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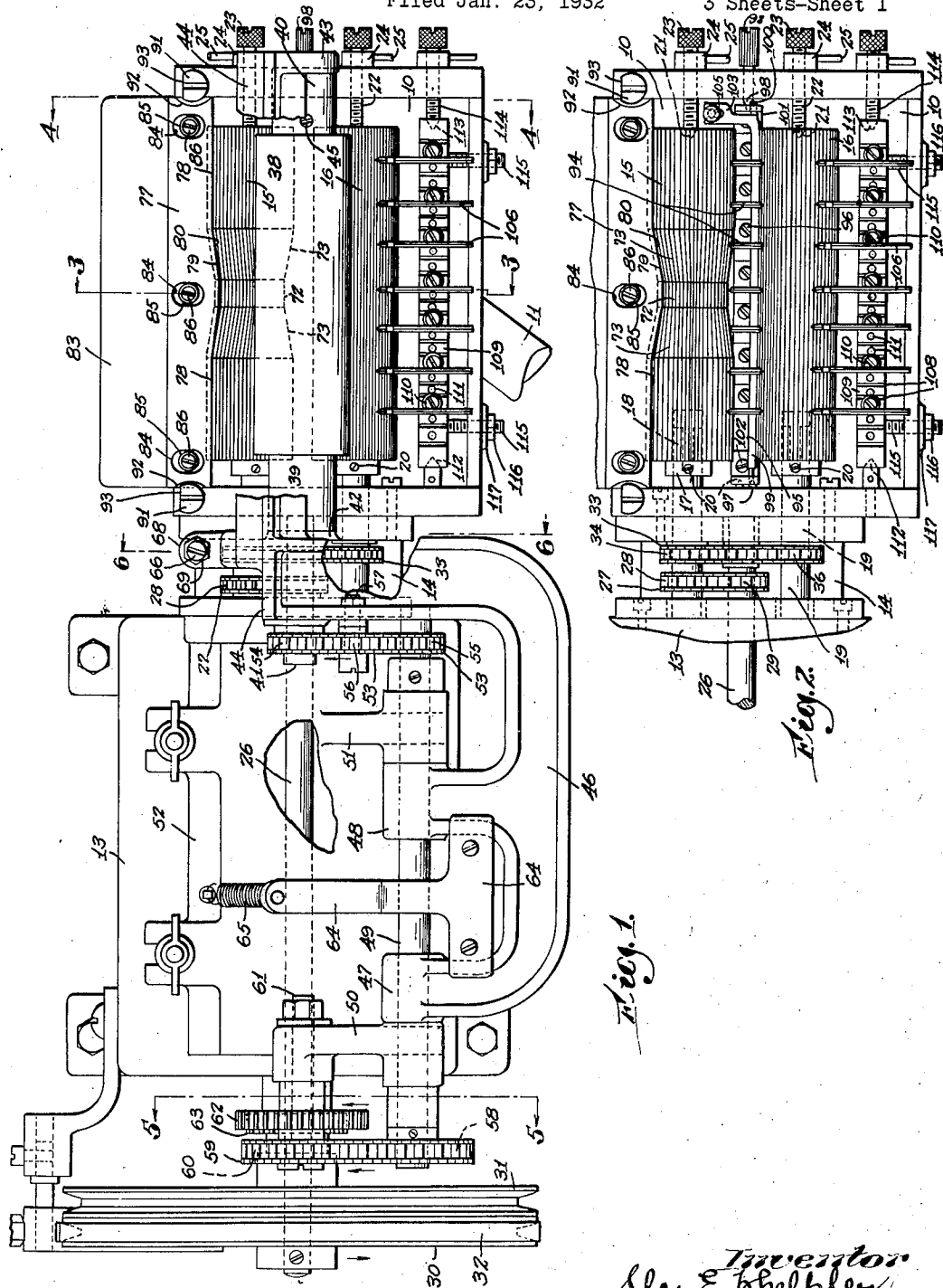
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2,060,152

CEMENTING MACHINE

Filed Jan. 23, 1932

3 Sheets-Sheet 1



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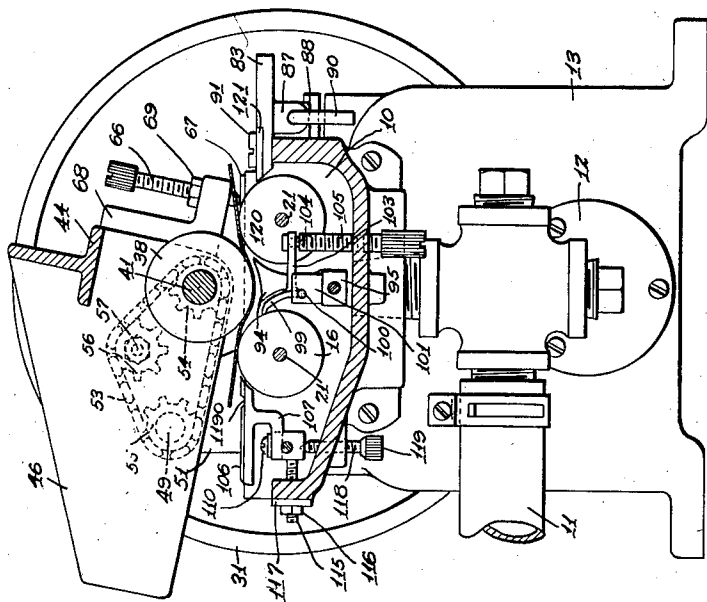


Fig. 4.

