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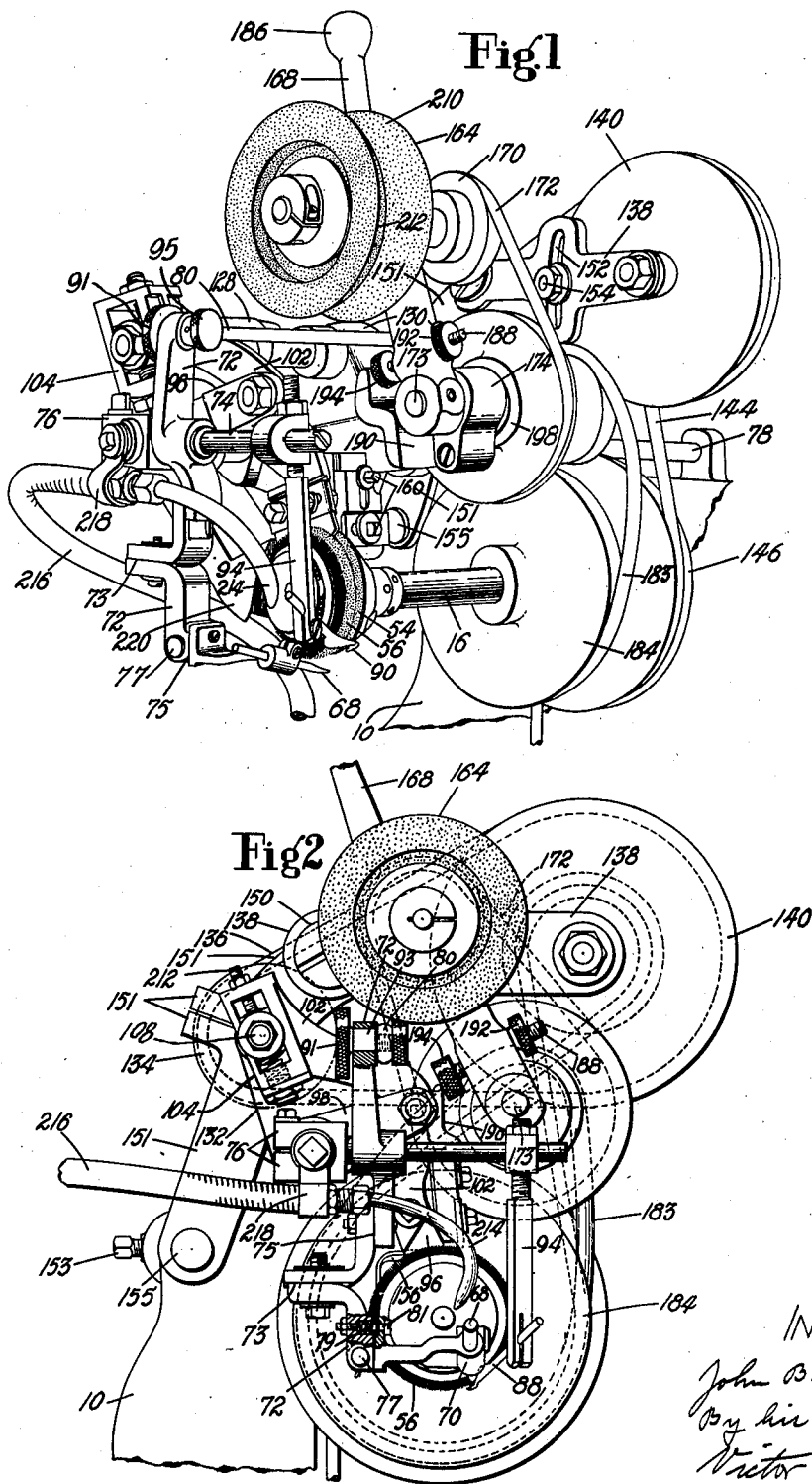
J. B. HADAWAY

