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SOLE TRIMMING MACHINE

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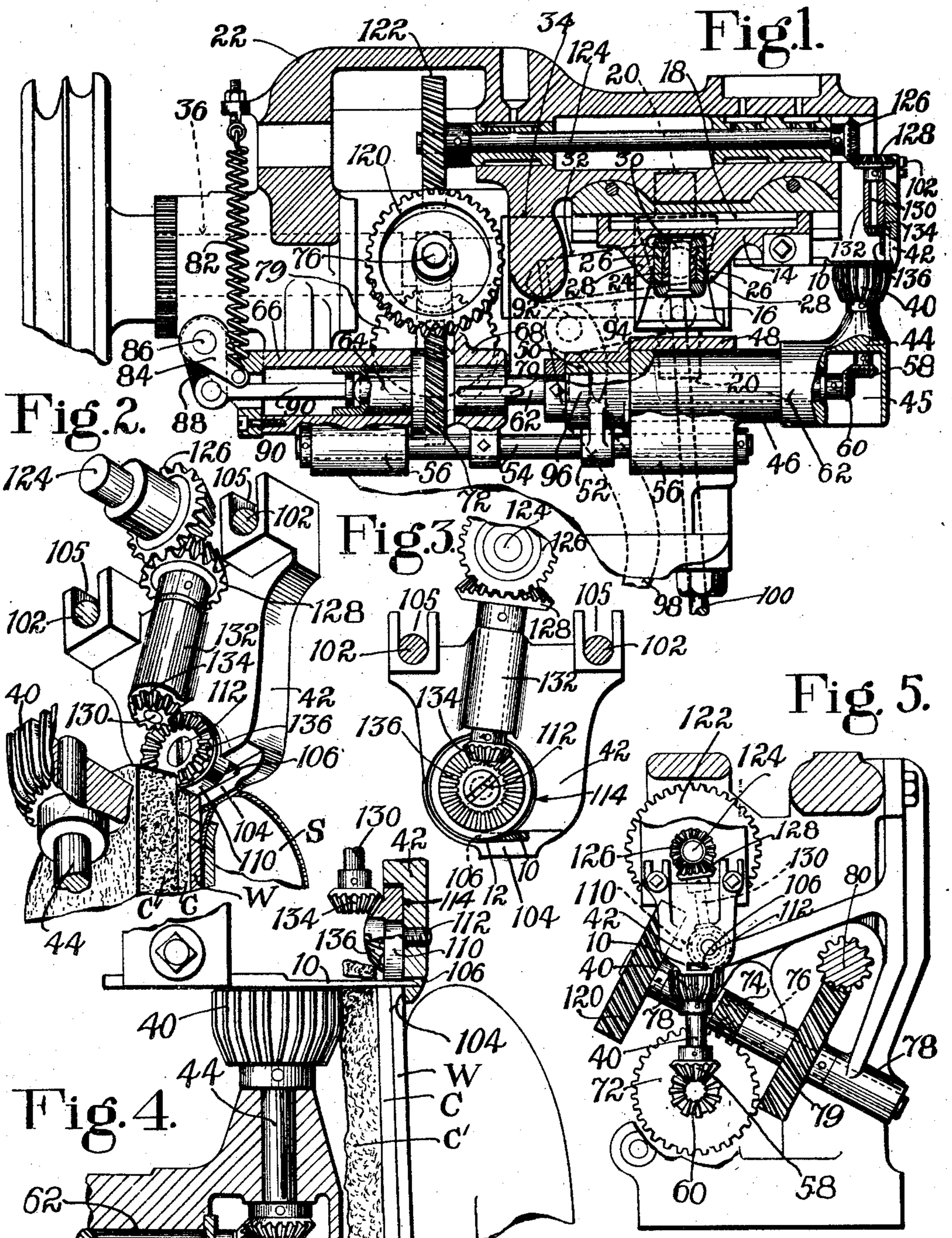
Fig. 1.



