Sept. 21, 1937. A. E. C. HALL 2,093,438

COATING

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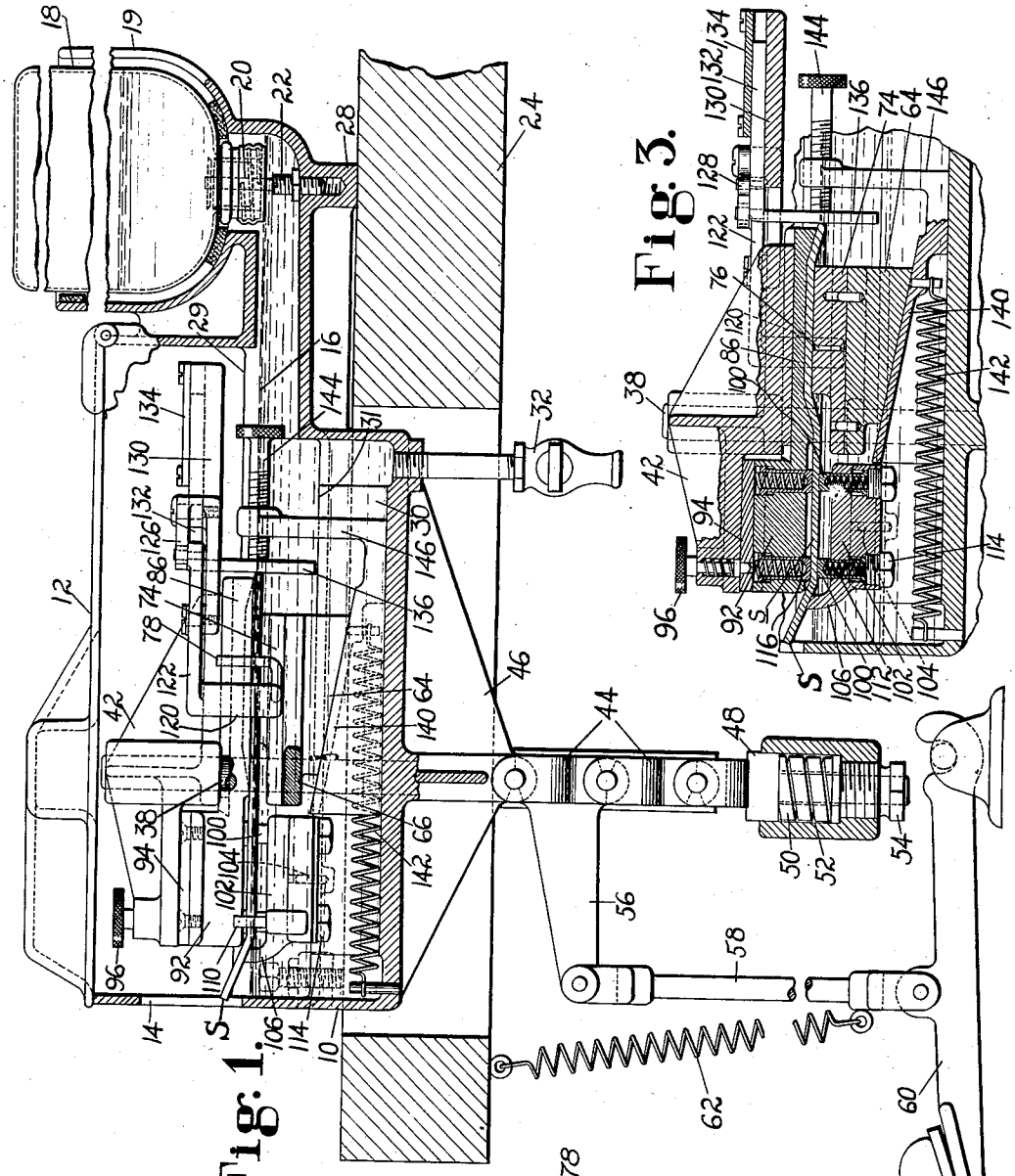


Fig. 1.