2,218,576

MACHINE FOR USE IN THE MANUFACTURE OF SHOES

Filed July 30, 1937

3 Sheets-Sheet 1



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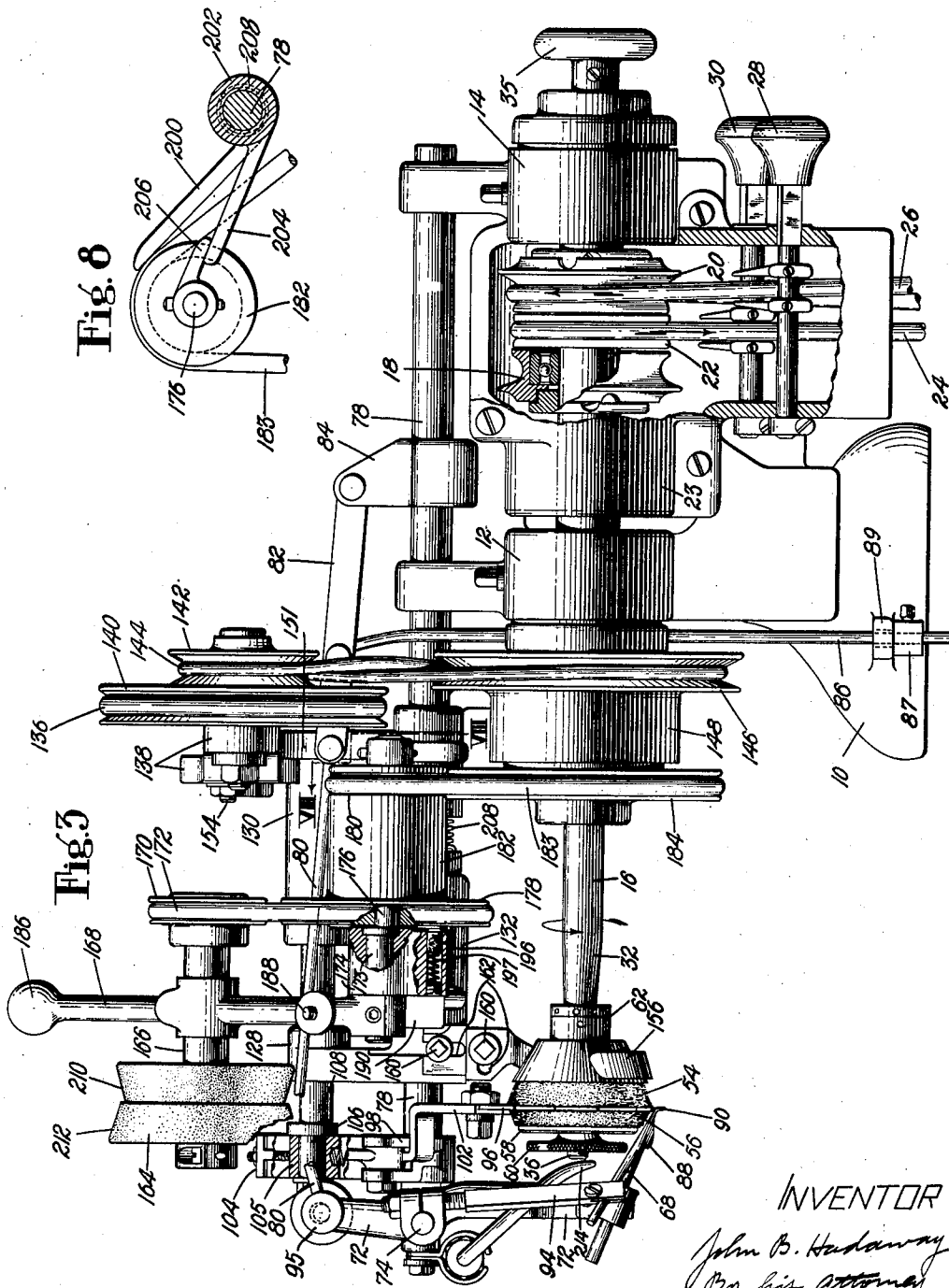
J. B. HADAWAY

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3 Sheets-Sheet 2



INVENTOR
John B. Hadaway
By his attorney
Victor Cobb.

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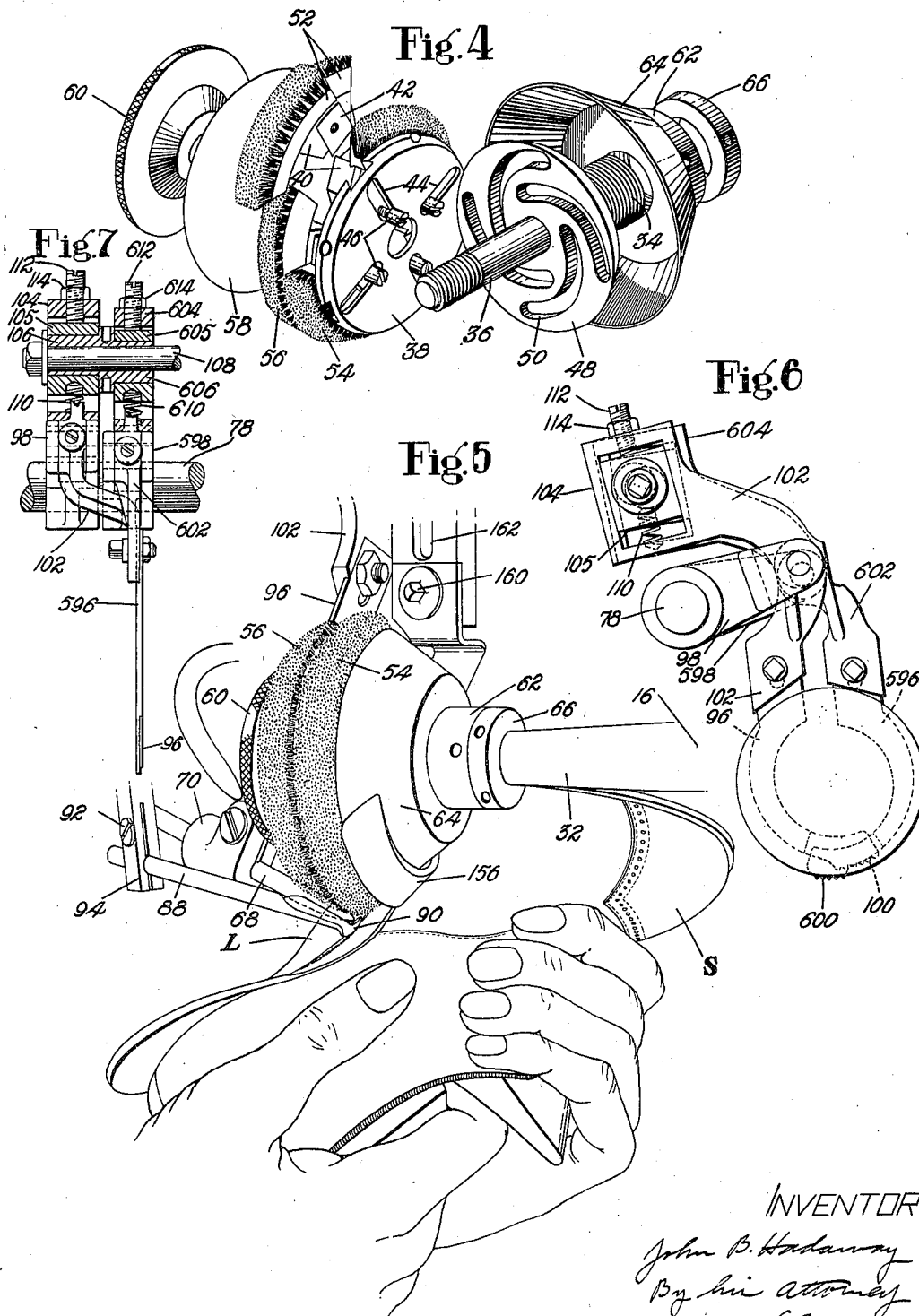
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MACHINE FOR USE IN THE MANUFACTURE OF SHOES

