Jan. 12, 1943. J. R. J. IOANNILLI 2,307,793

MACHINE FOR COATING CHANNELS IN SHOE PARTS

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Fig 2.

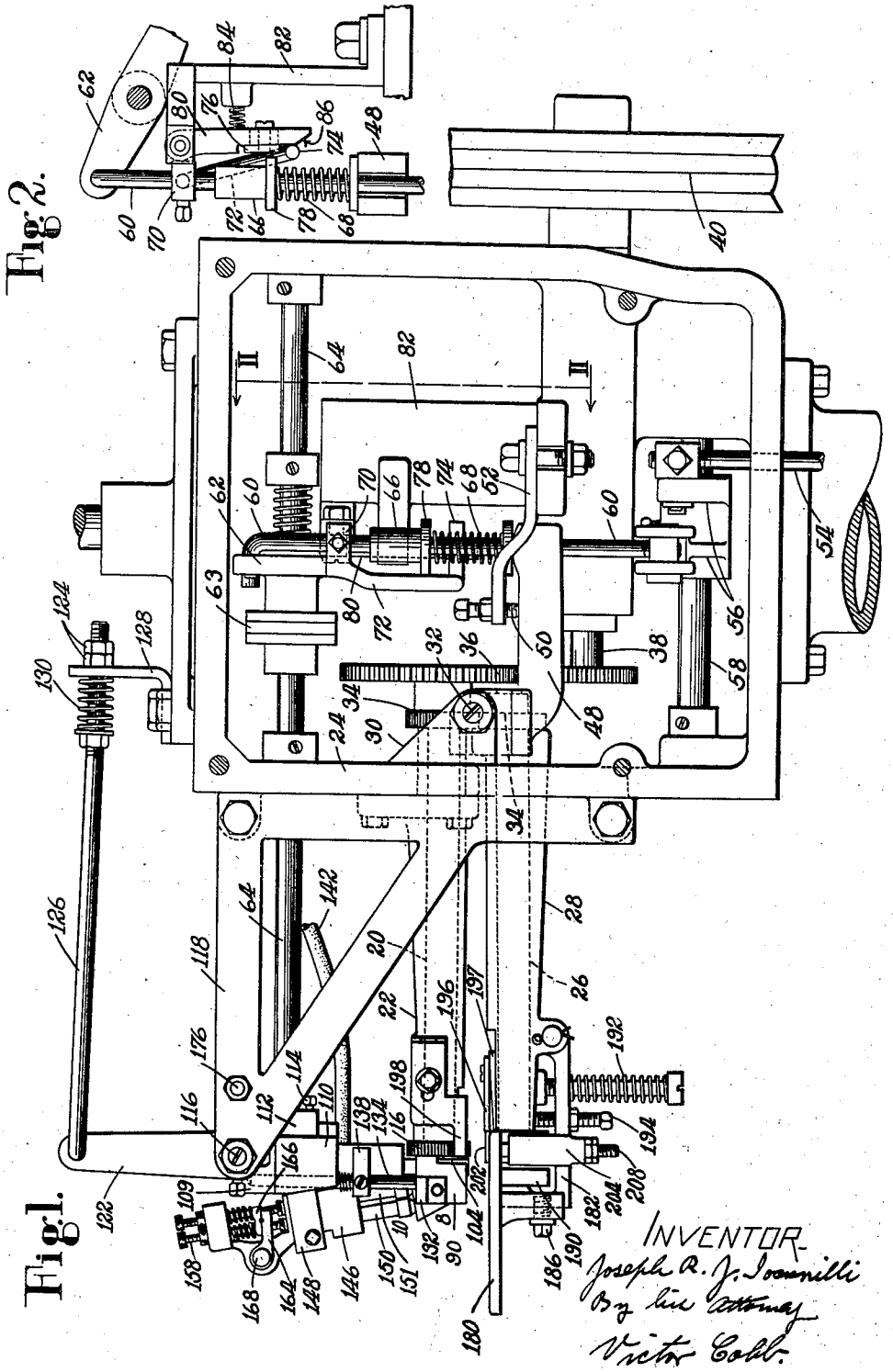


Fig 1.

