Sept. 21, 1937. A. E. C. HALL 2,093,439

SOLVENT APPLYING MACHINE

Original Filed Jan. 25, 1934 3 Sheets-Sheet 1

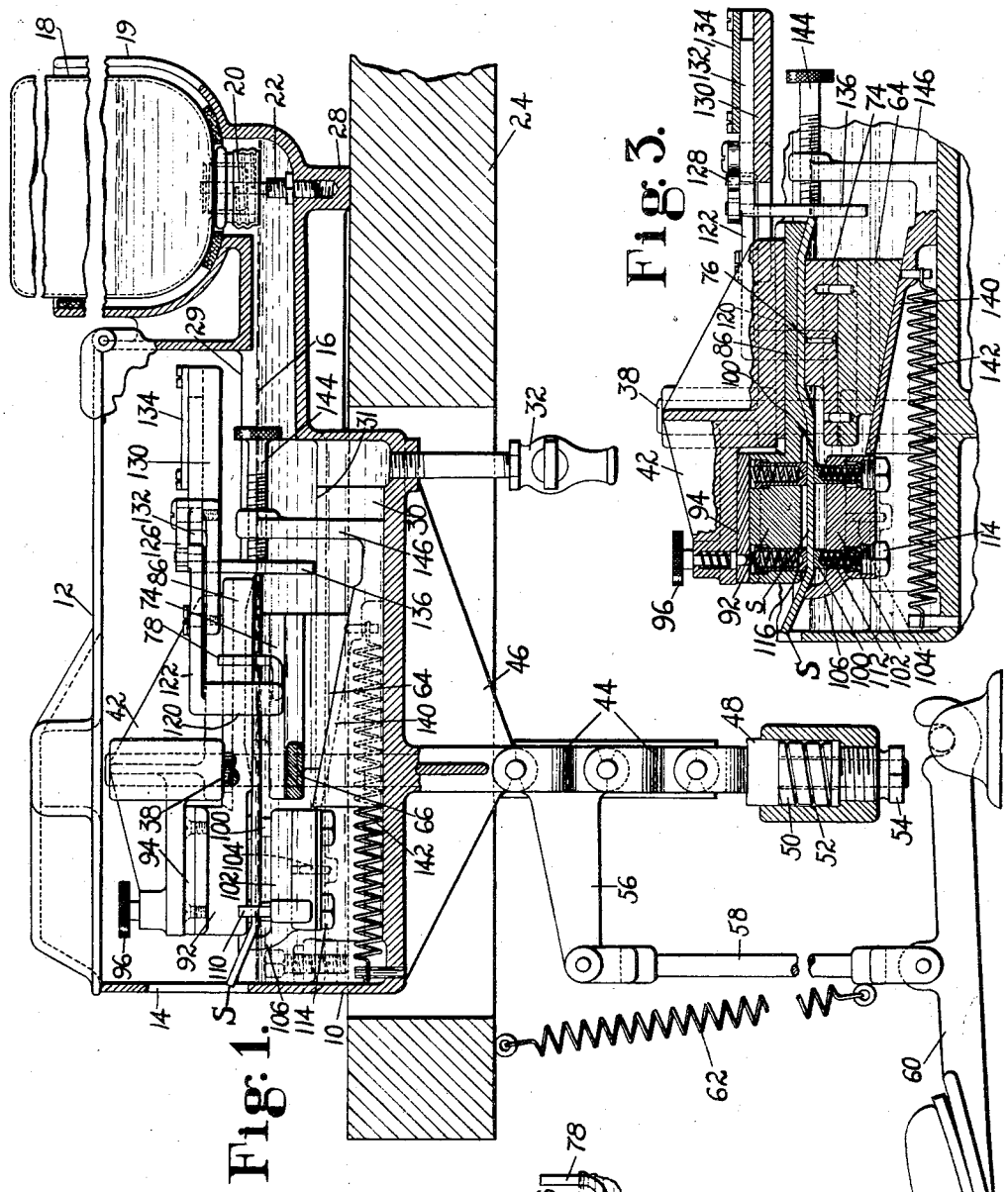


Fig. 1.