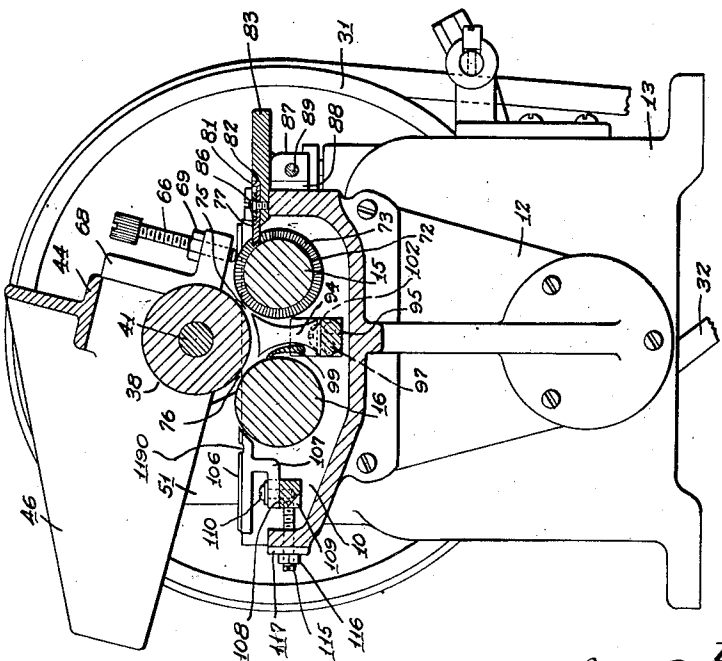


Fig. 3.

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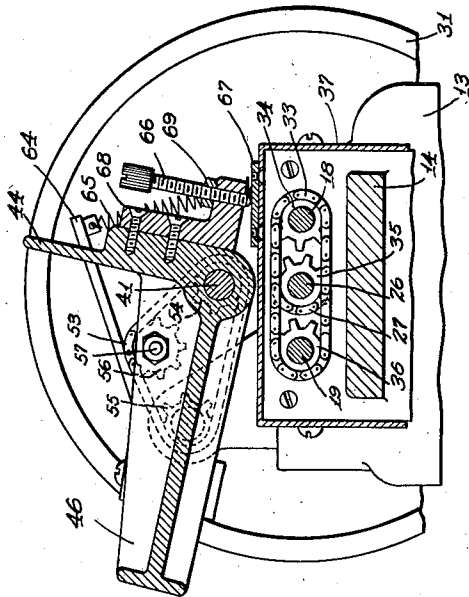
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UNITED STATES PATENT OFFICE

2,060,152

CEMENTING MACHINE

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The present invention relates to cementing machines which are used in many industries and which have a wide use in the manufacture of shoes in applying coating material to one face of various forms of shoe parts.

In one well known type of cementing machine the work is coated by being passed between a lower coating roll and an upper pressure roll. This construction and mode of operation is objectionable in that the pressure roll is liable to contact with the coating roll either before the work is inserted therebetween or when the work has passed beyond their influence, and in that the work is nipped by the rolls as it passes there-through. Many of the work pieces which the shoe industry finds it necessary to coat are very thin and are finished on the face which is exposed to view in the shoe. When these thin work pieces, provided with finished faces, are inserted between a lower coating roll and an upper pressure roll in order to coat the unfinished face thereof, the pressure roll is sure to soil some of the finished faces because of the great difficulty in keeping the pressure roll clean. Furthermore, the nipping action of the rolls often spoils the work passing between them by driving coating material from the coated face through the work to the finished face thereof.

The principal object of the present invention is to produce a cementing machine by which flexible work pieces may be coated on one face without danger of soiling the other face.

To the accomplishment of this object a feature of the present invention contemplates the provision in a cementing machine having means for supporting and coating one face of the work, of means, engaged with the opposite face of the work and spaced from the work supporting and coating means a distance at least greater than the thickness of the work, directly cooperating for an interval only during the passage of the work through the machine with only the first named means to feed the work positively.

Broadly considered, the means for engaging the opposite faces of the work to support, feed and coat it, may take any form found desirable or expedient. Preferably, one face of the work is supported and coated by a pair of lower rolls while the other face of the work is engaged by an upper roll which, however, in accordance with the feature of the invention broadly defined hereinbefore, has its periphery spaced from the peripheries of the other rolls a distance at least greater than the thickness of the work. With this construction it is impossible for the upper

roll to pick up coating material through contact with the coating rolls. Furthermore, as there can be no nipping action between the rolls engaging opposite faces of the work, danger of driving coating material through the work from the coated face to the finished uncoated face is obviated.

In the manufacture of shoes, soles therefor are often shanked-out, that is, the opposite sides of the shank on the flesh face are skived from the ball line rearwardly, in some cases to, and in others back of the heel breast line. Heretofore, it has been necessary in practice to apply coating material to the flesh face of a shanked-out sole in three operations. That is, the skived portions of the shanked-out sole were coated in two operations while the planiform surface thereof was coated in another operation.

Another object of the present invention is to produce a cementing machine by which both the skived and unskived portions of the flesh face of a shanked-out sole may be coated in one operation.

In the shoe industry it is highly desirable to apply to a piece of work primary and secondary coats of different grades or kinds of material, respectively.

Accordingly, a further object of the present invention is to produce a cementing machine by which two different coats may be applied to the same face of the work throughout its extent in a single operation.

To the accomplishment of these objects, and such others as may appear hereinafter, the various features of the present invention reside in certain constructions and arrangements of parts hereinafter described and then set forth broadly and in detail in the appended claims which possess advantages readily apparent to those skilled in the art.

