Jan. 29, 1935. C. G. BROSTROM 1,989,078

MACHINE FOR SURFACE TREATING SHOE PARTS

Filed Feb. 23, 1932 4 Sheets-Sheet 1

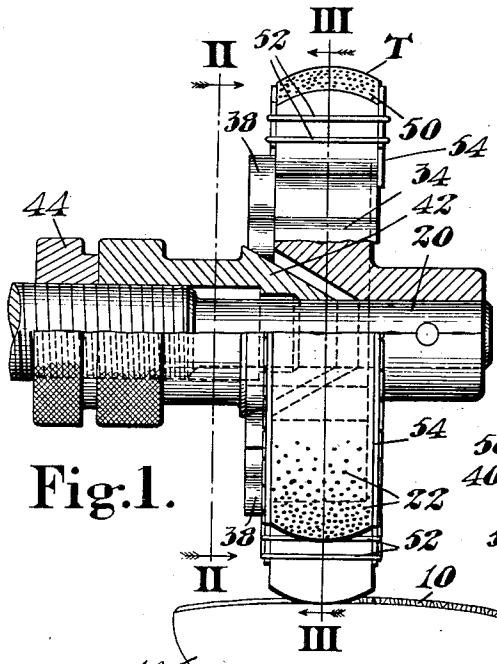


Fig.1.

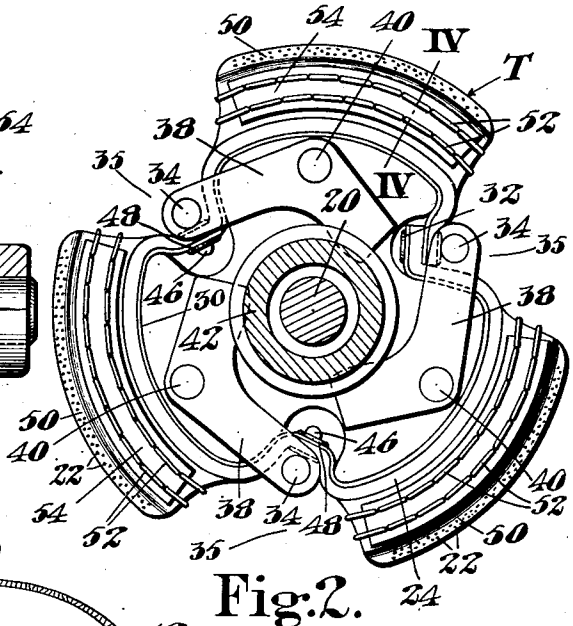


Fig.2.

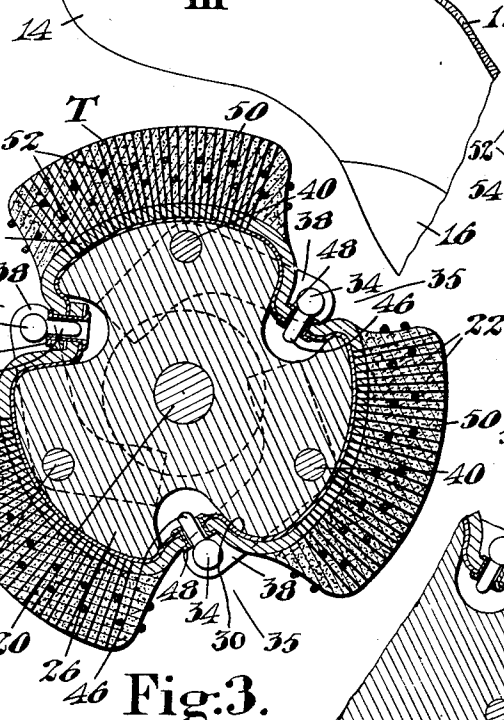


Fig.3.

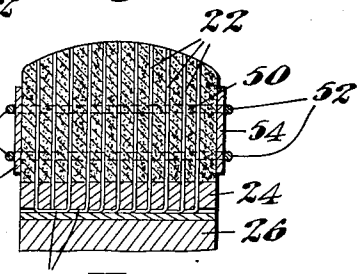


Fig.4.

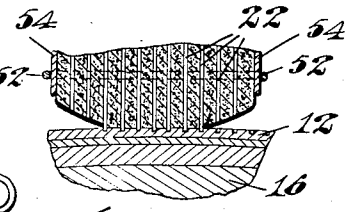


Fig.5.

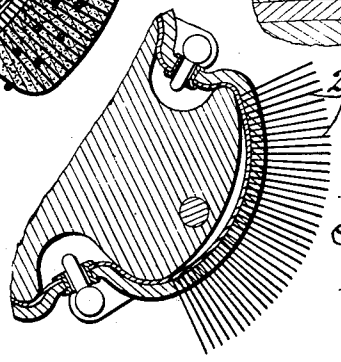


Fig.6.

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MACHINE FOR SURFACE TREATING SHOE PARTS

