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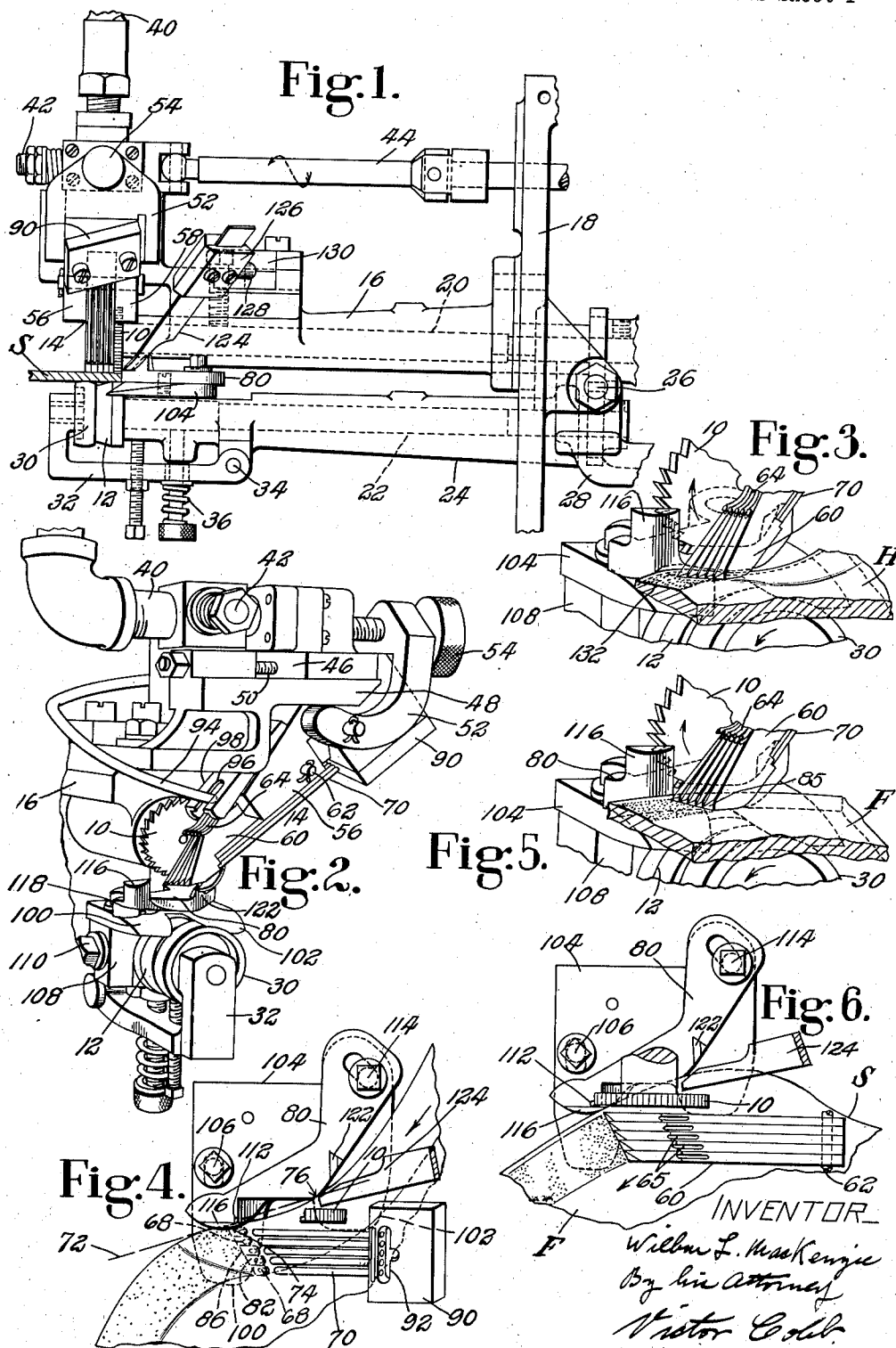
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2,293,209

COATING MEANS FOR SHOE SOLES

Filed Feb. 7, 1940

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

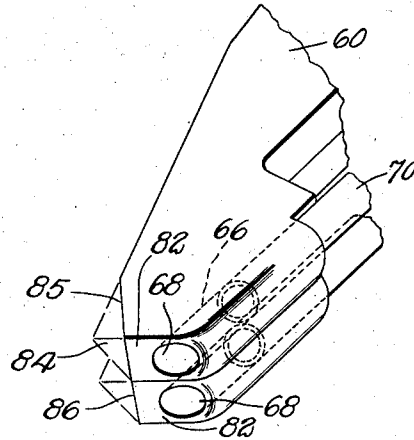


Fig. 7.

