Feb. 8, 1966 P. T. HANSEN ET AL 3,233,438

SHOE BOTTOM ROUGHING MACHINE

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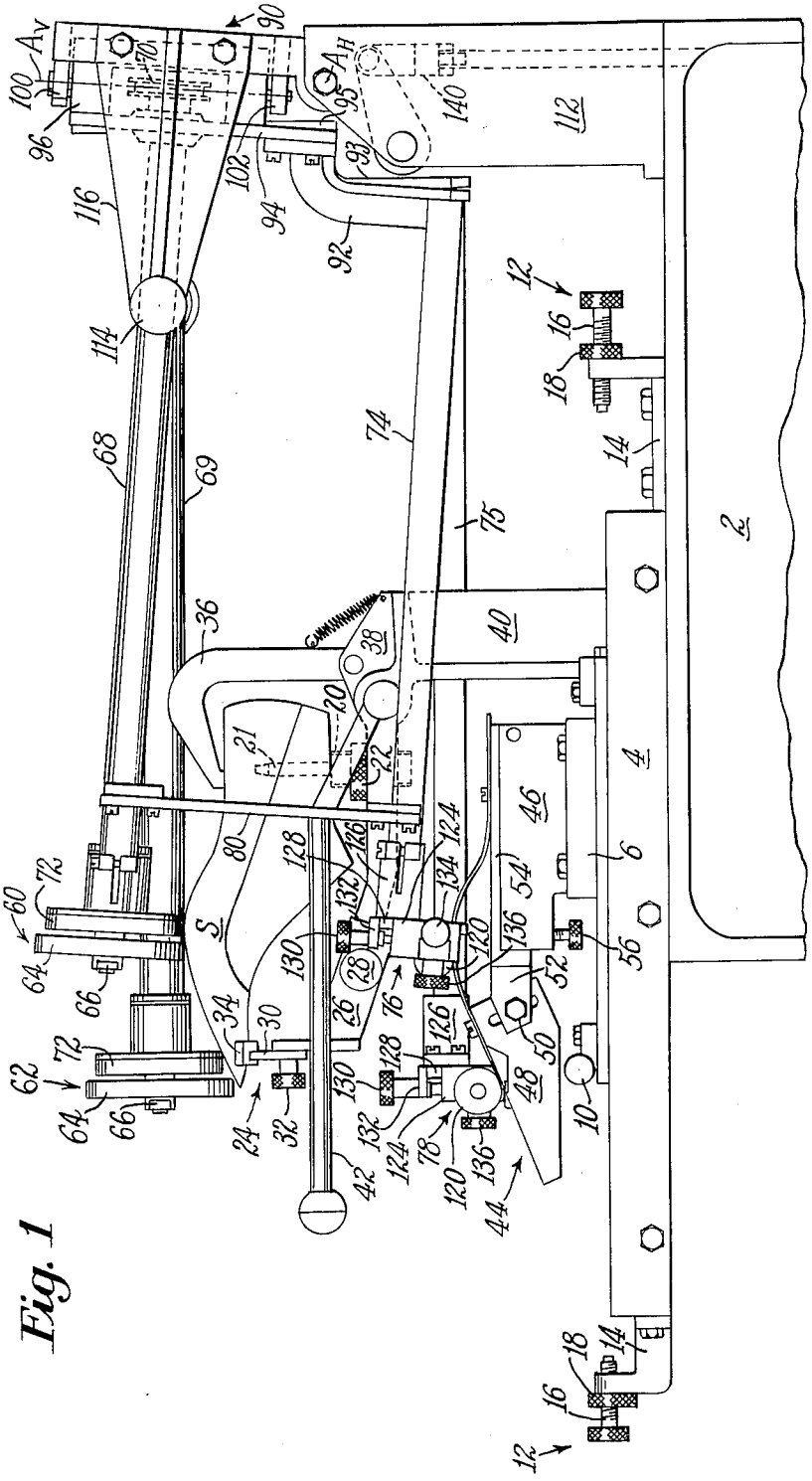