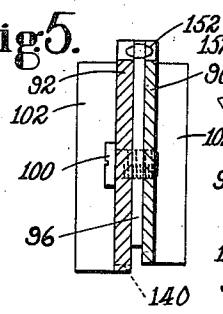
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Fig. 5.



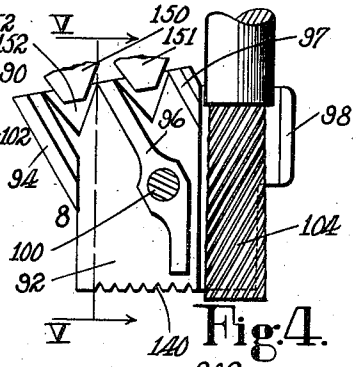


Fig. 4.

Fig. 3.

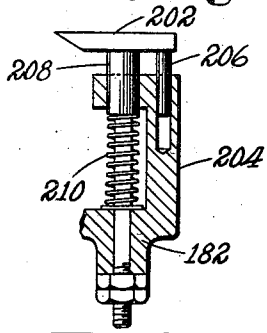


Fig. 6.

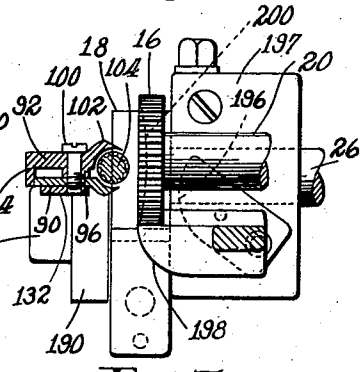


Fig. 7.

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Patented Jan. 12, 1943 2,307,793

UNITED STATES PATENT OFFICE

2,307,793

MACHINE FOR COATING CHANNELS IN SHOE PARTS

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Application November 22, 1940, Serial No. 366,645

11 Claims. (Cl. 12—80)

This invention relates to the coating of adjacent angularly related surfaces of pieces of work and is herein illustrated as embodied in a machine designed to apply coating material for the attachment of a strip of reinforcing canvas to the inside of the rib of an insole and to a portion of the adjacent surface or mid-portion.

For many years insoles for welted shoes have been prepared by first forming adjacent channels around the margin of the insole, turning up and sticking together the lips provided thereby to make a rib, and in then attaching reinforcing canvas, such as Gem duck, to the inside of the rib and to the whole of the intermediate surface or mid-portion. Various coating materials or cements have been employed for this purpose and, according to one system, pressure-sensitive cements are applied to a face of the canvas and the corresponding surface of the insole. The canvas is then applied and "formed in" or pushed into the corner between the mid-portion and the rib, after which the portion of the canvas which projects beyond the top of the rib must be trimmed off. More recently it has been proposed to avoid the use of reinforcing material which extends across the whole mid-portion space between the ribs and to apply to the insole, in place of this, strips of fabric which are flush with the top of the rib and extend across the inside channel and an adjacent portion of the middle of the insole far enough to avoid any danger that the inner edge of the fabric strip will be caught by the needle of the inseam sewing machine. This avoids the trimming of the canvas at the top of the rib and saves material, because the reinforcement of the mid-portion of the insole is usually unnecessary, it having been found that this portion is not commonly stretched or distorted by any of the strains which are ordinarily applied to it during lasting or other shoemaking processes. The application of a coating of adhesive to the insole in the desired location has been effected by means of spray guns to which the insoles are either manually or mechanically presented, but this involves difficulties in controlling the extent of the area coated and the quantity which is applied.

Accordingly, it is an important object of the invention to provide an improved machine by means of which coating material may be expeditiously and accurately applied to the angularly related surfaces under consideration.

