United States Patent

Babson

[15] **3,645,118**

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[54] SHOE BOTTOM ROUGHING MACHINES

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[52] **U.S. Cl.** .....**69/6.5,** 12/17 R, 51/35

[51] **Int. Cl.** **C14b 1/44**

[58] **Field of Search**.....69/6.5, 1; 12/17 R; 51/35;

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3,449,933	6/1969	Dunlap et al.	69/6.5
3,518,851	7/1970	Boot et al.	69/6.5
3,559,428	2/1971	Babson	69/6.5

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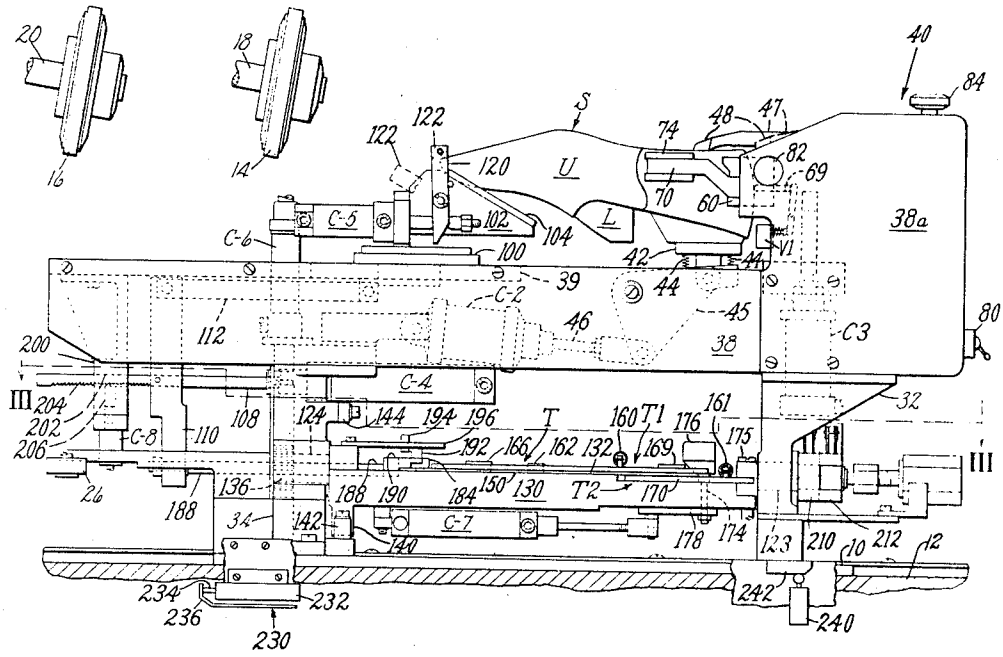
[57] **ABSTRACT**

A machine for roughing the bottoms of shoes having a pair of roughing tools and a support for a shoe during relative movement between the tools and the support to cause the shoe to pass by the tools. A template assembly for positioning the tools in which the assembly includes cooperating forepart and heel portions automatically adjustable in lengthwise and widthwise directions to accommodate shoes of different sizes and is automatically reversed by rotation about its longitudinal axis, to accommodate right and left shoes in accordance with the size and character of the shoe on the support. The shoe support also embodies an abutment for determining the heightwise position of the toe end of each shoe placed thereon and a heel support including a selectively displaceable hold-down means, the heel support being movable in response to the engagement of the heel end of a shoe therewith for actuating control means to initiate an automatic operating cycle of the machine.

