July 20, 1937. C. G. BROSTROM 2,087,238

ABRADING MACHINE

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Fig. 1.

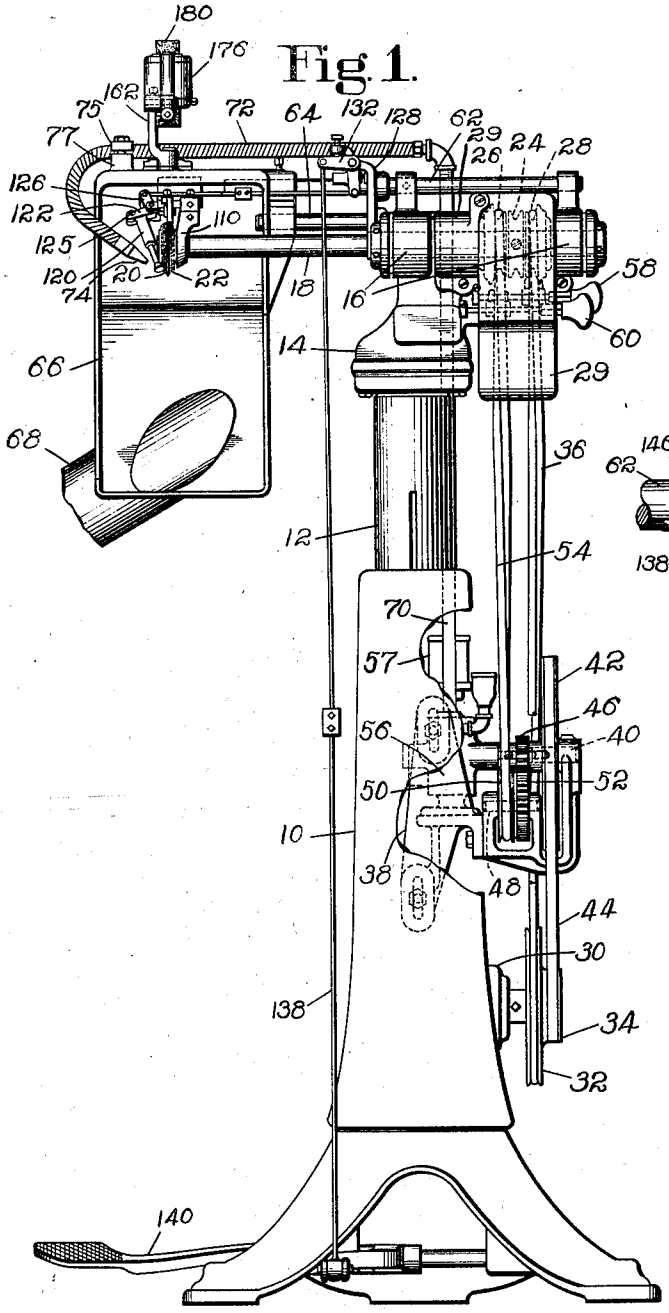
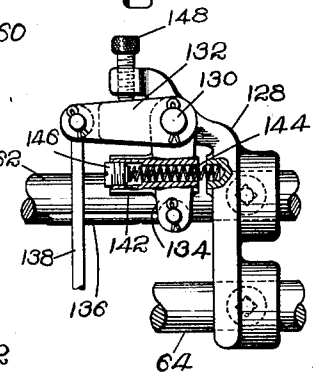



Fig. 6.




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Fig.2.