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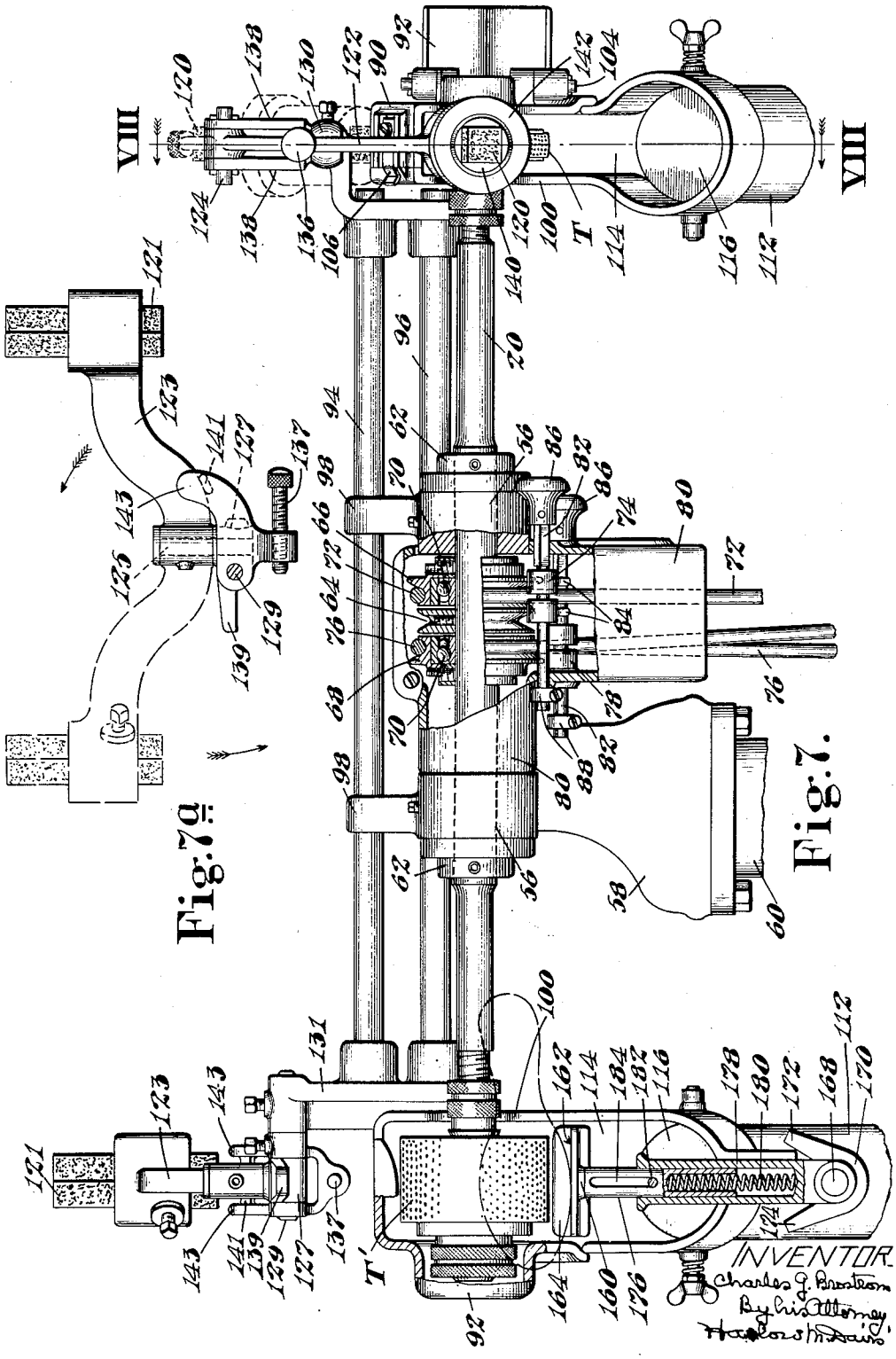


Fig. 7a.

Fig. 7.

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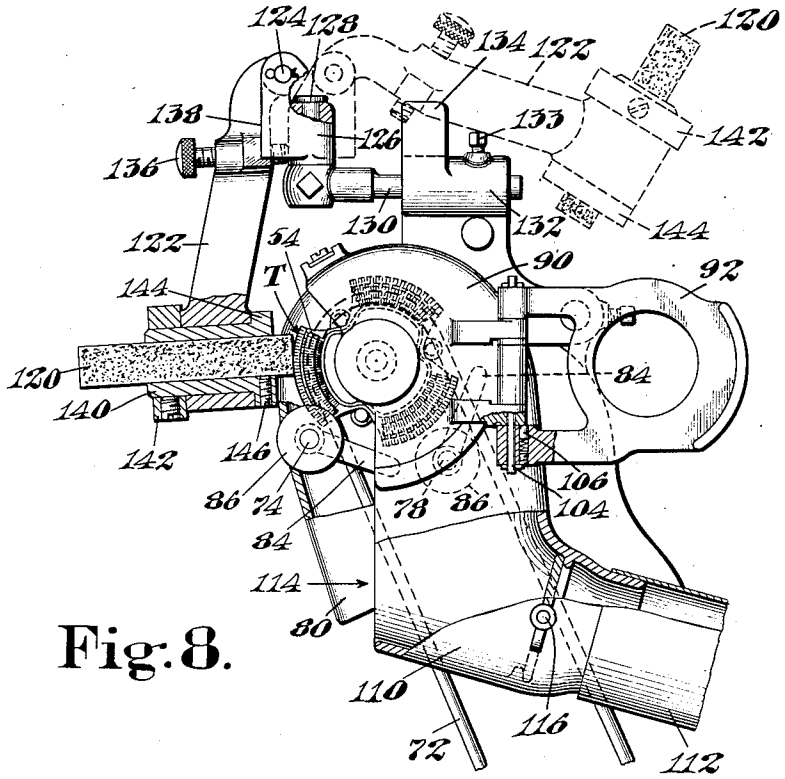


Fig. 8.

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MACHINE FOR SURFACE TREATING SHOE PARTS

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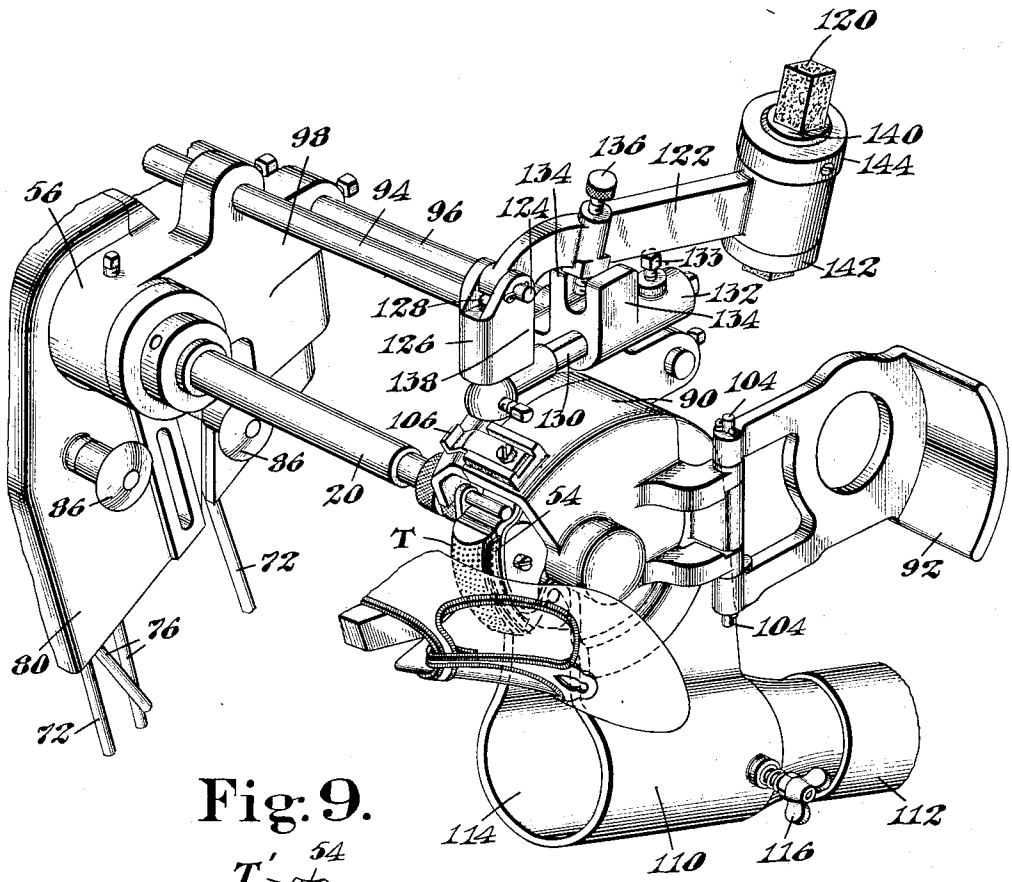


Fig. 9.

