle slidably mounted on said frame for movement to an operative position and an inoperative position, a spring urging said nozzle towards a stop defining

the inoperative position, and means for latching said nozzle in the operative position.

7. A fluid coating machine comprising, in combination, a frame, an extruding nozzle comprising a body and valve, a support for said nozzle slidably mounted on said frame for movement to an operative position and an inoperative position, valve operating means journaled in the frame, means for connecting said valve operating means with said nozzle in its operative position, and means for moving said nozzle to the inoperative position to sever said connecting means.

8. A fluid coating machine comprising, in combination, a frame, an extruding nozzle slidably mounted on said frame for movement to an operative position and an inoperative position, means urging said nozzle towards the inoperative position, and means for retaining same in the operative position.

9. A fluid coating machine comprising, in combination, a frame, an extruding nozzle slidably mounted on said frame for movement to an operative position and an inoperative position, spring means urging said nozzle towards the inoperative position, means for retaining said nozzle in the operative position, and means for varying the distance between the operative and inoperative positions.

10. A fluid coating machine comprising, in combination, a frame, an extruding nozzle slidably mounted on said frame for movement to an operative position and an inoperative position, means urging said nozzle towards the inoperative position, means for retaining said nozzle in the operative position, and means for varying both the operative and inoperative positions.

11. A fluid coating machine comprising, in combination, a frame, an extruding nozzle pivotally mounted on a support slidable in said frame to an operative position and an inoperative position, means allowing said nozzle to be rotated on its pivot at the inoperative position, and means to prevent rotation of said nozzle in the operative position.

12. A fluid coating machine comprising, in

combination, a cement receptacle, an extruding nozzle movable between operative and inoperative positions, means for transferring cement under pressure from said receptacle to said nozzle, a feed wheel for transporting a shoe past said nozzle, and means for moving the operative position of said nozzle to vary the spacing between the nozzle and feed wheel without affecting the inoperative position of said nozzle.

13. A fluid coating machine comprising, in combination, a cement receptacle, a rotatable feed wheel for transporting a shoe, an extruding nozzle slidably mounted for movement towards and from said feed wheel, means urging said nozzle away from the feed wheel, and means for restraining said urging means.

14. A fluid coating machine comprising, in combination, a frame, an extruding nozzle mounted on said frame and adapted to be elevated from its operative position, a solvent cup mounted above the operative position of said nozzle secured on said frame for horizontal movement toward and from said nozzle, means for locking said nozzle in its operative position, and means for releasing said locking means to allow said nozzle to be elevated and said solvent cup moved thereunder.

15. A fluid coating machine comprising, in combination a frame, an extruding nozzle pivotally mounted on said frame for vertically swinging movement from an operative position to an inoperative position, means for locking said nozzle in the operative position, a solvent cup mounted on said frame for movement towards and away from said nozzle and having its side walls higher than the operative position of said nozzle, and means for releasing said locking means to allow said nozzle to be swung to the inoperative position above said solvent cup thereby allowing said solvent cup to be moved into position under said nozzle where the nozzle may be again swung on its pivot and completely enclosed in said solvent cup.

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