To this end, and in accordance with features of the invention, the coating material is flowed upon the work through a nozzle the outlet opening of which is subdivided into sections and is provided with separate control means for regulating the flow of material through said sections. As herein illustrated, the nozzle is provided with a rotary applying member which coats the rib of the insole and which is also utilized to press it against the lateral face of a work-feeding roll. This applying member is provided with helical flutes which help to spread the coating material across the whole height of the rib.

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

Fig. 1 is a side elevation of the head of the machine with a cover removed to show those parts which are within a hollow frame;

Fig. 2 is a section on the line II—II of Fig. 1 looking at the right side of a treadle-latching mechanism;

Fig. 3 is an elevation partly in section, and on a larger scale, of the operating tools including coating and work-feeding devices;

Fig. 4 is a view of the nozzle and its co-acting spindle with the cover of the nozzle removed;

Fig. 5 is a vertical section through the nozzle on the line V—V of Fig. 4 but showing the cover of the nozzle in place;

Fig. 6 is a vertical section on the line VI—VI of Fig. 3 to show a yielding work-supporting plate; and

Fig. 7 is a horizontal section on the line VII—VII of Fig. 3 taken through the nozzle and looking down upon the feed wheels and the work guides.

The machine under consideration is particularly intended for use in the treatment of insoles I (Fig. 3) having an upstanding rib R formed by channeling the insole and turning up and sticking together the two lips thus separated from the body of the work. The margin outside of the rib is termed a feather F. For the purpose described above, the machine is arranged to apply a coating material, such as latex, by means of a nozzle 8 supplied through valves 10, to a portion of the flat mid-portion 12 of the insole and also to the channel 14 from which one of the lips was removed and to the upstanding face of the inside of the rib R. During this coating operation, successive portions of the insole are presented to the nozzle by means of co-acting feed wheels 16 and 18 (Fig. 7) which grip the opposite faces of the feather F. The feed wheel 16 is carried on a shaft 20 which is jour-

naled in an arm 22 secured to the outside of a hollow frame 24. The co-acting feed wheel 18 is carried on a shaft 26 which is journaled in an arm 28 tiltably mounted upon brackets 30 (Fig. 1), forming part of the frame, which are provided with pivot screws 32. These shafts 20 and 26 are interconnected by gears 34, and the upper shaft 20 is gear-connected at 36 to a drive shaft 38 having fast and loose pulleys 40. This tiltable arm 28 has an inward extension 48, and the downward movement of the arm 28 is limited by contact of the extension with a stop screw 50 carried by a bracket 52. When, on the other hand, it is desired to grip a piece of work, then the arm 28 is tilted clockwise by depressing a treadle attached to a treadle rod 54. This treadle rod is connected to one of two arms 56 on a shaft 58, and from the other of these arms there extends upwardly an operating rod 60 which is connected at its upper end to an arm 62 secured by a slip clutch 63 to a valve-operating shaft 64. On the rod 60 there is a freely slidable sleeve 66 which rests upon a spring 68 co-acting with a washer which bears upon the upper side of a forked end of the extension 48. Attached to the rod 60 is a collar 70 which is held thereon by a set screw and which has a depending portion 72 with an inward extension 74. When the treadle is depressed, the collar 70 on the rod 60 will be pulled down until it contacts with the upper end of the sleeve 66, and then, acting through the spring 68, it will raise the arm 28 carrying the lower feed wheel 18. As soon as the sleeve 66 has moved far enough down, it will be caught and held by the engagement of a latch plate 76 (Fig. 2) with an enlargement 78 upon the sleeve. The latch plate is carried upon a hanging arm 80 pivotally mounted upon a bracket 82 and pressed toward the sleeve 66 by a spring 84. Thus, as long as the operation on an insole is continued, the engagement of the feed rolls with the work is maintained by this latching mechanism and the operator will control the flow of latex through the nozzle 8 by holding down the treadle and keeping open the valves 10 by means of a connection to be described. As the end of the rib on the insole is approached, it is desirable to shut off the flow of latex before the feed is released so that any surplus in the nozzle will be used up. This is accomplished by releasing the treadle, thus permitting upward movement of the treadle rod by a spring (not shown), without disturbing the feed mechanism until the extension 74 contacts with a cam surface 86 on the lower end of the hanging arm 80. This will push aside the latch plate 76, allowing the spring 68 to expand and the lower feed roll 18 to drop. The latch plate 76 may be adjusted heightwise of the arm 80 (Fig. 2) by a screw and slot connection. It will also be noted that the arrangement just described permits the flow of latex to be started through the valves 10 just before the feed wheels 16 and 18 grip the work, thus insuring a coating of the desired thickness from the very start of the operation.