Fig. 1

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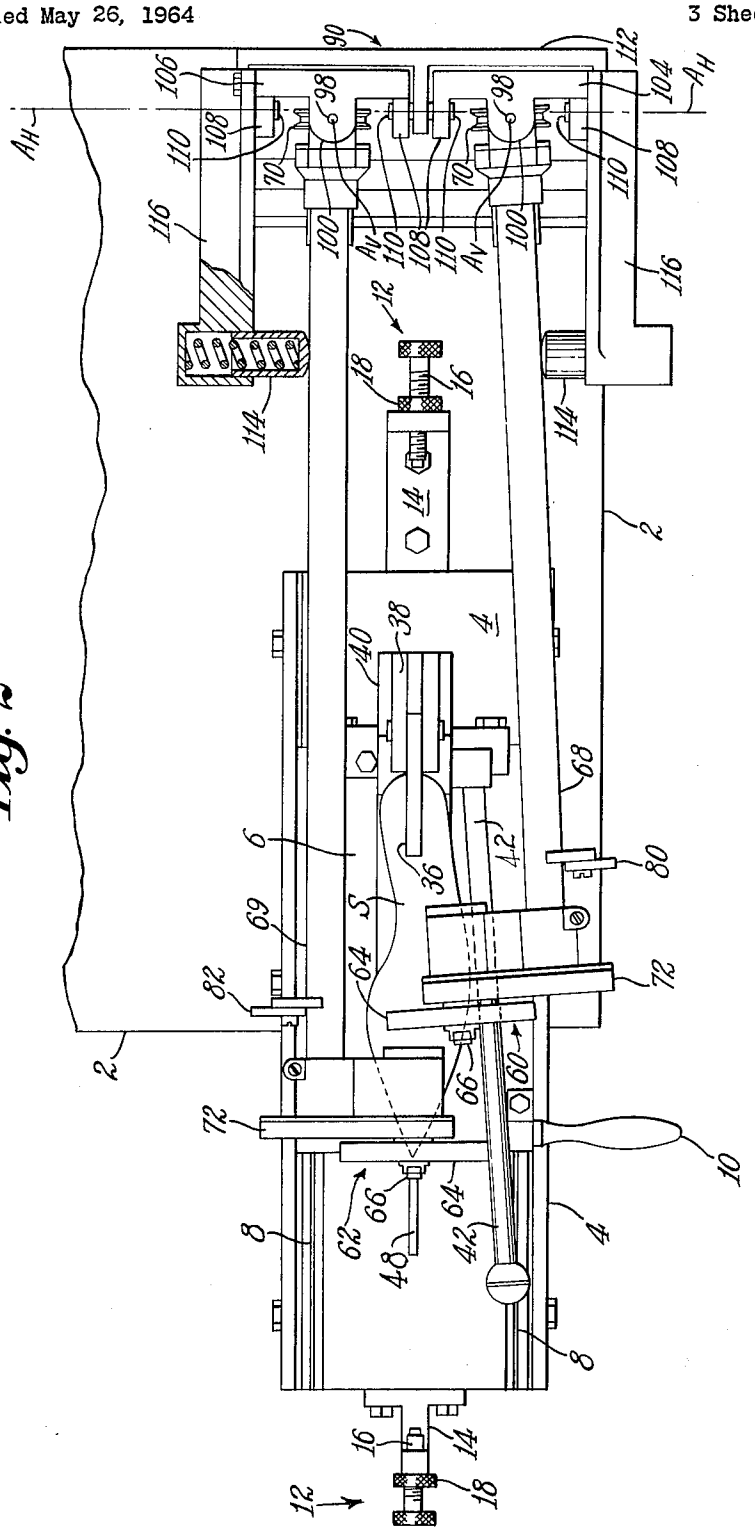
Fig. 2