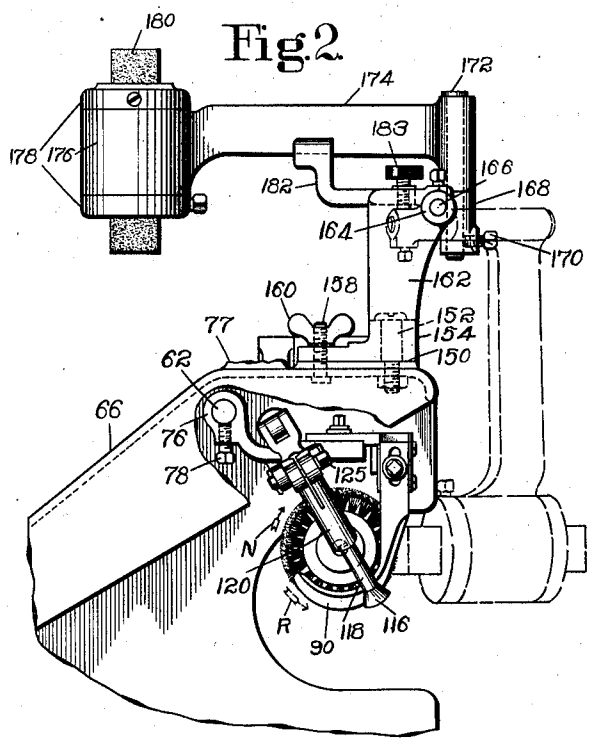



Fig.4

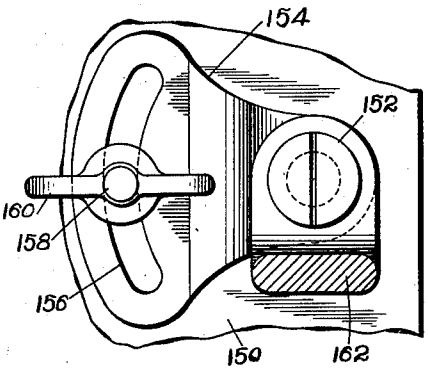



Fig.5.

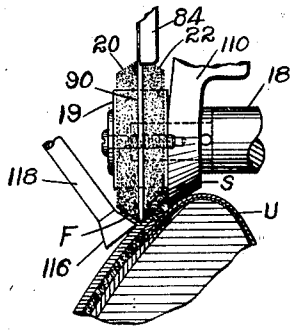
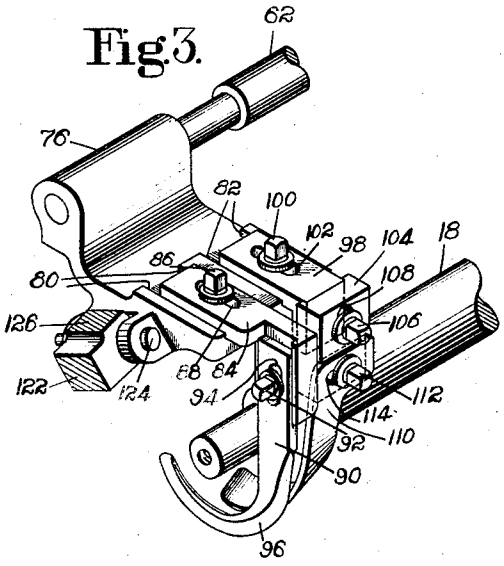



Fig.3.




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# UNITED STATES PATENT OFFICE

2,087,238

## ABRADING MACHINE

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Application February 11, 1935, Serial No. 5,897

9 Claims. (Cl. 69—1)

This invention relates to abrading machines and is herein illustrated as embodied in a machine for roughing channels and channel flaps formed in shoe parts to facilitate the cementing of the flaps to the channels. The illustrated machine is of the type disclosed in United States Letters Patent No. 2,004,109 granted June 11, 1935 upon the application of John B. Hadaway, and, like the machine disclosed in that patent, comprises scouring elements for operating upon the inner surface of the flap and upon the channel respectively, a gage for assuring proper presentation of the shoe to the scouring elements, and a member for pressing the flap against one of the scouring elements.

It is an object of the present invention to provide an improved machine of the type above indicated.

In accordance with a feature of the invention, the scouring elements of the illustrated machine are both frusto-conical in form. This construction enables the operator to present the shoe to the scouring elements by direct upward pressure without requiring him to exert a side pressure upon the shoe to hold it in contact with a gage. In the herein disclosed preferred embodiment of the invention, the scouring elements consist of frusto-conical wire brushes between which extends a gage in the form of a thin blade-like member which is adapted to engage the surface of the channel at the base of the flap to position the sole for presentation of the inner surface of the channel flap to one of the scouring brushes and for presentation of the surface of the channel to the other scouring brush.

In accordance with a further feature, a guard is provided for preventing the bristles of the brush which operates upon the channel from damaging the upper of the shoe. As illustrated, this guard is positioned closely adjacent to the scouring brush and has a frusto-conical work engaging surface which is substantially a continuation of the work-engaging surface of the brush.