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UNITED STATES PATENT OFFICE

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SOLE-TRIMMING MACHINE

Application filed October 20, 1927, Serial No. 227,555, and in Great Britain December 24, 1926.

This invention relates to machines for trimming the soles of shoes and is herein illustrated as embodied in a machine for trimming soles of crepe rubber although in certain aspects the invention is not necessarily limited to machines for operating upon this particular class of work.

In United States Letters Patent No. 1,657,632, granted January 31, 1928, upon application of Jacob Marcus, there is disclosed a trimming machine which is particularly adapted for operation upon crepe soles that are secured to the shoe uppers by means including a welt the outer edge of which has previously been trimmed or finished substantially to final shape.

One object of the present invention is still further to improve the construction of machines of the type disclosed in the Letters Patent above referred to, more particularly for the purpose of facilitating the feeding and guiding of the work in such machines.

With the above object in view, one feature of the present invention consists in the provision, in a machine for trimming a sole having assembled therewith a shoe bottom member previously trimmed substantially to final shape, of a trimming knife, means for engaging the previously trimmed bottom member to guide the shoe relatively to the knife, said means and said knife being relatively arranged to insure trimming of the sole to the shape of said bottom member, and a driven feed roll arranged to engage the tread face of the sole and to co-operate with said means in supporting and guiding the shoe.

Another feature of the invention consists in the provision, in combination with a knife constructed and arranged to trim the outsole of a shoe, of a work guide or bearing for supporting the shoe against the thrust of the knife, and a rotary edge gage on said bearing for engaging a trimmed or otherwise previously shaped edge portion of the shoe bottom to locate an untrimmed tread portion of the shoe bottom relatively to the trimming knife.

In the illustrated embodiment of the invention there is employed both a driven feed roll for engaging the tread face of the sole and a rotary edge gage arranged to engage the trimmed edge of the welt, and the rotary edge gage is connected to be driven in timed relation with the feed roll the better to facilitate the feeding and guiding of the work.

The invention will be explained in connection with the accompanying drawings, in which

Fig. 1 is a vertical sectional view of the head of a sole rounding machine in which the present invention is embodied;

Fig. 2 is a perspective view of the fixed work guide or bearing shown in Fig. 1 showing also the driven feed roll and illustrating the mode of operation of the work guide and the feed roll upon the work;

Fig. 3 is a view in rear elevation of the work guide showing particularly the driven rotary edge gage which is mounted thereon;

Fig. 4 is a view, partially in section and partially in elevation, of the parts shown in Fig. 2; and

Fig. 5 is a view, partially in front elevation and partially in section, of the work guide, the driven feed roll, and the driving mechanism associated therewith.

The illustrated machine is provided with a reciprocating trimming knife 10 having a lateral cutting edge 12 (Fig. 3), the shape of the knife and the mode of operation of the knife being substantially the same as disclosed in the Letters Patent No. 1,657,632 above referred to. As shown, the knife 10 is rigidly secured to a slide 14 and the slide 14 is reciprocated horizontally by means of an oscillating yoke 16 provided with a horizontal arm 18 connected with the slide and also provided with vertical trunnions 20 mounted in bearings in the frame or head 22 of the machine. The arm 18 carries a roll 24 which is engaged by bearing blocks 26 arranged between transverse ribs 28 on the under side of the knife slide 14. A horizontal shaft 30 is journaled in the yoke 16 and a cylindrical arm 32 is secured upon the shaft 30 and extends at right angles thereto. The cylindrical arm 32 fits within an inclined bearing formed in the enlarged extremity 34 of a power-driven shaft 36. The means just described for reciprocating the trimming knife is similar in

construction and mode of operation to corresponding means disclosed in U. S. Letters Patent No. 1,030,606, granted June 25, 1912, in the name of F. H. Perry, to which reference may be had for further description and illustration thereof.

To illustrate the operation of the machine the operative parts of the machine are shown in Figs. 2 and 4 as acting upon a shoe S having a bottom comprising a welt W and a two-ply sole consisting of first and second units or layers C and C′ of crepe rubber.