SHOE BOTTOM ROUGHING MACHINE

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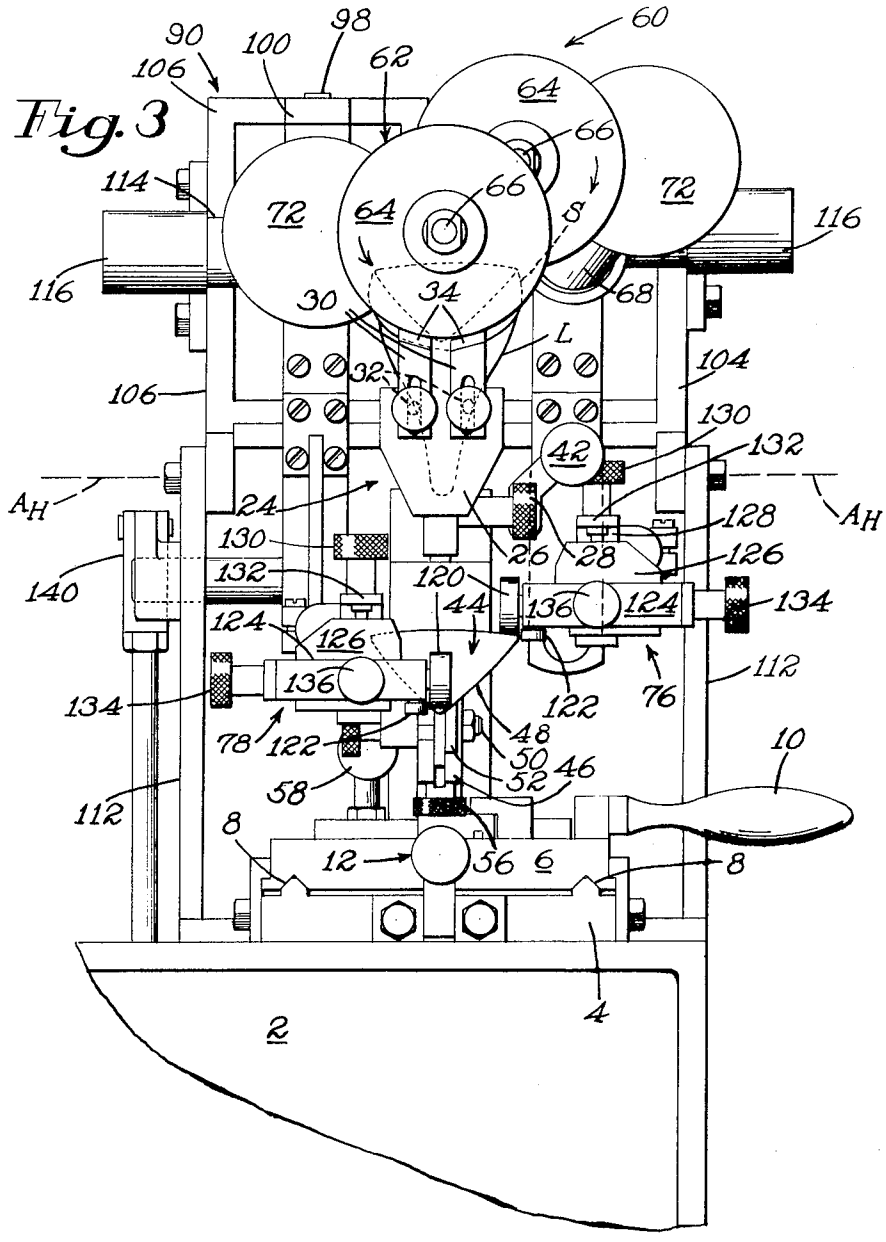
Fig. 3



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SHOE BOTTOM ROUGHING MACHINE

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14 Claims. (Cl. 69—6.5)

This invention relates to the roughing of shoe bottoms and more particularly to a machine for automatically roughing the overlasted margin of a shoe upper preparatory to the attachment of an outsole.