Fig. 3.

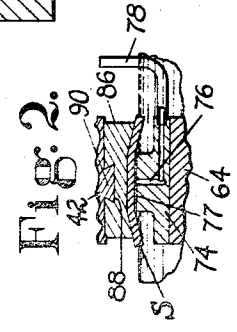


Fig. 2.

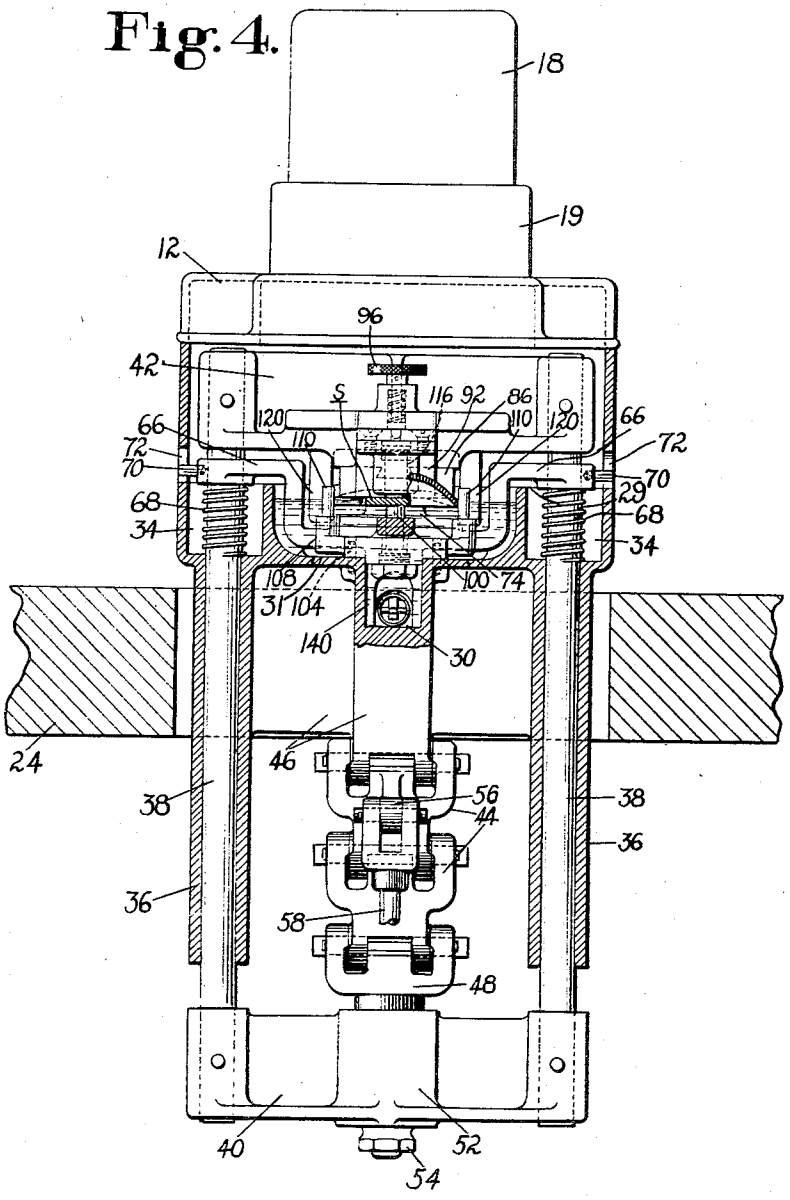
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Fig. 4.



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Fig. 5.