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3 Sheets-Sheet 3



INVENTOR

John B. Hadaway
By his attorney
Victor Cobb.

UNITED STATES PATENT OFFICE

2,218,576

MACHINE FOR USE IN THE MANUFACTURE
OF SHOESJohn B. Hadaway, Swampscott, Mass., assignor to
United Shoe Machinery Corporation, Borough
of Flemington, N. J., a corporation of New Jersey

Application July 30, 1937, Serial No. 156,560

16 Claims. (Cl. 12—17)

This invention relates to machines for use in the manufacture of shoes and is herein illustrated and described as embodied in a machine for rubbing the stitches of an outsole and for roughing the channel surfaces preparatory to applying cement to the channel to facilitate adhesion of cement when the channel lip is laid. The illustrated machine represents an improvement upon the machine disclosed in United States Letters Patent No. 1,217,595, granted February 27, 1917 upon my application and it includes features disclosed and claimed in United States Letters Patent No. 2,004,109, granted June 11, 1935 upon my application, United States Letters Patent No. 2,087,238, granted July 20, 1937 upon application of Charles G. Brostrom, and an application for United States Letters Patent Serial No. 125,608, filed February 13, 1937 in the name of Arthur S. Johnson.

It is an object of the present invention to provide improved instrumentalities for roughing channels and for rubbing stitches and also to provide an improved machine equipped with such instrumentalities and organized to enable them to perform their respective functions simultaneously. In accordance with a feature of the invention, the illustrated machine is provided with a pair of roughing tools constructed and arranged to operate, respectively, upon a channel base and a channel lip, and a stitch-rubbing tool positioned between the roughing tools. As illustrated, the roughing tools consist of rotary brushes and the stitch-rubbing instrumentalities are toothed members oscillated in such a manner as to bring them into rubbing engagement with the stitches. These stitch-rubbing members are oscillated in orbital paths which are elongated in the direction of feed of the work. The stitch-rubbing members engage the stitching alternately, one of them always being in engagement with the stitching.

In accordance with a further feature, each of the above-mentioned roughing tools, as herein illustrated, consists of an improved roughing brush comprising a plurality of sectors each having an abrasive periphery, a disk having a plurality of radial guideways in which the sectors are mounted, and a rotary cam mechanism for adjusting the sectors inwardly and outwardly of the guideways. These brushes in the illustrated machine are frusto-conical in form, having their end faces of larger diameter adjacent to each other, the end face of the brush which operates on the channel base being greater in diameter than the end face of the brush which operates

on the channel lip. This construction avoids the possibility of scouring through the lip.

These and other features of the invention, including certain details of construction and combinations of parts, will be described in connection with the illustrated machine and pointed out in the appended claims.

Referring now to the accompanying drawings,

Fig. 1 is a view in perspective of the improved machine, omitting the base of the supporting frame thereof;

Fig. 2 is a view in end elevation of the machine shown in Fig. 1;

Fig. 3 is a view in front elevation of the machine;

Fig. 4 is a perspective view of the several parts which make up the improved roughing tool;

Fig. 5 is a perspective view illustrating the operation of the machine;

Fig. 6 is a detail view in end elevation of a modified stitch-rubbing mechanism;

Fig. 7 is a detail view in front elevation of the stitch-rubbing mechanism shown in Fig. 6; and

Fig. 8 is an incomplete sectional view illustrating a detail of the machine and taken on line VIII—VIII of Fig. 3.