The machine illustrated and described in this application is provided with an arrangement for sharpening or dressing the bristles of a scouring brush. In accordance with a feature of the present invention, the machine illustrated herein comprises, in addition to the mechanism for driving the operating tool at a normal operating speed, means for driving the roughing tool at a greater than normal speed to facilitate dressing the roughing tool. The illustrated construction includes a device for dressing the roughing tool, which device normally occupies an inoperative position from which it may be moved into engagement with the roughing tool, and which is pivotally mounted in such a manner as to enable it to be presented in definitely determined angular relations to the roughing tool. By reason of such pivotal mounting, the dressing tool may be presented in proper angular relation first to one of the frusto-conical roughing elements and then to the other frusto-conical roughing element.

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

Referring now to the accompanying drawings:

Fig. 1 is a view in front elevation of a machine in which the present invention is embodied;

Fig. 2 is a view in end elevation of a portion of the machine shown in Fig. 1 with the outer scouring brush removed;

Fig. 3 is a view in perspective of portions of the machine;

Fig. 4 is a plan view of certain parts shown in Fig. 2;

Fig. 5 is a view in front elevation of the scouring elements of the machine in operation upon a shoe; and

Fig. 6 is an enlarged view in front elevation of a portion of the machine illustrated in Fig. 1.

The supporting structure of the machine consists of a hollow frame 10 adapted to rest upon the floor and to support an upwardly extending column 12 which carries a head 14. Supported by the head 14 are a pair of bearings 16 in which is journaled a shaft 18. Upon the outer end of the shaft 18 is mounted a scouring tool comprising a tool body 19 upon which are mounted a pair of frusto-conical wire scouring brushes 20 and 22 which are positioned side by side along the axis of the tool and which have their large ends adjacent to each other but spaced apart a slight distance for a purpose which will later be explained. Secured upon the shaft 18 is a pulley 24. On one side of the fixed pulley is an idler pulley 26 and on the opposite side is another idler pulley 28. A guard 29 for the pulleys 24, 26 and 28 is supported between the bearings 16.

Mounted upon the lower portion of the frame 10 is a motor 30 upon the shaft of which is mounted a relatively large pulley 32 and a smaller pulley 34. The idler pulley 28 is constantly driven from the pulley 32 by a belt 36. Secured upon the column 12 above the motor 30 is a bracket

38 having bearings in which is journaled a shaft 40. Secured upon the shaft 40 is a pulley 42 which is relatively large as compared with the pulley 34. The pulley 42 is driven from the pulley 34 by a belt 44. Also secured upon the shaft 40 is a pinion 46. Journaled in bearings in the bracket 38 is a shaft 48 upon which is secured a pulley 50 and a gear 52. The gear 52 is in mesh with and is driven by the pinion 46. A belt 54 from the pulley 50 drives the idler pulley 26. Supported upon the bracket 38 is an air pump 56 which is driven by the shaft 40, and which has a screened cylindrical air inlet 57. It will be apparent that by reason of the above described construction the idler pulley 28 will be constantly driven at relatively high speed while the idler pulley 26 will be constantly driven in the opposite direction at a much less speed. Supported by the head 14 is a belt shifter 58 for shifting the belt 36 between the idler pulley 28 and the pulley 24 which is fixed upon the shaft 18. A similar belt shifter 60 is provided for the belt 54 for shifting the latter between the idler pulley 26 and the fixed pulley 24. These belt shifters are employed not only for the purpose of starting and stopping the drive of the shaft 18 but also to control the direction and speed of the shaft, the shaft 18 being driven at a relatively slow operating speed by the belt 54, and at a much faster speed and in the reverse direction by the belt 36 when it is desired to sharpen the scouring elements above mentioned.

Supported by lugs extending from the bearings 16 are a pair of horizontal rods 62 and 64 upon which is mounted a dust hood 66 having a suction outlet 68 for disposing of the dust which results from the operation on the scouring tool. Extending upwardly from the pump 56 is a pipe 70 to which is connected a flexible extension 72 terminating in a blast nozzle 74 which is directed against the locality of operation of the scouring elements upon the work to prevent dust from adhering to the work. The extension 74 is supported by a clamp 75 mounted on a boss 77 formed on the hood 66.