The various features of the present invention will be understood readily from an inspection of the accompanying drawings illustrating the best forms of the invention at present devised, in which,

Figure 1 is a view in plan of a machine for applying coating material to both the skived and unskived portions on the flesh face of a shanked-out sole, the yoke supporting the upper roll having been broken out to show underlying parts;

Fig. 2 is a detail view in plan, the upper roll supporting yoke and the roll supported thereby having been removed to show underlying parts;

Fig. 3 is a view in sectional elevation on the line 3—3, Fig. 1;

Fig. 4 is a view in sectional elevation on the line

4—4, Fig. 1, the grooved roll shown in Fig. 1, however, having been replaced by a cylindrical roll;

Fig. 5 is a detail view in sectional elevation on the line 5—5, Fig. 1;

5 Fig. 6 is a detail view in sectional elevation on the line 6—6, Fig. 1;

Fig. 7 is a detail view in sectional elevation showing a modification of the trough illustrated in Fig. 1;

10 Fig. 8 is a view in plan of the flesh face of a shanked-out sole, and

Fig. 9 is a view in sectional elevation on the line 9—9, Fig. 8.

In the illustrated embodiments of the invention the coating material is contained in a trough 10 (Figs. 1, 2, 3, and 4) which is supplied, through a conduit 11 (Figs. 1 and 4) connected to the bottom thereof, from an inverted receptacle (not shown), in a siphonic or barometric manner. The bottom of the trough 10 is supported from a bracket 12 (Fig. 3) secured to the front face of a hollow frame 13. The rear end of the trough 10 is secured to one wall of a channel bar 14 (Fig. 2), the other wall of which is secured to the frame 13.

20 Mounted to dip into the trough 10 are two non-contacting, longitudinally fluted work supporting and coating rolls 15 and 16 arranged to project through the open top of the trough. The rear ends of the rolls 15 and 16 are provided with cylindrical portions 17 (Fig. 2) of reduced diameter which embrace loosely, respectively, the slotted ends of stub shafts 18 and 19 received within openings formed in the rear end face of the rolls. To provide a driving dog for the rolls 25 the portions 17 are provided with screws 20 (Figs. 1 and 2) the shanks of which are embraced by the walls of the slots in the stub shafts. The shanks of the screws 20 are held engaged with the blind ends of the slots in the stub shafts by conical centers 21 formed on the inner ends of screws 22 threaded through the front wall of the trough 10. Outside the trough 10 the screws 22 are provided with knurled and slotted heads 23 to facilitate manipulation of the screws 22 to engage the centers 21 with, and disengage them from, the rolls. The screws 22 may be locked in their final position of adjustment by collars 24 provided with lateral pins 25.

The stub shafts 18 and 19 are journaled in the upstanding walls of the channel bar 14 (Fig. 2). The stub shaft 18 is driven from a main shaft 26 by a chain 27 (Figs. 1, 2, and 6) which passes over a sprocket 28 on the stub shaft and a sprocket 29 on the main shaft 26. The shaft 26 is journaled in the frame 13 and the bar 14, is provided on its rear end with fast and loose pulleys 30 and 31 (Fig. 1), and is driven from a suitable source of power through a belt 32.

The stub shaft 19 is driven from the stub shaft 18 by a chain 33 (Figs. 1, 2, and 6) which passes over a sprocket 34 secured to the stub shaft 18, an idler sprocket 35 on the shaft 26 and a sprocket 36 secured to the stub shaft 19. The chains and sprockets for driving the stub shafts 18 and 19 are mounted within the walls of the channel bar 14 and are housed by an inverted box 37 secured to the walls thereof.

Cooperating with the lower work supporting and coating rolls 15 and 16 is a smooth upper roll 38 having lateral wings 39 and 40 (Fig. 1) of reduced diameter. The roll 38 is mounted on a horizontal shaft 41 journaled in the arms 42 and 43 (Fig. 1) of an overhanging yoke 44 the construction being such that the wing 39 engages the

arm 42 and the wing 40 engages the arm 43. The roll 38 is secured to the shaft 41 by a screw 45.

The yoke 44 projects forwardly from an arm 46 (Fig. 1) provided with hubs 47 and 48 free to turn on a horizontal shaft 49 journaled in brackets 50 and 51 rising from a hinged cover 52 on the frame 13. The brackets 50 and 51 embrace the hubs 47 and 48. The shaft 41 for the roll 38 is driven by a chain 53 (Figs. 1 and 6) which passes around a sprocket 54 secured to the shaft 41, a sprocket 55 secured to the shaft 49, and an idler sprocket 56 carried by a stub shaft 57 projecting rearwardly from the arm 46.

The rear end of the shaft 49 is provided with a sprocket 58 (Figs. 1 and 5) which is driven by a chain 59 from a sprocket 60 secured to a stub shaft 61 carried by the bracket 50. The stub shaft 61 is provided with a pinion 62 which meshes with a pinion 63 on the main shaft 26. With this construction, viewing Fig. 3, the lower rolls 15 and 16 are driven in a counter-clockwise direction and the upper roll 38 is driven in a clockwise direction. As shown particularly in Figs. 3 and 4 the upper roll 38 is larger than the lower rolls in order that a large surface area on the roll 38 may be located between the lower rolls. The gear ratios for driving the rolls are, however, correlated so that the three rolls are driven at the same surface speed.

In order that the upper roll 38 may be forced towards the lower work supporting and coating rolls 15 and 16, an arm 64 (Figs. 1 and 6) is clamped to the arm 46 adjacent the hubs 47 and 48. The free end of the arm 64 is connected to one end of a coiled spring 65 the other end of which is connected to the cover 52. The approach movement of the roll 38 towards the rolls 15 and 16 is definitely limited by the bottom end of a screw 66 (Figs. 3 and 4) which engages a plate 67 secured to the bottom of the inverted box 37. The screw 66 is threaded into a block 68 (Figs. 3, 4, and 6), secured to the right hand end of the arm 46, and is locked thereon in the desired position of adjustment by a locknut 69.