The operating instrumentalities of the machine are carried by a head 10 which is mounted upon a suitable standard. Formed in the head 10 are a pair of bearings 12 and 14, respectively, (Fig. 3), in which is mounted a shaft 16 having an externally tapered end portion 32. Mounted upon the shaft 16 are a pair of loose pulleys 18 and 20, and between these pulleys is mounted a pulley 22 which is fixed to the shaft 16. A cover plate 23 for the above-mentioned pulleys is secured to the head 10. A pair of oppositely running belts 24 and 26 which may be driven from any suitable source of power normally engage the loose pulleys 18 and 20, respectively. When it is desired to drive the shaft 16, one or the other of the belts 24 and 26 may be shifted from its loose pulley to the fixed pulley 22 by one of a pair of belt shifters 28 and 30.

The roughing tool is mounted upon the free end of the shaft 16 and comprises a hub 34 (Fig. 4) having a tapered spindle extending into a complementally tapered axial recess formed in the end of the shaft 16. A rod having a threaded end engageable with a tapped recess in the end of the above-mentioned spindle extends through the shaft 16 from the far end thereof, having a handwheel 35 which enables the operator readily to secure the roughing tool as a unit to the shaft 16, or to release the roughing tool for removal

therefrom. Extending axially from the hub 34 beyond the end of the shaft 16 is a spindle 36 upon which is rotatably mounted a disk 38. Four blocks 40 arranged to occupy the four sectors of the outer face of the disk 38 are secured to said face with provision for radial adjustment. Each of the blocks 40 is provided with a dovetail slide 42 which engages a complemental guideway formed in the disk 38. The disk 38 is provided with a radial slot 44 extending through the disk at the base of each of these guideways. Extending from each of the blocks 42 through each of the guideways 44 is a pin 46. Integral with the hub 34 is a circular plate or disk 48 in which are formed four spiral slots 50. Each of the pins 46 extends into one of the slots 50, the slots being so designed as to cause the blocks 42 to be adjusted radially upon relative rotary movement between the disks 38 and 48.

Mounted upon each of the blocks 40 are a pair of arcuate members 52 spaced axially from each other to accommodate stitch-rubbing mechanism later to be described. Each of the arcuate members 52 carries radially extending tufts of wire bristles which constitute the abrasive periphery of the tool. The arcuate members 52 are channel shaped, with the tufts of bristles set in the base of the channel and the walls serving to confine the bristles axially and presenting smooth outer surfaces. Each arcuate member is secured by screws extending through the base of its channel and threaded into the periphery of its respective block. Two rows of tufts are provided in each arcuate member, the rows extending circumferentially parallel to each other with the individual tufts staggered. Each arcuate member is staggered circumferentially with respect to its neighbor on the same block to enable the four arcuate members of each ring to break joint with those of the other ring. While expansion of the brush by radial adjustment of the blocks 42 may tend to open up spaces in each ring of bristles, the other ring will be continuous in the neighborhood of such spaces and as a result there will always be some bristles in engagement with the work to assure a steady even action upon the work and to avoid the bumping which might occur if the spaces did not break joint.

The bristles on the arcuate members 52 adjacent to the disk 38 are relatively coarse in texture, being in the neighborhood of 0.006 of an inch thick while the bristles on the arcuate members further removed from the disk 38 are relatively fine, for example about 0.0045 of an inch. The brush comprising the coarser bristles is identified by the reference character 54 and the brush comprising the finer bristles by the reference character 56. Loosely mounted upon the spindle 36 beyond the blocks 40 is a clamping disk 58.

The outer end of the spindle 36 is threaded to accommodate a clamping nut 60. It is evident that when the nut 60 is tightened all of the brush elements will be tightly clamped against the disk 48 in whatever position of radial adjustment the blocks 40 may occupy. Threaded upon the hub 34 is a sleeve 62 from which extends a frusto-conical shield 64, the rim of which may engage the bristles of the brush 54. The sleeve 62 is held in any desired position of adjustment by a locknut 66. By adjusting the sleeve 62 the bristles of the brush 54 may be prevented from flaring toward the right, or they may even be bent toward the left. The right-hand edge of the periphery of the brush 54 is thus sharply defined, enabling the operator to confine the roughing action to the

channel base without damaging the upper of the shoe and avoiding the possibility of stray bristles which might scratch the upper. The periphery of the brush 54 is frusto-conical with the large end adjacent to the brush 56. The periphery of the brush 56 is likewise frusto-conical with the large end adjacent to the brush 54. Referring to Figs. 3 and 5, however, it will be observed that the diameter of the large end of the periphery of the brush 54 is somewhat greater than the diameter of the adjacent large end of the periphery of the brush 56 for a reason which will later be explained.

