Oct. 14, 1941. C. G. BROSTROM 2,258,698

ROUGHING MACHINE

Filed Nov. 13, 1939 3 Sheets-Sheet 1

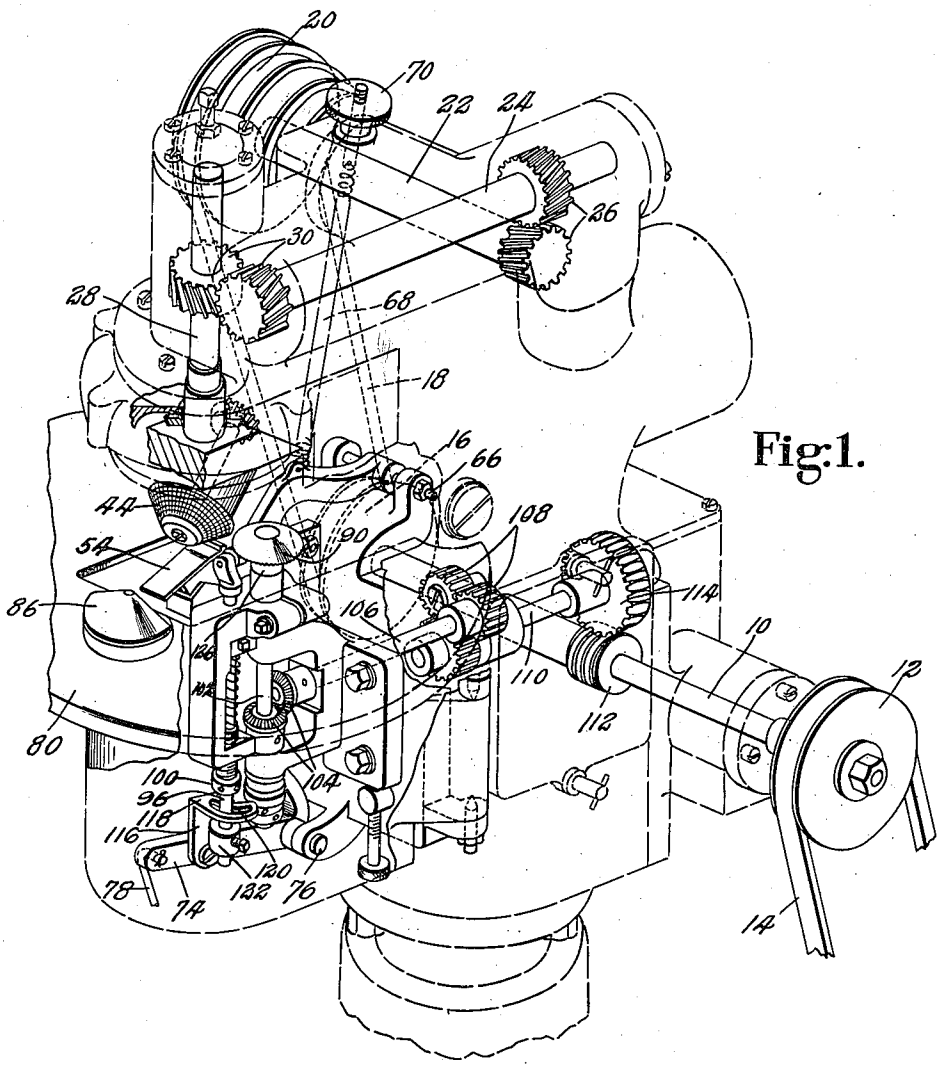

Fig:1.