The rod 62 extends within the dust hood 66 and supports a bracket 76 (Figs. 2 and 3) which is secured to the rod 62 for lengthwise adjustment thereon by the set screw 78. Formed in the bracket 76 are a pair of horizontal guideways 80 and 82 respectively. A block 84 is slidably mounted in the guideway 80 for adjustment forwardly and rearwardly with respect to the shaft 18 and is secured in adjusted position by a clamping bolt 86 which passes through a slot 88 in the block 84. Formed in the block 84 is a vertical guideway in which is slidably mounted a gage member 90. A clamping bolt 92 which passes through a slot 94 in the gage 90 enables the gage 90 to be secured in a desired position of vertical adjustment with respect to the shaft 18. The gage 90 extends downwardly from the block 84 and consists of a relatively thin blade-like member which extends between the scouring elements 20 and 22, and the lower portion of which is arcuate in form, having a curvature which is similar to that of the adjacent portions of the scouring elements 20 and 22. The curved portion of the gage 90 terminates rearwardly of the vertical center line and below the horizontal center line of the shaft 18. As indicated by the reference character 96 in Fig. 3, the gage 90 is beveled to provide a relatively sharp edge. This edge engages the angle between the channel, as shown in Fig. 5, and the base of the flap F to control the position of a shoe relatively to the scouring elements. Slidably mounted in the guideway 82 for adjustment forwardly and rearwardly with respect to the shaft 18 is a block 98. A clamping bolt 100 which passes through a slot 102 in the block 98 enables the latter to be secured in adjusted position. Slidably mounted upon the block 98 for vertical adjustment is a block 104. A clamping bolt 106 passes through a slot 108 in the block 104 for securing the latter in adjusted position. Slidably mounted in the block 104 for adjustment in a direction parallel to the shaft 18 is a guard 110. A clamping bolt 112 which passes through a slot 114 in the guard 110 enables the latter to be clamped in a desired position of adjustment relatively to the gage 96 in the direction of the axis of the shaft 18. As illustrated in Figs. 3 and 5, the guard 110 has a frusto-conical work engaging surface which curves downwardly and rearwardly to about the vertical center line of the shaft 18. As shown more particularly in Fig. 5, the frusto-conical work engaging surface of the guard 110 is substantially a continuation of the operating surface of a portion of the scouring brush 22. The guard 110 is adjusted lengthwise of the shaft 18 to bring it closely adjacent to the scouring element 22.

For holding the channel flap against the scouring brush 20 there is provided a frusto-conical idler roll 116 which is journaled for free rotation upon a reduced outer end of a pin 118. The pin 118 is clamped in a block 120 carried by an arm 122 which is pivotally mounted by a pin 124 upon the bracket 76. In the illustrated construction the block 120 and the arm 122 are integral, the block being in the form of a split socket in which the pin 118 is clamped by a screw 125. The arm 122 is provided with a bell crank extension 126. Secured upon the rods 62 and 64 is a bracket 128 upon which is pivotally mounted by a pin 130 a bell crank comprising a pair of arms 132 and 134. A link 136 connects the arms 134 and 126. Extending downwardly from the arm 132 is a rod 138, the lower end of which is connected to a treadle 140 which is fulcrumed in the lower portion of the frame 10. Carried by the arm 134 is a casing 142 into which extends an end portion of a compression spring 144 which bears against a plug 146 threaded into the end of the casing 142 and by means of which the degree of compression of the spring may be adjusted. The opposite end of the spring 144 extends within and bears against the inner end of a recess formed in the bracket 128. It will be observed that by reason of the construction above described the spring 144 serves normally to urge the frusto-conical presser roll 116 toward the scouring brush 20, while depression of the treadle 140 withdraws the pressure roll from the vicinity of the scouring tool to facilitate the insertion of work. The approach of the presser roll toward the scouring tool is limited by an adjustable stop screw 148 which is threaded in the bracket 128 and which bears against the bell crank arm 132.

Formed upon the upper surface of the dust hood 66 is a boss 150 into which is threaded an end of an upstanding pin 152 upon which is pivotally mounted a bracket 154. The axis of the pin 152 is substantially tangent to a circle which is coaxial with the shaft 18 and which is equal in diameter to the circles representing the larger ends of the brushes 20 and 22 respectively. The foot of the bracket 154 rests upon the boss 150 and has an extension in which is formed an arcuate slot 156 concentric with the pin 152.