While the work is being trimmed by the knife 10 the work is fed by a feed roll 40 past a work guide 42. The feed roll 40 is arranged to engage the tread surface of the second or outer crepe sole unit C′ and, as shown, the knife is arranged to move in a path at right angles to the axis of the roll and is located close to the end of the roll so that the roll will engage the sole and support it substantially at the point where the knife is acting upon it. The periphery of the roll is toothed or corrugated to enable it to secure better feeding engagement with the sole and the lower portion of the roll is tapered or rounded so that lower ends of the teeth will not sink into the sole so as to leave any defacing marks thereon. Referring to Fig. 4 the roll 40 is secured to the upper end of a vertical shaft 44 journaled within a holder 45 which is formed at the outer end of a sleeve 46 (Fig. 1). The sleeve 46 is mounted to slide within a fixed horizontal bearing 48 and is prevented from turning within the bearing by means of an arm 50 fixedly secured to the reduced inner end of the sleeve 46 and provided with a yoked lower extremity 52 arranged to straddle and slide upon a horizontal rod 54 the ends of which are supported in fixed lugs 56 on the head of the machine. The feed roll 40 is driven from the shaft 36 through connections which will now be described. A bevel gear 58, fixed to the vertical shaft 44, meshes with a bevel gear 60 fixed to the end of a horizontal shaft 62 which is journaled within the sleeve 46 and extends through a sleeve 64 which in turn is journaled within fixed bearings 66 and 68, the latter being carried by the horizontal rod 54. The shaft 62 is splined, as indicated at 70, to the sleeve 64 so that the shaft is connected to turn with the sleeve but is capable of sliding within the sleeve. The sleeve 64 has fixed thereon a spiral gear 72 located between the bearings 66 and 68. These bearings 66 and 68, by engagement with the opposite ends of the hub of the gear 72, serve to prevent axial displacement of the gear and the sleeve 64. Meshing with the gear 72 is a gear 74 (Fig. 5) fast on a shaft 76 which is journaled in inclined bearings 78. The shaft 76 is driven from the shaft 36 through intermeshing spiral gears 80. The feed roll 40 is urged forwardly to maintain it in yielding engagement with the tread face of the sole unit C′ by means of a spring 82 (Fig. 1), the lower end of which is connected to an arm 84 secured to a rockshaft 86. A second arm 88 secured to the rockshaft 86 is connected with a rod 90 which extends within the bearing 66 and the front end of which engages the rear extremity of the shaft 62. The feed roll 40 may be moved rearwardly against the action of the spring 82, in introducing or removing the work, by means of mechanism comprising a rockshaft 92, one end of which carries an arm 94 engaging a lug 96 on the arm 50. A bell crank lever 98 is secured to the rockshaft 92 and one arm of the lever 98 extends downwardly into a position conveniently to be grasped by the hand of the operator, while the other arm of the bell crank lever 98 is connected by a rod 100 with an operating treadle (not shown). By means of the treadle or the hand lever 98 the feed wheel may be retracted to facilitate the insertion and removal of the work.

It will be noted that the periphery of the feed roll 40 is shaped to afford a substantial area of feeding contact with a sole positioned with its tread face substantially parallel to the axis of the feed roll. Furthermore the feed roll 40 is located close to the knife 10 so that it will support the sole margin practically at the very portion where the knife is operating.

The work guide 42 is fixedly secured by screws 102 to the frame of the machine and is formed with a vertical bearing surface or shoulder 104 (Figs. 2 and 3) for engaging the outer or exposed side of the welt to support the work against the outward end thrust of the trimming knife and to assist in guiding the work as it is fed. The screws 102 extend through vertical slots 105 arranged to permit vertical adjustment of the work guide. The work guide 42 is shaped to avoid interference with the tip of the trimming knife which projects beyond the sole and overlaps the welt. To this end the work guide 42 is provided with a slot 106 within which the tip of the knife 10 is received. The slot 106 is shaped and arranged to support the knife against edge thrust caused by feeding the work against the knife and also against downward sidewise thrust, i. e., flatwise displacement of the knife, resulting from the pressure of the work against the beveled upper face of the knife. For these purposes the lower side wall of the slot 106 is arranged to engage the lower side of the knife while one of the end walls of the slot 106 is arranged to engage the back or unsharpened edge of the knife. The slotted lower extremity of the work guide 42 is beveled to adapt it to project into the welt crease of a shoe as shown in Fig. 4. As the work is fed the exposed face of the welt rides over the smooth bearing surface 104 of the work guide 42 and thus