In the manufacture of shoes in which an outsole is cemented directly to the overlasted margin of the upper it is necessary to carry out a roughing operation on the upper for a number of reasons. The first is to produce a smooth, continuous sole attaching surface by removal of pleats, bulges or irregularities from the overlasted margin. A second reason, and perhaps the more important, for roughing the overlasted margin is that the cements commonly used in sole attaching do not adhere securely enough to the grain side of the upper unless it is roughened or abraded. Insofar as the adhering qualities of the abraded surface are concerned, it is not particularly important by what type of tool the roughing takes place since practically all abrading tools produce a rough grainless surface from which the leather particles extend as minute fingers or fibers which provide excellent means for reception of the sole attaching cements.

Heretofore, roughing operations have for the most part been carried out manually by the use of relatively simple machines comprising a rotating wire brush against which the shoe is hand held. The operator moves the shoe lengthwise against the brush, tilting and turning the shoe to present the complete overlasted margin of the shoe bottom to the brush. It is mandatory that the roughened area extend to the edge or feather line of the shoe. It is equally important that the roughened area not extend beyond the feather line since such area would not be covered by the sole and be visible on the finished shoe. Furthermore, in roughing shoes which have a rather substantially curved bottom contour it is often impossible to completely abrade all of the margin with the wire brush and often a retouching operation must be performed with a small hand-held rotary tool. With this tool the operator hand draws the outer profile or line designating the edge of the roughened area around the periphery of the shoe bottom. It will be obvious that both hand operations require considerable skill and are therefore costly to perform.

Accordingly, it is an object of the present invention to provide a shoe bottom roughing machine which requires minimum skill on the part of an operator but which will produce work of high quality.

It is another object of this invention to produce a substantially automatic shoe bottom roughing machine in which the roughing tool is positively guided with respect to the shoe to carry out in a single operation all of the required roughing necessary to prepare the shoe for cement sole attaching.

Still another object of the present invention is to provide a substantially automatic shoe bottom roughing machine by which not only does the roughing operation take place accurately with respect to the shoe profile but by which a uniform degree of roughing is applied over the entire overlasted margin without regard to the sole surface contours of the shoe bottom.

In accordance with these objects and in accordance with a feature of this invention there is provided a shoe bottom roughing machine which comprises a carriage

or slide movable with respect to a fixed guideway, the carriage mounting means for firmly clamping a partially fabricated shoe on a last bottom upwardly. The carriage may be moved lengthwise of the guideway either manually or preferably by power operated means. Also carried by the carriage is a template corresponding to the sole surface contours of the shoe bottom as well as the periphery of the shoe bottom.

A pair of roughing tolls comprising power driven rotary brushes are mounted above the shoe bottom engageable one at each side of the shoe as the carriage is moved by the power means (not shown) or manually lengthwise of the guideway in order that the shoe may be roughened in a single pass of the machine. The power operated brushes are operated independently of each other but each is operatively attached to a follower member which is engageable with the template whereby as the carriage moves along the guideway, a separate follower contacts each side of the template imparting to its associated brushes movement corresponding to the exact shape of the template both with respect to the elevational or sole surface contour of the shoe bottom and the shape of the edge or periphery of the bottom.

A right and left shoe would each need a separate template but it is possible to utilize two machines of the type hereinafter to be described, one intended for left and one for right shoes, respectively. It also will become obvious that shoes of different styles will require different templates but a single template can be used for shoes of different sizes of the same style within a limited range of sizes because the positions of the follower members which engage the template may be varied with respect to the roughing brushes in a direction both along the heel-toe axis of the shoe and the axis transversely thereof. The template is also adjustable in height with respect to the shoe which presents the advantage of being able to compensate for wear of the rotating brushes.

The above and other features of the invention including various novel details of construction and combinations of parts will now be more particularly described with reference to the accompanying drawings and pointed out in the claims. It will be understood that the particular roughing machine embodying the invention is shown by way of illustration only and not as a limitation of the invention. The principles and features of this invention may be employed in varied and numerous embodiments without departing from the scope of the invention.

In the drawings,

FIG. 1 is a side elevation of a machine embodying the invention;

FIG. 2 is a plan view of the machine shown in FIG. 1; and

FIG. 3 is a front elevation of the machine as viewed by an operator.