The various embodiments of the invention operate upon short, flexible work pieces such as shoe soles, sock linings, covers for wood heels, other various component parts of shoes and shoe uppers, and book covers. In this class of work, only one face is coated and therefore it is essential that the upper roll 38 be kept free of coating in order to prevent soiling the uncoated face of the work. This desideratum is obtained by maintaining, through the adjustment of the screw 66, the periphery of the roll 38, whether work is in the machine or not, spaced from the peripheries of the rolls 15 and 16 a distance at least greater than the thickness of the work. For thin work the width of the space between the periphery of the roll 38 and the peripheries of the rolls 15 and 16 may be and preferably is substantially four times the thickness of the work.

The embodiment of the invention illustrated in Figs. 1, 2, and 3 is employed in coating the flesh face of a shanked-out sole. As shown in Figs. 8 and 9 the flesh face of a shanked-out sole 70 is provided with a plurality of skived portions or flanches 71. In order to coat the entire flesh face of the shanked-out sole, including the skived portions 71, in its single passage through the machine the coating roll 15 is provided with a central groove comprising a flat bottom 72 (Figs. 1, 2, and 3) flanked by inclined side walls 73. During the passage of the shanked-out sole through the machine, in a manner presently to be de-

scribed, the bottom 72 applies a stripe 74 (Fig. 8) to the flesh face of the shanked-out sole 70, the side walls 73 apply coating to the skived portions 71 and the roll 16 applies coating to the entire planiform surface of the sole including the previously formed stripe 74.

During the passage of the shanked-out sole through the machine the relative locations of the peripheries of the rolls 15, 16 and 38 cause the shanked-out sole to bend and to be wrapped about the periphery of the roll 38 from the point 75 (Fig. 3) to the point 76, thus causing the roll 38 to subject the sole to a tractive effort impelling it to the left (Fig. 3), notwithstanding the fact that the spaces between the periphery of the roll 38 and the peripheries of the rolls 15 and 16 are too great to allow the adjacent rolls to nip the work.

In order that the shanked-out sole may be coated properly, doctors for controlling the amount of coating material delivered to the sole are associated with the up-going sides of the rolls 15 and 16, respectively. In addition the gap between the rolls 15 and 16, below the roll 38, is bridged in order to prevent the sole from following the roll 15 in its down-going movement, to initiate the bending of the sole and to direct the leading edge of the sole against the up-going side of the roll 16. Moreover, in order to prevent the sole from following the roll 16 in its down-going movement, and to support the coated sole, knife-edges are associated with the down-going side of the roll 16.

In order to control the amount of coating material delivered by the roll 15 to the work, the up-going side of the roll 15 is associated with a doctor 77 (Figs. 1, 2, and 3) having portions 78 adjacent the cylindrical surface of the roll 15 and a projection 79, intermediate the portions 78, shaped complementary to the bottom 72 and the flanking walls 73 of the central groove in the roll.

The scraping edge 80 (Figs. 1 and 2), of the doctor 77, is beveled in order to bring it close to the surface of the roll. The scraping edge 80 is formed on one face of a flat plate 81 mounted in a way 82 (Fig. 3) formed in a block 83. The plate 81 is provided with three recesses 84 the bottoms of which are engaged by washers 85 underlying the heads of screws 86 which are threaded into the block 83. As the recesses 84 are wider than the diameters of the washers 85 this construction provides for the adjustment of the doctor relatively to the lateral surface of the roll 15 and its central groove to vary the amount of coating material delivered to the work by the roll.

The bar 83 is provided with a plurality of depending ears 87 (Fig. 3) which engage the lateral surface of lugs 88 projecting from the right hand wall of the trough 10, viewing Fig. 3. The ears 87 and the lugs 88 are pierced to receive a rod 89 provided on its front end with a down-turned finger piece 90 (Fig. 4) which may be grasped by the operative to withdraw the rod 89 and thus permit the block 83 to be removed from the machine. In order to lock the block 83 in operative position with its bottom engaged with the top of the right hand wall of the trough 10 (Fig. 3) the adjacent front and rear walls of the trough carry screws 91 (Fig. 1) the heads of which are provided with round portions which engage recesses 92 formed on the upper face of the doctor near the ends thereof. The heads of the screws 91 are provided also with flat faces 93 which may be brought in positions parallel with the opposite ends of the doctor thus freeing the block 83 so that it, and

its supported doctor, may be withdrawn as a unit when the rod 89 is removed from the ears 87 and lugs 88.

The bridge for the gap between the rolls 15 and 16 comprises a plurality of upstanding knife-edges 94, (Figs. 2, 3, and 4) herein shown as seven in number. The upper ends of the knife-edges 94 are formed on a curve sloping from a point adjacent the roll 15 downward to a point adjacent the roll 16 and are spaced from the periphery of the roll 38 substantially the same distance that separates the periphery of the roll 38 from the peripheries of the rolls 15 and 16. The knife-edges 94 are formed on plates the bottoms of which are bent laterally to the right, viewing Fig. 2, and these bottoms fit into ways cut across the top of a rectangular bar 95. The bottoms of the plates 94 are secured rigidly in the ways by screws 96.

The rear end face of the bar 95 is provided with dents which receive the conical ends of pins 97 projecting forwardly from the rear wall of the trough 10. The center of the front end face of the bar 95 is engaged by the conical point of a screw 98 threaded through the front wall of the trough 10. By engaging the rear end face of the bar 95 with the pins 97 the screw 98 may be rotated to engage its conical point with the center of the front end face of the bar 95 and hold it rigidly in position.