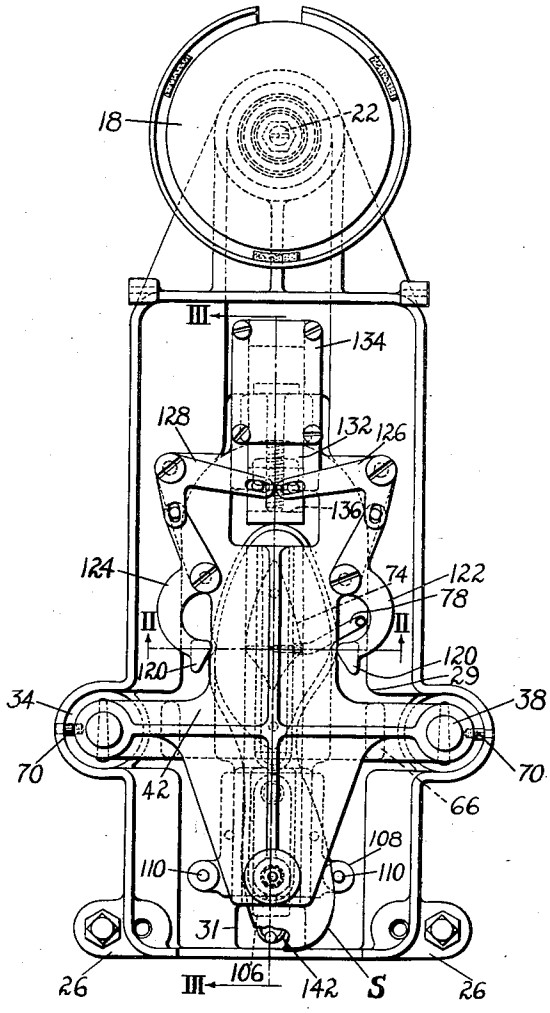
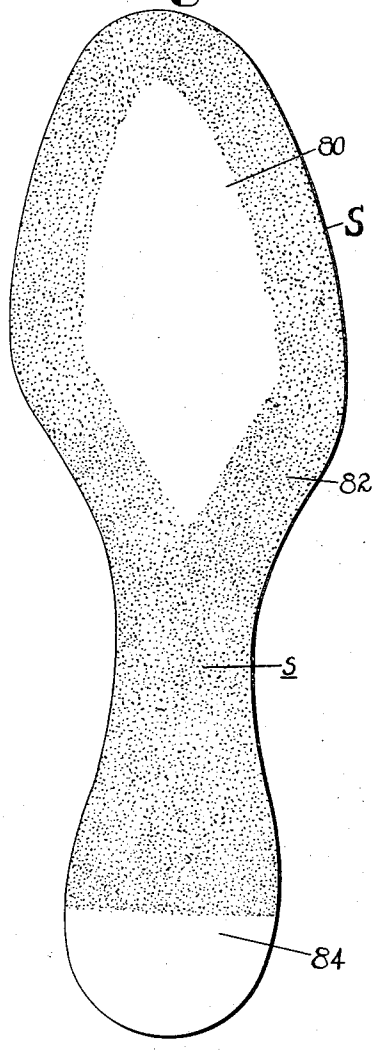


Fig. 6.



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UNITED STATES PATENT OFFICE

2,093,439

SOLVENT APPLYING MACHINE

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Original application January 25, 1934, Serial No. 708,267. Divided and this application October 31, 1935, Serial No. 47,623

20 Claims. (Cl. 12—80)

This invention relates to coating machines and is illustratively described as embodied in a machine for applying solvent to the previously-cemented portion of a shoe sole thereby to activate the cement preparatory to the attachment of the sole to the shoe.

In the manufacture of shoes in which the soles are attached permanently by means of cement which is usually of the pyroxylin type, it is customary to apply the cement and then to allow it to harden. After this and just as the operator brings together the sole and the shoe, the cement upon the sole is activated by the application of a solvent. For various reasons, including the matter of economy in the quantity of cement applied, it is usual to coat with cement only the marginal portion of the attaching face of the sole leaving uncoated the mid portion of the forepart of the sole and a portion of the sole at the heel end. If solvent is applied to uncoated portions of the sole, there is a waste of material and, if the solvent employed is liquid, it will frequently occur that solvent applied to an uncemented portion of the sole will penetrate the sole and stain the grain surface. This grain surface is exposed in the finished shoe and if a natural finish is employed, any stain would be especially detrimental and would render the sole unsuitable for use. In one method of applying solvent which has been extensively employed, the cemented surface of the sole is dipped in a bath of liquid solvent without wetting the opposite or grain surface of the sole but with this arrangement, it is not easy to guard the mid portion of the sole, for example, from the liquid solvent.