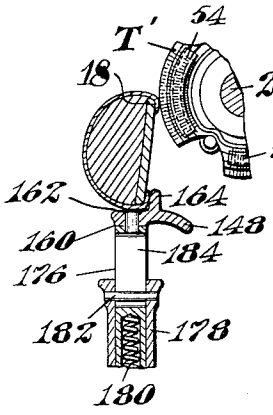


Fig. 10.

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UNITED STATES PATENT OFFICE

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MACHINE FOR SURFACE TREATING SHOE PARTS

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Application February 23, 1932, Serial No. 594,529

29 Claims. (Cl. 69—1)

This invention relates to improvements in machines for surface treating shoe parts as by roughing to prepare them, for example, for the reception of adhesive for securing them to other shoe parts, and to improvements in tools for use in such machines. The invention is herein illustrated as embodied in a machine especially adapted for roughing the overlasted margins of shoe uppers preparatory to coating them with cement for attaching outsoles thereto. The illustrated machine is adapted for use in the practice of a method of roughing shoe parts disclosed and claimed in a copending application, Serial No. 573,923, filed November 9, 1931, in the name of Walter H. Wedger.

Among its objects the present invention aims to provide an improved tool which will be adapted to operate upon shoe parts, and particularly leather uppers, to roughen them most effectively for the reception of the cement without danger of tearing or otherwise damaging them, and in the use of which the operator may readily vary the degree of roughing to suit the characteristics of the particular grade of leather being operated upon and also readily avoid extending the roughing to portions of the upper which will be exposed in the finished shoe.

In view of the foregoing the invention, in one aspect, contemplates an improved roughing tool having a multiplicity of roughing or abrading members, illustrated as resilient wire bristles, which are preferably embedded in soft yielding material such as rubber with only the extremities of the bristles adapted to be exposed for action upon the work. As herein illustrated, the improved roughing tool is, in effect, a rotary wire brush having radially disposed bristles which are mounted in soft rubber, each bristle being normally embedded throughout its length in the rubber with its outer end substantially flush with the surface of the rubber. In operation, the pressure of the work against the periphery of the tool serves to compress the rubber and thus to expose the extremities of the bristles sufficiently to enable them to roughen the work, the extent of projection of the bristles, and consequently the depth to which they are permitted to penetrate into the leather, varying with the degree of pressure exerted by the operator so that the tool has an easily controlled "soft" and "sensitive" action upon the work. It will be appreciated, therefore, that the rubber constitutes a yielding gaging means for determining the depth of grooves or furrows made by the bristles in the work and that invention is to be recognized in that step in the art of roughing shoe parts which consists in forming a series of furrows in a shoe part while utilizing yielding gaging means to determine the depth of the furrows.

The resilient character of the rubber in which the wire bristles are illustrated as being mounted is such as not to interfere with the desired resilient action of the bristles, permitting the bristles to yield from their normal radial positions upon engagement with the work but causing them to be returned to their initial positions upon leaving the work and thus insuring against cumulative and permanent displacement of the bristles from positions in which they are best adapted for effective action upon the work. It will be apparent that the bristles are also yieldingly supported against undesirable lateral displacement (i. e., in directions axially of the tool). Thus the illustrated bristles are retained substantially in their initial arrangement relatively to each other; the tool is prevented from becoming misshapen throughout a comparatively long period of use; and there is no danger of having any bent or broken bristles projecting from the sides of the tool such as would be liable to scratch and disfigure any portions of the upper which are to be exposed in the finished shoe. The illustrated construction therefore is such as to provide for a sensitive control of the roughing operation by the operator and tends to prevent harsh and uneven action upon the work.

In the illustrated tool the rubber in which the roughing elements are embedded is so mounted upon a rigid hub or holder that the rubber is held away from the solid hub by the action of centrifugal force at the point where the tool engages the work and thus, in effect, the tool is cushioned so as to render its action even more yielding and sensitive than it otherwise would be. Means is also provided, in the illustrated tool, for adjusting the degree of "air cushioning" thus imparted to the operative portion of the tool.

Invention is further to be recognized as residing in an improved machine for roughing shoe parts comprising a rotary roughing tool and operating means therefor and provided, as herein illustrated, with novel mechanism for use in dressing the tool and sharpening the roughing elements thereof, and means for reversing the direction of rotation of the tool shaft to facilitate the sharpening of the roughing elements.

The illustrated machine is provided with a roughing tool at each extremity of the tool shaft. As shown, one tool is particularly adapted for operating along the shank portion of the over-

lasted upper margins in the shank portions of shoes while the other tool is especially designed for roughing the upper margins at the foreparts of shoes. If desired, however, the tools at opposite ends of the tool shaft may be of similar construction, each being adapted for operating both along the shank and around the forepart of a shoe. A work rest is herein shown in conjunction with one of the roughing tools but it is to be understood that the invention is not limited to the use of a work rest in connection with either tool.

The invention further consists in features of construction and combinations and arrangements of parts both in the tool itself and in the machine in which the tool is embodied, as hereinafter described and claimed.

The invention will be better understood and appreciated from reading the following detailed description of one practical embodiment thereof, in connection with the accompanying drawings, in which

Fig. 1 is a view, partially in front elevation and partially in section of the improved roughing tool illustrating its mode of operation upon a shoe upper;

Fig. 2 is a view, partially in side elevation and partially in section, on the line II—II of Fig. 1;

Fig. 3 is a sectional view taken along the line III—III of Fig. 1;

Fig. 4 is a sectional detail on an enlarged scale taken on the line IV—IV of Fig. 2;

Fig. 5 is a sectional view illustrating the roughing action of the tool;

Fig. 6 is a fragmentary sectional view of a roughing tool of modified construction and illustrating the "air cushioning" of the roughing elements;

Fig. 7 is a view, in front elevation, of the head of the improved roughing machine;

Fig. 7*a* is a fragmentary view illustrating the operation of sharpening one of the roughing tools;

Fig. 8 is a view, partially in end elevation and partially in section, of the machine, the section being taken substantially along the line VIII—VIII of Fig. 7;

Fig. 9 is a perspective view of a portion of the head of the machine; and

Fig. 10 is a fragmentary side elevational view of a portion of the machine shown in Fig. 7 illustrating the manner in which a shoe is supported while the upper is being roughed at the forepart of the shoe.