8 Claims, 5 Drawing Figures



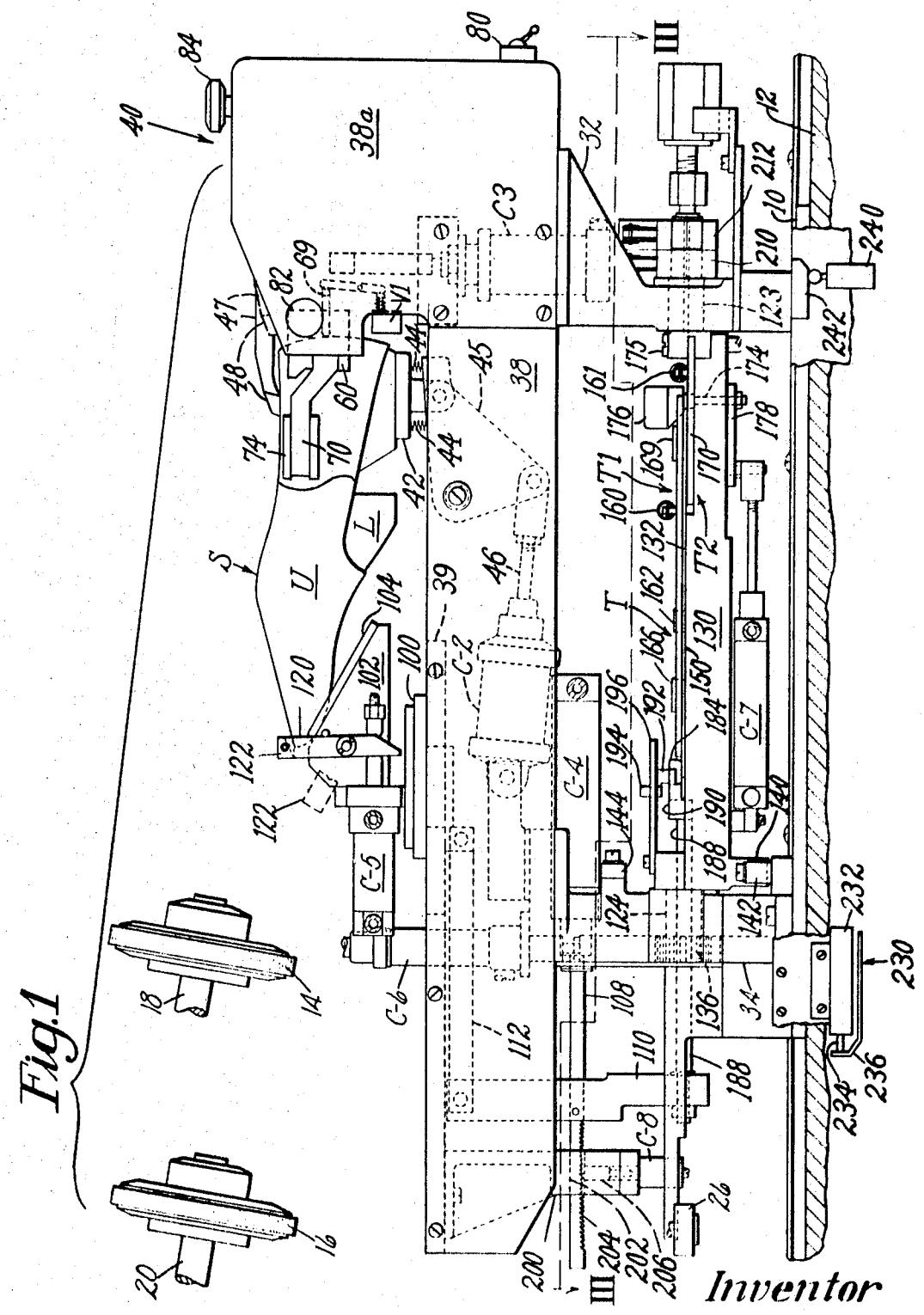


Fig. 1

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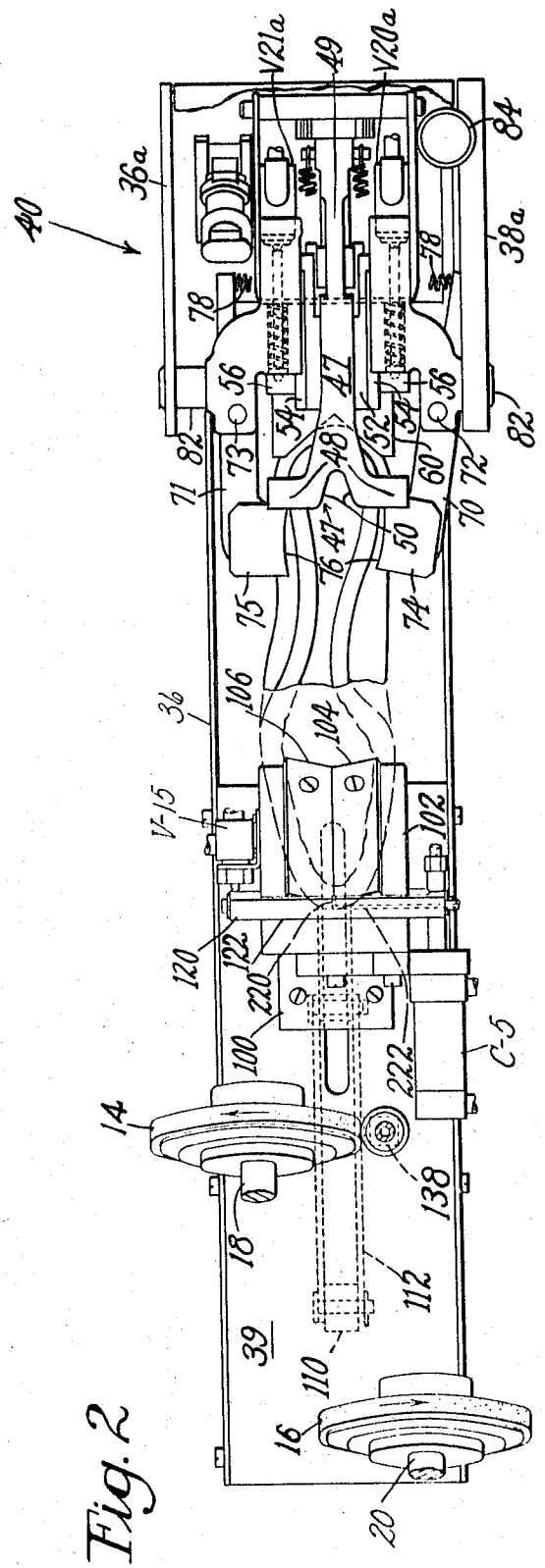
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V-15
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C-5
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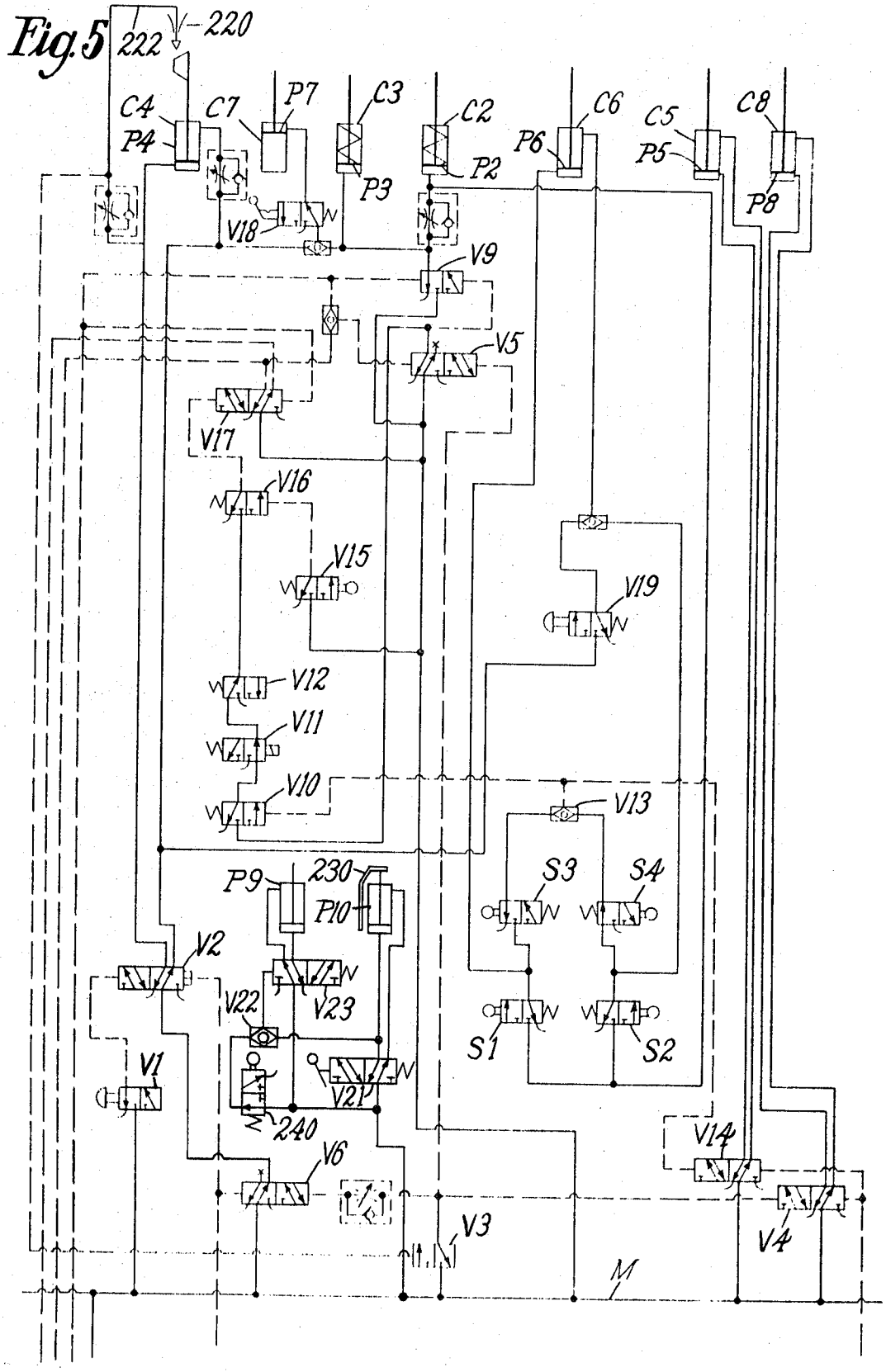
Fig. 2