To overcome this difficulty, I have devised an improved method for insuring the application of coating material to the desired pre-determined portions of an article without coating adjacent portions thereof, this method being claimed in a parent application Serial No. 708,267, filed January 25, 1934, in my name, of which this application is a division.

An important object of the invention is to provide an improved machine by means of which the cemented surface of a sole may be activated by solvent in accordance with the novel method described in the parent application and the desired economy in material secured.

In accordance with one feature of the invention, a lower form is provided for supporting the sole and is arranged to contact with the mid portion thereof, there being also a coacting, cupped upper form which, in pressing against the sole, distorts it and displaces the marginal portion thereof so that the coating liquid may be brought into contact with only this displaced margin.

Still other features of the invention reside in the provision of mechanism associated with these forms to control the extent of the dipping movement to the end that soles of different sizes may all be coated to a like extent, this mechanism being controlled, as illustrated, by gages contacting with the sole presented to the machine. In the illustrated machine, furthermore, the shank portion of the sole is coated over substantially the whole of its attaching surface but the heel end of the sole is not treated. These and other features of the invention will now be set forth in the following specification taken in connection with the accompanying drawings, in which

Fig. 1 is a side elevation of the machine with parts broken away and in section;

Fig. 2 is a fragmentary view in vertical transverse section through the sole-engaging forms and taken on the line II—II in Fig. 5;

Fig. 3 is a vertical section through the sole-engaging parts along a longitudinal median line III—III in Fig. 5;

Fig. 4 is an end elevation of the machine with parts of the casing broken away and in section;

Fig. 5 is a plan view of the machine with the cover removed, and

Fig. 6 shows the flesh or attaching surface of a sole for a woman's shoe indicating the portion of the sole which has been coated with cement and to which solvent is to be applied.

The solvent to be applied is contained within a box-like receptacle 10 having a hinged cover 12 and substantially closed except for a small opening 14 in the end of the machine through which pieces of work may be presented. In the receptacle, liquid solvent is maintained at the level indicated at 16 by means of an inverted supply bottle 18 supported in a cage 19. The bottle 18 has a spring-pressed control valve 20 which is opened by contact with a stop screw 22 in the bottom of the receptacle. This receptacle is shown as mounted in level position upon a bench 24 by screws contacting with the bench and threaded in lugs 26 (Fig. 5) at one end of the machine, the other end of the machine having a foot 28 (Fig. 1) resting upon the bench. A trough 30 (Figs. 1 and 4) formed between bottom ledges or shelf-like portions 31 (Fig. 5) extends lengthwise of the mid portion of the receptacle for a purpose which will later appear and this trough has a drain cock 32 through which the contents of the receptacle may be

drawn off. At the sides of the receptacle (Figs. 4 and 5) there are provided in side ledges 29 dry wells 34 communicating with depending guide tubes 36 through which pass operating rods 38, the lower ends of which are connected to a crossbar 40 and the upper ends of which are secured to a carrier 42, to be later more fully described. Actuation of the carrier for a purpose which will later appear is accomplished by a toggle 44 interposed between webs 46 formed on the under side of the receptacle and a plunger 48 (Figs. 1 and 4) supported upon a heavy spring 50 contained in a cup 52 at the middle of the crossbar 40. A screw plug 54 at the bottom of this cup provides for the adjustment of the tension of the spring 50. Operation of the toggle is secured by means of an arm 56 extending forwardly from the upper link thereof and to which is connected a rod 58 secured to a foot treadle 60 which is normally held in a raised position to break the toggle by means of a spring 62 extending between the treadle rod and the under side of the bench 24. When the treadle is depressed, the toggle is straightened and the carrier 42 is depressed.