In Figs. 1 and 5 of the drawings a tool T is illustrated as operating to produce a roughened surface 10 upon the overlasted margin 12 of the upper of a shoe 14 mounted upon a last 16. The usual innersole over which the upper margins are lasted is shown at 18 in Fig. 5. The illustrated operation is for the purpose of preparing the shoe bottom for the reception of cement by which an outersole is to be attached to the shoe.

The roughing tool is mounted upon a shaft 20 which is rotated at a suitable speed by means hereinafter to be described. In the illustrated tool the roughing means consists of a multiplicity of resilient wire bristles 22 carried by a flexible band 24 which is wrapped about the periphery of a metallic block or hub or carrier 26 and is capable of stretching and moving outwardly away from the periphery of the hub under the action of centrifugal force while the tool is being rotated at high speed as will be hereinafter explained. The hub 26 is fixedly secured upon a reduced end portion of the shaft 20 by means of a tapered pin 28. As shown in Fig. 4, the wire constituting the bristles 22 is bent to form a plurality of wire staples, the legs of each staple being forced outwardly through the flexible band 24 to provide two bristles and the heads or crossbars 28 of each staple resting against the inner surface of the band and serving to prevent the staple legs or bristles from being pulled or forced outwardly through the band.

A strip 30 of canvas or like flexible material suitably secured to the inner surface of the band 24 serves to prevent the bristles 22 from being forced inwardly through the band by the pressure of the work when the band is stretched and portions of it are thrown away from the periphery of the hub 26 by the action of centrifugal force during the rotation of the tool. The opposite ends of the band 24 are overlapped and secured together by a hollow rivet or eyelet 32 as shown in Fig. 3. As illustrated, the overlapped end portions of the band 24 are left free of bristles and the bristles are also omitted at two other portions of the band, thus providing three stretches 35 devoid of bristles the outer surfaces of which are adapted to be engaged by clamping studs 34 and forced thereby into three notches 36 which are formed at points spaced equal distances apart in the peripheral portion of the hub 26. The clamping studs 34 are carried by three levers 38 which are pivoted at 40 to one side of the hub 26, the levers 38 each having an end portion that is engaged by a cone nut 42 that is threaded upon the shaft 20 and is adapted to be locked in position by a check nut 44. The relative arrangement of the cone nut 42, the levers 38 and the clamping studs 34 is such that by turning the nut the levers may be swung to increase or diminish the tension exerted by the clamping studs upon the band 24. In order to hold the band 24 against edgewise displacement upon the hub 26 each clamping stud 34 is provided with a pin 46 adapted to project into or extend through an aperture in the band 24. As shown, one of the pins 46 extends through the eyelet 32 which secures together the overlapped ends of the band 24 while the other two pins extend through eyelets 48 located in the other two portions of the band which are engaged by the clamping studs 34.

In the use of the roughing tool it is desirable that the bristles should be retained indefinitely in substantially radial positions although, in order to avoid too harsh action upon the work, they should be permitted to yield at least slightly upon contact with the work. In order to permit such desirable slight yielding of the bristles while nevertheless supporting them against excessive yielding and cumulative permanent displacement in directions both lengthwise of the periphery of the tool and laterally of the tool, the bristles, as herein shown, are embedded in soft rubber, the band 24 being for this purpose provided with three separate sections or blocks 50 of rubber carried by the portions of the band which contain the bristles. The rubber may be molded or vulcanized both to the band and to the bristles and preferably the rubber extends throughout the full length of the bristles so that the ends of the bristles are substantially flush with the surface of the rubber. Lateral spreading of the rubber and the bristles is prevented, as herein illustrated, by lines of stitching 52 (Fig. 2), the individual stitches extending transversely through the rubber sections 50 between the bristles as shown in Figs. 3 and 4. Preferably the stitches 52 extend also through strips 54 of fibre or similar material which are placed against the oppo-

site sides of the rubber sections to reinforce the sections and to prevent the stitches from sinking into the rubber.

Preferably, also, the tool is "dressed" by means of a suitable grinding or abrading element prior to use to impart a transverse convexity to the work engaging surface of the tool, thus facilitating operation of the tool along the concave shank portions of the shoe bottom and avoiding danger of "bridging" the concavity and thus failing to operate effectively upon all portions thereof. The dressing operation results in sharpening the ends of the bristles 22 as well as shaping or rounding the surface of the rubber and insures that the ends of the bristles will be substantially flush with the work engaging surface of the rubber as above described. As shown, the sections 50 are separated by means of the spaces 35 which are advantageous inasmuch as they serve to prevent the rubber sections from obscuring the operator's view of the work, it being possible, because of the spaces 35 and the high speed at which the tool is rotated, for the operator to have a clear view of those portions of the work which are actually being operated upon.

In the use of the tool, as indicated more or less conventionally in Fig. 5, the pressure of the work against the tool will result in compressing the rubber sufficiently to expose slightly the outer extremities of the bristles, thus permitting them to penetrate a desired distance beneath the surface of the upper material so as to roughen the surface properly for the reception of the cement. The surface of the rubber is thus maintained in contact with the work during the roughing operation and serves as a yielding abutment for gaging the extent of penetration of the bristles. Thus the operator is enabled by varying the pressure of the work against the tool to control the amount of roughing imparted to the work. The high speed at which the tool is preferably rotated causes the sections of the band 24 between the clamping studs 34 to be thrown outwardly a short distance away from the periphery of the hub 26 by the action of centrifugal force, somewhat as indicated in Fig. 6, so that an air cushion is formed between the hub and the portion of the band carrying the bristles which are operating upon the work, thus insuring a more sensitive yielding action of the tool upon the work and making it easier for the operator to control the character of the roughing. The degree of air cushioning thus provided may be varied by turning the cone nut 42 and thus adjusting the tension on the band 24.

The above-described rubber mounting of the bristles permits them to yield as they engage the work sufficiently to avoid harshness of action and possibility of resulting damage to the work. The reaction of the rubber as it leaves the work insures the return of the bristles to their normal radial positions after they have operated upon the work and it also effectively prevents the bristles from being deflected an excessive amount by engagement with the work and thus becoming permanently bent or displaced in directions lengthwise of the periphery of the tool in which condition they would be liable to "overwipe", i. e., to engage and deface portions of the upper beyond the overlasted margins which are to be exposed at the sides of the finished shoe. By mounting the bristles in rubber they are also prevented from becoming permanently displaced laterally of the tool in such a way as possibly to result in damage to the exposed portions of the upper.