The nozzle 8 is made up of two plate-like parts which will be arbitrarily named a body 92 (Figs. 4 and 5) and a cover 90. The body 92 has ribs 94, 96, 97 and 98 and the cover 90 is secured by a screw 100. The rib 96 serves as a partition to divide the outlet opening of the nozzle into two sections. The part to the left of rib 96 delivers coating material to the insole surface 12. Between the ribs 97 and 98 the nozzle halves are bulged as at 102 (Fig. 7) to surround the upper portion of a fluted spindle 104 which covers the other section of the outlet opening. The lower portion of this spindle is provided with helical flutes and is arranged to rest against and coat the inner face of the rib R, and its lower end is seated in the channel 14 which will also be coated. Coating material is supplied to the spindle 104 through that part of the nozzle opening at the right of the rib 96. This spindle is journaled for free rotation in a carrier 110 and at its upper end is provided with ball bearings 106. The carrier 110 is adjustable heightwise upon a support 112 to which it is joined by a dovetail connection and is held in place thereon by a set screw 114. The support 112 is tiltable upon pins 116 extending inwardly from parallel brackets 118 and 120 which are carried upon the hollow frame 24. The support 112 has an upwardly extending arm 122 connected to a rod 126. This rod passes through a bracket 128 on the frame and is spring-pressed to the left by a spring 130 to a variable limit determined by nuts 124 (Fig. 1) so as normally to hold the fluted spindle 104 firmly against the inner face of the rib R. Since there may be variations in the depth of the channel 14 in different pieces of work, the nozzle 8 is yieldable heightwise and, to this end, it has an outward projection 132 on which is secured a rod 134 slidable in the upper portion of the carrier 110 and in an extension 109 thereof. The rod 134 is yieldably urged downwardly to hold the nozzle in contact with the surface 12 of the mid-portion of the insole by a spring 136 surrounding this rod and bearing against a guide arm 138. This guide arm bears against the carrier 110 and prevents twisting of the nozzle sufficient to cause it to bind on the fluted spindle 104.

It will be seen from Fig. 5 that the nozzle body 92 extends lower than the cover plate 90 and that the lower edge of this body 92 is serrated at 140 so as better to spread the coating material upon the surface 12 of the insole.

The coating material to be applied by the nozzle is supplied to it by gravity through a flexible hose 142 leading to valves 10 by way of a chamber 144 (Fig. 3) in a valve casing 146 which is supported in proper relation to the nozzle 8 by being clamped by arms 148 extending outwardly from the carrier 110. From the chamber 144, the coating material flows downwardly through valve tubes 150, 151 the conical lower ends of which are received in recesses 152 (Figs. 4 and 5) formed at the upper edges of the nozzle members 90 and 92 and consequently there is no interference between the valve tubes and the nozzle as the latter rides upon the work. The outflow of coating material from the tubes 150, 151 is controlled by valve rods 154 which are pointed at their lower ends to cooperate with the conical ends of the tubes to close them when the treadle is released. These valve rods are slidably mounted in the valve casing 146 and, after passing through stuffing boxes 156, they cooperate with adjustable stop screws 158 in the upper portion of the casing 146. These stop screws limit the opening movement of the valve rods and permit separate adjustment of the quantities of coating material which are delivered to the two sections of the nozzle lying on opposite sides of the partition rib 96. This makes it possible for the operator to determine separately the quantity of material which is applied to the channel 14 and the associated rib R, on the one hand, as compared with the amount which is applied to the surface