Fig. 5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SHOE BOTTOM ROUGHING MACHINES

BACKGROUND OF THE INVENTION

This invention relates to a machine for performing operations along the marginal portions of the bottoms of shoes, and as herein illustrated is embodied in a machine for performing a roughing operation on the bottom of a shoe, the machine being of the same general type as that disclosed in U.S. Pat. No. 3,233,438, issued Feb. 8, 1966 on an application filed in the names of Peter Tore Hansen and Svend Jorgen Hansen.

Machines of the featured type comprise a pair of rotary tools, e.g., wire brushes, for operating along opposite marginal portions of a bottom of a shoe on a support as relative movement between the support and the tools is effected to cause the bottom of the shoe to pass in operative relation to the tools. During such relative movement, the roughing tools are positioned in directions extending widthwise of the shoe by means including a template mounted on the support. In the particular arrangement disclosed in the above-mentioned patent, the template is also utilized to position the roughing tools in directions extending heightwise of the shoe. However, in subsequent modifications of the patented machine, a flat two-dimensional template is used and the roughing tools are positioned heightwise of the shoe bottom as a result of direct engagement therewith under the influence of gravity.

Also, as is disclosed in U.S. Pat. No. 3,518,851 issued July 7, 1970 in the names of Herbert W. Boot and Allan C. Wood, the two-dimensional template for the machine of the featured type may be mounted on the shoe supporting means for rotation about its longitudinal axis to reverse its position and adapt it for use on both a right and a left shoe. Further, in accordance with the disclosure of U.S. Pat. No. 3,518,851 the shoe-supporting means is provided with means for sensing the character of the shoe thereon, i.e., a right or a left, and there is associated with the rotatable template means for sensing its position. The arrangement is such that operation of the machine cannot be continued until the template is positioned in accordance with the character of the shoe on the supporting means, as is more particularly described in U.S. Pat. No. 3,518,851.