As already stated, the extent of penetration of the bristles into the work is gaged by the work-engaging surfaces of the rubber sections or blocks 50, the rubber yielding in accordance to the amount of pressure with which the work is held against the tool so that the depth of the roughing is varied accordingly. Thus, not only does the rubber make it easier to control the extent and character of the roughing upon the portions of the upper margins which are to receive the cement but because of the rubber it is also easier to avoid damaging the delicate exposed surfaces of the upper. However, the rubber mounting of the bristles may be dispensed with without lessening the sensitive yielding action of the tool which is due to the "air cushioning" of the operative portion thereof. Thus, as shown in Fig. 6, a band 240 may be provided with a multiplicity of wire bristles 220 which are not embedded in rubber. A tool such as that shown in Fig. 6 has been found to be particularly well adapted for operating upon fabric shoe uppers.

As illustrated in Fig. 7, the shaft 20 which carries the above-described roughing tool T is journaled in horizontally spaced bearings 56 in a head 58 surmounting a pedestal 60, the shaft extending beyond the bearings in one direction to receive the tool T and in the opposite direction to receive a second roughing tool T' which, as herein shown, differs slightly in construction from that of the tool T. The tool shaft 20 is restrained against endwise movement in its bearings 56 by means of two collars 62 which are fixed to the shaft and arranged to engage the outer sides of the bearings 56. The tool T is pinned to one end of the tool shaft as already described and the tool T' is similarly pinned to the opposite end of the shaft. The tool shaft is provided, between the bearings 56, with a pulley 64 which is fixedly secured to the shaft and with two pulleys 66 and 68 which are located at opposite sides of the fixed pulley and are mounted upon ball bearings 70 to turn idly upon the shaft. A belt 72 is adapted to pass over the loose pulley 66 when the machine is not in use and to be shifted to the fast pulley 64 by means of a belt shifter 74 for the purpose of driving the tool shaft to rotate the roughing tools in a direction to operate upon the work. A second belt 76 is arranged to pass over the loose pulley 68 when the machine is idle and to be shifted by means of a belt shifter 78 to the fast pulley 64 for the purpose of driving the tool shaft to rotate the roughing tools in the opposite direction for the purpose of dressing the tools. The belts 72 and 76 are adapted to be driven by means of driving pulleys (not shown) which are connected to a suitable source of power, the belt 76 being crossed to rotate the fast pulley 64 and the tool shaft in a direction opposite to the direction in which the shaft is rotated by means of the belt 72. The above-mentioned pulleys and the upper portions of the belts are enclosed and protected by means of a casing 80 in which the belt shifters 74 and 78 are mounted. As shown, each belt shifter comprises a rectangular rod 82 which is slidably mounted in rectangular guideways in the sides of the casing 80 and which carries two pins 84 arranged to engage opposite sides of the belt. Knobs 86 fixed to the ends of the shifter rods 82 at one side of the casing 80 provide means for manually operating the belt shifters. Collars 88 are fixed to the opposite ends of the shifter rods to engage one side of the casing 80 to limit the movement of the rods in one direction while

the knobs 86 are arranged to engage the opposite side of the casing 80 to limit the movement of the shifter rods in the opposite direction. With the belt shifters in the positions shown in Fig. 7 the driving belts 72 and 76 pass over the loose pulleys 66 and 68, respectively, and no rotation is imparted to the tool shaft. By sliding the belt shifter 74 toward the left the belt 72 may be shifted to the fast pulley 64 to rotate the shaft in the proper direction for the tools to operate upon the work. By returning the shifter 74 to the position shown in Fig. 7 and sliding the shifter 78 toward the right the crossed belt 76 will be shifted to the fast pulley 64 to rotate the tool shaft in the opposite direction to facilitate the dressing of the tools.

The tool T is of a width which has been found most suitable for adapting the tool to perform roughing operations in the shank portions of a shoe bottom, the radius of transverse curvature of its periphery being such as to avoid danger of bridging any portion of the longitudinal arch of the shoe bottom, even in instances where the curvature of such arch is most abrupt. The tool T′ is like the tool T except that it is wider and its peripheral surface is transversely straight, thus affording an area of contact with the work which is substantially greater than that between the tool T and the work. The tool T′ therefore has been found particularly well adapted for operations in the forepart and at the toe portions of shoe bottoms where the material to be operated upon is substantially flat. By arranging the two roughing tools at opposite ends of a single tool shaft, as above described, a single operator may conveniently employ the tool T for roughing the shank portions of the uppers of shoes and utilize the tool T′ for roughing the foreparts of the shoe uppers. If desired, however, two operators may use the machine simultaneously, one operator roughing the foreparts of shoe uppers by means of the tool T′, while the other operator roughs the shank portions of the shoe bottoms by means of the tool T. Satisfactory results may also be obtained by employing the tool T to do the entire roughing operation, roughing not only the shank portions but also the foreparts of the shoe uppers, and it may be desirable to fit the machine with two tools like the tool T so that both tools may be employed at the same time to do the same class of work. Furthermore, a tool like that shown in Fig. 6 may be substituted for the tool T′ thereby adapting the machine to operate upon fabric uppers as well as leather uppers.

Each roughing tool is protected by a circular casing comprising a body portion 90 and a movable cover 92. The body portions 90 of the tool casings are supported at the opposite extremities of two horizontal rods 94 and 96 the middle portions of which extend through and are supported by rearward extensions 98 formed upon the tool shaft bearings 56. Openings 100 in the front of each tool casing 90 are adapted to expose the portions of the tools to which the work is to be presented. The opening 100 in the casing for the tool T is adapted to be closed, when the machine is not in use, by means of a cover 92 sufficiently to guard the tool and prevent it from causing damage or injury in case the machine should be unintentionally started. As shown, the cover 92 is hinged upon a vertical pin 104 carried by lugs projecting from the rear of the tool casing, the construction being such that the cover may be swung backwardly into an out-of-the-way position, as indicated in Fig. 9. A spring-pressed plunger 106, Fig. 8, is carried by the cover 92 and arranged to engage the tool casing frictionally to hold the cover in both open and closed position.

Provision is made for receiving and carrying away the dust resulting from the roughing operations. For this purpose dust hoods 110 are arranged to communicate with openings in the lower portions of the tool casings 90 and are connected with conduits 112 leading to the pipes of a factory suction system. The front portions of the dust hoods 110 are open, as indicated at 114, to receive the dust and dampers 116 are provided for controlling the suction.