The knife-edges 94 cut through the coating material applied by the roll 15. Any material removed from the sole by the knife-edges trickles down the sides of the knife-edge supporting plates back to the trough. The knife-edges slope from a point adjacent the roll 15 to a point adjacent the roll 16 in order to drain them properly and thus prevent them from accumulating a mass of coating material liable to contact eventually with the upper roll 38 and soil it.

In order to control the amount of coating material delivered to the work by the roll 16 a doctor 99 is mounted to extend closely adjacent the up-going lateral surface of the roll 16 throughout its extent. The doctor 99 comprises a curved plate having trunnions 100, projecting laterally from its end faces near the bottoms thereof, which are journaled in angular plates 101 secured by screws 102 to the top of the bar 95. At its front end the doctor 99 is provided with a lateral arm 103 having a forked end which embraces the walls of a peripheral groove 104 formed in a vertical screw 105 threaded into the bottom of the trough 10. By manipulating the screw 105 the distance separating the doctor 99 from the lateral surface of the roll 16 may be varied to vary the amount of coating material delivered to the work by the roll 16.

In order to prevent the work from following the roll 16 in its down-going movement, the machine is provided with a plurality of knife-edges 106 (Figs. 1, 2, and 3), herein shown as seven in number, having beveled ends positioned closely adjacent the lateral surface of the roll 16 on its down-going side. The knife-edges 106 are formed on plates having downwardly and longitudinally extending fins 107 which fit into transverse slots 108 formed in a bar 109. The fins 107 are provided with lateral integral lugs which rest upon the top of the bar 109 to which they are secured by screws 110 passing through tap holes 111 formed in the bar. As shown in Fig. 2 there are 22 slots 108 and associated tap holes 111 to permit the use of different numbers of knife-edges 106, or, it may be, the same number

in different positions along the length of the bar 109.

The opposite ends of the bar 109 are engaged by centers 112 and 113, the former being supported rigidly from the rear wall of the trough 10 and the latter being formed on a screw 114 threaded through the front wall of the trough 10 and provided with a knurled and slotted head and locking washer like the screws 22 for the rolls 15 and 16. To provide a limited adjustment for the bar 109 laterally the left hand face of the bar, viewing Fig. 3, is engaged by the ends of a pair of screws 115 which are threaded through the left hand wall of the trough 10 and provided with adjusting nuts 116 and bosses 117 underlying the nuts. To provide a limited adjustment for the bar 109 vertically the bottom of the bar is engaged by one end of a screw 118 (Fig. 4), which is threaded through the bottom of the trough 10, the other end of which is provided with a knurled head 119 to facilitate manipulation.

In operating the machine to coat in one operation the skived and unskived portions on the flesh faces of shanked-out soles, the operative sits at the front, which is the end of the machine opposite the fast and loose pulleys 30 and 31, and with her right hand inserts a shanked-out sole, flesh face down, into the space between the peripheries of the rolls 15 and 38, care being taken to locate the sole over the region of the roll 15 containing the central groove. The operative pushes the leading edge of the shanked-out sole through the space between the peripheries of the rolls 15 and 38. As this space is wider than the thickness of the sole the leading edge thereof slips readily therethrough until it reaches the bridge formed by the knife-edges 94. Then the sole commences to bend between its lines of contact with the coating roll 15 and the bridge, respectively, thus wrapping the grain face of the sole about the periphery of the roll 38. As soon as the sole is bent sufficiently to produce a traction between the periphery of the roll 38 and the grain surface of the sole engaged thereby the feed of the sole commences so that it is whisked out of the operative's right hand and the leading edge of the sole is moved into engagement with the up-going side of the roll 16 which bends the leading edge of the sole upwardly and directs it into the space between the peripheries of the rolls 16 and 38. So long as the sole remains bent there is traction between the periphery of the roll 38 and the grain face of the sole sufficient to enable the roll 38 to feed the sole. The feed of the sole continues until its trailing edge clears the bridge at which time the sole is disengaged from the periphery of the roll 38 and the leading edge has been projected out of the space between the peripheries of the rolls 16 and 38 far enough for the operative with her left hand to grasp the sole and draw it downwardly over the roll 16 and the knife-edges 106.

When the roll 15 engages the sole initially the planiform surface of its forepart bridges the groove thereby receiving coating material only on its bearing edges. As soon as the shanked-out part of the sole reaches the groove it drops therein and the flanking side walls 73 coat the skived portions 71, the bottom 72 incidentally applying the median stripe 74, (Fig. 8). During its travel over the roll 16 the planiform surface of the shanked-out sole is coated. As the coated shanked-out sole is dragged by the operative over the knife-edges 106 there is a tendency for coat-

ing material to follow the sole in a flood. To avoid this, the coated face of the shanked-out sole is scraped by an edge 1190 on one side of a groove formed on the upper surface of each of the knife-edges 106. This edge 1190 scrapes off excess coating material which collects in the groove and then trickles back in the trough 10.

With this construction and mode of operation the flesh face of the sole is bent convexly about an axis extending at right angles to the length of the sole during the application of the coating thereto by the roll 16. The bending of the flesh face of the sole in this manner opens up the pores therein to allow the coating to penetrate into the body portion of the sole, thus providing for a strong bond. Owing to the tendency of the sole to resist the bending action, the flesh face of the sole is pressed firmly against the roll 16 thus causing it to drive the coating into the body portion of the sole through the opened pores in the bent flesh face.