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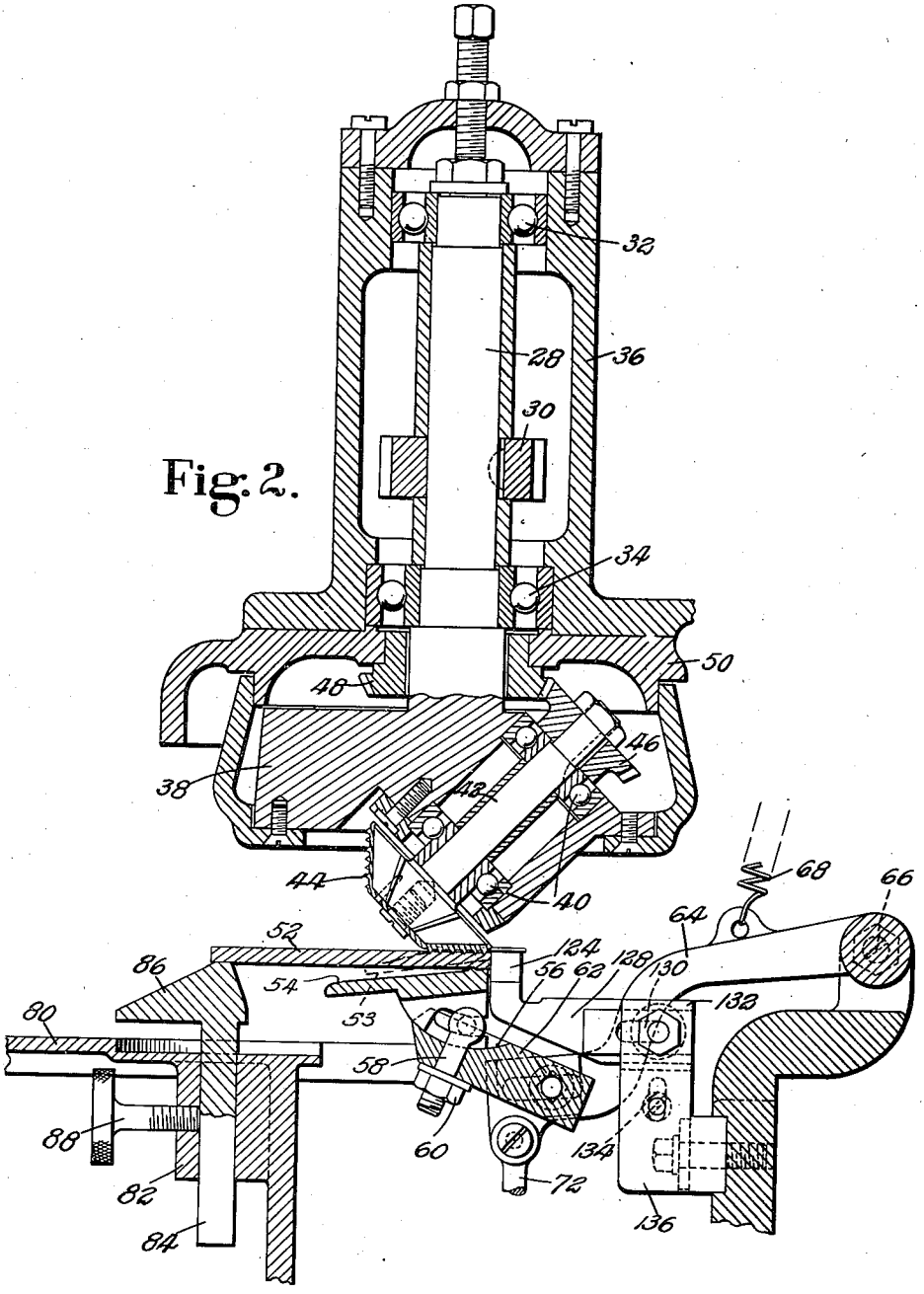
Fig. 2.



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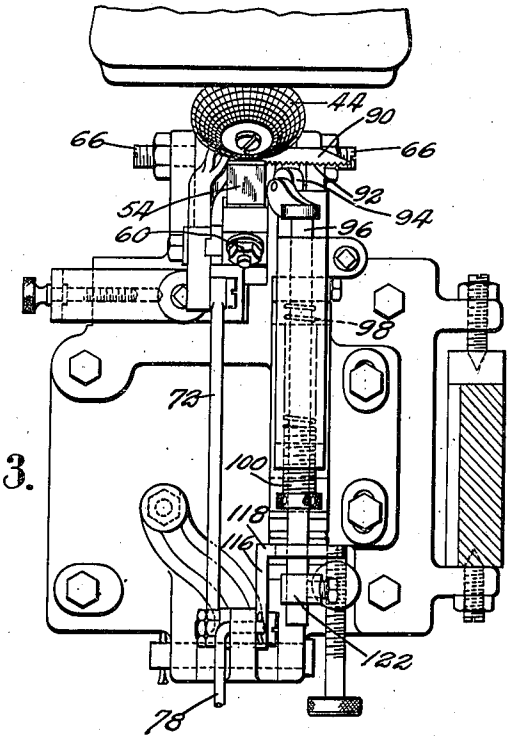

Fig. 3.