There is then disclosed in application for U.S. Pat. Ser. No. 864,704 filed Oct. 8, 1969 in the names of Herbert W. Boot, Leslie R. Parr and Sirley L. W. Fudger now U.S. Pat. No. 3,579,695, an improvement in the basic machine whereby the machine previously limited to roughing on a toe to heel breast can also be operated to rough all around the periphery of a shoe bottom. That improvement allows a single machine to do either or both operations at the selection of the operator. To accomplish that, application Ser. No. 864,704 discloses a heel support assembly including a selectively removable holddown foot which engages the bottom of a shoe at the heel area. Means are provided for selectively removing the holddown foot to an inoperative position to permit the tools to work all around the entire margin as distinguished from only the toe to the heel breast line when the holddown foot is in the operative clamping position, all of which is more particularly described in the said application Ser. No. 864,704.

A further improvement in the basic machine is disclosed in application for U.S. Pat. Ser. No. 831,821, filed June 2, 1969 in the name of Edward S. Babson, now U.S. Pat. No. 3,559,428. That improvement allows the machine to operate on shoes in a range of sizes using a single template, but only to the extent that toe to heel breast roughing can be practiced. As disclosed in application Ser. No. 831,821, the template is automatically adjustable in both widthwise and lengthwise dimensions in response to a shoe located on the shoe support. With that improvement however, and even though a range of shoe sizes may be accommodated using a single template the output and operation of the machine is not entirely satisfactory. This is for the reason that the improvement does not accommodate all around roughing, but is restricted to providing toe to heel breast type roughing. Thus, in cases where all around roughing is desired on a shoe or shoes being operated upon, it is necessary to remove the shoe after operation in the machine to another machine to rough the heel area, or as an alternative, carrying out the heel portion roughing by hand.

Therefore, it is an object of this invention to provide an improved machine of the above-mentioned type whereby the above noted difficulties are effectively eliminated or substantially reduced. With this object in view, and in accordance with a feature of the invention, the herein illustrated machine which has a pair of roughing tools for operating along the marginal portions of the bottom of a shoe and means for supporting a shoe during relative movement between the tools and the supporting means to cause the bottom of the shoe to pass in operative relation to the tools is provided with a template assembly including cooperating forepart and heel portions which is mounted on the supporting means for adjustments in lengthwise and widthwise directions thereby to accommodate shoes of different sizes and styles and provide them, if desired, with all around roughing. The supporting means as illustrated also includes means for sensing the size of a shoe thereon and for effecting corresponding lengthwise and widthwise adjustments of the template assembly.

In accordance with another feature of the invention, the heel support is provided with a removable holddown foot which engages the bottom of the shoe at the heel area. Means are provided for selectively removing the holddown foot to an inoperative position to permit the roughing tools to rough all around the margin of the shoe bottom. In this manner the machine may be optionally operated to provide either all around roughing or toe to heel breast roughing. It is, of course, also possible to adapt the machine to rough a marginal area which is less than that which amounts to toe to heel breast roughing as generally considered. Also, the means for supporting the shoe in the herein-illustrated machine includes a heel support for engaging the heel seat portion of the bottom of the shoe, a member for clamping the heel end of the shoe against the heel support, a V-shaped heel abutment, and a toe support, and power means are provided for operating the clamping means and for moving the toe support. To facilitate the operation of the machine, particularly the loading of shoes thereinto, there is provided control means for initiating the operation of the mentioned power means, this control means conveniently being responsive to the engagement of the heel seat portion of the bottom of a shoe with the heel support. More particularly, the heel support is mounted for limited pivotal movement from an inoperative position to an operative position and the control means includes a member actuated as a result of such movement.

Further, in the illustrated machine the two-dimensional template assembly is mounted for rotation to reverse its position thus to adapt it for use with either a right or a left shoe. Advantageously, means are provided for effecting a 180° rotation of the template assembly at the conclusion of each operating cycle. Thus, if right and left shoes are presented to the machine in succession as is usual, the template assembly will be automatically turned to the proper position for each shoe before it is placed in the machine. However, should it happen that two or more shoes for the same foot are to be handled in succession, when the second shoe is placed on the supporting means and clamped in place, continued operation of the machine is prevented until the position of the template assembly is reversed in response to the manual operation of a control device by the operator.

To avoid the delay and risk involved in such a procedure in the herein-illustrated machine, there is provided means for automatically effecting rotation of the template 180° in response to means sensing the character of the shoe on the supporting means and the position of the template assembly, when these sensing means indicate that the template assembly is improperly positioned for use with the particular shoe on the supporting means. As illustrated, the sensing means include a V-shaped heel block movable to one position by the heel end of a right shoe and to another position by the heel end of a left shoe and a sensing member adapted to be actuated by the

block, not shown, pivoted on a bracket, not shown, secured to a side wall. Rotation of the screw 84 is thus effective to vary the position of the casting 60 and thus of the heel support arrangement.

Slidably mounted on the top plate 39 is a smaller plate 100 which carries lengthwise a toe supporting block 102. This block is provided with an inclined V-shaped groove formed by a pair of wear plates 104, 106 and is adapted to engage and to position the toe end of a shoe on the supporting structure. For moving the toe supporting block from a retracted position to the operative position in which it is shown in FIG. 1, there is supported on the postlike member 34 a cylinder C–4 in which there is a piston P–4, FIG. 5. This piston has a rod which is secured to and extends through a crosshead 110, the upper end of which is connected to the plate 100 by means of a link 112.