12 of the insole, on the other hand. These valve rods 154 are urged downwardly by springs 160 bearing against collars 162 which are secured to the rods. They are shown in Fig. 3 in their upper positions to which they have been lifted by a forked arm 164 the ends of which underlie a pin extending across a sort of double-forked whiffletree 166. This whiffletree has rounded surfaces underlying the collars 162 and when the arm 164 is turned counterclockwise, an equalized lifting force is applied to the rods. The arm 164 is mounted on one end of a pivot 168 extending through an intermediate portion of the member which forms the valve casing 146, and fastened to the other end of the pivot is a long arm 170 which overlies at its right end (Fig. 3) an arm 172 extending forwardly from the valve-operating shaft 64. Downward movementof this forwardly extending arm 172 is limited by a stop 174 which hangs from a cross-rod 176 traversing the two brackets 118 and 120. When the treadle is depressed, the arm 172 is raised to open the valves 10.

The insole I rests upon a table 180 which is mounted for heightwise adjustment at the outer end of an arm 182 (Fig. 3) pivoted at 184 to the arm 28 carrying the lower feed roll 18. The table is clamped to this arm 182 by means of a screw 186. The arm 182 is provided with an anti-friction work-supporting roll 190 which directly underlies the channeled portion 14 of the work, and the arm 182 is urged upwardly by a spring 192 to a limiting position determined by a stop screw 194.

The work is guided through the machine partly by bringing the edge of the insole against a gage plate 196 (Fig. 7) and partly by the cooperation of the rib R with the rounded surface 198 upon another gage which is adjustably mounted upon the arm 22. The gage plate 196 is attached to a plate 197 which is carried upon the lower arm 28. It will be seen from Fig. 3 that the end face of the feed roll 16 is made concave, as indicated at 200, so as to reduce the friction between this roll and the side of the rib. At the same time, the very lowest portion of the rib is lightly gripped, by the action of spring 130 (Fig. 1), between the lower end of the fluted roll 104 and the lower edge of the feed roll 16. Inasmuch as the rib R is quite flexible and does not always stand directly upright, there is some danger that it will ride under the gage 198 and the feed roll 16, and to avoid this tendency, a yieldably mounted support 202 is positioned in a recess of the table 180 directly below the curved edge 198 of the rib gage. This support 202, guided for vertical movement in an upwardly projecting portion 204 (Figs. 3 and 6) of the arm 182 by means of pins 206 and 208, is pressed up against the work by a spring 210.

In the use of the machine, successive insoles will be presented to the machine, each with the toe end toward the operator, and the free end of the rib R, adjacent to the heel end of the insole, will be inserted between the fluted roll 104 and the upper feed roll 16. The operator then, by depressing the treadle, will raise the lower arm 28 to bring up the supporting members and to grip the feather F of the insole between the feed rolls 16 and 18. The timing of the mechanism is such that the valves 10 will be opened before the work is gripped by the feed rolls, thus giving the coating material a chance to flow down into the nozzle 8 and into contact with the work just as the latter starts to move along. The work-supporting arm 28 will be latched in its uppermost position, as shown in Fig. 3, by means of the engagement of the latch 76 with the flange 78 (Fig. 2). Before the end of the piece of work is reached, the operator will release the treadle, thereby closing the valves 10 by reason of upward movement of the rod 60, and this will take place prior to the time when the lower feed roll 18 is dropped by the action of the depending member 72 upon the cam surface 86 at the lower end of the latch arm 80. During the progressive movement of the insole past the nozzle 8, the coating material will be spread upon the mid-portion 12 by the serrated edge 140 of the nozzle at the leaving side thereof and the coating material will be spread upon the whole heightwise extent of the inner surface of the rib R by the fluted spindle 104 as the latter is turned by contact with the rib.