Within the receptacle a support 64 (Fig. 3) is provided for the sole and this support has laterally extending arms 66 (Fig. 4) encircling the operating rods 38 and resting upon springs 68 which surround these rods and are positioned in the dry wells 34. A pin 70 screwed into each arm enters a slot 72 in the side of the receptacle thereby to limit the up and down movement of the support. Upon the support 64 is mounted a lower mold or form 74 (Fig. 3) which is held in place thereon by dowels. This lower form is to be used for distorting the sole and operates to hold the mid portion of the sole out of contact with the liquid. To this end, the contour of the lower mold or form 74 approximates that of the uncoated mid portion 80 of a sole S (Fig. 6) but it will usually be smaller than this mid portion. The sole S which has been shown in Fig. 6 has been coated with cement along the margin 82 around the uncoated mid portion 80. Usually the shank portion *s* is coated over its whole width while there is an uncoated portion 84 at the heel end of the sole which is held to the shoe by fasteners, such as nails or screws.

For a reason which will later appear, the form 74 has been provided with an air passage 76 (Fig. 2) communicating at its upper end with a transverse groove 77 extending to the edges of said form. This air passage 76 communicates at its lower end with a tube 78 which extends outwardly and upwardly to a point above the level of the liquid thereby to allow the escape of any air which may be trapped between the sole and the liquid.

Coacting with the lower form 74 is an upper form 86 which is slightly cupped, as shown in Figs. 2 and 3, thereby to distort the forepart of a sole positioned between it and the lower form 74 as by concaving or cupping said forepart. The upper face of the upper form is provided with a groove 88 slidably engaging a dovetailed rib 90 upon the lower face of the carrier 42 thereby facilitating the interchange of forms of different shapes. This upper form has a recessed rear portion 92 provided with a cover plate 94 which has an aperture receiving a spring-pressed locking pin 96 mounted in the carrier 42.

For the support of the shank portion *s* of the sole, a pair of hollow pins 100 are resiliently supported in a heel block 102 positioned by dowels 104 upon the bottom of the receptacle adjacent to the trough 30. At the rear end of this heel block 102 is an upwardly projecting finger 106 designed to tilt upwardly the rear end of the sole corresponding to the portion 84 in Fig. 6 to keep it out of the liquid. The heel block 102 also has ears 108 (Figs. 4 and 5) in which are gage pins 110, one of which will contact with the edge of the rear end of the sole, as will later appear. Within the hollow pins 100 are springs 112 which rest upon screw plugs 114. In the rear portion 92 of the upper form 86 similar hollow pins 116 are arranged to bear against the top of the shank portion *s* at points directly above the spring-pressed hollow pins 100. The springs positioned within these upper pins 116 and held therein by the cover plate 94 are stronger than the springs 112 so that, upon movement of the carrier 42 to depress the sole against the lower form 74, the upper pins 116 will carry the shank portion *s* downwardly, supported by the hollow pins 100, until these pins contact with the upper ends of the screw plugs 114. These plugs are of such a length or are so adjusted that the downward movement of the pins 100 allows the lower or flesh surface of the shank portion *s* to dip in the liquid maintained at a constant level in the receptacle 10 without coating the upper surface of the shank portion.