A clamping bolt 158 extends upwardly through an opening in the boss 150 and through the slot 156. A thumb nut 160 threaded upon the bolt 158 enables the bracket 150 to be secured against rotation about the pin 152. Extending upwardly from the bracket 154 is an arm 162 on which is formed a boss 164 for a pin 166 upon which is pivotally mounted a bracket 168. Secured within the bracket 168 by a set screw 170 is a pin 172 upon which is pivotally mounted an arm 174. In the other end of the arm 174 is formed a bearing 176 for a rotatable bushing 178 in which is carried an abrading element, for example a rectangular block of carborundum 180. The normal or inoperative position of the arm 174 is shown in solid lines in Fig. 2 with the arm 174 resting upon a support 182 which extends from the arm 162 and which is provided with a V-shaped notch to receive the arm 174. When the dressing tool 180 is to be used, the bracket 168 is swung about the axis of the pin 166 from the full line position shown in Fig. 2 until the bracket 168 is substantially horizontal. The arm 174 is then substantially upright, whereupon it is swung downwardly about the pin 172 until the bearing 176 is in its low position. The thumb nut 160 is then loosened and the bracket 154 is rotated about the pin 152 to the position indicated by dash lines, that is, until one end of the slot 156 engages the bolt 158. In this position the face of the block 180 is adjacent to the conical face of one of the brushes and preferably extends therebeyond in the direction of the other brush a distance substantially equal to the face of the other brush as will be apparent from Fig. 1 and from the dotted showing of Fig. 2. The slot 156 is so designed that when the bracket is in this position the end of the carborundum block 180 will be in proper angular relation to the axis of the scouring tool for engagement with one of the scouring brushes. The operator then presses the block 180 toward the scouring tool, rotating the bushing 178 by hand to distribute the wear upon the end surface of the carborundum block and swinging the arm 174 about the pin 172. The swinging of the arm 174 about the pin 172 contributes to the distribution of the wear on the end surface of the carborundum block and, in addition, it permits the use of a block of less width than above indicated. The approach of the block toward the scouring tool is adjustably limited by a screw 183 which is threaded through the arm 182 and which bears against the bracket 168. After thus sharpening one of the frusto-conical brushes, the operator swings the bracket 154 about the pin 152 until the opposite end of the slot 156 engages the bolt 158. The dressing tool is thus positioned in its proper relation for sharpening the other frusto-conical scouring brush.

As already stated, the axis about which the bracket 154 is pivoted is substantially tangent to a circle coaxial with the scouring brushes and equal in diameter to the adjacent large ends of the scouring brushes. The swinging of the bracket to present the dressing tool first to one brush and then to the other will not, therefore, grind off the corners of the large ends of the brushes. As the brushes diminish in diameter, in the course of repeated sharpening, the screw 183 will be turned to advance the dressing tool accordingly; and the axis of the bracket 154 will come somewhat outside of the circle above mentioned, so that there will still be no danger of grinding off the corners of the large ends of the scouring brushes.

To operate the machine the motor 30 is started and the belt 54 is shifted from the idler pulley 26 to the fixed pulley 24. The scouring tool is thereby driven at a speed, for example, of about 300 revolutions per minute in a direction indicated by the arrow N on Fig. 2, which is the normal or operating direction of drive. The treadle 140 is then depressed and the flap of a channel is inserted between the presser roll 116 and the scouring brush 20. The treadle is then released enabling the spring 144 to cause the roll 116 to press the channel flap against the scouring tool 20. In Fig. 5 is shown a portion of a shoe having a channel flap F and a channel having a surface S from which the flap F has been cut, with the inner surface of the flap F in engagement with the scouring tool 20 and with the channel surface S in engagement with the scouring tool 22. As shown in Fig. 5, the gage 96 engages the channel at the base of the flap F. The operator presents the shoe with the toe end pointing toward him and begins at the end of the channel, holding the shoe in the gaged position above described and feeding it away from himself. The direction of rotation, indicated by the arrow N on Fig. 2, 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 pointing away from him.