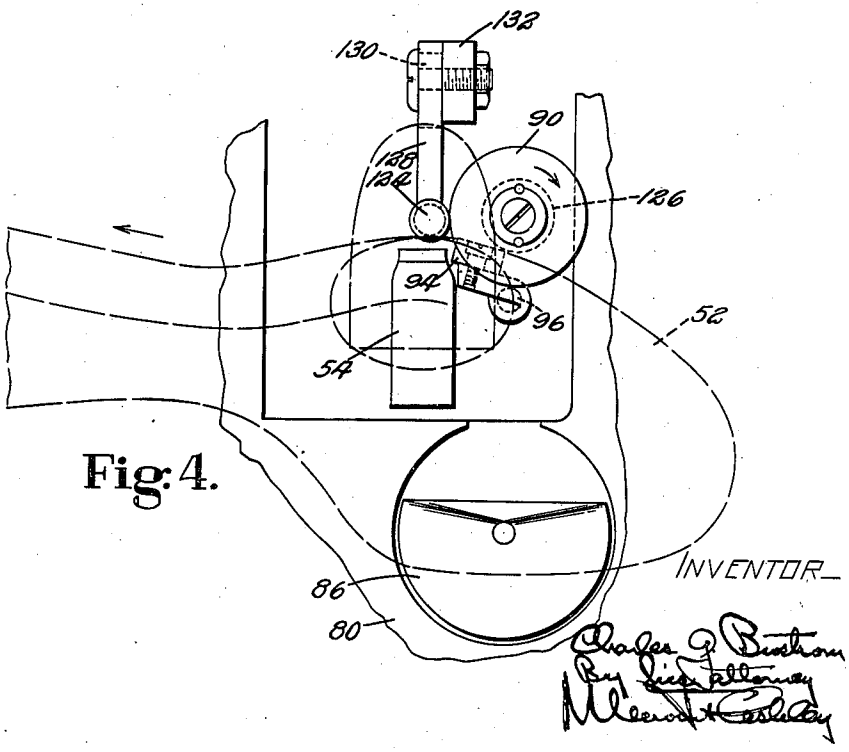

Fig. 4.

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UNITED STATES PATENT OFFICE

2,258,698

ROUGHING MACHINE

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Application November 13, 1939, Serial No. 303,979

7 Claims. (Cl. 69—1)

This invention relates to roughing machines and is herein described as embodied in a machine for roughing the marginal portion of a shoe sole, although certain features of the invention are not limited in their utility to sole roughing but may be employed advantageously in machines for performing roughing operations upon other shoe parts.

It is an object of the invention to provide an improved roughing machine which will rapidly and effectively produce upon a shoe part a roughened surface of superior character for the reception of cement by which the shoe part is to be bonded to another part of a shoe.

There has been considerable controversy over the type of roughing which would produce a surface best adapted for the reception of cement, especially pyroxylin cement, and a number of different types of roughing machines have been built and used with more or less success. I have discovered, however, that very superior results can be obtained by imparting to the roughing tool a new gyratory movement which is a compound of rotation and whirling movements about two separate angularly related axes. This raises the fibers of the leather and stirs them thoroughly in all directions, producing a velvety surface which is excellent for cement attachment.

Accordingly, an important feature of the invention consists in a rotatable shaft to which is affixed a tool carrier wherein a roughing tool is journaled to rotate about an axis disposed at an angle to the axis of the shaft, the tool preferably having a conical operating face and the axes of the cone and the shaft intersecting obliquely at such an angle that the operating face of the tool is at right angles to the axis of the shaft and the axis of the shaft intersects the operating portion of the tool. In order to secure the desired gyratory motion of the tool the latter may be rotated about the axis of its own spindle by planetary gearing operated by the whirling of the tool carrier shaft.

As herein shown, there is also provided a work support adapted to engage the sole and press it against the roughing tool and the above-mentioned manual means is arranged to retract first the work support and then the work presser to cause the sole to be relieved from the action of the tool before it is released from the feed mechanism in order that uneven roughing, resulting from continued action of the tool upon one spot shall be avoided.

Other features of improvement in the feed mechanism, designed to effect automatically the accurate, uniform feeding of a sole past the roughing tool, are also to be found in the illustrated machine which is described in detail in connection with the accompanying drawings, in which

Fig. 1 is an angular view of the operating mechanism with the casings and housings in which the mechanism is enclosed indicated in dash lines to facilitate visualization of the machine;

Fig. 2 is a vertical central section from front to rear showing the roughing mechanism and the work support;

Fig. 3 is a view in front elevation of the roughing tool, work support and feed mechanism; and

Fig. 4 is a plan view showing the relation of the various sole engaging elements to each other and to the sole being operated upon.

In the drawings, 10 indicates a main driving shaft having affixed thereto a pulley 12 which is continuously rotated by a belt 14 driven from any suitable source of power.

To the shaft 10 is also affixed a pulley 16 connected by a belt 18 to a pulley 20 upon a countershaft 22. Rotation of the countershaft 22 is transmitted to a shaft 24 through gearing 26 and thence to a vertical shaft 28 through gearing 30. The shaft 28 is journaled in ball bearings 32, 34 (see Fig. 2) mounted in an upright housing 36.