As the bristles of the roughing tool engage the work they are deflected in a direction opposite to the direction of rotation of the tool and as a result, after continued use of the tool, the work-engaging ends of the bristles become worn and the end faces of the bristles become inclined so that their leading edges become blunt or dull. Consequently, the bristles are then less effective to accomplish their roughing operation and it becomes necessary to sharpen them. Furthermore, the rubber in which the bristles are embedded becomes worn away more or less unevenly through continued use and it becomes necessary to dress the rubber. In order to sharpen the bristles in such a manner as to render them more effective in roughing the work, provision is made for reversing the direction of rotation of the roughing tool so that, while the tool is being operated upon by the sharpening means, it will turn in a direction opposite to that in which it turns while operating to roughen the work. As a result of reversing the direction of rotation of the roughing tool at this time the bristles upon engagement with the sharpening means will be deflected in a direction opposite from that in which they were deflected by engagement with the work and thus the bristles will be ground so that their edge faces will be inclined oppositely to the direction of inclination produced by their action on the work. As a result those edges of the ground faces of the bristles which engage the work when the tool is performing its roughing operation will be sharper than they would be if the tool were rotated while being sharpened in the same direction as when it is operating upon the work.

The reversal of the direction of rotation of the tool shaft is effected by manipulation of the belt shifters 74 and 78 in the manner hereinbefore described and thereafter an abrading stone 120, which is normally located in an inoperative and out-of-the-way position, is swung into engagement with the periphery of the tool.

As shown, the sharpening means comprises an abrading stone 120 which is in the form of a rectangular bar. The stone is mounted at one end of an arm 122 which is adapted to be moved by the operator to and from operative position. As shown, the end of the arm 122 which is remote from the tool is pivoted upon a horizontal pin 124 carried by a block 126 which is mounted to turn about a vertical post 128 (Fig. 8) secured to the front end of a horizontal rod 130 which is mounted for longitudinal adjustment in a bracket 132 on the tool casing 90. A set screw 133 holds the rod 130 in adjusted position. When the abrasive stone 120 is not in use it occupies the out-of-the-way position indicated in dotted lines in Fig. 8, and in full lines in Fig. 9; that position being determined, as shown, by engagement of the arm 122 with the set screw 133, two lugs 134

projecting upwardly from the bracket 132 and being arranged to engage opposite sides of the arms 122 to prevent undesired vibration of the latter. When it is desired to use the stone it is swung forwardly and downwardly about its pivot 124 and, at the same time, it is turned 180° about the post 128 to bring it into the position shown in full lines in Figs. 7 and 8, with the end of the stone in engagement with the periphery of the roughing tool. A stop screw 136 functions at this time to limit the extent of the sharpening and dressing operation by engagement with the front side of the block 126. Two lugs 138 project forwardly from the block 126 to embrace a thickened portion of the arm 122 to steady the stone while it is operating upon the roughing tool. While the stone 120 is held by the operator in contact with the tool it is swung back and forth about the pivot post 128 which is set to impart the desired radius of transverse curvature to the peripheral surface of the roughing tool. By loosening the set screw 133 the post 128 may be adjusted forwardly or rearwardly to vary the radius of curvature imparted to the dressed surface of the tool.

To equalize the wear on the stone 120 and to enable the stone to be adjusted lengthwise relatively to its support as it wears down the stone is supported with provision for longitudinal adjustment in a sleeve 140 (Fig. 8) which is rotatably mounted in the end of the arm 122. The sleeve is held against endwise movement in the arm 122 by means of a collar 142 fixed to the sleeve and arranged to engage the front of the arm 122 and an annular flange 144 on the sleeve 140 arranged to engage the back of the arm 122. A set screw 146 extends through the flange 144 and engages the stone 120 to hold it firmly in place. As the operator swings the arm 122 from side to side in dressing the roughing tool he also occasionally turns the stone about the axis of the sleeve 140, thus equalizing the wear on the operative end of the stone and maintaining a flat work-engaging surface at that end. As the roughing tool is rotated in a direction opposite to that in which it is rotated from operating upon the work the pressure of the stone against the bristles causes the bristles to be deflected somewhat in a direction opposite to that in which they engage the work and thus effective cutting edges are readily formed at the end of the bristles. The sharpening process serves also to wear away the bristles sufficiently to restore the desired substantially flush relation of the ends of the bristles to the surface of the rubber blocks 50 and to smooth the surfaces of the blocks 50 and true up the transverse curvatures of their work-engaging surfaces.

An abrading stone 121, similar to the stone 120, is provided for use in sharpening and dressing the tool T'. In order to adapt the abrasive stone 121 for operation upon a roughing tool with a peripheral face which is wider than the stone and which is transversely straight as in the case of the tool T' the mounting of the stone 121 is somewhat different from that of the stone 120. As shown in Figs. 7 and 7*a* the stone 121 (which is square in cross-section) is frictionally held in the upper end of an arm 123 and is arranged in said arm in a transversely diagonal position, i. e., with one corner of the stone directed forwardly, this arrangement insuring that when the end of the stone contacts with the roughing tool the stone will operate upon a wider area on the face of the tool than if the stone 121 were arranged like the stone 120 with one of its flat sides facing forwardly. The arm 123 is pivoted at 125 (Fig. 7*a*) to a block 127 which is mounted to swing about a horizontal pin 129 projecting from a fixed bracket 131 carried by the rods 94 and 96. In the drawings the stone 121 is shown by full lines in its inoperative position wherein the arm 123 rests upon an abutment 141, formed as an integral part of the block 127, and lies between two lugs 143 on the block 127 which prevent unintentional sidewise displacement of the arm. When the stone is to be used the arm 123 is lifted sufficiently to clear it from the lugs 143 and turned 180° about the pivot 125, to the dotted line position shown in Fig. 7*a*, after which the arm 123 is swung downwardly about the pin 129 approximately 90° until the stone engages the periphery of the tool. While the tool is rotated in the proper direction for sharpening as above explained the stone is moved from side to side about the axis 125 (which is then substantially horizontal) to traverse the stone across the periphery of the tool. A set screw 135 carried by the bracket 131 serves, by engagement with a projection 137 on the block 127, to limit the extent to which the tool may be sharpened by the stone 121.