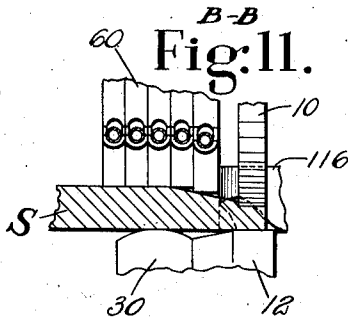


Fig. 11.

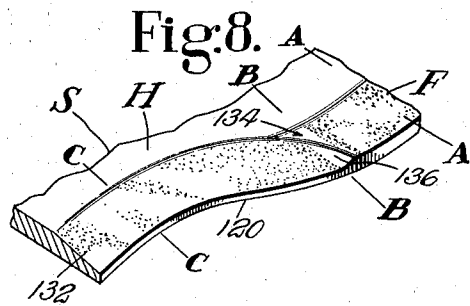


Fig. 8.

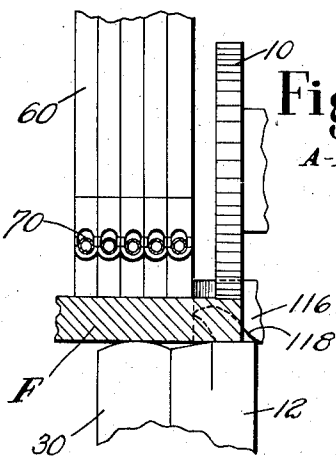


Fig. 9.

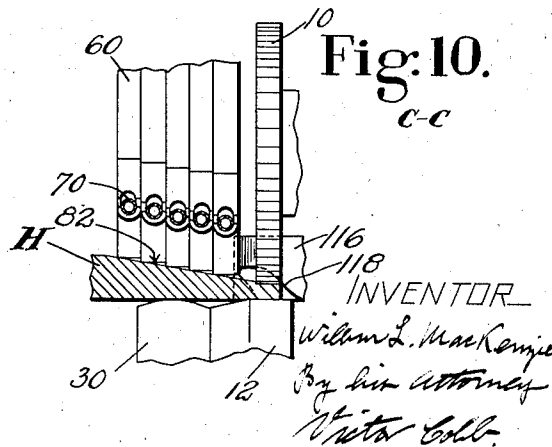


Fig. 10.

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UNITED STATES PATENT OFFICE

2,293,209

COATING MEANS FOR SHOE SOLES

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4 Claims. (Cl. 91—43)

This invention relates to coating applying machines for shoe parts and is herein illustrated as embodied in a machine for applying a marginal stripe of cement to a shoe sole, which machine is of the type illustrated in Letters Patent of the United States No. 2,042,479, granted June 2, 1936, and No. 2,073,647, granted March 16, 1937, upon the application of Carl A. Newhall.

In machines of the type illustrated in the aforementioned patents, a rigid nozzle is provided which rides upon the surface of a sole as the latter is fed automatically beneath the nozzle so as thereby to apply a marginal band of coating material, such as a somewhat viscous cement, from approximately the heel breast line at one side of the sole around the forepart thereof to the heel breast line upon the other side. The feeding mechanism therein employed is of the cross-feed type in which the edge of the sole is held against spaced gage points by one component of the force imparted by a thin disk-like feed wheel, the end face of which is at an acute angle to the line of feed determined by the gage points. With an arrangement of this sort it has been found necessary, as set forth in lines 25 to 51 on page 7 of the earlier patent, that the line of nozzle openings should extend at an angle less than a right angle to the line of feed as determined by these gage points, if the marginal band or stripe is to have a substantially uniform width. Such machines are in extensive use and have been found wholly satisfactory for the application of coating material to soles of substantially uniform thickness throughout their whole extent. If, however, the shank portions of the soles have been reduced by skiving cuts made along the opposite sides of said portions, then some difficulty is experienced in applying a uniform and continuous band, particularly at the points where the reduced portions merge with the forepart portion. There, it is impossible for a rigid nozzle to adapt itself to the changing contour of the work and, accordingly, it would seem advantageous to use the flexible articulated type of nozzle described in Letters Patent of the United States No. 2,177,666, granted October 31, 1939, upon the application of W. L. MacKenzie et al., wherein this nozzle is used for the application of a band of coating material to the margin of the bottom of a shoe before the sole is applied.