The means for holding the channel lip against the brush 56 are in some respects similar to those disclosed in the above-mentioned Patent No. 2,004,109 and comprise a wedge-shaped finger 68 adjustably secured to a sleeve 70 carried upon the lower end of a lever 72. The finger 68 is similar to the member 82 of the machine disclosed in the above-mentioned application of Johnson, having an under surface adapted to engage the sole of a shoe and an upper surface adapted to support the channel lip against the roughing tool. As best shown in Figs. 1 and 2, the lever 72 is made up of four segments secured together by adjustable rigid connections 73 and 75 and also by a hinge 77. The connections 73 and 75 are of the tongue-and-groove type, the former being arranged for forward and backward adjustment (right and left as seen in Fig. 2) and the latter for heightwise adjustment of the finger 68. The hinge 77 connects the lowest segment, which carries the fingers 68, to the rigid assembly comprising the other three segments, and is arranged for swinging movement of the finger 68 toward and from the roughing tool. A relatively weak compression spring 79 surrounding a screw 81 tends to hold the finger 68 away from the roughing tool. The screw 81 extends through one of the segments and is threaded into the other to provide an adjustable stop for the extent of separation of the segments under the influence of the spring 79. The spring 79 yields under pressure as the shoe is held against the roughing tool during the operation, the upward swinging movement of the finger being limited by the engagement of adjacent surfaces on the two segments of lever which are connected by the hinge 77. The uppermost segment of the lever 72 is fulcrumed upon a pin 74 carried by a block 76 which in turn is mounted upon the end of a rod 78 secured in lugs extending from the head 10. The upper arm of the lever 72 is connected to one end of an operating rod 80, the opposite end of the rod 80 being pivotally connected to an arm 82 which is mounted for free swinging movement upon a bracket 84 carried by the rod 78. A rod 86 extends upwardly from a treadle (not shown) and is pivotally connected to the arm 82. Depression of the treadle will draw the arm 82 downwardly, causing the rod 80 to be pulled toward the right, as seen in Fig. 3, to rotate the lever 72 in a clockwise direction. The treadle is normally held up by a spring (not shown) to a stop position determined by a collar 87 adjustably secured upon the rod 86 and engageable with a lug 89 extending from the head 10. The connection between the lever 72 and the rod 80 provides for fine adjustment of the normal or operating position of the lever 72 about its fulcrum 74 and comprises a pin having a knurled head 91. The end portion of the shank of this pin is threaded through an eye in the rod 80 and is secured by a locknut 95. An eccentric 93 (Fig. 75

2) formed on the shank engages an eye formed in the lever 72. Adjustment is effected by turning the head 91 while the locknut is loosened.

A gage 88 is provided for assisting the operator in positioning the work piece. This gage extends over the channel lip and terminates in a downwardly extending convex edge 90 which is positioned in the general plane of the clearance space provided by the axial spacing of the two sets of arcuate members 52 as already described. The shank of the gage 88 is adjustably clamped by a screw 92 in the lower end of a bar 94, the upper end of which is clamped upon the pin 74.

In addition to the roughing brushes which act upon the channel base and the channel lip, the machine is provided with means for rubbing down the stitches which extend over the surface of the channel base closely adjacent to the shoulder of the channel. The machine shown in Figs. 1, 2, 3 and 5 is provided with a single stitch rubbing tool. A modification comprising a pair of stitch-rubbing tools is illustrated in Figs. 6 and 7. Each member of the pair shown in Figs. 6 and 7 is similar, except for minor differences which will later be pointed out, to the single tool disclosed in the other figures, and the same reference characters employed to identify various portions of the single tool (together with its operating mechanism) have been applied to corresponding portions of one member of the pair. Such numbering will be convenient for the reason that certain details of the stitch-rubbing mechanism common to both the single and the double tool arrangements are best shown in Figs. 5 and 6.

The single stitch-rubbing mechanism will first be described. This mechanism comprises an arcuate plate 96 which extends rearwardly around the blocks 40 and through the clearance space between the two sets of bristles and which has formed in its lower extremity a plurality of blunt teeth 100 which engage the stitching. The plate 96 (see Figs. 5 and 7) is secured upon an arm 102, the upper end portion of which carries a block 104 having a longitudinal slot which is engaged by a slide 105 in which is journaled an eccentric 106 secured on a shaft 108. A compression spring 110 is interposed between the lower end of the slot and the slide 105. A screw 112 threaded through the upper end of the block 104 extends downwardly to engage the slide 105 as a stop to limit upward movement of the slide. The screw 112 is held in any desired position of adjustment by a locknut 114. The arm 102 at a locality between the plate 96 and the block 104 is pivotally connected to a link 98 which is pivotally mounted for free swinging movement about the rod 78.

The shaft 108 is journaled in bearings 128 and 130 which are both carried by a bracket 132 (Fig. 3) secured upon the rod 78. Secured upon the shaft 108 is a pulley 134 (Fig. 2) driven by a belt 136. Rotatably mounted in an arm 138 are a pair of pulleys 140 and 142 which rotate as a unit, being integral in the illustrated machine. The pulley 140 drives the belt 136 while the pulley 142 is, in turn, driven through a crossed belt 144 from a pulley 146 which, in turn, is driven, when the shaft 16 is turning in Fig. 3, through a Horton one-way clutch 148 on the shaft 16. The arm 138 is pivotally mounted for adjustment about a pin 150 (Fig. 2) secured in a bracket 151 and has an arcuate slot 152 (Fig. 1) concentric with the pin 150. The arm 138 may be clamped in any desired position of adjustment against the

bracket 151 by a bolt 154 extending through the slot 152. The bracket at its intermediate portion is split for clamping about the bearing 130. The lower end of the bracket 151 is clamped by a screw 153 to a pin 155 secured in the head 10.

