June 15, 1943. W. L. MacKENZIE 2,321,691

SHOE BOTTOM COATING MACHINE

Filed July 9, 1941 2 Sheets-Sheet 1

Fig. 1.

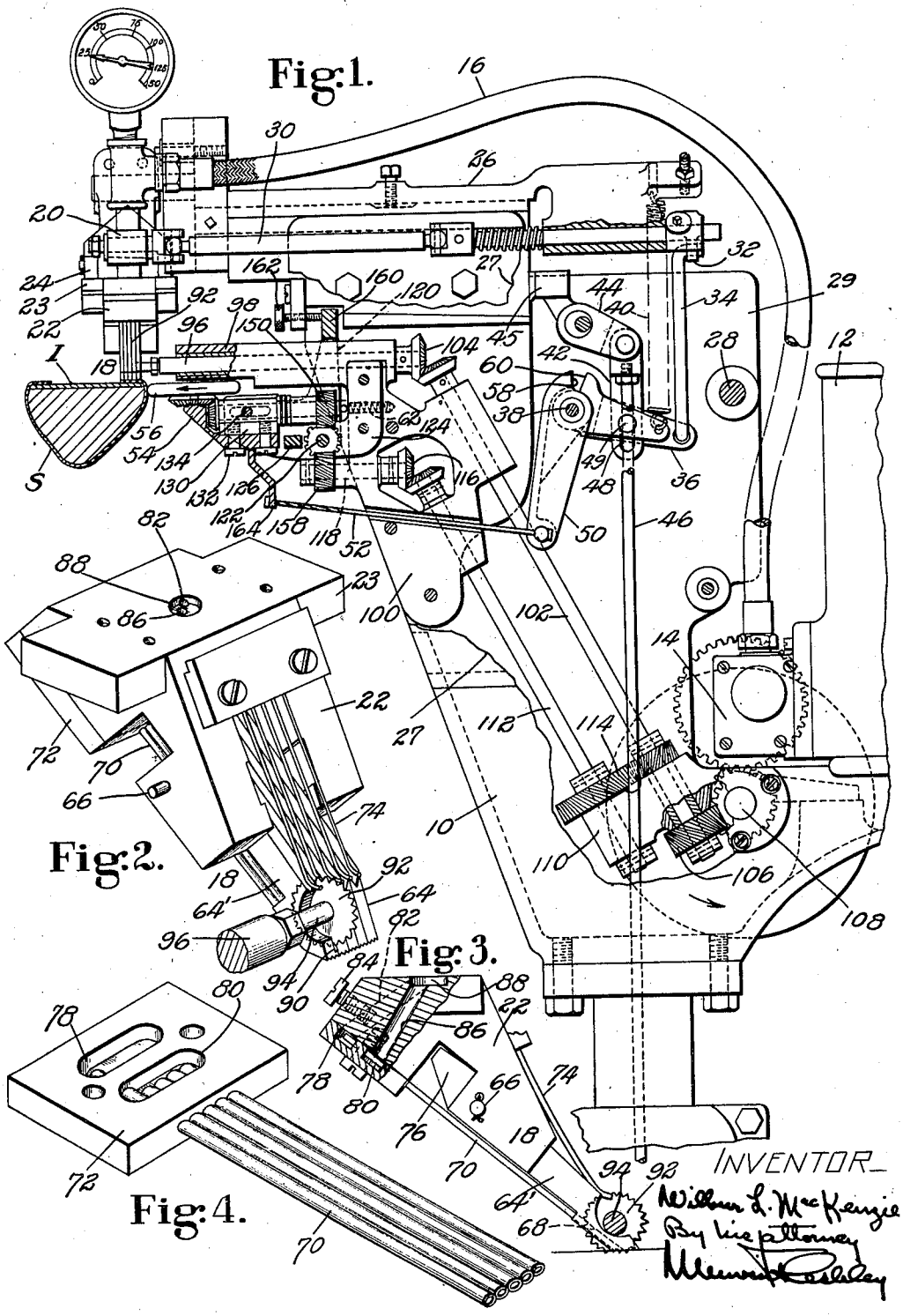


Fig. 2.

Fig. 3.

Fig. 4.