the work is supported against the thrust of the feed roll 40 and the outward end thrust of the trimming knife. The thrust of the knife in the opposite direction is received by the feed roll 40.

In order that the location of the trimming cut may be determined by engagement with the previously trimmed edge of the welt W and, in the illustrated shoe the first unit C of the crepe sole, an edge gage roll 110 is mounted upon the inner side of the work guide 42, the axis of the roll being located as closely as practicable to the vertical plane of the cutting edge of the trimming knife and at such a distance above the knife that the edge of the welt and the first unit of the sole will be engaged by the lowest portion of the periphery of the edge gage roll. As shown, the roll 110 is journaled upon a stud 112 carried by the work guide 42 and arranged with its axis parallel to the direction of movement of the trimming knife and the roll is located within a recess 114 (Figs. 3 and 4) in the work guide, the arrangement being such that the roll will be located in the plane of the welt when the welt is held against the work guiding shoulder 104 and thus will be adapted to engage the trimmed edge of the welt.

In order to facilitate the feeding of the work provision is made for driving the edge gage roll 110 in timed relation with the feed roll 40. For this purpose, as shown, the edge gage roll is connected with the shaft 36 in the following manner. A spiral gear 120 (Fig. 1) secured to the upper end of the shaft 76 meshes with a spiral gear 122 that is fast upon the rear end of a horizontal shaft 124. The shaft 124 is journaled in suitable bearings in the frame of the machine and at its forward end carries a bevel gear 126 which meshes with a bevel gear 128 on the upper end of a shaft 130 journaled in a bearing 132 on the work guide 42. The lower end of the shaft 132 carries a bevel gear 134 which meshes with bevel gear teeth 136 formed on the rear side of the edge gage roll 110.

On account of the characteristics of crepe rubber considerabe difficulty is experienced in feeding material of this sort over stationary supporting surfaces. In the present machine no such difficulty is encountered inasmuch as the only elements engaging the crepe rubber portion of the shoe are the rotary feed wheel 40 and the rotary gage roll 110. Inasmuch as both the feed wheel 40 and the gage roll 110 are positively driven the operator is relieved of the necessity of feeding the work and he is enabled to give his entire attention to manipulating and guiding the work with the result that accurate and superior trimming is accomplished.

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

1. In a machine for trimming a sole having assembled therewith a shoe bottom member previously trimmed substantially to final shape, in combination, a trimming knife, means for engaging the previously trimmed bottom member to guide the shoe relatively to the knife, said means and said knife being relatively arranged to insure trimming of the sole to the shape of said bottom member, and a driven feed roll arranged to engage the tread face of the sole and to co-operate with said means in supporting and guiding the shoe.

2. In a machine of the class described, in combination, a trimming knife constructed and arranged to operate upon an untrimmed portion of the outsole of a shoe, and co-operating feed members for feeding the shoe to present the margin of the shoe bottom progressively to the knife, one of said feed members being arranged to engage a previously trimmed edge portion of the shoe bottom to locate the trimming cut in line with said previously trimmed edge.

3. In a machine of the class described, in combination, a knife constructed and arranged to trim the outsole of a shoe, a bearing for supporting the shoe against the thrust of the knife, and a rotary edge gage on said bearing for engaging an edge portion of the shoe bottom previously shaped substantially to the final contour to locate an untrimmed tread portion of the shoe bottom relatively to the knife.