While, as hereinbefore pointed out, the overlasted margins of shoe uppers may be effectively roughed both in the shank portions and at the forepart of the shoes by means of the roughing tool T it is sometimes desirable to use the tool T' for roughing the foreparts of the upper margins. To facilitate the operation of roughing the upper margins at the foreparts of shoes there is provided a movable work rest 160, as shown in Figs. 7 and 10. The work rest 160 comprises a table 162 and a vertical rib 164 which projects upwardly from the rear edge of the table 162. The table 162 is formed at the upper end of an arm 166 the lower end of which is pivoted at 168 to a fixed support 170 (Fig. 10). The work rest 160 is adapted to be swung equal distances toward the right and toward the left about the horizontal axis of its pivotal connection with the support 170, the extent of swinging movement of the work rest being determined by engagement of the arm 166 with one or the other of two stop lugs 172, 174 on the support 170. In use the work rest 160 is swung to the limit of its movement in one direction (e. g. toward the right) and a shoe is placed against the work rest, the shoe being held substantially horizontally with the toe portion of its bottom facing the tool T' and with the side of the shoe upper which is lowermost resting upon the table 162 and the adjacent portion of the shoe bottom resting against the rib 164, as shown in Fig. 10. The overlasted upper margin which extends along the upper edge of the shoe bottom is presented to the action of the tool T'. The operator holds both the shoe and the work rest in one hand, a curved projection 148 (Fig. 10) being provided on the back of the work rest for engagement by the operator's fingers, and the operator swings the work rest and the shoe about the pivot 168 toward the left until the upper margin has been roughed from toe to ball line along one lateral edge of the shoe bottom. The shoe is then removed from the work rest and turned end-for-end and placed again on the work rest which is now located at the opposite limit of its movement (i. e. at the left end of its movement). The overlasted upper margin which extends along the other lateral edge of the shoe bottom is now

presented to the tool T' and the work rest and shoe are swung again about the pivot 168 (but this time toward the right) to complete the roughing of the upper at the forepart of the shoe.

It is desirable that the portion of the shoe upper which is being operated upon should be located at substantially the same level irrespective of the width of the shoe so that all shoes will be acted upon in the same manner by the tool. To accomplish this result the work rest arm 166 is made in two sections 176 and 178 arranged to telescope one within the other and a coiled spring 180 normally urges the section 176 upwardly but permits it to yield downwardly as may be necessary to adapt it to accommodate shoes of different widths. A stop pin 182 carried by the lower arm section 178 extends through a vertically elongated slot 184 in the upper arm section 176 to limit the upward movement of the work rest under the action of the spring 180.

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

1. A roughing brush the bristles of which are embedded from end to end in yielding material, the outer ends of the bristles and the outer surface of said yielding material being substantially flush so that both the bristles and the yielding material are adapted to engage the work.

2. A roughing tool comprising a plurality of bristles set in soft rubber with the work-engaging ends of the bristles normally substantially flush with the surface of the rubber so that both the bristles and the rubber will engage the work.

3. A roughing brush having its bristles embedded substantially throughout their length in a holder of yieldable material capable of being compressed to expose the outer ends of the bristles.

4. A rotary roughing tool comprising a soft rubber roll, and a multiplicity of wire bristles embedded in the roll and normally having their outer end faces substantially flush with the peripheral surface of the roll so that both the bristles and the surface of the roll will engage the work.

5. A roughing tool comprising a series of roughing members embedded in resilient material adapted to yield in a direction to facilitate the performance of a roughing operation, and reinforcing means embedded in said material for supporting it against yielding excessively in another direction.

6. A rotary roughing tool comprising a resilient roll, a multiplicity of roughing elements embedded in the roll and extending radially thereof, and a line of stitching extending through the roll and arranged to prevent displacement of said roughing elements in directions axially of the roll.

7. A rotary roughing tool comprising a yielding roll, a multiplicity of bristles embedded in the roll and extending radially thereof, reinforcing members overlying the end faces of the roll, and means extending through the roll and through said reinforcing members for reinforcing the roll against yielding excessively in directions axially of the roll.

8. A rotary roughing tool comprising a hub, a band encircling the hub, roughing means carried by the band, means for tensioning the band constructed and arranged to permit a portion of the band to be moved outwardly under the action of centrifugal force to provide for air cushioning of the roughing means, and means for regulating the extent of said outward movement of said band.

9. A rotary roughing tool comprising a hub, a band encircling the hub and provided with roughing elements, clamping devices located at a plurality of points around the periphery of the hub and arranged to engage the outer side of said band, and means for moving said clamping devices simultaneously inward to clamp the band or simultaneously outward to release the band.

10. A rotary tool for operating upon shoe parts comprising a shaft, a hub on said shaft, a band encircling the hub and provided with roughing elements, levers pivoted at a plurality of points around the periphery of the hub for clamping the band to the hub, means carried by the outer ends of the levers for clamping the band to the hub, and a cone nut on said shaft arranged to engage the inner ends of said levers adapted to be turned on the shaft to move the levers to increase the tension upon the band.

11. A rotary roughing tool comprising a hub, a plurality of soft rubber blocks extending in spaced-apart relation around the periphery of the hub, and a multiplicity of bristles set in each of said blocks and disposed substantially radially with respect to said hub, each bristle being normally embedded throughout its length in its respective rubber block.

12. A rotary tool for operating upon shoe parts comprising a hub having a gap in its periphery, a band encircling the hub and provided with elements for operating upon the work, and a tensioning device for said band comprising a lever pivoted to move in a plane transverse to the axis of the hub, a stud carried by said lever and arranged to overlie the portion of said band which bridges said gap, and means for operating said lever to vary the amount of tension applied to said band.

13. A rotary tool for operating upon shoe parts comprising a hub having a plurality of gaps spaced apart around the periphery of the hub, a band encircling the hub and provided with elements for operating upon the work, and a tensioning means for said band comprising a plurality of levers pivoted to the hub for movement in planes perpendicular to the axes of the hub, studs carried by said levers and arranged to overlie the portions of said band which bridge said gaps, and means for operating said levers simultaneously to vary the amount of tension applied to said band.

14. A rotary tool for operating upon shoe parts comprising a hub having a plurality of gaps in its periphery, a band encircling the hub and having apertures therein located in the portions of the band which bridge said gaps, operating elements carried by the portions of said band which are located between said apertures, and means for tensioning said band comprising a plurality of levers pivoted to the hub for movement in planes transverse to the axes of the hub, studs carried by said levers and arranged to overlie said band, pins on said studs projecting into said apertures to prevent edgewise displacement of the band, and means for operating said levers to vary the amount of tension applied to said band.

15. In a machine for roughing shoe parts, a driven shaft, a roughing tool on said shaft, a normally inoperatively positioned device for dressing said tool, and means for reversing the direction of rotation of the tool shaft whereby the machine may be alternately rendered adaptable for roughing shoe parts and adjusted to sharpen

the roughing tool in a manner to facilitate the performance of the roughing operation.