Fig. 3.

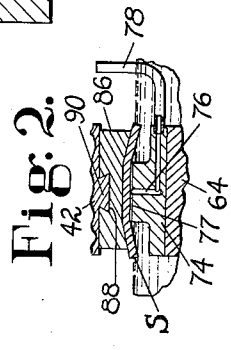


Fig. 2.

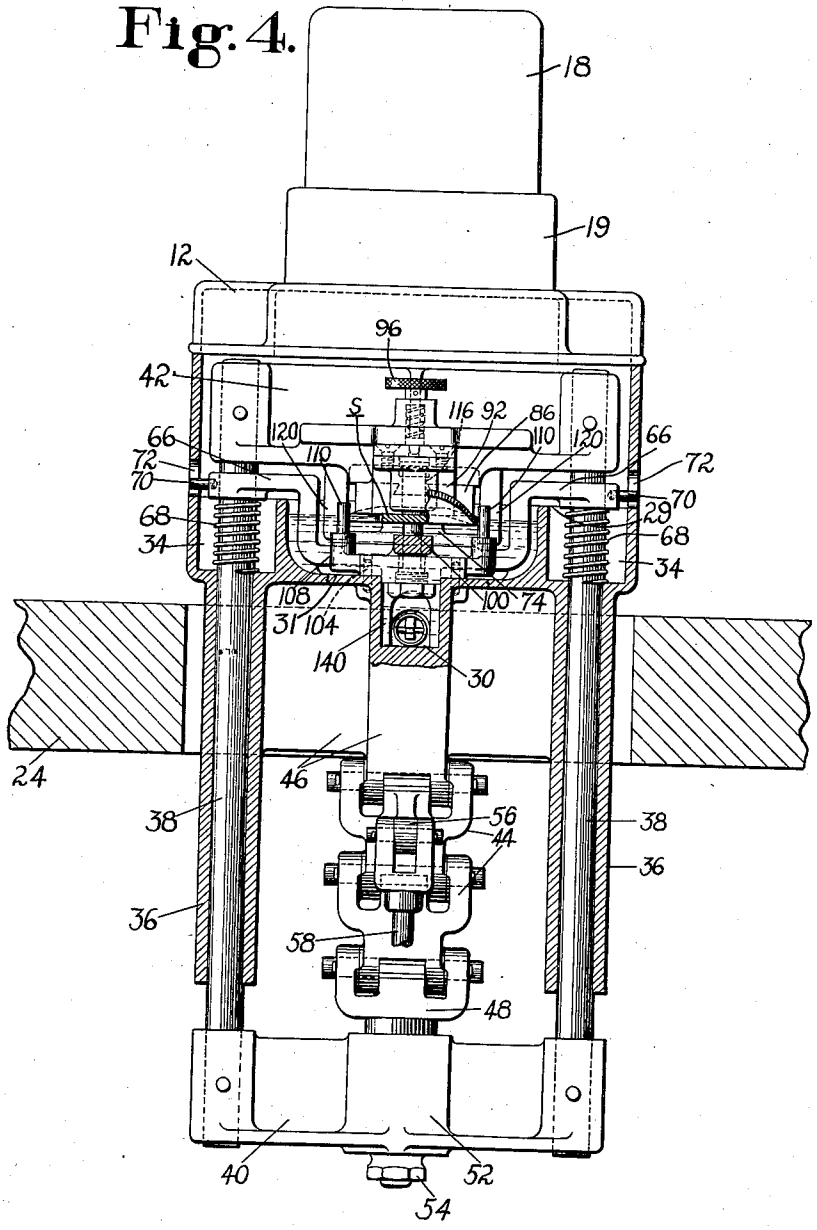
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Fig. 4.



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Fig. 5.