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 machine for coating angularly related adjacent surfaces upon pieces of work, a nozzle having outlets along angularly related sides to apply coating material to said angularly related surfaces, said nozzle being provided with a rotary applying member pivotally supported with one portion of its periphery adjacent to and arranged to receive coating material from one of said outlets to apply it to one of said surfaces as relative movement between the work and the nozzle permits the latter to treat the work progressively.

2. In a machine for coating angularly related adjacent surfaces upon pieces of work, a nozzle having an outlet constructed and arranged to apply coating material to one of said surfaces, said nozzle also being provided with an opening substantially covered by a fluted, rotatable applying member positioned thereon to receive coating material through the nozzle and having an exposed portion to contact with and to coat the other of the surfaces of a piece of work presented progressively thereto.

3. In a machine for coating soles having an upstanding rib, a sole support, an abutment supporting said rib, a rotatable applying member, means for pressing said applying member laterally against the side face of the rib opposite said abutment, a nozzle having dual outlets one of which coacts with said applying member to supply coating material thereto, and means for resiliently holding together the other outlet of said nozzle and the surface of a sole resting on said support.

4. In a machine for coating soles having an upstanding rib, a nozzle constructed and arranged to apply coating material to the surface of the sole and to the side face of the rib thereon, the outlet opening of said nozzle being divided into sections, valves, normally spring closed, for controlling the flow of coating material to the respective sections, and operator-controlled means for opening said valves.

5. In a machine for coating soles having an upstanding rib, a nozzle constructed and arranged to apply coating material to the surface of the sole and to the side face of the rib, said nozzle being divided into sections, valves for controlling the flow of coating material to the respective sections, and operator-controlled means for simultaneously opening said valves.

6. In a machine for coating soles having an upstanding rib, work-feeding mechanism, means including a nozzle constructed and arranged to

apply coating material to the surface of the sole and to the side face of the rib, said nozzle being divided into sections, spring-closed valves for controlling the flow of coating material to the respective sections, and operator-controlled means for opening said valves and controlling said feeding mechanism to operate them in timed relation.

7. In a machine for coating soles having an upstanding rib, a nozzle constructed and arranged to apply coating material to the surface of the sole and to the side face of the rib thereon, said nozzle being divided into sections, means for supplying coating material to said sections including separate valves therefor, operator-controlled means for opening said valves, and an adjustable stop controlling the extent of opening movement of one of said valves.

8. In a machine for coating soles having an upstanding rib, a nozzle constructed and arranged to apply coating material to the surface of the sole and to the side face of the rib thereon, said nozzle being divided into sections, means for supplying coating material to said sections including individual valves controlling the flow of said material, springs tending to close said valves, an adjustable stop for one of the valves, operator-controlled means for opening said valves, and an equalizing device between said means and said valves.

9. In a machine for coating the channel and one face of the rib of a sole, a support for the sole, a feed wheel coacting with the margin of the sole outside of the rib, means including a nozzle for delivering coating material to the inside of the rib and provided with a rotatable member contacting with the rib to press it against the feed wheel, and means for holding said nozzle against the work.

10. In a machine for coating the channel and one face of the rib of a sole, a support for the sole, a feed wheel coacting with the margin of the sole outside of the rib, means including a nozzle for delivering cement to the inside of the rib and provided with a rotatable member contacting with the rib to grip it against the feed wheel, means for holding said nozzle against the work, and means for moving said nozzle toward the feed wheel to grip the rib.

11. In a machine for coating soles having a rib, a coating member, feed rolls gripping a margin of the sole, a gage coacting with one surface of the sole, and a work-supporting member yieldably supported on the machine to coact with another surface of the sole substantially opposite to the point of contact of the gage with the sole.

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