Pivotally mounted on the toe supporting block 102 is a U-shaped member 120, the base portion 122 of which is provided with a rounded surface adapted to engage the extreme toe end of the bottom of a shoe when the parts are in the operative positions (FIG. 1). For swinging this U-shaped member, which serves as an abutment for locating the toe end of the shoe in a heightwise direction, between the operating position in which it is shown and the inoperative position indicated in broken lines, a piston P–5 contained within a cylinder C–5 (FIG. 5) is provided. This cylinder is mounted on the plate 100 and has a rod which is connected to one of the arms of the U-shaped member 120 (FIG. 1).

Mounted for rotation by means of trunnion shafts 123 and 124 (FIG. 1) which are journaled in bearings provided in the lower portions of the postlike members 32 and 34 is a template support 130 which has a flat surface 132, uppermost when the support is in the position shown in FIG. 1, and which is shaped as shown in dotted lines in FIG. 3. The trunnion shaft 124 extends beyond and to the left of the member 34 and carries a pinion 136, FIG. 3. This pinion meshes with a vertically extending rack 138 which is connected to the rod of a piston P–6 contained within a cylinder C–6, FIGS. 1 and 5. By means of this piston, the template support 130 may be rotated through an angle of 180° from the position shown in FIG. 1 and as determined by the engagement of an ear 140 with a stop member 142 to its other position as determined by the engagement with the ear with a second stop 144.

The template assembly includes cooperating adjustable fore T–1 and heel T–2 portions and is indicated generally by the reference character T. Also included is a base plate 150 which mounts by means of a pivot pin 151, two template fore sections 152 and 153 as well as two template heel sections 154 and 155 shaped as shown in FIG. 3 The inner edges of these template sections are cut away to form oppositely facing wedging surfaces 156, 157 and 158, 159. When the template assembly is on the support 130, coil springs 160 and 161 yieldingly urge the template fore and heel sections, respectively, toward each other to the extent determined by the engagement of the wedging surfaces 156, 157 and 158, 159. A stud 162 fixed to the support 130 and extending upwardly therefrom through a slot 164, formed in the baseplate 150 determines the extent of wedging or widening of surfaces 156 and 157. A flat headed stud 165 overlays the template sections 152, 153 as shown in FIGS. 1 and 3. A pair of controls 166 and 169 are provided to keep the sections 152 and 153 of the fore template portion T–1 from separating completely. These are attached to the template plate 150 by means of pins, not shown. Pivotally mounted in a groove 170 formed on the support 150 is the heel template portion T–2 having a groove formed between surfaces 158 and 159 through which a pin 174 having an enlarged head 176 projects. Heel template sections 154 and 155 are pivotally held to support 130 by pin 175 run through holes, not shown, provided in the extreme rear end of each of the sections. Pin 174 serving to wedge or widen surfaces 158 and 159 is connected to the rod of a piston P–7 (FIG. 5) by means including a plate 178 (FIG. 1). The piston P–7 is contained within a cylinder C–7 (FIGS. 1 and 5) and when fluid under pressure is admitted to the right hand end of this cylinder as viewed in FIG. 1, the pin 174 is urged to the left, thus to bear yieldingly against the bottom of a notch 180, FIG. 3, formed in the right-hand end of the baseplate 150. This action urges the whole template assembly to the left (FIG. 1) thus holding the bottom of a notch 182, formed in the left-hand end of the base plate, yieldingly against a block 184. The block 184 is formed on the right hand end of a rod 186 which is slidably mounted in the right hand end of another rod 188 which extends through the postlike member 34 which is secured to the lower portion of the crosshead 110.

Formed on the end of the rod 188 is an S-shaped arm 190 (FIG. 3) on which there is pivotally mounted one end of a lever 192. This lever is connected, by means of a pin and slot arrangement, to the block 184. Thus, the force yieldingly exerted on the template assembly by the piston P–7 tends to swing the lever 192 in a counterclockwise direction (FIG. 3) to the extent permitted by the engagement of the other end of the lever with a stop pin 194 carried by a plate 196, secured to the template supporting member 130. On the other hand, when pressure fluid is exhausted from the cylinder C–7, the whole template assembly may be easily released for removal from the support by sliding the heel template portion T–2 to the right by means of the headed pins 174, 176.

Secured to, and extending downwardly from, the lower side of the plate 39 is a bracket 200 (FIG. 1). This bracket is formed with a guideway 202 through which the left hand end portion of the piston rod 108 extends. On its lower side this portion of the piston rod is provided with ratchet teeth 204 and slidably mounted within this bracket for upward movement into locking engagement with these teeth is a pawl member 206. This pawl member is connected to the rod of a piston P–8 contained within a cylinder C–8 (FIGS. 1 and 5). As shown in FIG. 1, this cylinder is mounted on the lower portion of the bracket member 200. Accordingly, the toe supporting means is secured in its adjusted lengthwise position.

For sensing the position of the template support 130 and also of the template assembly thereon, there is mounted on a portion of the trunnion shaft 122 which extends to the right of the member 32, a pair of indicator cams 210, 212. These cams are adapted to actuate the plungers of two sensing valves S–3 and S–4, FIGS. 3, 4 and 5) generally in the same manner as the cams (70), (72) of the machine shown in the above mentioned U.S. Pat. No. 3,518,851.

Referring again to the U-shaped toe abutment member 120, there is formed in its rounded shoe-engaging surface an orifice 220 (FIG. 2) which leads to a cross passage 222 (FIGS. 2 and 5). When it is in its retracted position, shown in broken lines in FIG. 1, one of the arms of this toe abutment member is adapted to shift the plunger of a control valve V–15 to the left from the position in which it is shown in FIG. 5 of the drawings.