16. In a machine for roughing shoe parts, a shaft, a roughing tool on said shaft, driving mechanism for said shaft capable of driving the shaft in a direction for roughing a shoe part, means adapted to be moved transversely of the roughing tool shaft to and from operative position for sharpening the roughing tool, and means for operating the driving mechanism to reverse the direction of rotation of the tool shaft to sharpen the tool in a manner to facilitate the performance of the roughing operation.

17. In a machine for roughing shoe parts, a driven shaft, a roughing tool on said shaft, a dressing device for said tool, a driving pulley fast on the tool shaft, two loose pulleys on said shaft arranged at opposite sides of the fast pulley, a belt normally passing over one of said loose pulleys, a crossed belt normally passing over the other of said loose pulleys, means for shifting the first belt to the fast pulley to rotate the tool shaft in a direction to facilitate operation of the tool, and means for shifting the crossed belt to the fast pulley to rotate the tool shaft in the opposite direction to sharpen the tool in a manner to facilitate the performance of the roughing operation.

18. In a machine for roughing shoe parts, a driven shaft, a roughing tool on said shaft, a dressing device for said tool comprising an abrasive member mounted for movement in the plane of rotation of the tool to and from operative position for sharpening said tool and also in a plane transverse to said plane of rotation to enable said member to be moved crosswise of the periphery of the tool, means for rotating the roughing tool in one direction for operating upon a shoe part and in the opposite direction to sharpen the tool in a manner to facilitate the performance of the roughing operation, and means for quickly reversing the direction of rotation of the roughing tool.

19. In a machine for roughing shoe parts, a driven shaft, a roughing tool on said shaft, a dressing device for said tool comprising an abrasive member mounted for movement in the plane of rotation of the tool to and from operative position for sharpening said tool and also in a plane transverse to said plane of rotation to enable said member to be moved crosswise of the periphery of the tool, means for limiting the movement of the abrasive member in the plane of rotation of the tool to limit the extent of the sharpening operation, and means for reversing the direction of rotation of the tool shaft thereby enabling the tool to be turned in one direction for operation upon a shoe part and in the opposite direction to sharpen the tool in a manner to facilitate the performance of the roughing operation.

20. In a machine for roughing shoe parts, a driven shaft, a roughing tool on said shaft, a dressing device for said tool comprising an abrasive member mounted for pivotal movement about an axis parallel to the axis of rotation of the tool to enable the tool to be swung to and from operative position for sharpening said tool, said member being mounted also for oscillatory movement about an axis transverse to the axis of rotation of the tool to enable said member to be moved crosswise of the periphery of the tool to impart a transverse curvature to said periphery, and quickly reversible driving mechanism for the tool shaft enabling the tool to be turned in one direction for operation upon a shoe part and in the opposite direction to sharpen the tool in a manner to facilitate the performance of the roughing operation.

21. In a machine for roughing shoe parts, a driven shaft, a roughing tool on said shaft, an abrasive stone for dressing said tool, an arm carrying said stone, a block to which said arm is pivoted for movement about a horizontal axis to and from position to operate upon said tool, a post adjustable transversely of the axis of said tool upon which said block is swiveled to permit said stone to be moved transversely of the direction of rotation of the roughing tool, and quickly reversible driving mechanism for the tool shaft enabling the tool to be turned in one direction for operation upon a shoe part and in the opposite direction to sharpen the tool in a manner to facilitate the performance of the roughing operation.

22. In a machine for roughing shoe parts, a driven shaft, a roughing tool on said shaft, an arm mounted for movement toward and from said tool, an elongated sharpening member having an end face for engagement with the roughing tool, said member being mounted on said arm and being capable of being rotated relatively to said arm about the longitudinal axis of the sharpening member for the purpose of equalizing the wear upon said member, and quickly reversible driving mechanism for the tool shaft enabling the tool to be turned in one direction for operation upon a shoe part and in the opposite direction to sharpen the tool in a manner to facilitate the performance of the roughing operation.

23. In a machine for roughing shoe parts, a driven shaft, a rotary roughing brush on the shaft, a casing for said brush having an opening shaped to expose a portion of the periphery and a portion of one side of said brush to permit the work to be acted upon by said brush, a cover for said opening shaped to guard said portions of said brush when the brush is not being used and adapted to be opened and moved into an out-of-the-way position when said brush is being used, and means for frictionally holding the cover in both open and closed positions.

24. In a machine for roughing the overlasted margins of shoe uppers, a rotary roughing tool, means for driving the tool, a work rest mounted for movement with a shoe as the shoe is moved past the roughing tool, and a finger hold on the work rest for assisting an operator in holding a shoe against the work rest and moving the latter with the shoe.

25. In a machine for roughing the overlasted margins of shoe uppers, a rotary roughing tool, means for driving the tool, and a work rest constructed and arranged to engage both the bottom and one side of a shoe to support the shoe while its upper margins are being acted upon by the roughing tool, the work support being mounted to yield to accommodate different sizes of shoes and to move with the shoe as the shoe is moved past the roughing tool.

26. In a machine for roughing the overlasted margins of shoe uppers, a rotary roughing tool, means for driving the tool, and a work support comprising a shoulder constructed and arranged to engage the upper at one side of a shoe, and a second shoulder angularly disposed with respect to the first shoulder for engaging the overlasted margin of the upper at said side of the shoe to support the shoe while the overlasted upper mar-

gin at the opposite side of the shoe is being acted upon by the roughing tool.

27. In a machine for roughing the overlasted margins of shoe uppers, a rotary roughing tool, means for driving the tool, and a work support comprising a shoulder constructed and arranged to engage the upper at one side of a shoe, and a second shoulder angularly disposed with respect to the first shoulder for engaging the overlasted margin of the upper at said side of the shoe to support the shoe while the overlasted upper margin at the opposite side of the shoe is being acted upon by the roughing tool, said support being capable of movement with the shoe as the shoe is fed past the roughing tool.

28. In a machine for roughing the overlasted margins of a shoe upper, a rotary roughing tool, means for driving the tool, a work support having angularly disposed shoulders constructed and arranged to support a shoe by engagement with one side of the upper and an adjacent portion of the shoe bottom, said support being pivoted for oscillatory movement in a vertical plane to move with a shoe as the shoe is moved first in one direction and then in the opposite direction past the roughing tool.

29. In a machine for roughing the overlasted margins of a shoe upper, a rotary roughing tool, means for driving the tool, a work support having angularly disposed shoulders constructed and arranged to support a shoe by engagement with one side of the upper and an adjacent portion of the shoe bottom, said support being pivoted for oscillatory movement in a vertical plane to move with a shoe as the shoe is moved first in one direction and then in the opposite direction past the roughing tool, said work support being mounted to yield to accommodate shoes of varying widths, and means for limiting the extent of movement of the work support in both directions.

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