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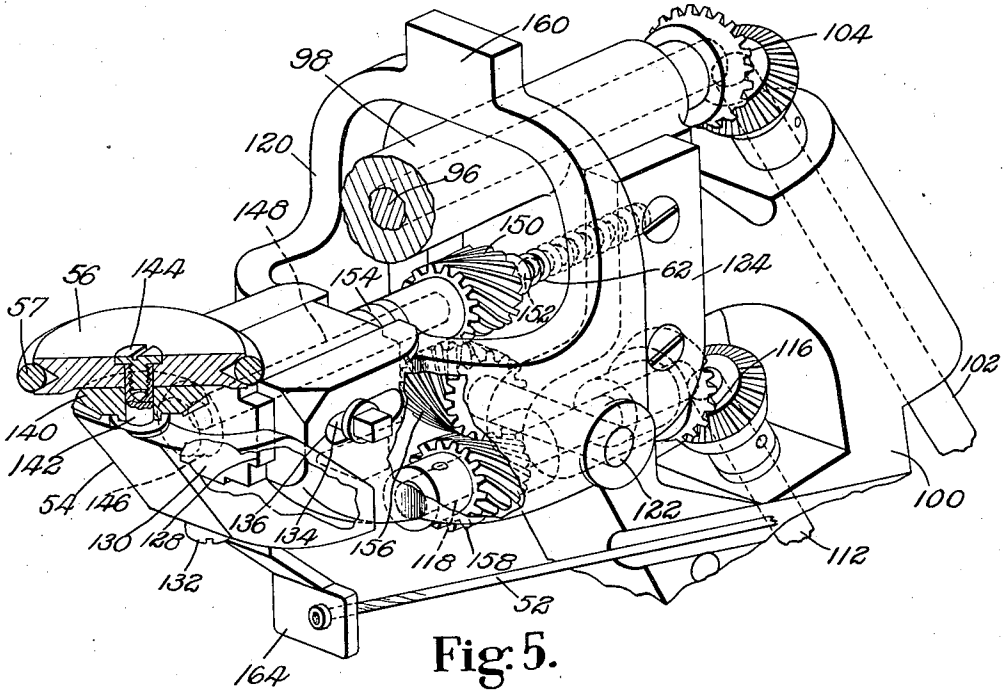


Fig. 5.

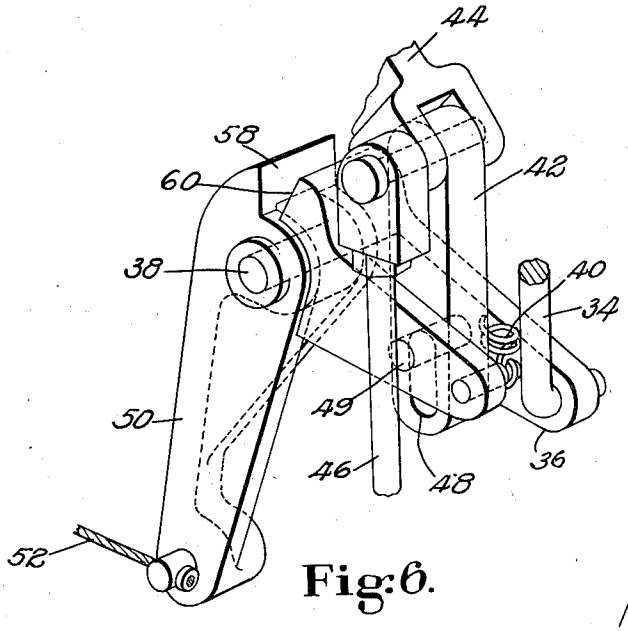


Fig. 6.

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UNITED STATES PATENT OFFICE

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SHOE BOTTOM COATING MACHINE

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Application July 9, 1941, Serial No. 401,678

16 Claims. (Cl. 12—80)

This invention relates to machines for coating the marginal portions of the bottoms of shoes and is herein illustrated in a machine which applies a band of cement intended to be used for the permanent attachment of a sole to a shoe.

In the preparation of that class of shoes in which the soles are to be attached by means of cement, there is illustrated in Letters Patent of the United States No. 2,100,341, granted November 30, 1937, upon my application, a machine for extruding a band of cement upon the marginal portion of the shoe bottom. This machine is provided with a depending flexible nozzle to the lower end of which the bottom portion of a shoe held in an inverted position is presented and a traversing movement is imparted to the shoe to carry the peripheral portion of the shoe bottom past the nozzle. This latter traversing movement is assisted by a feed wheel frictionally engaging the side of the shoe. This feed wheel is mounted for movement laterally of the nozzle into and out of shoe-contacting relation and can yield as the contour of the side of the shoe changes.