Where the illustrated machine can be set to operate for either toe to heel breast roughing or all around roughing, the extent of travel of base portion 10 relative to tools 14 and 16 is made adjustable. One manner in which to effect this involves use of a single stop for each tool (not shown) with an adjustable striker 230 (FIG. 1) again for each tool. The latter includes a pneumatic cylinder 232 housing a piston (not shown) and piston rod 234 carrying a striking or cam surface 236.

Additionally, the machine is shown including a reset switch 240 (FIG. 1) cooperating with a striking abutment 242 carried on the base portion 10 which operates at return of the base portion 10. With switch 240 in the position shown in FIG. 1 the heel holddown foot 47 is in the forward position, shown in phantom in FIG. 1.

When the machine is idle, the heel holddown foot 47 is in the forward position shown in FIG. 1, the side clamp levers 70 and 71 are released, the clamping plate 42 is in a lowered position and the toe supporting block 102 is retracted to a position to the left of that shown in FIG. 1. To use the machine, the operator takes a shoe, for example, a left shoe, and places its heel end beneath the heel holddown foot 47, between this and

the clamping plate 42, with its toe end pointing generally toward the toe supporting structure and with its heel end in engagement with the heel block 60, and elevates the heel end of the shoe. Such movement permits the plunger of the valve V–1 (FIGS. 1 and 5) to be shifted to the left by its spring, thus piloting a valve V–2.

Fluid under pressure, e.g., compressed air, now passes through the valve V–2 to the cylinder C–4 causing the piston P–4 to move the toe supporting block 102 to the right. During this movement of the toe supporting block, the toe end of the shoe enters, and is positioned in a widthwise direction by, the inclined groove provided by the plate 104, 106. Also, the toe end of the shoe is elevated to a heightwise operating position determined by its engagement with the rounded surface on the toe abutment member 120. As shown in FIG. 5, the cross passage 222 in the toe abutment member 120 is connected to the same line which leads to the cylinder C–4 so that air flows freely out through the orifice 220 until this orifice is closed or restricted by the toe end of the shoe. Pressure now builds up in a line leading to a pilot valve V–3 which is shifted so as to pilot three valves V–4, V–5 and V–6.

Pressure fluid now flows from the manifold line M (FIG. 5) through the valve V–4 to cylinder C–8 causing the piston P–8 to move the pawl 208 into engagement with the teeth 204 on the rod 108, thus locking the toe support and the rod 188 against movement to the left, (FIG. 1). Pressure fluid also flows through the valve V–5 to pilot a valve V–9 and also to a series of valves V–10, V–11, V–12 (FIG. 5), the latter two of which are associated with the pneumatic control circuit for effecting relative movement between the shoe supporting means and the tools 14 and 16. After a slight delay, valve V–6 moves to a position to shut off the flow of pressure fluid to the valve V–2.

The piloting of the valve V–9 permits pressure fluid from the manifold to be admitted to the cylinders C–2, C–3 and C–7. The side clamps 70, 71 are now actuated by the piston P–3 and shortly thereafter the clamping plate 52 is elevated to clamp the heel end of the shoe against the heel holddown foot 47 by the action of the piston P–2 and the template assembly T is yieldingly urged to the left and held in engagement with the block 184 by the piston P–7. Pressure fluid directed to the cylinder C–2 also flows to the sensing valves S–1, S–2, S–3 and S–4.

As stated above, the operator had placed a left show in the machine and as shown in FIG. 3, the template assembly is in proper position for a left shoe so that the valve S–4 will be in the position shown in FIG. 5. Accordingly, when the side clamps 70 and 71 are moved in against the shoe in the machine, its heel end swung the heel abutment block 60 to the position shown in FIG. 2, thereby shifting the plunger of the valve S–2 to the left in FIG. 5. Pressure fluid now flows through the valves S–2 and S–4 and a shuttle valve V–13 to pilot the valve V–10 and another valve V–14.

Pressure fluid now flows through the valve V–14 to the cylinder C–5 causing the piston P–5 to swing the toe abutment member 120 to its retracted position. Such movement of the toe abutment member shifts the valve V–15 to pilot a valve V–16. The valves V–11 and V–12 being at this time open, pressure fluid flows therethrough and also through the valve V–16 to pilot a valve V–17. As a result of the piloting of the valve V–17, an operating cycle of the machine is started. During this operating cycle the work supporting structure 8 is moved back and forth on the frame 12, thereby to cause the bottom of the shoe thereon to pass in operative relation to the tools 14 and 16.

Movement of the work supporting structure is effected by means of fluid pressure actuated mechanism which is generally like that shown in the above-mentioned U.S. Pat No. 3,233,438 which forms no part of the present invention. At the conclusion of this operating cycle the various control valves mentioned above are reset to their original positions. Thus, side clamp levers 70, 71 are released, the clamping plate 42 is lowered, the pawl 206 is retracted to release the rod 108 and the toe supporting block 102 is retracted, thereby releasing the shoe for removal by the operator. Also, the toe abutment is returned to its inoperative position. Pressure fluid is however, still admitted to the cylinder C–7. For relieving such fluid pressure, thus to facilitate removal of the template assembly, a manually operable exhaust valve V–18 is provided, FIG. 5.