Supported by the bracket 132 is a frusto-conical guard 156 extending beneath and in front of the rotating shield 64. The guard 156 is similar to that disclosed in the above-mentioned Brostrom Patent No. 2,087,238 and is similarly adjustable both heightwise and axially of the tool by means of clamping bolts 160 extending through slots 162 (see Fig. 3).

For sharpening the brushes 54 and 56 and for maintaining the desired contour of their periphery there is provided a grinding wheel 164 secured upon a shaft journaled in a bearing 166 carried by an arm 168. The grinding wheel shaft carries a pulley 170 which is driven by a belt 172. The arm 168 is secured upon a shaft 173 which is journaled in a bearing 174 carried by the bracket 132. Rotatably mounted upon an eccentric 176 are a pair of pulleys 178 and 180 both integral with a common hub 182 and rotating as a unit. The belt 172 runs over the pulley 178 while the pulley 180 is driven by a belt 183 running over a pulley 184 secured upon the shaft 16. The arm 168 extends beyond the bearing 166 and its outer end portion constitutes a handle having a knob 186 by which the arm 168 may be swung about the axis of the shaft 173. It will be observed that the grinding wheel 164 may be brought down from its inoperative position, as shown in Figs. 1, 2 and 3, into engagement with the brushes 54 and 56. The operating position of the grinding wheel is determined by a stop screw 188 engageable with an abutment surface 190 formed on the bracket 132 and secured in adjusted position by a lock-nut 192. When in its upper or inoperative position the arm 168 is supported by a knurled head 194 of the screw in contact with an upper portion of the abutment 190.

The arrangement of the eccentric 176 upon the shaft 173 is such as to loosen the belt 183 when the grinding wheel is moved into inoperative position, thereby stopping the drive of the grinding wheel, and to tighten the belt 183 and thereby cause the grinding wheel to be driven when the grinding wheel is brought into operative position. In order further to insure that the driving wheel will not needlessly be driven when in inoperative position a plunger 196 (see Fig. 3) mounted in the bearing 174 is urged by a spring 197 into engagement with an annular raised surface 198 on the pulley 178. Movement of the grinding wheel into operative position will withdraw the surface 198 from engagement with the spring plunger. In order still further to insure against the grinding wheel being needlessly driven when in its inoperative position there is provided a brake in the form of a finger 200 (Fig. 8) engageable with the belt 183 where the latter runs over the pulley 180. The finger 200 extends from a hub 202 rotatably mounted on the rod 78 and having a second finger 204 which, in turn, is engageable by an arm 206 extending from a hub secured upon the end of the eccentric 176. A torsion spring 208 coiled about the rod 78 tends to hold the above-mentioned brake in inoperative position. Swinging of the grinding wheel 164 up into inoperative position will cause the arm 206 to engage the finger 204 and thereby force the finger 200 against the belt 183.

As previously mentioned, the peripheries of the

brushes 54 and 56 are frusto-conical with their larger diameters adjacent to each other and with the larger diameter of the brush 54 somewhat greater than that of the brush 56. In order to maintain this desired contour of the roughing tool the grinding wheel is provided with two frusto-conical surfaces 210 and 212 which are complementary, respectively, to the desired contours of the brushes 54 and 56. The smaller ends of the frusta 210 and 212 are accordingly adjacent to each other, the diameter of the smaller end of the frustum 210 being somewhat less than the diameter of the smaller end of the frustum 212. The frusta 210 and 212 may conveniently be composed of separate disks of suitable grinding material secured together as a unit upon the shaft 166.

In order to keep the surface of the work piece free of leather dust during operation there is provided a blast nozzle 214 which is supplied with air under pressure through a conduit 216 supported by a clamp 218 on the bracket 76. A suction dust hood 220 (Fig. 1) is provided for disposing of the dust.

The operation of the machine upon a shoe S having a channel lip L is illustrated in Fig. 5. The operator first depresses the treadle to retract the finger 68 from the brush 56. He then inserts an end portion of the lip L between the finger 68 and the brush 56, pressing upwardly to compress the spring 79 until the finger 68 swings upwardly as far as permitted by the above-described engaging faces on the segments of the lever 72 connected by the hinge 77. He then releases the treadle, enabling the treadle spring to swing the lever 72 counter-clockwise, as viewed in Fig. 3, into the operating position determined by the adjustment of the eccentric 93. The finger 68, in accordance with such adjustment, will control the pressure of the lip L against the brush 56. In presenting the shoe to the machine the operator holds the shoe with the toe end pointing toward him, and he feeds the shoe away from himself. He is careful at all times to hold the shoe with the edge 90 of the gage 88 against the shoulder of the channel, thus maintaining the shoe in proper relation to the roughing and stitch-rubbing tools. The edge 90 prevents the operator from inadvertently moving the shoe too far to the left, which might cause the finger 68 to turn down the lip L and thus to expose the wrong side of the lip to the brush 56. The direction of rotation of the shaft 16 as indicated by the arrow in Fig. 3 is such as to assist in the feeding of the shoe. The operator in feeding the shoe turns it in accordance with the curvature of the outline of the sole, continuing the operation until the opposite end of the channel is reached. When he finishes the operation the toe end of the shoe will be pointed away from him.