Integral with or affixed to the lower end of the shaft 28 is a tool carrier 38 in which are mounted ball bearings 40. A tool spindle 42 is journaled in the bearings 40 and has affixed to its lower end a frusto-conical roughing tool 44. To the upper end of the spindle 42 is secured a pinion 46 which constitutes a planet gear, in mesh with a stationary sun gear 48 which surrounds the shaft 28 and is mounted in a shell 50 secured to the lower end of the housing 36.

The axis of the tool spindle 42 intersects the axis of the shaft 28 at an oblique angle such that the operating face or portion of the tool 44 is horizontal where it engages the work, and its work engaging portion is intersected at right angles by the axis of the shaft 28.

As a result of the above-described organization the roughing tool 44 has imparted to it a gyratory motion composed of a whirling movement about the axis of the shaft 28 and a simultaneous rotating movement about the axis of the spindle 42 which, as the shaft 28 is whirled, is rotated about its own axis by the planet gear 46 rolling around the stationary sun gear 48.

The shoe sole of which the marginal portion is to be roughed is shown at 52 and is pressed upward against the gyrating roughing tool 44 by

a work support consisting of a plate 54 mounted for angular adjustment in an arcuate bearing 56 in which it is held in adjusted position by a bolt 58 and nut 60.

The bearing 56 is formed in the top of a block 62 at the outer end of an arm 64 movable about a stationary pivot 66 and sustained by a spring 68 the tension of which can be adjusted by turning a nut 70 (Fig. 1). The arm 64 is connected by a link 72 (Figs. 2 and 3) to a lever 74 which is movable about a fixed pivot 76 and has at its forward end a treadle rod 78 by which the lever 74 may be manually operated to draw down the arm 64 and thus relieve the sole 52 from the action of the roughing tool.

A work table 80 surrounds the work support 54 and provides at 82 a mounting for the stem 84 of a stationary sole support 86 which can be adjusted vertically and secured in adjusted position by a set screw 88. This sole support is spaced from the movable work support 54 by a distance greater than the width of the shank portion of the sole 52 and less than the width of the forepart of the sole so that when the beveled margin of the shank portion of the sole is beneath the roughing tool the sole will drop down from the position shown in solid lines in Fig. 2 to an inclined position, shown at 53 in broken lines, the table 54, the angle of which is adjusted to correspond to the angle of bevel of the sole margin, being lifted by the spring 68 to support the sole against the roughing tool. When the forepart of the sole, the margin of which is only slightly beveled, if at all, is being operated upon, the sole will be supported by both the movable support 54 and the stationary support 86, as illustrated.

For the purpose of feeding the sole automatically to the tool, a power driven feed mechanism is provided. This consists fundamentally of a rotary feed disc 90, having a corrugated or toothed lower face 92 (Fig. 3), and a work presser comprising a roll 94 mounted on the upper end of a plunger 96 surrounded by a spring 98 which urges the plunger upward and causes the roll 94 to press the work firmly into engagement with the lower face of the disc. The spring 98 is sustained by a bushing 100 which can be screwed up or down to adjust the tension of the spring.

The feed disc is affixed to the upper end of a vertical shaft 102 which is prevented from moving vertically but is rotated continuously, being driven through bevel gears 104 from a horizontal shaft 106 connected by speed reducing gearing 108 to a second shaft 110. The shaft 110 is driven from the main shaft 10 through worm gearing consisting of a worm 112 upon the shaft 10 and a worm gear 114 on the shaft 110.

As a result of the above-described construction the shaft 10 may be driven at the high speed required for the actuation of the roughing tool while the feed mechanism will be operated at the necessary speed, which is much lower.

In order to permit the insertion or removal of a sole at any stage of its progress through the machine provision is made for lowering the work presser 94 manually whenever the operator so desires. To this end there is affixed to the lever 74 a bracket 116 (Figs. 1 and 3) having a horizontal shelf 118 provided with an opening 120 through which the lower end of the plunger 96 passes. A collar 122 is adjustably secured to the plunger beneath the shelf 118 and is normally spaced below the shelf to provide sufficient lost motion between the lever 74 and the plunger 96 to permit the lever to be lowered sufficiently to retract the work support 54 and relieve the sole from the action of the roughing tool 44 before the shelf 118 engages the collar 122. Further depression of the lever 74 by means of the manually operable treadle rod 78 will retract the plunger 96 and lower the presser roll 94 from the position in which it presses the work against the feed disc 90 to an inactive position far enough away from the feed disc to permit the work to be easily inserted or removed.