Assuming now that the operator next places a right shoe in the machine, thereby causing the heel abutment block 60 to be swung to a position to shift the valve S–1 and to leave the valve S–2 in the closed position shown, pressure fluid cannot reach the shuttle valve V–13 either through valves S–1 and S–3 or valves S–2 and S–4 inasmuch as the template assembly T is in a position for a left shoe and valve S–3 is closed. However, pressure fluid now passing through valve S–1, but blocked by valve S–3, flows to the cylinder C–6 thereby causing the piston P–6 to rotate the template assembly to the proper position for a right shoe. Valve S–3 is now opened by cam 210 and an operating cycle is initiated in the manner described above. A similar action will occur when a left shoe is placed on the supporting structure when the template assembly T is in a position for a right shoe. Under these conditions, pressure fluid flowing through the valve S–2, but blocked by the valve S–4 would flow to the cylinder C–6 and cause the piston P–6 to rotate the template assembly to the proper position for a left shoe. For the convenience of the operator, a manually operable valve V–19 is provided for his use in reversing the position of the template assembly.

During the operating cycle of the machine the tools 14 and 16 are positioned in directions extending widthwise of the shoe S by the action of the template on the cam rolls 24, 26 generally in the same manner as in the prior machines, such, for example, as that shown in U.S. Pat. No. 3,233,438. However, whereas in these prior machines it is necessary either to change the template for shoes of different sizes, or to remove the shoe after operation when all around roughing is required, the arrangement herein illustrated avoids these difficulties entirely. Thus, when the toe supporting block 102 is moved to the right and into engagement with the toe end of the shoe which the operator has placed in the machine, and is brought to a stop by the engagement of the toe end of the shoe with the toe abutment member 120, the size of the shoe is automatically sensed. At the same time, the rod 188 which moves with the toe-supporting block effects lengthwise and widthwise adjusting movements of the template assembly in the following manner.

One end of the lever 192 is carried along by the arm 190 formed on the right-hand end of the rod 188 and on which this lever is pivotally mounted. The stop pin 194 limits swinging movement of this lever in a counterclockwise direction. Thus the block 184 is moved to the right, but by an amount which is less than the distance moved by the rod 188 because of the proportioning action provided by the leverage arrangement. The purpose of this is to compensate for the difference in the overall foreshortening of shoes of different sizes and the foreshortening, particularly that which exists from the toe of the shoe back to the ball portion thereof. Thus, for a particular style of last, the overall foreshortening with respect to the forepart through the heel breast is found to be 2½ inches while the corresponding foreshortening from the toe end back to the ball portion is only 1¾ inches, for a full run of sizes 11 down to 3½. Accordingly, the leverage arrangement for this style of last is designed to provide for a loss of ¾ inch in the movement of the block 184 during the 2½ inches movement of the rod 188 which occurs as the toe supporting block 102 moves between a position in engagement with the toe end of a size 11 shoe and a position in engagement with the toe end of a size 3½ shoe. In this way, the template assembly is automatically adjusted in a lengthwise direction in accordance with the size of the shoe placed on the shoe supporting structure and as sensed by the movement of the toe supporting block. The lengthwise adjustment of the heel end portion T–2 of the template is proportioned on the widthwise adjustment made to

that portion, which is then introduced on the basis of movement of forepart portion T–1 relative to heel portion T–2. The heel end portion T–2 remains stationary, attached by pin 175, see FIG. 1, while the forepart portion T–1 is moved lengthwise. As a result forward or rearward movement of template T–1 exposes more or less of template heel portion T–2 to act as camming surfaces on which cams 24 and 26 travel, as indicated in FIG. 4.

Moreover, as the template assembly is thus adjusted in a lengthwise direction to bring the ball portion of the template into proper lengthwise position for the particular size shoe in the machine, the action of the stud 162 on the inclined wedging surfaces 156 and 157 effects a widthwise adjusting movement of the template sections 152 and 153 of forepart template portion T–1 to correspond to the variations in the width of shoes of different sizes. Similarly the action of stud 174 on the wedging surfaces 158 and 159 effects widthwise adjusting movement of the template sections 154 and 155 of heel end template portion T–2, to correspond to the variations in the width of shoes of different sizes. Thus, when a shoe of the largest size of the run of sizes, e.g., size 11, is in the machine, the block 184 will assume its extreme left hand position and the template sections of both template portions will be swung apart the greatest amount and similarly the forepart portion T–1 will be lengthened the greatest distance relative to heel end portion T–2. On the other hand, when a shoe of the smallest size of the run, e.g., size 3½, is in the machine, the block 184 will be shifted to the right a maximum distance (i.e., 1¾ inch) and the template sections will be swung together by the springs 160 and 161 to the greatest extent to reduce the width of the template portions, forepart T–1 and heel portion T–2 to correspond to the smallest size shoe. Similarly, the two template portions T–1 and T–2 are shortened relative to one another a comparable amount (see FIG. 3).

The template assembly is readily removable for replacement with another similar assembly designed for use with a run of sizes of shoes of a different style in the following manner. While there is pressure fluid in the manifold M the template assembly is yieldingly urged to the left by the action of the piston P–7. By actuating the manually operable valve V–18, cylinder C–7 may be connected to exhaust thus relieving pressure on the template assembly. The block 172 and pinion 174 may now be moved to the right by means of the enlarged head 176, thus releasing the template assembly for removal and replacement.