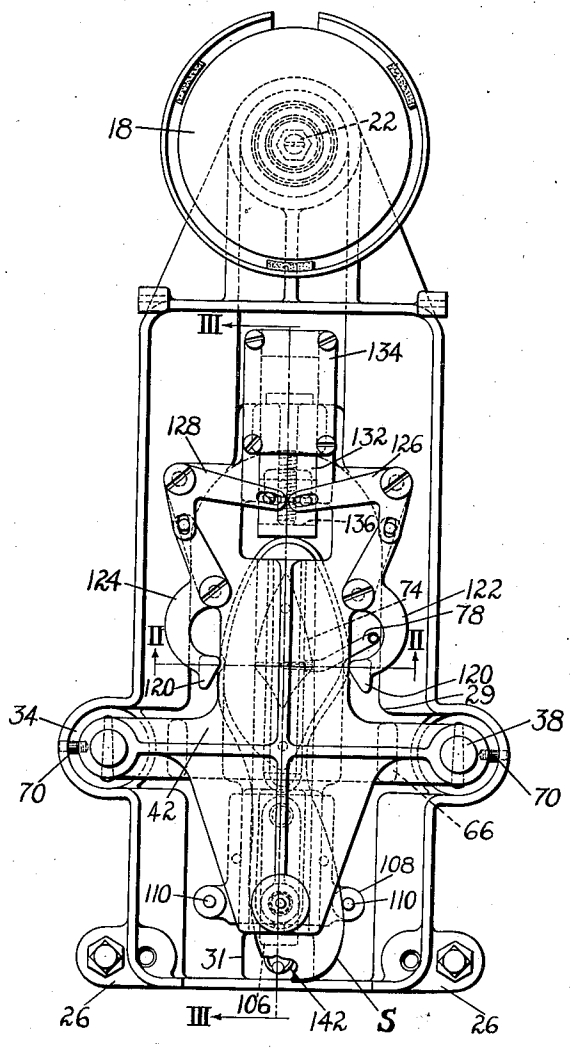
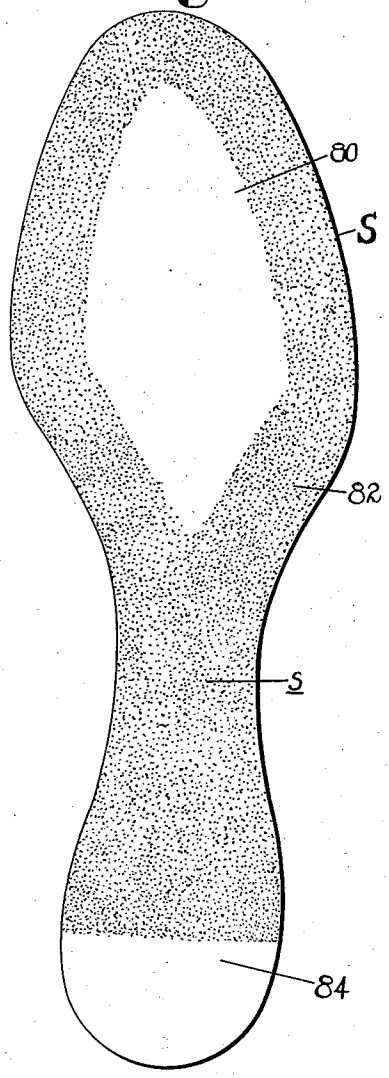


Fig. 6.



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UNITED STATES PATENT OFFICE

2,093,438

COATING

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13 Claims. (Cl. 12—146)

This invention relates to coating, being concerned with a method of coating only a portion of an article. The invention is, illustratively described as applied to the application of solvent to the previously cemented portion of a shoe sole.

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.

One important object of my invention is to insure the application of coating material to the desired predetermined portions of an article without coating adjacent portions thereof. In its illustrated application to the activation of the cement coated surface of soles, the invention comprises an improved method of coating by which the waste of coating substance and possible damage to the article is avoided.