The point where the sole is gripped between the disc 90 and the presser roll 94 of the feed mechanism is as close as possible to the point of engagement of the roughing tool 44 with the sole, and by reference to Fig. 4 it will be seen that the feding force exerted upon the sole at this point by the disc is applied both in a direction to feed the sole toward the roughing tool and in a direction transverse to the sole edge. In order to cause the sole to proceed accurately in the desired path two guide members, spaced apart to engage the edge of the sole at separated points, are provided. One of these sole edge guiding members is shown at 124 and the other at 126. The guide 124 is carried by a support 128 which is adjustable horizontally by virtue of a bolt and slot connection 130 with a block 132 (Figs. 2 and 4) which, in turn, is adjustable vertically by means of a screw and slot connection 134 with a support 135 bolted to a stationary portion of the machine.

The guide member 126 is concentric with the feed disc shaft 102 and may consist of a portion of the shaft itself, a collar upon the shaft or a hub portion of the feed disc. As best seen in Fig. 4, the component of feeding force, applied to the sole by the disc 90, which lies between the guide members 124 and 126 holds the edge of the sole against the two guide members and the component of said force which lies in the direction of the sole edge causes the sole to progress toward the roughing tool 44. This mechanism feeds the sole entirely automatically from beginning to end of the roughing operation, turning the sole perfectly around the sharply curved portions at the toe and the inner end of the ball line, without any necessity for the operator to touch the sole until he is ready to remove it from the machine.

In operation the operator merely depresses the treadle rod 78, inserts the sole in the feed mechanism and releases the treadle rod. The feed mechanism first seizes the sole and starts to feed it to the roughing tool. The work support 54 next presses the sole up to the action of the roughing tool and the roughing proceeds around the margin of the sole until the stopping point is reached whereupon the operator again depresses the treadle rod, first relieving the sole from the action of the roughing tool and then releasing it from the feed mechanism, whereupon he removes it from the machine.

Having described the invention, what is claimed as new and desired to be secured by Letters Patent of the United States is:

1. In a roughing machine, a rotatable shaft, a tool carrier mounted upon the shaft, a roughing tool having a conical operating face journaled to rotate in the carrier, the axis of the cone intersecting the axis of the shaft obliquely and the axis of the shaft intersecting the conical operating face of the tool at right angles.

2. In a roughing machine, a vertical, rotatable shaft, a tool carrier mounted upon the shaft, a tool spindle journaled to rotate about an inclined axis in the carrier, and a roughing tool affixed

to said spindle in such a position that the axis of said shaft intersects the operating portion of the tool.

3. In a machine for roughing a shoe sole, a rotating roughing tool, a work support adapted to engage the sole and press it against the roughing tool, a power driven feed disc adapted to engage one face of the sole and feed the sole to the roughing tool, a work presser adapted to engage the other face of the sole and press the sole against the feed disc, and manual means for retracting first the work support and then the work presser, to insure continuance of the feeding of the sole until the operation of the roughing tool thereon has ceased.

4. In a roughing machine, the combination of a roughing tool, a work support adapted to engage a shoe sole and press it against said tool, a power driven feed mechanism adapted to seize the sole and feed it to the roughing tool, a single manual means for retracting the work support and opening the feed mechanism to release the sole therefrom, and a lost motion connection between said manual means and the feed mechanism, whereby the sole is relieved from the action of the roughing tool before it is released from the feed mechanism.

5. In a machine for roughing a shoe sole, a roughing tool, a power driven feed mechanism for feeding a sole to said tool, and guide members spaced apart to engage the edge of the sole at separated points for determining the direction of feed of the sole, said feed mechanism comprising a feed disc having a corrugated side face arranged in overlapping engagement with the sole margin and a work presser engaging the face of the sole opposite said disc, to press the sole against the disc, at a point which is so related to said guide members that feeding force is exerted upon the sole by the face of the disc both in a direction to hold the edge of the sole against the guide members and in a direction to feed the sole past the roughing tool.

6. In a machine for roughing the margin of a shoe sole, a roughing tool, a power driven feed mechanism for feeding a sole to said tool, and guide members spaced apart for determining the direction of feed of the sole, said feed mechanism comprising a feed disc overlapping the sole margin and one of the guide members being concentric with said disc.

7. In a machine for roughing the margin of a shoe sole, a roughing tool, a movable spring sustained work support adapted to engage a sole and press it against said tool, and a stationary sole supporting member spaced from the movable work support by a distance greater than the width of the shank portion of the sole and less than the width of the forepart of the sole.

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