It will be observed that the stitch-rubbing tool 96 is oscillated in an orbital path which is elongated in the direction of feed of the shoe and that this tool in its lower position, at which it engages the shoe, will travel in the direction of feed. The movement of the tool is considerably faster than the feed of the shoe to enable the tool to rub against the stitching. The spring 110 yields and thereby enables the shoe to flatten out the lower portion of the path of travel of the stitch-rubbing tool 96 which otherwise might tend to push the shoe away from the brushes 54 and 56. The teeth 100 engage a length of stitching greater than the extent of their oscillation. The successive contacts of the teeth will thus

overlap, and the entire length of stitching will be engaged. The effect of the teeth 100 is not only to rub down and flatten out the stitches, but also slightly to mutilate the top of the thread to enable the cement better to penetrate and better to adhere when the lip is laid. The teeth 100 are not sharp enough to weaken the thread appreciably. The stitch-rubbing tool, also operating in the direction of feed, contributes to the effect of the roughing brushes in helping the operator feed the shoe. The width of the teeth 100, that is, the thickness of the plate 96, is more than sufficient to cover the stitching, being enough greater to avoid likelihood of missing the stitching as the operator, aided by the gage 90, feeds the shoe.

When it is desired to sharpen the brushes the rotation of the shaft 16 is reversed by moving first the belt shifter 28 to the left and then the belt shifter 30 to the left, as viewed in Fig. 3. Such reversal of drive while the brushes are being sharpened increases their effectiveness when driven in their normal direction for roughing. It will be observed that the Horton clutch 148 will not operate to transmit such reverse drive of the shaft 16 to the shaft 108, and will thus prevent the stitch-rubbing instrumentalities from being needlessly driven during the grinding of the brushes. The arm 186 is then swung down into operative position. As has already been explained, such movement will cause the grinding wheel to be driven and the adjustment of the screw 188 will determine the exact diametrical dimensions of the brushes. As the brushes wear down they may be expanded by loosening the nut 60 and rotating the brushes together with their disk 38 relatively to the disk 48. The brush assembly may then be clamped in adjusted position by tightening the nut 60. The contour of the periphery of the brushes as above described is important, inasmuch as it has been found that unless the diameter of the larger end of the brush 56 is less than the diameter of the larger end of the brush 54, the brush 56 may sometimes tend to scour through the relatively thin lip of the channel. The fact that the brush 56 is composed of finer and more flexible bristles than the brush 54 helps likewise to avoid damage to the channel lip.

The modified stitch-rubbing mechanism shown in Figs. 6 and 7 comprises a pair of stitch-rubbing tools oscillated alternately with one or the other always in engagement with the work. Except for such differences as will presently be pointed out, the various members of one set which make up this double mechanism are similar to corresponding members of the other set, and also to corresponding members of the simpler mechanism already described. For convenience, one set of members of the double mechanism have been given the same reference characters as the corresponding members of the single mechanism. The second set of members shown in Figs. 6 and 7 comprise a plate 596 similar to the plate 96 but extending forwardly around the blocks 40, and having formed in its lower extremity a plurality of blunt teeth 600. Each of the plates 96 and 596 in the locality of the teeth is reduced to half the thickness of the remaining portion of the plate. The reduced portions of the plates are in sliding engagement with each other, and are of sufficient extent to provide clearance for the unreduced portions as the plates oscillate. The unreduced portions of the plates, as seen in Fig. 7, are in alinement with each other and occupy the clearance space between the brushes 54 and

56. The plate 96 of the single stitch-rubbing mechanism is not reduced in thickness at the locality of the teeth and in that respect differs from the plate 96 of the double mechanism. The plate 596 is secured upon an arm 602 similar to the arm 102 except for the fact that the arm 102 is offset to bring the plate 96 into alinement with the plate 596. The upper end portion of the arm 602 carries a block 604 similar to the block 104 and having a longitudinal slot which is engaged by a slide 605 similar to the slide 105. An eccentric 606 similar to but displaced 180° from the eccentric 106 is secured on the shaft 108 and is journaled in the slide 605. In the double construction illustrated in Figs. 6 and 7 the eccentrics 106 and 606 are integral, being formed on a sleeve which is secured upon the shaft 108. A compression spring 610 similar to the spring 110 is interposed between the slide 605 and the lower end of the slot in the block 604. A screw 612 threaded through the upper end of the block 604 extends downwardly to engage the slide 605 as a stop to limit the upward movement of the slide. The screw 612 is held in any desired position of adjustment by a locknut 614. The arm 602 at a locality between the plate 596 and the block 604 is pivotally connected to a link 598 which is pivotally mounted for free swinging movement about the rod 78. The members 612, 614 and 598 are similar in construction and purpose to the previously described members 112, 114 and 98, respectively.

The movement of the stitch-rubbing tool 596 like that of the tool 96 previously described will be oscillation in an orbital path elongated in the direction of feed of the shoe. By reason of their respective eccentrics being displaced from each other by 180° the stitch-rubbing tools 96 and 596 will operate alternately. The springs 110 and 610 will yield and thereby enable the shoe to flatten out the paths of travel of the tools with the result that one tool will engage the work before the other has left it.

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

1. A machine for operating on channeled soles comprising a pair of roughing tools constructed and arranged to operate respectively upon a channel base and a channel lip, a movable stitch-rubbing tool positioned between said roughing tools, and means for imparting stitch-rubbing movement to said stitch-rubbing tool.