In one aspect, the invention consists in distorting an article, such as a sole, to impart to it a concavo-convex cross-section thereby to cause one portion of the sole to project below another portion and in applying a coating to one portion, as by dipping the projecting portion in a bath of coating material without coating the remainder of the sole. In applying the invention to the wetting of the margins of soles, the margin of a sole may be displaced to carry it below the level of the mid portion thereof to bring the margin into contact with the surface of a bath of liquid coating substance. In some instances, it will be found desirable to impart an additional relative movement between the sole and the liquid, after the sole has been distorted, to dip the marginal portion in the liquid.

A machine with the aid of which the method of the invention may be expeditiously carried out 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 to impart to it a concavo-convex cross-section with one portion of the forepart in a different plane from another portion. 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 against 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 sliding wedge **140** 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 carrying out my method by means of the above-described 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, thereby adjusting the end gage, and will slide along the depending wedge-shaped portions **120** 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.

Novel features of the hereinabove-described machine are not claimed herein since they form the subject matter of a divisional application Serial No. 47,623, filed October 31, 1935.

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

1. The method of coating an article which consists in distorting the article to impart to it a concavo-convex cross-section with one portion in a different plane from another portion, and then producing relative movement between substantially the whole article and a holder of coating material to coat a portion thereof without coating the adjacent portion.

2. The method of coating a separate, unitary article which consists in displacing one portion of an article to render the article concavo-convex in cross-section and to cause one portion to extend below another portion, maintaining the displaced condition, and then moving the article in this condition to dip the displaced portion in a bath of coating material.

3. The method of coating a sheet of material which consists in distorting the sheet to displace the margin and cause it to extend beyond the plane of the inner portion of the sheet, and then dipping the displaced margin of the sheet in a bath of coating material.

4. The method of applying a coating to a shoe sole which consists in distorting the margin of the forepart of the sole, and then coating this distorted margin of the forepart, the whole length of the margin being coated simultaneously.

5. The method of coating previously cemented portions of the attaching face of a shoe sole which consists in distorting the forepart of the sole to displace the margin thereof, and applying coating material to the displaced margin of the forepart and to the whole width of the shank portion of the sole.

6. The method of coating previously cemented portions of the attaching face of a shoe sole which consists in distorting the forepart of the sole to displace the margin thereof, and applying coating material to the displaced margin of the forepart and to a portion of the shank of the sole stopping short of the heel end of the sole.

7. The method of coating previously cemented portions of the attaching face of a shoe sole which consists in distorting the forepart of the sole to displace the margin thereof, and applying coating material to the displaced margin of the forepart and to the whole width of the shank portion of the sole and extending rearwardly to a point separated from the heel end of the sole.

8. The method of coating the margin of a shoe sole which consists in bending the sole to cause the margin to project below the mid portion of the sole, and then immersing the depending margin in a bath of the coating material.

9. The method of preparing a sole for permanent attachment to a shoe by means of cement which consists in applying cement to the attaching surface of the sole, allowing the cement to dry, distorting the sole to move the margin out of the plane of the mid portion thereof, and applying a coating of solvent to the margin.

10. The method of preparing a sole for permanent attachment to a shoe by means of cement which consists in applying cement to the attaching surface of the sole, allowing the cement to dry, distorting the sole to depress the margin below the mid portion thereof, and dipping the depressed margin of the attaching face of the sole in a bath of solvent without coating the mid portion of the sole.

11. The method of preparing a sole for permanent attachment to a shoe by means of cement which consists in applying a band of cement to the margin of the sole, allowing the cement to dry, distorting the sole to depress the marginal portion below the mid portion, and bringing together the surface of the distorted marginal portion of the sole and the surface of a body of solvent thereby to activate the dried cement.

12. The method of coating the margin of a sole which consists in depressing the marginal portion of the forepart of a sole below the level of the mid portion of the sole while the sole is above a body of solvent, thereby causing the marginal portion of the forepart of the sole to contact with the solvent.

13. The method of activating the margin of a precemented sole which consists in depressing the marginal portion of the sole below the level of the mid portion while the sole is positioned above a body of solvent thereby causing the marginal portion to dip in the solvent.

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