When thin, flat work pieces are to be coated in the machine the grooved roll 15 is removed and a longitudinally fluted cylindrical roll 120 (Fig. 4), in all respects similar to the roll 16, is substituted therefor. In addition, a straight-edge doctor 121 (Fig. 4) is substituted for the doctor 77. As shown in Fig. 4 the space between the periphery of the roll 38 and the peripheries of the rolls 16 and 120 and the bridge spanning the gap between them, is a distance at least greater than the thickness of the work. Preferably, the width of said space is substantially four times as much as the thickness of the work. The operative, with her right hand, inserts the leading edge of the flexible work piece in between the rolls 38 and 120 and pushes the work over the latter until the leading edge engages the curved bridge and is deflected thereby against the up-going side of the roll 16 which directs the work into the space between the roll 16 and the roll 38. By this time the flexible work piece has been wrapped about the periphery of the roll 38 so that the work is held against the roll 38 with sufficient traction to cause the roll 38 to impel the work into the space between the rolls 16 and 38. The tractive effort impelling the work piece towards and through the space between the rolls 16 and 38 continues until the trailing edge of the work piece leaves the bridge between the rolls 16 and 120, at which time the operative grasps the leading edge of the work piece and drags the trailing edge thereof over the roll 16 and the knife-edges 106.

It will be apparent to those skilled in this art that the machine illustrated in Figs. 1, 2, 3, and 4, whether it is provided with a grooved roll 15 or a cylindrical roll 120, applies two separate and distinct coats of the same coating material to the work piece sequentially.

In operating upon many of the short, flexible work pieces required in the manufacture of shoes, it is highly desirable, and often necessary, to apply thereto primary and secondary coats of different materials. For instance, heretofore it has been found impracticable to coat flexible covers for wood heels with latex because they curled immediately after the coating operation. I have found that by applying sequentially to the work pieces coatings of different materials, such, for instance, as water for the primary coat and latex for the secondary coat, curling, subsequent to the coating operation, is obviated. Other primary coatings may be water mixed with sizing, alcohol, gasoline, various solvents, or the

usual adhesive. Other secondary coatings may comprise rubber cement, glue and various adhesives or sizing compounds.

In order to adapt the machine to the application of two different grades or kinds of coating materials to the work piece during a single passage therethrough I provide a central partition 122 through the trough 10, integral with the bottom, front and end walls thereof, thus providing a separate trough 123 for the roll 120 and a separate trough 124 for the roll 16. The different grades or kinds of coating material are contained in the troughs 123 and 124, the only difference in the mode of operation of the machine disclosed in Fig. 7 and that previously described, is that the secondary coating applied to the work piece by the roll 16 is a different grade or kind of material than that applied as a primary coating by the roll 120. These different coatings are supplied to the troughs 123 and 124, respectively, through conduits 125 and 126 from inverted receptacles (not shown) in a manner well understood in this art. The introduction of the partition into the trough 10 necessitates slight changes in the manner of supporting the knife-edges 94, which bridge the gap between the rolls 16 and 120, and the doctor 99. As shown in Fig. 7 the knife-edges 94 are secured to the top of the partition 122. The doctor 99 is mounted entirely within the trough 124 on the left hand wall of the partition 122. The position of the doctor 99 is varied by a screw 127 threaded through the bottom of the trough 124. The provision of the partition 122 permits the roll 120 to be operated in a dry condition if desired so that while the rolls 16 and 38 and 120 may continue to cooperate to bend and to feed the work, the roll 16 alone may apply the coating to the bent work.

In operating coating machines, in which latex is used as the coating material, the parts become clogged when it coagulates, necessitating frequent shut-downs for cleaning purposes. In the illustrated embodiments of the present invention the cover 52 may be turned about its pivotal connection with the frame 13 to swing all the parts supported therefrom, including the roll 38, to the left, Figs. 3 and 4, and thus expose to view the lower work supporting rolls. These rolls, together with the doctors and the knife-edges, may be then removed readily and cleaned. Removal of the parts from within the trough facilitates its cleaning.

Nothing herein explained is to be interpreted as limiting the various features of the present invention in the scope of its application to use in connection with the particular machine or the particular mode of operation or both selected for purposes of illustration and explanation. While the particulars of construction herein set forth are well suited to one mechanical form of the invention and to the use to which it is put, it is not limited to this use, nor to these details of construction, nor to the conjoint use of all its features, nor is it to be understood that these particulars are essential since they may be modified within the skill of the artisan without departing from the true scope of the actual invention, characterizing features of which are set forth in the following claims by the intentional use of generic terms and expressions inclusive of various modifications.

What is claimed as new, is:

1. In a cementing machine, the combination with means for supporting and coating one face

of the work, of means engaged with the opposite face of the work and spaced from the work supporting and coating means a distance at least greater than the thickness of the work directly cooperating for an interval only during the passage of the work through the machine with only the first named means to feed the work positively.

2. In a cementing machine, the combination with a pair of lower work supporting and coating rolls mounted with their peripheries out of contact, said rolls forming for an interval only during the passage of the work through the machine the only support for the work while it is being coated, and an upper roll, having its periphery spaced from the peripheries of the other two rolls a distance at least greater than the thickness of the work, mounted to bend the work piece while it is supported only by the lower rolls, of means for driving the three rolls to feed the bent work piece.

3. In a cementing machine, the combination with a pair of lower work supporting and coating rolls mounted with their peripheries out of contact, said rolls forming for an interval only during the passage of the work through the machine the only support for the work while it is being coated, and an upper roll larger than the other two rolls, having its periphery spaced from the peripheries of the other two rolls a distance at least greater than the thickness of the work, mounted to bend the work piece while it is supported only by the lower rolls, of means for feeding the bent work piece while it is engaged by the three rolls.