The illustrative machine comprises a base 2 which may be either bench or floor mounted depending upon the desired working height of the machine. Mounted on the base 2 is a guideway 4 which slidably mounts a carriage 6 which moves lengthwise of the guideway on bearing guides 8 (FIG. 3). The carriage may be moved either by hand, the operator using a lever 10 for this purpose, or by appropriate power means such as a hydraulic or pneumatic motor (not shown). The movement of the carriage 6 is limited by a pair of stops generally indicated 12 and comprising angle brackets 14 secured to the guideway 4 or machine base 2 and into which brackets are threaded stop screws 16 secured in place by lock nuts 18. Mounted on the carriage 6 is a jack 20 upon which a partially fabricated shoe S on a last L is placed bottom upwardly in conventional manner on a last pin 21. The jack 20 and hence the shoe S

is adjustable vertically with respect to the carriage 6 by an adjusting wheel 22.

The toe of the shoe S is engageable with a toe support generally indicated 24 and comprising a bracket 26, the angular position of which is adjusted by a screw 28 with respect to the carriage. The bracket 26 mounts a pair of arms 30, 30 which are adjustable heightwise by conventional slot and screw connections 32, 32. Each of the arms mounts a toe support 34 upon which the toe of the shoe rests.

The shoe is held firmly in position by a heel clamp 36 which is pivoted in a bifurcated bracket 38 on the top of a column 40 on the carriage 6. The heel clamp 36 is pivoted into and out of operative position by an operator controlled lever 42 and is locked in operative position as shown in FIG. 1 by internal locking means, not shown.

A matser template generally indicated 44 is centrally located on the carriage 6, being secured to a mounting bracket 46. The template may be constructed of a plurality of pieces as shown in FIG. 1, the forward or toe portion 48 being adjustably secured by a slot and screw connection 50 between the bifurcated end of a clamping member 52. A second template portion 54 is also included. The template 44 is adjustable vertically by a screw 56 with respect to the bracket 46 and hence to the carriage 6 and the shoe S. The template is also adjustable lengthwise of the carriage by a screw 58 through means, not shown. Since the shoe is fixed with respect to the carriage 6, except for heightwise adjustment, any adjustment of the template 44 is made with respect to the shoe. The composite template, it will be seen, corresponds to the bottom of the shoe S having both sole surface contour and edge profile or peripheral shape.

Two roughing tools generally indicated 60 and 62 are mounted for movement in engagement with the shoe bottom. Each roughing tool comprises a wire brush 64 mounted for rotation on a shaft 66 which extends generally in the direction of the heel-toe axis of the shoe and generally, but not exactly, parallel therewith. The brushes are mounted at one end of substantially horizontal arms 68, 69 through each of which passes a drive shaft (not seen) to transmit rotation (as indicated in FIG. 3) from pulleys 70 (FIG. 2) to the wire brushes 64 through gear box 72 adjacent the brush. The pulleys 70 are driven from means such as an electric motor (not shown) in the base of the machine.

The arms 68, 69 are connected to parallel arms 74, 75, respectively, which mount at their free ends template sensing means or followers generally designated 76, 78, respectively. The tool arm 68 is connected to the follower arm 74 by a rigid bar 80. In similar manner the tool arm 69 is connected to the follower arm 82.

The tool arms and the follower arms are mounted on the frame 2 for universal pivotal movement with respect to the template 44 and the shoe S by mounting means generally indicated 90 and located at the right-hand side of the machine as seen in FIGS. 1 and 2. The follower arms 74, 75 are secured to angular brackets 92, 93 which in turn are secured to plates 94, 95, respectively (FIG. 1). Secured to each of the plates is a bearing housing 96 only one of which is seen in FIG. 1 each carrying a pivot stud 98 received in forwardly projecting ears 100, 102 of bracket plates 104, 106 to permit the arms 74, 75 to pivot about vertical axes A_V. Plates 104, 106 in turn are each mounted for separate pivotal movement about a horizontal axis A_H by trunnions 108 mounting pivot studs 110 received in a fixed composite column 112 extending upwardly from the base 2 of the machine.