It will be evident that, for the machine to be effective, it is necessary to position the sole above the lower form 74 in such a relation that the lower form will coincide with the uncoated portion of the sole. Side gages 120 interconnected for equal and opposite movement are provided, therefore, which are adapted to position the sole laterally. The side gages 120 depend from levers 122, 124 (Fig. 5) pivoted upon the upper face of the carrier 42. The levers 122, 124 are joined by slot-and-pin connections to bell crank levers 126, 128 pivoted upon an extension 130 (Figs. 1 and 3) of the carrier 42. The inner ends of these bell cranks are interconnected by being joined by a pin-and-slot connection to a slide 132 received in a slot in the extension 130 and retained therein by a cover 134. The slide 132 has a depending portion 136 which serves as an end gage thereby to position the sole lengthwise in the machine in the proper relation to the lower form 74. In a range of sizes, there is such a relation between the width of the sole at the ball and the length thereof that outward movement of the side gages 120 as the sole is pushed between them will correctly position the end gage 136. The sole illustrated in Fig. 5 is for a right shoe, being upside down in the machine, and is correctly angled in the machine by bringing the heel end of the sole against the right-hand pin 110. If a left sole is presented to the machine, it is moved over against the left-hand pin 110. A spring pressure is applied to the end gage 136 which operates through the connecting levers just described, to move the side gages 120 toward one another. The operative faces of these depending side gages are beveled as shown in Fig. 5 thereby to facilitate pushing the sole between them and moving them out to the position corresponding to the size of the sole. When this is done, the end gage will be positioned in correct relation and the sole will be pushed in until it contacts with the end gage. Although the forms 74 and 86 are shown as detachably secured in the machine, it will be understood that one set of forms will ordinarily be satisfactory for a run of sizes of men's shoes, for example, but that another set of forms will

usually be required for women's shoes and still another for children's shoes, etc.

When the forms 74 and 86 are brought into engagement with a large sole, the marginal portions of such a sole will be brought to a lower level than will the marginal portions of a smaller and, hence, narrower sole. This would result in applying the solvent over a different width of margin in soles of different sizes were it not for the fact that the machine is arranged automatically to compensate for this difference. To this end, a slidable hollow wedge 140 is mounted for longitudinal movement in the trough 30 in the bottom of the receptacle and contacts with a correspondingly inclined surface upon the under side of the support 64 which carries the lower form 74. Movement of this wedge lengthwise, therefore, is effective to determine the heightwise position of the lower form and, if necessary, to raise it. The form carrier 64 is normally held in raised position by the springs 68 (Fig. 4) and is pushed down until stopped by the wedge 140 when the work is pressed against it. Adjustment of the position of this wedge to make the compensation automatic is effected by a spring 142, one end of which is received within the hollow wedge and is secured thereto and the other end of which is secured to the bottom of the receptacle 10. This spring 142 tends to drag the wedge 140 toward the front of the machine until a hand screw 144 threaded through an upright 146 upon the wedge engages the rear face of the depending end gage 136. The spring 142, therefore, is effective to return the gages to their initial position. Conversely, the larger and, hence, the longer the sole is, the more the gage 136 will be pushed toward the rear of the machine by the action of the levers 126, 128 and the greater will be the height of the lower form 74 above the liquid as a sole is moved into position. Differences in elevation of the lower form resulting from an adjustment of this wedge 140 are relatively small. These differences, however, might be sufficient to prevent the straightening of the toggle 44 were it not for the fact that the plunger 48, to which the lower link of the toggle is pivoted, is supported on the heavy spring 50. This spring permits straightening of the toggle in the various positions at which the carrier 42 stops when the sole is cupped between the upper and lower forms.