4. In a cementing machine, the combination with two independent lower rolls for applying coating material sequentially to one face of the work and an upper roll having its periphery spaced from the periphery of each of the other two rolls a distance at least greater than the thickness of the work, of means located between the coating rolls, underneath the upper roll, for supporting the work until the leading edge thereof introduced into the space between the upper roll and the first coating roll reaches the space between the upper roll and the second coating roll.

5. In a cementing machine, the combination with a pair of work supporting rolls mounted with their peripheries out of contact, at least one of which coats one face of the work, of a traction feed roll mounted to engage the uncoated face of the work and having a portion of its periphery interposed between the pair of rolls and spaced therefrom a distance at least greater than the thickness of the work.

6. In a cementing machine, a pair of lower work supporting and coating rolls, an upper roll cooperating with the other two rolls during the feed of the work, resilient means tending to force the upper roll towards the lower rolls, and means for holding the upper roll in an operating position spaced from the lower rolls a distance at least greater than the thickness of the work.

7. In a cementing machine, a frame, a pair of lower work supporting and coating rolls, an upper roll cooperating therewith during the feed of the work, a pivoted arm for supporting the upper roll, resilient means interposed between the frame and the arm tending to force the upper roll towards the lower rolls, and means for holding the upper roll in an operating position spaced from the lower rolls a distance at least greater than the thickness of the work.

8. In a cementing machine, the combination

with a pair of rolls, providing for an interval a two point support for the work during its passage through the machine, at least one of which coats one face of the work, of a roll operating in engagement with the uncoated face of the work and positioned between and out of work-nipping contact with the points of support cooperating directly with the other two rolls to feed the work positively.

9. In a cementing machine, the combination with a pair of work supporting rolls, one of which applies a primary coat to one face of the work and the other one of which applies a secondary coat upon the primary coat, of a third roll mounted to engage the uncoated face of the work and directly cooperating with the other two rolls to feed the work positively.

10. In a cementing machine, the combination with separate troughs and a coating roll journaled in each trough arranged to project thereabove, of a single roll engaging one face of the work and cooperating with both coating rolls to feed the opposite face of the work across the periphery of each coating roll in contact therewith and apply to said opposite face a plurality of coats throughout its extent.

11. In a cementing machine, the combination with a pair of independent coating rolls, of a single roll, having its periphery spaced from the peripheries of the other two rolls a distance at least greater than the thickness of the work, engaging one face of the work and cooperating with both coating rolls to feed the opposite face of the work across the periphery of each roll in contact therewith and apply to said opposite face a plurality of coats throughout its extent.

12. In a cementing machine, the combination with means for supporting and applying a plurality of coats successively to one and the same face of the work throughout its extent, of means engaged with the opposite face of the work and spaced from the work supporting and coating means a distance at least greater than the thickness of the work directly cooperating, for an interval only during the passage of the work through the machine, with only the first named means to feed the work positively.

13. In a cementing machine, the combination with means for supporting a sole, and means engaged with the grain face of the supported sole and spaced from the entire supporting means a distance at least greater than the thickness of the supported sole for bending the flesh face of the supported sole convexly about an axis extending at right angles to the length of the sole, of means forming part of the sole supporting means for applying coating to the flesh face of the sole throughout its extent.

14. In a cementing machine, the combination with a pair of rolls for supporting the flesh face of a sole, of a third roll engaging the grain face of the sole and cooperating with only the pair of rolls for an interval only during the passage of the work through the machine for bending the flesh face of the supported sole convexly about an axis extending at right angles to the length of the sole, said three rolls cooperating to feed the sole, at least one of said rolls applying coating to the flesh face of the sole.

15. In a cementing machine, the combination with a pair of rolls for supporting a shanked-out sole, said rolls forming for an interval only during the passage of the work through the machine the only support for the shanked-out sole, of a third roll for bending the flesh face of the supported

sole convexly about an axis extending normally to the length of the sole while said sole is supported by only said pair of rolls, said three rolls cooperating to feed the sole, one of said work supporting rolls applying coating to the skived portions of the sole.

16. In a cementing machine, the combination with a pair of rolls for supporting a shanked-out sole, said rolls forming for an interval only during the passage of the work through the machine the only support for the shanked-out sole, of a third roll for bending the flesh face of the supported sole convexly about an axis extending normally to the length of the sole while said sole is supported by only said pair of rolls, said three rolls cooperating to feed the sole, one of said work supporting rolls applying coating to the shank portion of the shanked-out sole including the skived portions thereof.

17. In a cementing machine, the combination with a pair of rolls for supporting a shanked-out sole, of a third roll for bending the flesh face of the supported sole convexly about an axis extending at right angles to the length of the sole, said three rolls cooperating to feed the sole, one of said work supporting rolls applying coating to the shank portion of the sole including the skived portions thereof, and the other of said work supporting rolls applying coating to the entire unskived flesh face of the sole.

18. In a cementing machine, the combination with means for feeding a shanked-out sole, of means acting sequentially for applying coating material first to the skived portions of the sole and to a part of the unskived portion thereof, and then to the entire unskived portion of the sole.

19. In a cementing machine, the combination with means for bending one face of a piece of work convexly about an axis extending at right angles to the length of the piece, said bending means including members engaged with the opposite faces of the piece and spaced from each other a distance at least greater than the thickness of the piece, said piece normally having on said face a planiform portion and beveled portions, and means for feeding the piece of work while it is in a bend condition, of means forming a part of the bending means for applying coating material to the beveled portions and to at least a portion of said convexly bent face simultaneously while the work piece is bent.