The guard 110 serves to protect the upper of the shoe indicated by the reference character U in Fig. 5. The section of the shoe shown in Fig. 5 is taken at the inside of the shank, at which portion the upper U extends outwardly almost as a continuation of the channeled margin of the sole. Inasmuch as the bristles of the scouring brush 22 tend to spread under the pressure of the work, there would be danger of these bristles scratching the upper of the shoe at this locality if it were not for the guard 110.

When it is desired to sharpen the brushes 20 and 22, the belt 54 is shifted back to the idler pulley 26 and the belt 36 is shifted from the idler pulley 28 to the fixed pulley 24 thereby driving the brushes 20 and 22 at a much greater speed (for example, about 4200 revolutions per minute) in the reverse direction, indicated by the arrow R on Fig. 2. The dressing tool is then manipulated in the manner already described. The effect of rotating the scouring brushes at high speed in the opposite direction while in engagement with the dressing tool is to raise a burr on the tip of each of the bristles, greatly increasing their effectiveness for the roughing operations.

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

1. A machine for scouring channels and channel flaps formed in shoe soles, comprising a shaft, a tool on said shaft comprising a pair of frusto-conical scouring elements, and a gage engageable with a channeled sole to aid in positioning the sole for presentation of the inner surface of the channel flap to one of said scouring elements and for presentation of the surface at the bottom of the channel to the other scouring element.

2. A machine for scouring channels and channel flaps formed in shoe soles, comprising a shaft, a tool on said shaft comprising a pair of frusto-

conical wire scouring brushes, and a gage engageable with the angle between the base of a channel flap and the bottom surface of the channel of a channeled sole to aid in positioning the sole for presentation of the inner surface of the channel flap to one of said scouring brushes and for presentation of the surface of the bottom of the channel to the other scouring brush.

3. A machine for scouring channels and channel flaps formed in shoe soles, comprising a shaft, a tool on said shaft comprising a pair of frusto-conical wire scouring brushes, and a stationary gage in the form of a thin blade-like member extending between said brushes and adapted to engage the angle between the base of a channel flap and the bottom surface of the channel of a channeled sole to aid in positioning the sole for presentation of the inner surface of the channel flap to one of said scouring brushes and for presentation of the surface of the bottom of the channel to the other scouring brush.

4. A tool for scouring channels and channel flaps formed in shoe soles, comprising a rotary tool body, and a pair of frusto-conical wire scouring brushes carried by said tool body, said brushes having their large ends adjacent to each other but separated by a slight space to accommodate a gage between them.

5. A machine for scouring channels formed in shoe soles, comprising a rotary driven wire scouring brush for scouring a channel of the sole of a shoe, and a guard adjacent to the brush for preventing the bristles of the brush from damaging the upper of the shoe.

6. A machine for scouring channels formed in shoe soles, comprising a rotary driven scouring brush for scouring the channel of the sole of a shoe, and a stationary guard closely adjacent to said brush and having a work-engaging surface which is substantially a continuation of a portion of the operating surface of said brush to prevent the bristles of the brush from damaging the upper of the shoe.

7. A machine for scouring channels formed in shoe soles, comprising a rotary frusto-conical driven scouring brush for scouring the channel of the sole of a shoe, and a guard closely adjacent to said scouring brush and having a frusto-conical work engaging surface which is substantially a continuation of a portion of the operating surface of said brush to prevent the bristles of the brush from damaging the upper of the shoe.

8. In a machine for roughing shoe parts, a pair of rotary driven frusto-conical scouring brushes, a dressing tool for said brushes, and a support for said dressing tool pivotally mounted for movement about an axis which is substantially tangent to a circle coaxial with the scouring brushes and equal in diameter to the adjacent ends of the scouring brushes to enable said dressing tool to be presented in proper angular relation first to one of said brushes and then to the other brush.

9. In a machine for roughing shoe parts, a pair of frusto-conical scouring brushes, the large diameters of said brushes being adjacent to each other, a dressing tool for said scouring brushes, a support for said dressing tool pivotally mounted for movement about an axis which is substantially tangent to a circle coaxial with the scouring brushes and equal in diameter to the adjacent ends of the scouring brushes, and means for limiting the pivotal movement of said support to determine the angular relation of presentation of said dressing tool to each of said scouring brushes.

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