Differences in the construction and mode of operation of the two machines, however, render it impossible to transfer the nozzle bodily from one machine to the other. For example, real-

izing that it is necessary, as pointed out above, to have the outlet ends of the nozzle delivery members positioned upon a line making an angle less than a right angle with the line of feed, an attempt would naturally be made to turn the articulated nozzle of the MacKenzie patent to such an angle that this requirement as to the position of the ends of the delivery members would be satisfied. This cannot be accomplished, however, without causing the nozzle members to collide with the disk-like feed wheel which engages the upper side of the work.

It is, accordingly, an important object of the invention to devise improved coating devices for use in coating-applying machines by means of which a band of coating material of uniform width may be applied rapidly and accurately to shoe parts, even when the surface to be coated is irregular and various portions of each part are not of uniform thickness.

To this end and in accordance with features of the invention, an improved nozzle for a sole-margin-coating machine has delivery members mounted for pivotal movement in planes substantially parallel to the end face of the feed roll and have work-contacting ends which are staggered and engage the work at different distances from their pivots. These end portions, in order that the coating may be of uniform thickness, have end faces substantially normal to the direction of feeding movement, and the supply tubes for the delivery members, as illustrated, are supported in a plane which intersects at an angle thereto the common axis of the hinge points of said members.

These and other features of the invention will be apparent from a consideration of the following specification taken in connection with the accompanying drawings, in which—

Fig. 1 is a front elevation of the work-engaging portion of a coating machine embodying my improvements;

Fig. 2 is an angular view looking toward the end of the feeding mechanism;

Fig. 3 is a fragmentary, angular view on a larger scale, showing the coating of the shank portion of a shoe sole;

Fig. 4 is a view in plan, partly diagrammatic, to illustrate the coating of a sole in this same position;

Fig. 5 is a fragmentary view, similar to Fig. 3 but showing the coating of a portion of the forepart of a sole;

Fig. 6 is a view looking down upon the nozzle when coating work in this same position;

Fig. 7 is an angular view up a greatly enlarged scale looking up toward the under ends of two of the delivery members of the nozzle;

Fig. 8 is an angular view of a portion of a sole where the reduced shank portion joins the forepart; and

Figs. 9, 10, and 11 are fragmentary views in elevation to show the positions of the nozzle members when coacting with successive portions of a sole.

Inasmuch as the invention has been shown as embodied in a machine of the type illustrated in the Newhall patents, there is illustrated herein only the work-engaging members of such a machine, and these include an upper feed roll 10 and a lower feed roll 12 for gripping a shoe sole S to carry the margin of the sole beneath a nozzle 14. These feed rolls are driven, the upper feed roll being mounted upon a shaft 20 journaled in an arm 16 extending outwardly from a frame 18, while the lower feed roll 12 is mounted upon a shaft 22 journaled in an arm 24 which is pivotally supported in the machine for up and down tilting movement about a center 26. When a piece of work is introduced into the machine, the lower feed roll is raised by the depression of a treadle (not shown) which is connected to a portion 28 of the lower arm 24. As an aid in supporting the work in firm engagement with the nozzle, another roll 30 is provided which is pivoted for rotation upon an arm 32 hinged to the arm 24 at 34 and held up to an adjustably predetermined position by a spring 36. When my improved nozzle is employed, this spring 36 is compressed enough so that the roll 30 does not yield, the changes in the thickness of the sole being accommodated by the yielding nozzle.

The delivery of coating material to the nozzle 14 is effected by means of a pump (not shown) which forces the coating material under pressure through a pipe 40 whenever a valve 42 is opened by rotation of a shaft 44 under the control of the aforementioned treadle. The nozzle, as in the form shown in the MacKenzie patent, comprises a block 46 (Fig. 2), portions of which overlie the outwardly extending arms 48 (only one of which may be seen) formed on a member which is secured to the arm 16 and extends beyond the end thereof. The position of the nozzle block 46 is determined by an abutment screw 50 and it is gripped in position upon the arms 48 by a bifurcated clamp lever 52 which is turned to clamping position by a hand screw 54. The lower portion of the nozzle block 46 is forked to provide side members 56 and 58 (Fig. 1) between which are a plurality of delivery members 60 each mounted upon a pivot pin 62 so that they may move up and down, being urged into firm engagement with the work by wire springs 64 (Fig. 2), as in the MacKenzie patent, resting in grooves 65 (Fig. 6). These delivery members 60 are made up of thin plates placed side by side and each has a passage 66 (Fig. 7) terminating in an outlet opening 68, said passage being supplied with coating material through a capillary tube 70 slidably engaging the passage and flexing to permit the desired heightwise movement of the work-engaging end of the delivery member. As seen from Figs. 1 and 9, for example, the delivery members, to avoid interference with the end face of the feed roll 10, are mounted for movement in planes parallel to that end face and, consequently, the axis of the pivot pin 62 is parallel to the axis of the drive shaft 20.