It is an object of the invention to provide an improved machine of this type in which the progressive movement of the shoe may be more readily accomplished and may be carried out more positively so that the band of cement on the margin of the shoe will be uniform about its periphery.

In accordance with one feature of the invention, the machine herein illustrated is provided with a yielding nozzle of the articulated type associated with which is a driven disk interposed between sections of the nozzle. The latter is made up of a plurality of downwardly and forwardly sloping hollow delivery members having outlet openings at their lower ends through which cement is extruded on the shoe bottom. As in other nozzles of this type, the delivery members are thin members, individually yieldable and arranged side by side to deposit narrow stripes or threads of the coating material which merge to form a marginal band of the desired width. If the work is presented at a regular speed, such nozzles may be depended upon to apply a uniform coating. If, however, the speed of the movement of the work varies from one portion of the shoe to another, then, more cement will be applied per unit of area when the feeding movement of the work slows down. Accordingly, the driven disk has a serrated periphery engaging the bottom of the shoe and imparting a positive feeding movement which serves to bring about the desired result and, at the same time, being driven about a fixed axis, limits the upward movement of the nozzle members by its engagement with the shoe and thus prevents breakage of the nozzle parts if the shoe is raised too forcibly into contact therewith.

A driven feed wheel for engagement with the side of the shoe is useful in that it helps the operator to gage the work so that the band of cement will be applied in just the desired relation to overlie the margin of the insole with its edge coinciding as near as possible with the feather line. Accordingly, another feature of the invention resides in an improved mounting for such a lateral feed wheel which permits it to move laterally to accommodate differences in the relation between the plane of the bottom of the shoe and the side thereof; between, for example, the forepart portion and the shank portion. As the inner side of the shoe at the shank portion is presented to this lateral feed wheel, the latter must move farther away from the nozzle than is the case when the forepart portion is presented thereto. As herein illustrated, a block is slidably mounted for movement substantially horizontally in a tiltable bracket. A spring resists the sliding movement of the block, and the bracket is permitted to have limited tilting movement so that the relation between the two feed members, here shown as a feed disk and a feed wheel, can be adjusted to the particular style of shoe being treated.

These and other features of the invention will best be understood from a consideration of the following description 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 and showing a transverse section through the forepart of a shoe held in operative position;

Fig. 2 is an angular view, on a larger scale, looking at the upper side of an articulated nozzle one of the delivery members of which is cut away to receive a disk-like feed wheel;

Fig. 3 is a side elevation of the nozzle and this feed wheel, and has a portion broken away to illustrate passages through which cement is supplied to the delivery members;

Fig. 4 is an angular view of a plate supporting tubes through which the cement is supplied to the delivery members, this plate having recesses which cooperate with the respective passages of the nozzle;

Fig. 5 is an angular view of the mounting for the lateral feed wheel; and

Fig. 6 is an angular view on a large scale showing a portion of a treadle connection to a nozzle valve and to the slidable feed wheel mounting.

As in the patented machine, there is supported on a column a frame 10 carrying a cement receptacle 12 from which cement is delivered under pressure by a pump 14 through a flexible pipe 16 to a nozzle 18. A control valve 20 is interposed between the pipe and the nozzle. The nozzle comprises a block 22 with flanges 23 held by a clamp 24 on the outer end of an arm 26 which is capable of limited tilting movement about a pin 28 extending between two spaced plates 27 and 29 at the top of the frame 10. On this arm 26 is journaled a jointed valve-operating rod 30 on the inner end of which is mounted a rearwardly extending lever 32 joined by a rod 34 to a two-arm lever 36 which is pivoted on a pin 38 extending between the side plates of the frame. This lever 36 (see also Fig. 6) is urged upwardly by a spring 40 joined to its shorter arm and, interposed between the arms, is a slotted link 42 hanging from a hinged arm 44 and connected to a treadle rod 46. The slot 48 in this link 42 provides a lost-motion connection the purpose of which will later appear.