The two tool arms 68 and 69 and hence the follower arms 74 and 75 which are attached to them, are urged inwardly of the machine, i.e. inwardly toward the heel-toe axis of the shoe as seen in FIG. 2, by a pair of spring loaded plungers 114 mounted at the free ends of arms 116 secured on the plate 106 to which the arms 68 and 69 are attached. Thus, the spring loaded plungers 114 are always in engagement with the arms 68 and 69 urging them inwardly.

Each of the follower members 76, 78 mounted at the ends of the follower arms 74 and 75, respectively, comprise a first wheel 120 rotatable about a substantially horizontal axis and a second smaller wheel 122 rotatable about a substantially vertical axis. The wheels are mounted for rotation on blocks 124 adjustably mounted on block members 126 clamped on the forward ends of the arms 74 and 75. As seen in FIG. 1, the blocks 124 which mount the wheels 120, 122 are adjustable heightwise with respect to the clamping members 126 along guideways 128. An adjusting screw 130 passing through a boss 132 attached to the clamping members 126 are threaded in the blocks 124. Rotation of the screws 130 causes the blocks 124 to move with respect to the guideways 128 and consequently vertically with respect to the template 44. Without describing the construction in great detail the followers 76 and 78 may be adjustable inwardly and outwardly with respect to the sides of the shoe by adjusting knobs 134 (FIG. 3) and forwardly and rearwardly, i.e. along the shoe heel-toe axis, by adjusting knobs 136.

As will be seen in FIG. 3, the larger sensing wheels 120 are engageable with the upper or sole surface of the template 44 to impart vertical movement to the respective roughing wheels 64, 66. In like manner the smaller sensor wheels 122 engage the opposite sides of the template to impart in and out movement to the roughing wheels in accordance with the shoe profile or peripheral shape.

As the carriage 6 is caused to move to the left, as seen in FIG. 1, the follower wheels 120, 122 rest on the template 44 by gravity and ride along its surface causing each of the roughing tools 60, 62 to move inwardly and outwardly and rise and fall imparting to the lasted margin of the shoe bottom a roughing operation consistent with the shape of the template. Since the roughing tools operate simultaneously on opposite sides of the shoe bottom only a single pass is necessary to completely roughen the bottom of a shoe. Once the pass has been completed the roughing tools and followers may be elevated from the shoe and template respectively by treadle operated mechanism 140 connected to the mounting means 90.

It will be appreciated that a single template or a template with interchangeable toe portions 48 may be employed to control the roughing of a range of shoe sizes or a given style by the appropriate adjustment of the followers 76, 78. For example, the followers are adjusted to the right as viewed in FIG. 1 when smaller shoes of a given style are operated upon and to the left with larger sizes.

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

1. A machine for roughing the bottoms of partially fabricated shoes comprising means for mounting a shoe bottom upwardly, means for moving the mounting means longitudinally, a template on the mounting means and having a shape corresponding to the shoe bottom and movable longitudinally therewith, at least one roughing tool engageable with the shoe bottom as it moves and at least one sensing member engageable with the template, and means operatively connecting the sensing member to said tool, whereby movement of the template longitudinally of the sensing member causes the tool to act upon the moving shoe bottom in a pattern controlled by the template.

2. A machine for roughing the bottoms of partially fabricated shoes comprising a frame, a carriage movable with respect to said frame, means for mounting a shoe bottom upwardly on said carriage, a template on said carriage having a shape corresponding to the shoe bot-

tom, at least one roughing tool engageable with the shoe bottom and at least one template sensing member mounted on the frame and engageable with the template, means operatively connecting the sensing member to said tool whereby movement of the template with respect to the sensing member causes the roughing tool to act upon the moving shoe bottom in a pattern controlled by the template.