The arrangement of the nozzle differs markedly from that shown in the MacKenzie patent,

however, in that the successive delivery members 60 are of different lengths, thereby to have the outlet openings 68 (Fig. 4) staggered or in echelon to bring them along a line which is at an angle less than a right angle to the line of feed. This line of feed extends in the general direction of the dash line 72 drawn tangent to gage humps or points 74 and 76 upon the gage 80, to be later more fully described. The showing in Fig. 4 is diagrammatic in that the outlines of the outlet openings 68 and of the adjacent end faces 82 (Fig. 7) of the successive members 60, as shown in dash lines, indicate the shapes of said openings and faces as they rest upon the work. It will be noted that, because of the fact that the line of feed 72 is not parallel to the lengths of the delivery members 60, the band of cement made up of the series of stripes extruded through the adjacent outlet openings frequently leaves said openings in a direction non-parallel to the length of the members 60 when the work moves in a direction such as is indicated by the arrow in Fig. 6. Therefore, in order to make this band of substantially uniform thickness, it has been found necessary to cut away portions 84 of the material of the successive fingers to provide end faces 85, the intersection of which with the bottom ends 82 form edges 86 which are substantially normal to the line of feed or are at angles thereto less than right angles. Thus, the resistance to the outflow of the coating material from the outlet openings to various parts of the edges 86 is substantially equalized. Each of the bottom ends has a slight rim or heel (Fig. 7) back of the outlet opening and which is at least as low as the flat portion adjacent to the edge 86 and this heel rides on the work and keeps the cement from being extruded at the rear ends of the members 60.

The tubes 70, in view of the different lengths of the delivery members, are also of different lengths and, as in the MacKenzie patent, are soldered in a supporting block 90. Furthermore, by reason of the fact that the line of the outlet openings 68, when the members 60 rest on the upper surface of the forepart of a sole, is not parallel to the axis of the pivot pin 62, the tube-supporting block cannot be parallel to said axis. Accordingly, as indicated in Fig. 1, the tube block 90 is attached to a face of the nozzle block 46 which lies in a plane inclined to the axis of the pin 62 and intersects it at an angle thereof. There is a passage (not shown) in the nozzle block 46 which connects the shut-off valve 42 to a recess 92 (Fig. 4) in the tube block. This recess communicates with the tubes and conducts the coating material to the outlet opening 68. Any danger of the sticking together of the delivery members by reason of adhesive accidentally smeared on their side faces is avoided by delivering a fluid solvent to the upper faces thereof through a tube 94 (Fig. 2) which is received in an aperture 96 of a cover plate 98. This cover plate overlies the springs 64 and prevents displacement thereof and damage thereto.

As a sole S is presented to the coating nozzle, it lies above and is partly supported by tapered fingers 100 and 102 which form part of a plate 104 adjustably attached by a screw 106 (Fig. 4) to the top of a block 108 (Fig. 2) which, in turn, is attached to the arm 16 by means of a screw 110. The gage 80 is supported on the plate 104 and is swingable about a pivot 112 at one end of the gage. This gage 80 has two humps which provide the gage points

74 and 76, and, in accordance with the character of the work to be treated, especially as regards its rigidity, the other end of the gage member may be swung in and out, and clamped in position by a screw 114, to determine the magnitude of the cross-feed effect imparted by the feed roll 10. At the gage point 74, the gage member 80 has an upstanding flange 116 which, near its lower end, is provided with a notch or groove 118 (Fig. 10), lower than the normal thickness of a sole, and designed to receive the reduced edge 120 of the sole at the shank portion H. Thus, on a sole of rather soft, flimsy quality, this edge will not be turned up as the sole is urged against the flange 116 as a result of the cross-feed imparted by the feed roll 10 but will be held flat in the groove and will not ride over the gage. The gage 80 has a flange 122 (Fig. 2) adjacent to the rear or first-encountered contact point 76 (considered with reference to the direction of feeding movement of the work) and a leaf spring 124 mounted in a clamp 126 (Fig. 1) which is supported upon the arm 16 prevents curling of the edges of soft edged soles at this point. The clamp 126 is at the end of a supporting stud 128 which may be held at any suitable angle in a split clamp 130, so that the pressure of the spring may be adjusted to the type of work.