Also pivoted on the pin 38, in my improved machine, is a lever arm 50 the lower end of which is joined by a cable 52 to a slidably mounted carrier block 54 supporting a lateral feed wheel 56. This lever arm 50 has an abutment 58 adapted to cooperate with an opposing abutment 60 on the two-arm lever 36. During operation of the machine, these abutments are separated to permit free control by the work of the position of the feed wheel 56. The treadle rod is here shown in its depressed position, determined by engagement of the left end of the arm 44 with a stop 45 on the frame, and the machine has the valve 20 open and the block 54 free to slide to permit the feed wheel 56 to be pressed by a spring 62 against the side of a shoe S being presented in inverted position to the lower end of the depending nozzle 18. At the completion of an operation on the shoe, the operator releases the treadle rod, thereby shutting the valve 20 and then the two-arm lever 36 is raised further by the spring 40 until the abutments 58 and 60 come into contact and turn the lever arm 50 to draw the sliding carrier block 54 inward so as thereby to withdraw the feed wheel 56 from the work. Another spring (not shown) is provided for raising the treadle rod 46 and when the next shoe is presented for treatment depression of the rod will free the block 54 for movement under the impulse of the spring 62 to carry the feed wheel 56 into contact with the side of the shoe and then will open the valve 20 to start the flow of cement.

The construction of the nozzle 18 is similar to that illustrated in Letters Patent of the United States No. 2,177,666, granted October 31, 1939, on an application of W. L. MacKenzie et al. Such a nozzle is commonly called an articulated nozzle and it is made up of a plurality of thin plate-like delivery members 64 placed side by side upon a pivot pin 66 traversing a forked portion of the block 22. The lower ends or terminals of these delivery members have outlet openings at the lower ends of passages 68 (Fig. 3) in which are slidably received the ends of flexible delivery tubes 70 supported by a recessed plate 72 attached to the lower side of the nozzle block 22. Springs 74 are provided urging these delivery members downwardly to a limit determined by engagement of upper ends 76 with a portion of the block. The upper end of the nearest of these tubes 70 (Fig. 4) opens into a recess 78 in the plate 72, while the other tubes terminate in a recess 80 therein. The recess 78 communicates with a passage 82 controlled by a screw 84, while the other recess 80 communicates with a passage 86 in the nozzle block 22. When the nozzle is in position in the machine, the upper ends of these passages 82 and 86 communicate with a shallow recess 88 which is fed with cement under pressure through the valve 20. That delivery member 64' which is positioned to apply cement to the outermost portion of the margin of the shoe bottom is recessed laterally, as indicated at 90, to allow a thin disk-like, serrated feed wheel 92 to be positioned between it and the next adjacent delivery member with the teeth of the wheel engaging the shoe bottom substantially in transverse alinement with the outlet openings at the lower ends of the delivery members. The feed wheel 92 has a supporting stud 94 threaded in the end of a shaft 96 which is journaled in a bearing 98 rigidly secured between the side plates of the frame. Upward movement of the shoe is therefore limited by this feed wheel and breakage of the nozzle parts by undue work pressure is avoided. The bearing 98 constitutes a portion of a block 100 in which there is journaled the upper end of a shaft 102 connected by miter gears 104 to the shaft 96 and driven by means of a skew gear 106 from a worm wheel on a drive shaft 108 of the machine. Also journaled in this block 100 and in another block 110 which is supported on the drive shaft 108 is a parallel shaft 112 connected to receive power from the shaft 102 by means of gears 114 and joined by miter gears 116 to a counter shaft 118 also journaled in this block 100.