In the operation of the machine, assuming that solvent has been supplied to the receptacle from the container 18 to bring the solvent to the desired level 16, a sole will be presented through the opening 14 and pushed between the side gages 120 until it contacts with the end gage 136. It will be recalled that the spring 142 is effective between each operation of the machine to draw the wedge 140 toward the open end of the machine. In so doing, it will pull the end gage 136 toward the opening of the machine and this will cause the side gages 120 to be pulled into their narrowest position. When a sole is presented by the operator, it will push apart the side gages 120, thereby adjusting the end gage, and will slide along the depending side gages until the toe end of the sole contacts with the toe gage 136. In this adjustment of the end gage, the wedge 140 will also be pushed away from the machine opening. The operator then depresses the treadle 60, bringing down the carrier 40 and, with it, the upper form 86 to press the sole against the lower form 74, 64 until the support 64 contacts with the wedge 140. Downward movement of the lower form is against the tension of the springs 68 which underlie the arms 66 connected to said lower form and which springs tend to raise the same between each operation of the machine. As the upper and lower forms are brought into firm contact with the sole, the forepart thereof is distorted, cupped or concaved, to cause the marginal portions to dip directly into the liquid without depressing and without coating the inner adjacent portion of the forepart. Whether the margin dips directly in the liquid or whether there is first a depression of the support 64 for the lower form will depend upon the strength of the spring 68 by means of which this support 64 is carried. In either case, the ultimate position of the lower form and, hence, of the margins of the sole will depend upon the adjustment of the wedge 140 and it is immaterial whether the springs 68 are sufficiently heavy so that the sole is distorted before the lower form is depressed to bring it into contact with the wedge 140 or whether the distortion of the sole takes place after the lower form becomes firmly supported by the wedge 140. If the cupping of the forepart of the sole takes place before it reaches the level of the liquid, then the vent supplied by the groove 77, the passage 76 and the tube 78 will avoid any tendency for the exclusion of liquid from the margin of the cupped under surface of the sole by reason of air which might otherwise be retained within the cupped forepart of the sole. The shank portion of the sole will at the same time be brought to a fixed level irrespective of the size of the sole and determined by the coacting spring-pressed pin plungers 100, 116 so that the whole width of the lower surface of the shank portion will be wetted without wetting the grain surface. At the same time, the heel portion, indicated at 84 in Fig. 6, will be supported by the projection 106 so that this will not dip in the solvent. After the sole has remained in the machine as long as is desired, which will usually be only a few seconds, the treadle is released and the sole may be withdrawn and applied directly to a shoe, being pressed into firm engagement therewith by a sole-attaching machine.

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

1. In a coating machine, a receptacle for coating material, means for cupping a portion of a piece of flat work to render it concave, and means for effecting relative movement between the work and the flat surface of the coating material in the receptacle thereby to submerge the margin of the cupped piece in the coating material.

2. In a coating machine, a receptacle for a body of coating material having an exposed surface, means for displacing a portion of the margin of a piece of flat work, and means for dipping the displaced margin in the exposed surface of the coating material without dipping the adjacent inner portion.

3. In a coating machine, a receptacle for a mass of coating material the surface of which is free for engagement with the work, and means for cupping a piece of work above the coating material thereby to bring a portion of the work into a lower plane than the remaining portion and to cause said lower portion of the distorted work to move directly into the mass of coating material and hence below the surface thereof.

4. In a coating machine, a receptacle for a body of coating material, the surface of said body of material being free for engagement with the work, coacting forms adapted for engagement

with opposite sides of a piece of work constructed and arranged to distort the work thereby to bring a marginal portion of the work to a level lower than an adjacent inner portion, and means for effecting relative movement between the distorted work and the body of liquid in the receptacle in a direction angularly related to the undistorted inner portion of the work to coat the lowered portion of the work.

5. In a coating-applying machine, a receptacle for coating material the surface of which is free for engagement with the work, a work support, and coacting means adapted to operate upon a piece of material positioned upon the work support to depress a portion of the marginal portion of the piece into contact with the surface of the coating material in the receptacle without depressing and without coating the adjacent inner portion.

6. In a coating machine, a receptacle for coating substance, coacting forms positioned above the receptacle and constructed and arranged to distort a piece of work, one of said forms being cupped, means for bringing said forms together in contact with the opposite surfaces of a piece of work thereby to depress the marginal portions of the work, said forms being supported for movement with respect to the coating substance in the receptacle, and means for limiting the downward movement of the forms thereby to limit the extent to which the coating substance is applied to the sheet of material.

7. In a coating machine, a receptacle for coating material, a sole support, a gaging device movable by a sole presented to the machine thereby to assume a position in accordance with the size of the sole, means for effecting relative movement between a sole on the support and the coating material thereby to immerse at least a portion of the sole, and an interconnection between said gaging device and said movement-effecting means constructed and arranged to control the depth of immersion of the sole in accordance with the size of the sole.