The stop assembly 230 and reset 240 (FIGS. 1 and 5) are operated from a circuit communicating with the manifold. Selection switch V–21 allows operator choice as to whether toe to heel breast roughing or all around roughing is to be provided with respect to a specific shoe or shoes to be roughed. When the selection is made to have toe to heel breast roughing, the air goes to one side of the piston in stop assembly 230, causing the piston P–10 to extend and carry the camming surface outward to be struck by the stop to lift the brushes 14 and 16 when the breast of the shoe is reached. At the same time the air is allowed to go through the shuttle valve V–22 activating in turn V–23 to affect piston P–9 accordingly to retain the holddown foot 47 in the forward position. In the event all around roughing is indicated to selection switch V–21, air is provided to the opposite side of P–10, causing the cam surface on P–10 to be retracted. Brushes 14 and 16 then are not lifted until the heel end is reached. Simultaneously air is shut off to valve V–22 but the air pressure remains on to maintain the holddown foot 47 in the forward position, until such time as stop assembly 240 is deactivated. With deactivation of stop assembly 240 the valve V–23 is also deactivated, shifting the air to the opposite side of P–9 causing the holddown foot 47 to be retracted.

With the novel arrangement described above, the operation of the machine is greatly facilitated and the output thereof correspondingly increased. Thus, all the operator has to do after seeing that the proper template assembly for the particular style of shoe to be handled is installed on the supporting member 130, is to place successive shoes on the supporting structure and by elevating their heel ends to initiate the operating cycle by actuating the valve V–1, and at the conclusion of the operating cycle to remove the shoe and place another in the machine. The sensing valves S–1, S–2, S–3, S–4 compare the particular shoe, i.e., a right or a left with the position of the template assembly and, if required, effect automatic rotation of the assembly to the proper position for that shoe. At the same time, appropriate lengthwise and widthwise adjusting movements of the template assembly are effected in accordance with the size of the shoe as sensed by the toe supporting block and the toe end of the shoe is automatically brought to the proper heightwise position by engagement with the toe abutment 120.

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 having a tool for operating on marginal portions of the bottom of a shoe and means for supporting a shoe during relative movement between the supporting means and said tool to cause the bottom of the shoe to pass in operative relation to said tool, a template assembly including cooperating adjustable heel and forepart portions located on the supporting means for positioning the tool relatively to the bottom of the shoe on the supporting means in a direction extending widthwise thereof, means mounting said template assembly for adjustment in a direction extending lengthwise relatively to the supporting means and a shoe thereon to position the template assembly in accordance with the size of the shoe, and means on the supporting means for sensing the size of a shoe thereon and for effecting a corresponding lengthwise adjustment of said template assembly on the supporting means.

2. A machine as set forth in claim 1 wherein the heel and forepart portions of said template assembly are cooperatively adjustable in a widthwise direction to accommodate shoes of different sizes in response to said lengthwise adjustment thereof.

3. In a machine having a pair of tools for operating on marginal portions of the bottom of a shoe, and means for supporting a shoe during relative movement between the supporting means and said tools to cause the bottom of the shoe to pass in operative relation to said tools, a template assembly including cooperating adjustable heel and fore portions on the supporting means for positioning the tools relatively to the bottom of a shoe on the supporting means in directions extending widthwise thereof as the bottom of the shoe passes in engagement with the tools, means mounting said template assembly for adjustment in a direction extending lengthwise relatively to the supporting means and a shoe mounted thereon to position the template in accordance with the size of the shoe, and means on the supporting means for sensing the size of the shoe thereon and for effecting a corresponding lengthwise adjustment of said template assembly on the supporting means.

4. A machine as set forth in claim 3 wherein said template assembly comprises a base member mounted on the shoe supporting means for lengthwise adjustment and each of said heel and forepart portions of the template assembly include a pair of template sections carried on the base member.

5. A machine as set forth in claim 4 wherein the template sections are mounted on the base member for widthwise adjustment.

6. In a machine having a tool for operating on the marginal portions of the bottoms of shoes, means for supporting a shoe during relative movement between the tool and the supporting means to cause the bottom of a shoe thereon to pass in operative relation to said tool, and a template assembly including cooperating adjustable heel and fore portions on the supporting means for positioning the tool relatively to the bottom of a shoe on the supporting means in a direction extending widthwise thereof as the shoe passes the tool, said template assembly being mounted for rotation about its longitudinal axis to reverse its position to adapt it for use with a right and a left shoe, means for rotating the template assembly, and means for controlling the operation of said template assembly rotating

means to position the template assembly for use with a particular shoe on the supporting means including means for sensing the character of the shoe on the supporting means and means for sensing the position of the template assembly.

7. A machine as set forth in claim 6 wherein said means for sensing the character of the shoe comprises a heel abutment block on the shoe supporting means movable to one position by the heel end of a right shoe and to another position by the heel end of a left shoe, and a separate sensing member adapted to be actuated by the heel abutment block in each of its two positions.

8. A machine as set forth in claim 6 wherein the means for sensing the position of the template assembly includes a pair of cam members rotatable with the template assembly.

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United States Patent

Berg et al.

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[54] METHOD AND APPARATUS FOR STRAIGHTENING ELONGATED ARTICLES

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[58] **Field of Search** 72/88, 89, 90, 94, 110, 111, 72/190

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[57] **ABSTRACT**

A method and apparatus for straightening an elongated article about all of the lateral axes thereof, wherein the article is continuously and progressively bent about such axes by progressively decreasing amounts.

7 Claims, 11 Drawing Figures