To support the sliding block 54 carrying the feed wheel 56, there is a hollow casting 120 having side members joined by a top member. The casting 120 is pivotally supported on a cross pin 122 received in J-shaped hangers 124 (Figs. 1 and 5) which are secured by screws to the carrying block 100. This casting 120 has a cross strut 126 and a forked left-hand end grooved to receive similar ribs 128 on the sides of a slide 130 to which the carrier block 54 is attached by screws 132. Movement of the slide block 130 in the arms of the casting 120 is limited by the cooperation of shoulder screws 134 with duplicate slots 136 in the arms of the casting 120. The feed wheel 56 (Fig. 5), which has a rubber tire 57, has a miter gear 140 fastened to it, and the feed wheel and the miter gear are rotatably mounted upon an upright stud 142 secured to the block 54. They are held upon this stud by a screw 144. This miter gear 140 meshes with another miter gear 146 mounted on the end of a shaft 148 which is journaled in the sliding block 130 and to the other end of which is pinned a helical gear 150. The spring 62, as previously mentioned, operates to press the shaft 148 and the block 130 along with the feed wheel 56 to the left, as shown in Figs. 1 and 5, and a ball 152 is interposed between the spring and the end of the shaft. Between the hub of the helical gear 150 and the block 130 is a thrust bearing 154. Power is transmitted to this shaft 148 through the helical gear 150 which meshes with another helical gear 156 rotatable upon the pin 122 and meshing in turn with a helical gear 158 secured to the countershaft 118. On the top member of the casting 120 is a lug 160 which cooperates with an

adjustable stop screw 162 threaded in the frame and this serves to limit the tilting movement of the casting around the pivot 122. By adjusting the screw 162 the heightwise relation between the upper feed wheel 92 and the lateral feed wheel 56 may be adjusted. The previously-mentioned cable 52 is attached to an arm 164 depending from the carrier block 54. It will be seen therefore that the lateral feed wheel 56 is arranged not only for heightwise movement with respect to the other feed wheel as the casting 120 is tilted around the pivot pin 122 but it is also mounted for horizontal sliding movement against the tension of the spring 62 thereby enabling it more readily to accommodate the changing relation between the nozzle and the side of the shoe as the point of application progresses from the forepart portion to a shank portion thereof. This is especially marked at the inner side of the shoe.

In using the machine, an inverted shoe is presented to the nozzle 18 and to the upper feed wheel 92 as the treadle attached to the rod 46 is depressed to allow the lateral feed wheel 56 to be moved against the side of the shoe and then to open the valve 20. The guiding and feeding of the shoe are greatly facilitated by the use of these two feed members 92 and 56 and they enable the operator to place the band of cement exactly upon the margin of the overlasted upper with its outer edge registering with the edge of the insole I. As the end of the shoe is reached, it is dropped away from the nozzle and the treadle 46 is released to pull away the lateral feed roll 56 and to shut the valve 20 so that coating material will not drip either upon the floor or upon this feed wheel 56.

Having thus 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 coating applying nozzle having yieldable sections, the downwardly extending terminals of which have outlet openings, and a work contact member rotatable between the nozzle sections adjacent to said outlet openings, said member serving to limit upward movement of the work toward the terminals such as would tend to cause undue displacement of said sections.

2. In a shoe-coating machine, a yieldable coating extruding device to which a shoe may be presented, a feed wheel for engagement with a surface of the work coated by said extruding device, a feed wheel for engagement with a work surface lying at an angle to the coated surface, and means for rotating the feed wheels.

3. In a shoe-bottom-coating machine, a nozzle having a plurality of adjacent applying members coacting to deposit a band of coating material on the margin of a shoe bottom, and a feed wheel interposed between said applying members and arranged for engagement with the shoe bottom.

4. In a shoe-bottom-coating machine, a nozzle having a plurality of individually yieldable, adjacent delivery members for depositing merging stripes of coating material to form a marginal band upon a shoe bottom, a member for engagement with the side of an inverted shoe presented to said nozzle, and a driven feed wheel adjacent to a delivery member for engagement with the bottom of the shoe.

5. In a shoe-bottom-coating machine, a nozzle for depositing a band of coating material upon the margin of the bottom of an inverted shoe, a yieldably mounted, driven feed roll engaging the side of said shoe, and a driven feed roll engaging the marginal portion of the shoe bottom closely adjacent to the point of delivery of the coating material.

6. In a shoe-coating machine, a nozzle for depositing a band of coating material upon the irregular surface of the shoe bottom, said nozzle comprising a plurality of delivery members yieldably mounted side by side and having outlet openings in a row to apply threads of cement which merge to form a band, and a driven feed wheel disk contacting the work between two of said delivery members at a point substantially in line with the row of outlet openings of the adjacent members.

7. In a shoe-coating machine, a nozzle for depositing a band of coating material upon the irregular surface of the shoe bottom, said nozzle comprising a plurality of delivery members yieldably mounted side by side to apply threads of cement which merge to form a band, and a driven, thin, disk-like feed wheel contacting the work between two of said delivery members and substantially in line with the points of contact of adjacent members with the work, one of said delivery members being laterally recessed to receive the thin, disk-like feed wheel.