2. A machine for operating on channeled soles comprising a pair of adjacent roughing brushes for operating respectively upon a channel base and a channel lip, a driven shaft on which said roughing brushes are mounted, a stitch-rubbing tool positioned between said roughing brushes, and means for oscillating said stitch-rubbing tool.

3. In a machine for operating on channeled soles, a rotary roughing brush adapted to operate upon a channel surface, driving means for said brush, a stitch-rubbing tool adjacent to said brush, and means for oscillating said stitch-rubbing tool.

4. A machine for operating on channeled soles comprising a pair of driven adjacent co-axial roughing brushes for operating respectively upon a channel base and a channel lip, a stitch-rubbing tool in the form of a thin blade-like member extending between said brushes and having blunt stitch-engaging teeth extending from its outer edge, and means for oscillating said stitch-rubbing tool.

5. In a machine for operating on shoes, a stitch-rubbing tool, mechanism for oscillating said tool in an orbital path, and a spring in said mechanism yieldable under pressure of the sole against the tool to flatten out said orbital path to prolong the rubbing contact of said tool upon the stitching.

6. In a machine for operating on shoes, a stitch-rubbing tool, a lever carrying at one of its ends said stitch-rubbing tool and having a slotted guideway formed in its other end, a driven eccentric in driving engagement with said guideway, and a freely swinging link upon which the intermediate portion of said lever is fulcrumed.

7. In a machine for operating on shoes, a stitch-rubbing tool, a lever carrying at one of its ends said stitch-rubbing tool and having a slotted guideway formed in its other end, a driven eccentric in driving engagement with said guideway, a freely swinging link upon which the intermediate portion of said lever is fulcrumed, and a compression spring interposed between said eccentric and the base of said slot to enable said stitch-rubbing tool to yield under pressure of the work.

8. In a machine for operating on shoes, a pair of stitch-rubbing tools in sliding contact with each other, and means for oscillating said tools alternately in orbital paths.

9. A machine for operating on channeled soles comprising a pair of roughing tools constructed and arranged to operate respectively upon a channel base and a channel lip, a stitch-rubbing tool positioned between said roughing tools, and a gage engageable with the shoulder of the channel to position the shoe in operating relation to said tools.

10. A machine for operating on channeled soles comprising a stitch-rubbing member, means for oscillating said stitch-rubbing member to cause it to rub down stitching on a channeled sole, and a gage engageable with the shoulder of the channel to position the shoe in operating relation to said stitch-rubbing member.

11. A machine for operating on channeled soles comprising a roughing tool, a member adapted to hold a turned-up channel lip against said roughing tool, said lip-holding member being constructed and arranged to occupy the space between the turned-up lip and the outer surface of the sole on which the lip is formed, a lever carrying said lip-holding member, said lever being fulcrumed for swinging movement of said lip-holding member toward and from said roughing tool, a yieldable element in said lever, and resilient means urging said yieldable element in a direction to maintain said lip-holding member away from the roughing tool, said resilient means being yieldable under pressure of the outer surface of the sole to enable the operator to exert pressure through the shoe to cause the lip-holding member to press the lip against the roughing tool.

12. A rotary abrading tool comprising a plurality of sectors, a support constructed and arranged for radial movement of said sectors, and abrasive material constituting the periphery of the tool and carried by the sectors, the abrasive material on each adjacent pair of sectors overlapping to insure circumferential continuity when the sectors are expanded as a group.

13. A rotary abrading tool comprising a plurality of sectors each having abrading bristles extending outwardly from its periphery, a disk having a plurality of radial guideways in which

said sectors respectively are mounted, a cam having a plurality of slots, means carried by said sectors and engageable with said cam slots for adjusting the radial positions of said sectors, said
5 cam slots being arranged to cause radial movement of said sectors upon relative rotation of said disk, and means for securing said disk against rotation to hold said sectors in their adjusted positions.

10 14. A rotary roughing brush comprising a plurality of sectors each having abrading bristles extending outwardly from its periphery, a disk having a plurality of guideways in which said sectors are respectively mounted, a circular plate
15 having a plurality of spiral cam slots and having a hub on which said disk is rotatably mounted, cam elements on said sectors respectively cooperating with said spiral slots to move said sectors radially to expand and contract the brush upon
20 rotation of said disk relatively to said cam plate, and means for clamping said sectors against said cam plate to maintain the sectors in adjusted position.

15. A rotary abrading tool comprising a plurality of sectors, a support constructed and arranged for radial movement of said sectors whereby the sectors may be expanded as a group to increase the diameter of the tool, and a pair
5 of arcuate abrading elements on each of said sectors, the members of each pair being axially separated from each other to provide a clearance space extending around the periphery of the tool.

10 16. A rotary roughing brush comprising a plurality of sectors, a support constructed and arranged for radial movement of said sectors whereby the sectors may be expanded as a group to increase the diameter of the brush, a pair of
15 arcuate channel-shaped bristle holders on each of said sectors, the members of each pair being axially separated from each other to provide a clearance space extending around the periphery of the brush, and wire bristles set in the bases
20 of said channel-shaped holders and extending beyond the walls of said holders.

JOHN B. HADAWAY.