3. A machine for roughing the bottoms of partially fabricated shoes comprising a frame, a carriage movable with respect to said frame, means for mounting a shoe bottom upwardly on said carriage, a template on said carriage having a shape corresponding to the shoe bottom, a pair of roughing tools simultaneously engageable with opposite sides of the shoe bottom, template sensing members engageable with said template, and means operatively connecting the sensing members one to each roughing tool whereby movement of the template with respect to the sensing members causes the roughing tools to act upon opposite marginal portions of the shoe bottom in patterns controlled by the template.

4. A machine for roughing the bottoms of partially fabricated shoes comprising a frame, a carriage movable with respect to said frame, means for mounting a shoe bottom upwardly on said carriage, a template on said carriage having a shape corresponding to the shoe bottom, at least one roughing tool engageable with the shoe bottom, and at least one template sensing member mounted on the frame and engageable with the template, means operatively connecting said sensing member to said tool, said sensing member having two template contacting members one engageable with the sole surface of the template and the other simultaneously engageable with the edge profile of the template to impart compound movement to the tool with respect to the sole surface and edge profile of the shoe bottom.

5. A machine for roughing the bottoms of partially fabricated shoes comprising a frame, a carriage movable with respect to said frame, means for mounting a shoe bottom upwardly on said carriage, a template on said carriage having a shape corresponding to the shoe bottom, at least one roughing tool engageable with the shoe bottom and at least one template sensing member mounted on the frame and engageable with the template, means operatively connecting said sensing member to said tool, and means for adjustably spacing both the shoe and the template with respect to each other as well as with respect to said carriage, whereby movement of the template with respect to the sensing member causes the roughing tool to act upon the shoe bottom in a pattern controlled by the template.

6. A machine for roughing the bottoms of partially fabricated shoes comprising a frame, a carriage movable with respect to said frame, means for mounting a shoe bottom upwardly on said carriage, a template on said carriage having a shape corresponding to the shoe bottom, at least one roughing tool engageable with the shoe bottom, at least one template sensing member mounted on the frame and engageable with the template, means operatively connecting said sensing member to said tool, and means associated with the sensing member for varying the distance between the tool and the sensing member in a direction substantially normal to the sole surface of the shoe, whereby movement of the template with respect to the sensing member causes the tool to act upon the shoe bottom in a pattern controlled by the template.

7. A machine for roughing the bottoms of partially fabricated shoes comprising a frame, a carriage movable with respect to said frame, means for mounting a shoe bottom upwardly on said carriage, a template on said carriage having a shape corresponding to the shoe bottom, at least one roughing tool engageable with the shoe bottom, at least one template sensing member mounted on the frame and engageable with the template, means operatively connecting said sensing member to said tool,

and means associated with the sensing member for varying the distance between the tool and the sensing member measured in a direction extending substantially lengthwise of the heel-toe axis of the shoe, whereby movement of the template with respect to the sensing member causes the roughing tool to act upon the shoe bottom in a variable pattern controlled by the template.

8. A machine for roughing the bottoms of partially fabricated shoes comprising a frame, a carriage movable with respect to said frame, means for mounting a shoe bottom upwardly on said carriage, a template on said carriage having a shape corresponding to the shoe bottom, at least one roughing tool engageable with the shoe bottom, at least one template sensing member mounted on the frame and engageable with the template, means operatively connecting said sensing member to said tool, and means associated with the sensing member for varying the distance between the tool and the sensing member measured in a direction extending substantially transversely of the heel-toe axis and substantially parallel with the sole surface of the shoe whereby movement of the template with respect to the sensing member causes the roughing tool to act upon the shoe bottom in a variable pattern controlled by the template.

9. A machine for roughing the bottoms of partially fabricated shoes comprising a frame, a carriage movable with respect to said frame, means for mounting a shoe bottom upwardly on said carriage, a template on said carriage having a shape corresponding to the shoe bottom, a pair of roughing tools simultaneously engageable with opposite sides of the shoe bottom, each tool being mounted on the frame at the end of an arm which is universally pivotable on the frame, and a pair of template sensing members each associated with one roughing tool and mounted at the end of an arm universally pivotal on the frame and connected to the arm mounting the associated roughing tool, each of said tools simultaneously engaging the opposite margins of the shoe bottom while their associated sensing members engage opposite edges of the template, whereby movement of the carriage along the frame causes movement to be imparted by the template through the sensing members to the tools to act on the shoe bottom in a pattern controlled by the template.