8. In a shoe-bottom-coating machine, a depending nozzle for applying a marginal band of coating material upon the bottom of an inverted shoe lifted into contact with the outlet end of the nozzle, said nozzle comprising a plurality of hinged delivery members having outlet openings adjacent to their lower ends arranged closely adjacent to one another to deposit merging stripes of coating material, yieldable means for pressing said members into engagement with the work, that member which contacts the work nearest the periphery of the work being cut away, and a thin feed disk contacting the shoe bottom and positioned in the cut-away portion of said last-mentioned delivery member and having a drive shaft overlying said delivery member.

9. In a shoe-bottom-coating machine, coating means, and driven feed wheels for carrying a shoe past said coating means arranged for engagement with adjacent, angularly related surfaces of the shoe, one of said feed wheels being yieldable with respect to the other feed wheel.

10. In a shoe-bottom-coating machine, coating means, a feed wheel positioned for engagement with the bottom of an inverted shoe presented to said coating means, and another feed wheel positioned for engagement with the side of said shoe, one of said feed wheels being mounted for yielding movement heightwise of the shoe and laterally thereof.

11. In a shoe-bottom-coating machine, coating means having an exposed lower portion to which a shoe bottom may be presented with the shoe held in inverted position, a driven feed wheel engaging the marginal portion of the shoe bottom adjacent to said coating means, and a feed wheel frictionally engaging the side of said shoe and mounted for movement in a direction heightwise of the shoe bottom and for movement toward and away from the side of the shoe.

12. In a shoe-bottom-coating machine, coating means to the under side of which the bottom of an inverted shoe may be presented, said coating means being yieldable heightwise of the shoe bottom, a driven feed wheel for engagement with the marginal portion of the shoe bottom adjacent to the coating means, and a driven feed wheel engaging the side of said shoe, said latter

feed wheel being mounted for sliding movement toward and away from the side of the shoe.

13. In a shoe-bottom-coating machine, coating means for applying a marginal band to the bottom of a shoe presented in an inverted position to the said coating means, a feed wheel for engagement with the marginal portion which is to be coated, said coating means being yieldable heightwise of the shoe bottom, and a bearing on the machine supporting said feed wheel for rotation in a fixed location thereby to limit the upward yield of the applying means.

14. In a shoe-bottom-coating machine, coating means for applying a marginal band to the bottom of a shoe presented in an inverted position to the said coating means, a feed wheel for engagement with the marginal portion which is to be coated, said coating means being yieldable heightwise of the shoe bottom, a bearing on the machine supporting said feed wheel for rotation in a fixed location thereby to limit the upward yield of the applying means, a feed wheel mounted for rotation on an axis substantially normal to the axis of rotation of the fixed feed wheel to frictionally engage the side of a shoe presented to the coating means, and a tiltably mounted bracket for supporting said latter feed wheel to permit limited heightwise movement thereof with respect to the fixed feed wheel.

15. In a shoe-bottom-coating machine, coating means for applying a marginal band to the bottom of a shoe presented in an inverted position to the said coating means, a feed disk for engagement with the marginal portion which is to be coated, said coating means being yieldable heightwise of the shoe bottom, a bearing supporting said feed wheel for rotation in a fixed location thereby to limit the upward yield of the applying means, a feed wheel mounted for rotation on an axis substantially normal to the axis of rotation of the fixed feed wheel to frictionally engage the side of a shoe presented to the coating means, a tiltably mounted bracket for supporting said latter feed wheel to permit limited heightwise movement thereof with respect to the fixed feed wheel, said latter feed wheel being slidably mounted in said tiltable bracket in a direction toward and away from the side of the shoe, and yielding means for pressing said slidably mounted feed wheel toward the shoe.

16. In a shoe-bottom-coating machine, an applying nozzle, means for delivering coating material to said nozzle under pressure including a control valve, a feed wheel for engagement with the bottom of the shoe closely adjacent to said nozzle, a lateral feed wheel for engagement with the side of the shoe, means slidable toward and away from the side of the shoe supporting said lateral feed wheel, and operator-controlled means for closing said valve and sliding the lateral feed wheel away from the side of the shoe.

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