4. In a machine of the class described, in combination, a trimming knife, means for engaging the edge of a portion of a shoe bottom previously shaped substantially to final contour to locate an untrimmed portion of the shoe bottom relatively to the knife, a driven feed roll for engaging the margin of the tread face of the shoe bottom, and means for supporting the shoe bottom against the thrust of the knife.

5. In a machine for trimming the soles of welt shoes, in combination, a trimming knife, means for engaging the edge of the welt and locating the portion engaged thereby in line with the knife, a feed roll having a toothed periphery for securing positive feeding engagement with the tread face of the shoe bottom, and means for driving the feed roll positively to feed the work past the knife.

6. In a machine of the class described, in combination, a feed roll for engaging the tread face of the sole of a shoe, the feed roll having a periphery shaped to afford a substantial area of feeding contact with a sole positioned with its tread face substantially parallel to the axis of the feed roll, and a reciprocating knife for trimming the margin of the sole, the knife being arranged to move in a path disposed at right angles to the axis of the feed roll and to the portion of the sole engaged by the feed roll and being located

closely adjacent to one end of the roll so that the latter will engage the sole close to the point being acted upon by the knife.

7. In a machine of the class described, in combination, a trimming knife, a fixed bearing for rigidly supporting the bottom of a shoe against the thrust of the knife, a rotary edge gage on said bearing for engaging the edge of a previously trimmed portion of the shoe bottom to locate an untrimmed portion of the shoe bottom relatively to the knife, and means for positively rotating the edge gage.

8. In a machine of the class described, in combination, a trimming knife, a driven feed roll for engaging the thread face of the sole of a shoe, a rotary edge gage for engaging the edge of a previously trimmed portion of the bottom of the shoe to determine the location of the trimming cut and arranged to locate the portion engaged thereby in line with the trimming knife, and means for driving the feed roll and the edge gage in timed relation.

9. In a machine of the class described, in combination, a trimming knife beveled at one side to provide a lateral cutting edge, means for reciprocating the knife in a direction substantially parallel to said cutting edge, means for engaging the edge of a portion of a shoe bottom previously trimmed substantially to final contour to gage the location of the trimming cut, and a bearing for the opposite side of the knife constructed and arranged to support the knife to prevent flatwise displacement thereof resulting from engagement of the work with the beveled side of the knife.

10. In a machine of the class described, in combination, a trimming knife having a beveled face providing a lateral cutting edge, means for reciprocating the knife in a horizontal path substantially parallel to said cutting edge, work guiding means for engaging the edge of a portion of a shoe bottom previously shaped substantially to final contour to gage the location of the trimming cut, and a bearing for the lateral margin of the shoe bottom immediately beneath the knife to support the shoe bottom against the end thrust of the knife.

11. In a machine of the class described, in combination, a guide roll arranged to engage the edge of a portion of a shoe bottom previously shaped substantially to final contour, a trimming knife having a lateral cutting edge extending substantially parallel to the axis of the guide roll and located close to the periphery of the roll, means for reciprocating the knife in a direction substantially parallel to the axis of the roll, and means for supporting the work against the end thrust of the knife.

12. In a machine of the class described, in combination, a guide roll arranged to engage the edge of a portion of a shoe bottom previously shaped substantially to final contour, a trimming knife having a lateral cutting edge extending substantially parallel to the axis of the guide roll and located close to the periphery of the roll, means for reciprocating the knife in a direction substantially parallel to the axis of the roll, and means arranged to engage opposite sides of the margin of the shoe bottom to support the work against the end thrust of the knife in both directions.

13. In a machine of the class described, in combination, a guide roll arranged to engage the edge of a portion of a shoe bottom previously shaped substantially to final contour, a trimming knife having a lateral cutting edge extending substantially parallel to the axis of the guide roll and located close to the periphery of the roll, means for reciprocating the knife in a direction substantially parallel to the axis of the roll, means for supporting the work against the end thrust of the knife in one direction, and means for feeding the work and supporting it against the thrust of the knife in the opposite direction.

In testimony whereof I have signed my name to this specification.

EVERETT E. MURPHY.