20. In a cementing machine, a pair of lower work supporting and coating rolls, an upper roll cooperating with the other two rolls during the feed of the work, means tending to cause a relative movement between the upper roll and the pair of lower rolls to effect a position thereof in which the upper roll would have biting contact with the pair of lower rolls, and a stop for limiting the relative movement between the upper roll and the pair of lower rolls to effect a position thereof in which the upper roll is spaced from the lower rolls a distance at least greater than the thickness of the work.

21. In a cementing machine, the combination with a pair of coating rolls providing for an interval a two-point support for the work during its passage through the machine and a roll operating upon the work between and out of work-nipping contact with the points of support cooperating directly with the other two rolls to positively feed the work, of a bridge located between the coating rolls underneath the upper roll, comprising for an interval a work support during the passage of the work from the first coating roll to the second.

22. In a cementing machine, the combination with a pair of coating rolls providing for an interval a two-point support for the work during its passage through the machine and a roll operating upon the work between and out of work-nipping contact with the points of support cooperating directly with the other two rolls to positively feed the work, of a bridge comprising a plurality of knife-edges, the work engaging surface of each of which is curved, located between the coating rolls, underneath the upper roll.

23. In a cementing machine, the combination with a pair of coating rolls providing for an interval a two-point support for the work during its passage through the machine and a roll operating upon the work between and out of work-nipping contact with the points of support cooperating directly with the other two rolls to positively feed the work, of a bridge comprising a plurality of knife-edges, the work engaging surface of each of which slopes downwardly in the direction the work is fed, located between the coating rolls, underneath the upper roll.

24. In a cementing machine, a receptacle for a coating substance, a pair of coating rolls rotatable therein, means in the receptacle for preventing a work piece, in passing over the rolls, from following the rolls in their down-going movement, and means in the receptacle for controlling the amount of coating substance delivered to the work piece by at least one of the rolls.

25. In a cementing machine, a receptacle for a coating substance, a pair of axially separate work supporting and coating rolls rotatable therein and removable as units therefrom, means removably mounted in the receptacle between the rolls for preventing a work piece, in passing over the rolls, from following the rolls in their down-going movement, and means removably mounted in the receptacle for controlling the amount of coating substance delivered to the work piece by at least one of the rolls.

26. In a cementing machine, the combination with means for bending the flesh face of a shanked-out sole convexly about an axis extending at right angles to the length of the sole, said means including two independent supports engaged with one face of the shanked-out sole and between which the bending occurs and a member engaged with the opposite face of the shanked-out sole and spaced from the supports a distance at least greater than the thickness of the shanked-out sole, and means for feeding the bent shanked-out sole, of means forming a part of the bending means for applying coating material to the skived portions of the bent sole.

27. In a cementing machine, the combination with means for bending the flesh face of a shanked-out sole convexly about an axis extending at right angles to the length of the sole, said means including two independent supports engaged with one face of the shanked-out sole and between which the bending occurs and a member engaged with the opposite face of the shanked-out sole and spaced from the supports a distance at least greater than the thickness of the shanked-out sole, and means for feeding the bent shanked-out sole, of means forming a part of the bending means for applying coating material to the skived portions of the bent sole and to a median strip therebetween.

28. In a machine for cementing shanked-out

soles, the combination with a cylindrical coating roll having a peripheral groove therein for receiving the shanked-out portion of a sole, said groove having a width substantially commensurate with the width of the sole at the shank, of a doctor spaced substantially uniformly from the lateral surface of the roll and the walls of the groove.

29. In a machine for cementing shanked-out soles, the combination with a cylindrical coating roll having a peripheral groove therein provided with a flat bottom flanked by inclined side walls for receiving the shanked-out portion of a sole, said groove having a width substantially commensurate with the width of the sole at the shank, of a doctor spaced substantially uniformly from the lateral surface of the roll and the bottom and the side walls of the groove.

30. In a cementing machine, the combination with a pair of lower work supporting rolls, mounted with their peripheries out of contact, at least one of which applies coating to one face of the work, said rolls forming for an interval only during the passage of the work through the machine the only support for the work while it is being coated, and an upper roll engaged with the uncoated face of the work, mounted to bend the work piece while it is supported only by the lower rolls, of means for driving the two lower rolls in the same direction.

31. In a cementing machine, the combination with a pair of lower work supporting rolls, at least one of which applies coating to one face of the work, a pivoted arm, and an upper roll, carried by said arm at a distance from its pivotal point, engaged with the uncoated face of the work and cooperating with the lower rolls to feed the work, of means for holding the upper roll in an operating position spaced from the lower rolls a distance at least greater than the thickness of the work.

32. In a cementing machine, the combination with a pair of lower work supporting rolls, at least one of which applies coating to one face of the work, and an upper roll engaged with the uncoated face of the work and cooperating directly with the lower rolls to positively feed the work, of means for holding the upper roll in an operating position spaced from the lower rolls a distance at least greater than the thickness of the work.

33. In a cementing machine, the combination with a trough, a coating roll rotatable therein, a roll mounted outside of said trough, said rolls supporting one and the same face of the work, of means engaged with the opposite face of the work and spaced from the two rolls a distance at least greater than the thickness of the work directly cooperating for an interval only during the passage of the work through the machine with only the two rolls to feed the work positively.

34. In a cementing machine, the combination with a plurality of supports for the flesh face of a sole, and means engaged with the grain face of the supported sole for bending the flesh face thereof convexly about an axis extending normally to the length of the sole to open up the pores in its flesh face, of means spaced from the bending means a distance at least greater than the thickness of the sole for applying cement to the opened pores.

LLOY E. WHELPLEY.