In the utilization of a coating machine for applying a marginal stripe to shoe soles which have been reduced in the shank portion H to form an inclined surface 132 (Fig. 8), it is necessary for the nozzle to be equally adapted for coating both this portion and the forepart portion as, for example, at the line A—A. At the latter position, the lower ends of the delivery members 60 rest evenly upon the work, as shown in Figs. 5, 6 and 9. At the break between the forepart portion and the inclined portion 132, as at the point indicated by the line B—B of Fig. 8, a rigid nozzle tends to leave uncoated the small triangular portions 134 and 136, regardless of how the sole is tilted with respect to the nozzle. If, however, an articulated nozzle, such as is herein shown, is utilized, then certain of the delivery members 60, such as those at the left in Fig. 11, will coat the portion 134, while at the same time the delivery members at the right will coat the portion corresponding to 136. A third characteristic portion of the sole to be treated is represented by the line C—C in Fig. 8, and the position of the nozzle fingers will then be as indicated in Figs. 3 and 10. At this time, as well as at B—B, the angular separation between the contacting end 82 of any delivery member and the work is so slight that there is no difficulty in causing the cement to spread on the work. It should be understood, however, that an attempt to cause cement to jump a gap of any substantial size is either unworkable or so uncertain that it may not be depended upon.

In the use of the machine, a sole will be positioned beneath the nozzle and will be laid on the fingers 100, 102, whereupon the operator will depress a treadle connected to the portion 28 of the arm 24, thus raising these fingers, the lower feed roll and the adjacent supporting roll 30. The same action of the treadle serves to turn the shaft 44, thereby to open the valve 42, and the sole is fed automatically from a posi-

tion adjacent to the heel breast line on one side around the forepart to the heel breast line on the other side. During this time the edge of the sole will be held against the two gage points 74 and 76 by the cross-feed mechanism, and the various delivery members of the nozzle will adjust themselves to the changes in the surface of the sole. The stripe of coating material applied to the margin of the sole will be of substantially uniform width because of the relation of the outlet openings to the line of feed, as illustrated in Fig. 4, which follows the requirement set forth in the earlier Newhall patent. The coating will also form a complete band of uniform thickness for reasons already pointed out.

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

1. A nozzle for applying a stripe of coating material of uniform width to the margin of a sole presented progressively thereto, said nozzle comprising a support, a series of delivery members pivotally mounted thereon side by side and of progressively greater lengths, said delivery members having outlet openings in their work-contacting ends adjacent to one another and spaced a substantially uniform distance from said ends whereby said openings form a row disposed at an oblique angle to the lengths of the members, and means for conducting coating material to said outlet openings.

2. A nozzle for applying a stripe of coating material of uniform width to the margin of a sole presented progressively thereto, said nozzle comprising a series of delivery members pivotally mounted side by side and having outlet openings in their work-contacting ends closely adjacent to one another, said delivery members having their work-contacting ends arranged in echelon to bring the end of one member, which contacts with the work nearest the edge of the sole, forward of the end of that member which contacts with the work nearest the mid-portion of the sole.

3. A nozzle for applying a stripe of coating material of uniform width to the margin of a sole as the part of the sole being treated is moved approximately along a predetermined path representing a line of feed, said nozzle having a group of hingedly mounted delivery members having work-contacting surfaces and upright end faces adjacent thereto, said end faces being positioned at acute angles to the lengths of the delivery members and means for arranging said end faces in positions substantially normal to said predetermined path.

4. A nozzle for applying a stripe of coating material of uniform width to the margin of a sole, said nozzle comprising a plurality of delivery members hinged thereto on a common axis and extending forwardly in a side-by-side relation, said hinged members having their work-contacting ends arranged in echelon, and having passages terminating in outlet openings in said ends, supply tubes entering said passages, and means for supporting the upper ends of said tubes in a plane which intersects at an angle thereto said common axis of the hinge points of said members.

WILBUR L. MACKENZIE.