8. In a coating machine, a receptacle for coating material, gages associated therewith and mounted for movement by contact with a piece of work thereby to assume a position corresponding to the size of the piece of work, movable means for supporting a piece of work constructed and arranged to carry a portion of the work into the coating material in the receptacle, and means responsive to the position of said gages for controlling the movement of said support thereby to control the depth of immersion of the piece of work.

9. In a coating machine, a receptacle for coating material, coacting forms for engaging opposite sides of a piece of substantially flat material constructed and arranged to distort the material, said forms being vertically movable, and means adjusted by a sole presented thereto for limiting the downward movement of one of said forms thereby to control the depth of immersion of a portion of the distorted piece of work.

10. In a machine for coating shoe soles, a receptacle for coating material, coacting forms adapted for engagement with the upper and lower sides of a sole constructed and arranged to distort a portion of the sole, said forms being vertically movable to carry the distorted portion of the sole into the liquid, and means adjustable in accordance with the size of the sole constructed and arranged to limit the movement of said forms thereby to determine the depth of immersion of the sole.

11. In a coating machine for shoe soles, a receptacle for coating material, coacting forms, one of which is cupped, constructed and arranged to engage opposite surfaces of a sole thereby to cup said sole to bring one portion to a lower level than another portion, means for effecting immersion of only a portion of the distorted sole without wetting another portion, and gaging devices for locating the sole with respect to the forms.

12. In a coating machine for soles, a receptacle for coating material, coacting forms for distorting a sole thereby to permit the immersion of a portion of the sole without wetting the remaining portion, side and end gages for determining the location of the sole with respect to said forms, and means for interconnecting said gages whereby the position of one gage is determined in response to adjustment of the position of the other gage.

13. In a coating machine for soles, a receptacle for coating material, coacting means for immersing a sole to coat one surface thereof without wetting the other surface, side gages spring pressed toward the sole, a slidably mounted end gage, and connections between said side gages and said end gage such that the spreading of the side gages by the presentation of a sole to the machine determines the position of the end gage.

14. In a machine for coating shoe soles, a receptacle for coating material, coacting forms constructed and arranged to distort a portion of the sole and to carry one portion of the sole into the coating material without wetting another portion of the sole, interconnected side gages adapted to be spread by a sole presented thereto, and means responsive to the movement of said side gages for controlling the depth of immersion of the sole.

15. In a machine for coating shoe soles, a receptacle for coating material, coacting means for gripping the forepart of the sole constructed and arranged to distort it to bring the margin to a lower level than the mid portion of the sole, means for gripping the shank portion of the sole, means for effecting a relative movement between the sole and the coating material thereby to immerse a portion of the sole, and independent means for limiting the relative movement with respect to the forepart and with respect to the shank portion of the sole thereby to avoid coating one face of the sole.

16. In a machine for coating shoe soles, depressible forepart supporting means, depressible shank-supporting means, movable means for engagement with the upper surface of the sole, fixed means for limiting the downward movement of the shank portion of the sole, and adjustable means responsive to the size of the sole for limiting the downward movement of the forepart-supporting means.

17. In a machine for coating shoe soles by immersion, sole engaging means, variably movable for distorting portions only of the foreparts of soles and dipping said portions to constant depths, and shank-portion-engaging means for dipping the shank portions of the soles to a predetermined depth.

18. In a machine for coating shoe soles, a receptacle for coating material, means for gripping the forepart of a sole constructed and arranged for movement to dip a portion only of the width of the forepart, and a support for the heel end

of the sole to hold it out of the coating material.

19. In a machine for coating shoe soles, a receptacle for coating material, forepart-gripping means constructed and arranged for movement to immerse at least a portion of the forepart, and shank-portion-gripping means constructed and arranged for movement independent of the forepart-gripping means to immerse a portion of the shank portion of the sole.

20. In a machine for coating shoe soles, a receptacle for coating material, forepart-gripping means constructed and arranged for movement to immerse at least a portion of the forepart, shank-portion-gripping means constructed and arranged for movement independent of the forepart-gripping means to immerse a portion of the shank portion of the sole, and a support for the heel end of the sole to hold it above the level of the coating material.

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