10. A machine for roughing the bottoms of partially fabricated shoes comprising a frame, a carriage movable with respect to said frame, means for mounting a shoe bottom upwardly on said carriage, a template on said carriage having a shape corresponding to the shoe bottom, a pair of roughing tools simultaneously engageable with opposite sides of the shoe bottom, each tool being mounted on the frame at the end of an arm which is universally pivotal on the frame, and a pair of template sensing members each associated with one roughing tool and mounted at the end of an arm universally pivotal on the frame and connected to the arm mounting the associated roughing tool, each of said tools simultaneously engaging the opposite margins of the shoe bottom while their associated sensing members engage opposite edges of the template, each of said sensing members being adjustable with respect to its associated tool in three directions, each direction mutually normal to the other, whereby movement of the carriage along the frame causes movement to be imparted by the template through the sensing members to the tools to act on the shoe bottom in a variable pattern controlled by the template.

11. A machine for roughing the bottoms of partially fabricated shoes comprising means for mounting a shoe bottom upwardly, template means fixed to said shoe mounting means and having a shape corresponding to the shoe bottom, means for moving the shoe and template means longitudinally, a pair of roughing tools mounted in tandem relationship and engageable with opposite sides of the shoe bottom, and means, including a pair of sensing devices having means operatively connect-

ing them with the roughing tools and engageable with said template means, for controlling the positions of the roughing tools heightwise and widthwise of the shoe bottom whereby, upon movement of the shoe longitudinally being effected, the roughing tools are caused to successively engage with the shoe bottom and to progressively operate along opposite sides thereof.

12. A machine for roughing the bottoms of partially fabricated shoes comprising a frame, a carriage movable with respect to said frame, means for mounting a shoe bottom upwardly on said carriage, template means on said carriage having a shape corresponding to the shoe bottom, a pair of roughing tools mounted in tandem relationship and engageable with opposite sides of the shoe bottom and a sensing device operatively connected to each roughing tool and engageable with said template means, whereby movement of the template with respect to the sensing devices causes the roughing tools to successively engage with the shoe bottom and to progressively operate along opposite sides thereof in a pattern controlled by the template.

13. A machine for roughing the bottoms of partially fabricated shoes comprising means for mounting a shoe bottom upwardly, template means fixed to said shoe mounting means and having a shape corresponding to the shoe bottom, means for moving the shoe and template means longitudinally, a pair of rotary roughing tools engageable with opposite sides of the shoe bottom, and means mounting said tools for rotation in such a manner that they effect an inward wiping action on said opposite sides of the shoe bottom, and means, including a pair of sensing devices having means operatively connecting them with the rotary roughing tools and engageable with

said template means, for controlling the positions of the roughing tools heightwise and widthwise of the shoe bottom whereby, upon movement of the shoe longitudinally being effected, the rotary roughing tools are caused to engage with the shoe bottom and to progressively operate along opposite sides thereof.

14. A machine for roughing the bottoms of partially fabricated shoes comprising a frame, a carriage movable with respect to said frame, means for mounting a shoe bottom upwardly on said carriage, template means on said carriage having a shape corresponding to the shoe bottom, a pair of rotary roughing tools engageable with opposite sides of the shoe bottom, means mounting the tools in tandem relationship for rotation in such a manner that they effect an inward wiping action on said opposite sides of the shoe bottom, a sensing device associated with each tool and engageable with said template, and means operatively connecting each sensing device to a rotary roughing tool whereby movement of the template with respect to the sensing devices causes the rotary roughing tools to successively engage with the shoe bottom and to progressively operate along opposite sides thereof in a pattern controlled by the template.

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