United States Patent

Boot et al.

[15] **3,704,604**

[45] **Dec. 5, 1972**

[54] **AUTOMATIC BOTTOM ROUGHING MACHINE**

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[73] Assignee: **USM Corporation,** Flemington, N.J.

[22] Filed: **June 17, 1971**

[21] Appl. No.: **154,029**

[30] **Foreign Application Priority Data**

June 27, 1970 Great Britain.....31,258/70

[52] **U.S. Cl.**.....**69/6.5**

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

[58] **Field of Search**.....69/6.5; 12/17 R

[56] **References Cited**

UNITED STATES PATENTS

3,233,438	2/1966	Hansen et al.	69/6.5
3,267,705	8/1966	Simmonds	69/6.5
3,518,851	7/1970	Boot et al.	69/6.5
3,559,428	2/1971	Babson	69/6.5
3,645,118	2/1972	Babson	69/6.5

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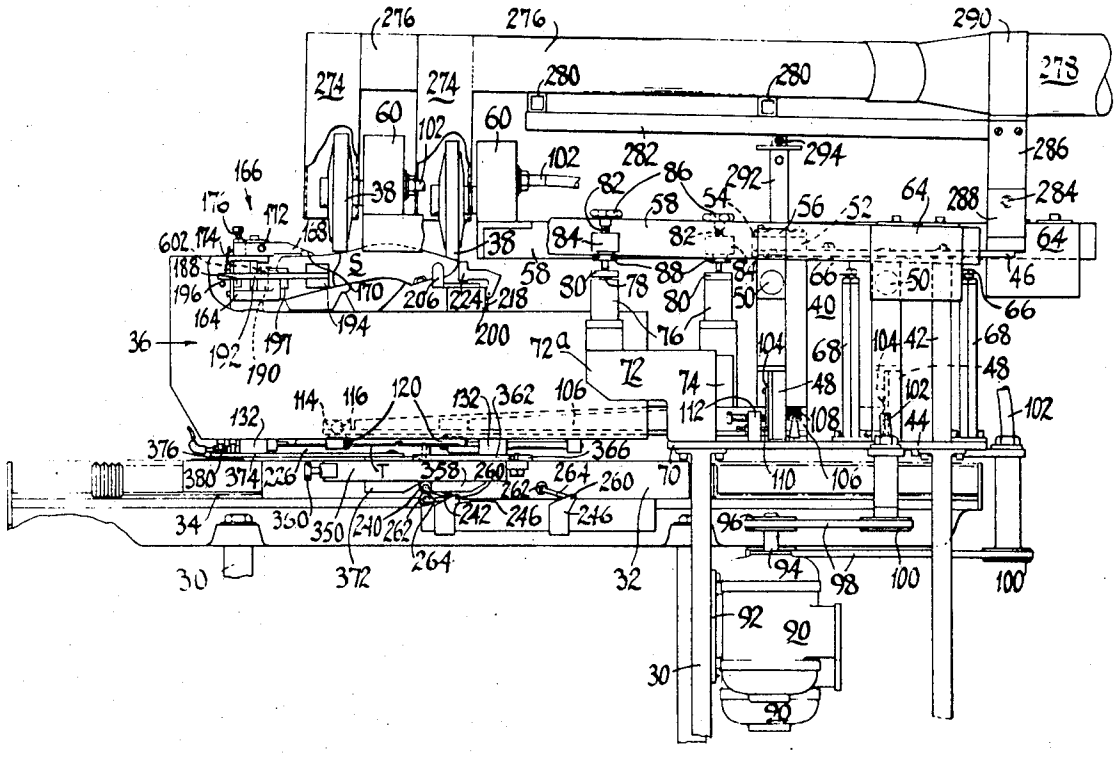
Attorney—Richard A. Wise et al.

[57] **ABSTRACT**

An apparatus for operating on shoe bottoms having a pair of rotatable tools, a shoe support, means for moving the shoe support in advancing and returning directions relative to the tools, and means for arresting movement of the shoe support in the returning direction to a predetermined extent.

14 Claims, 10 Drawing Figures



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SHEET 1 OF 8

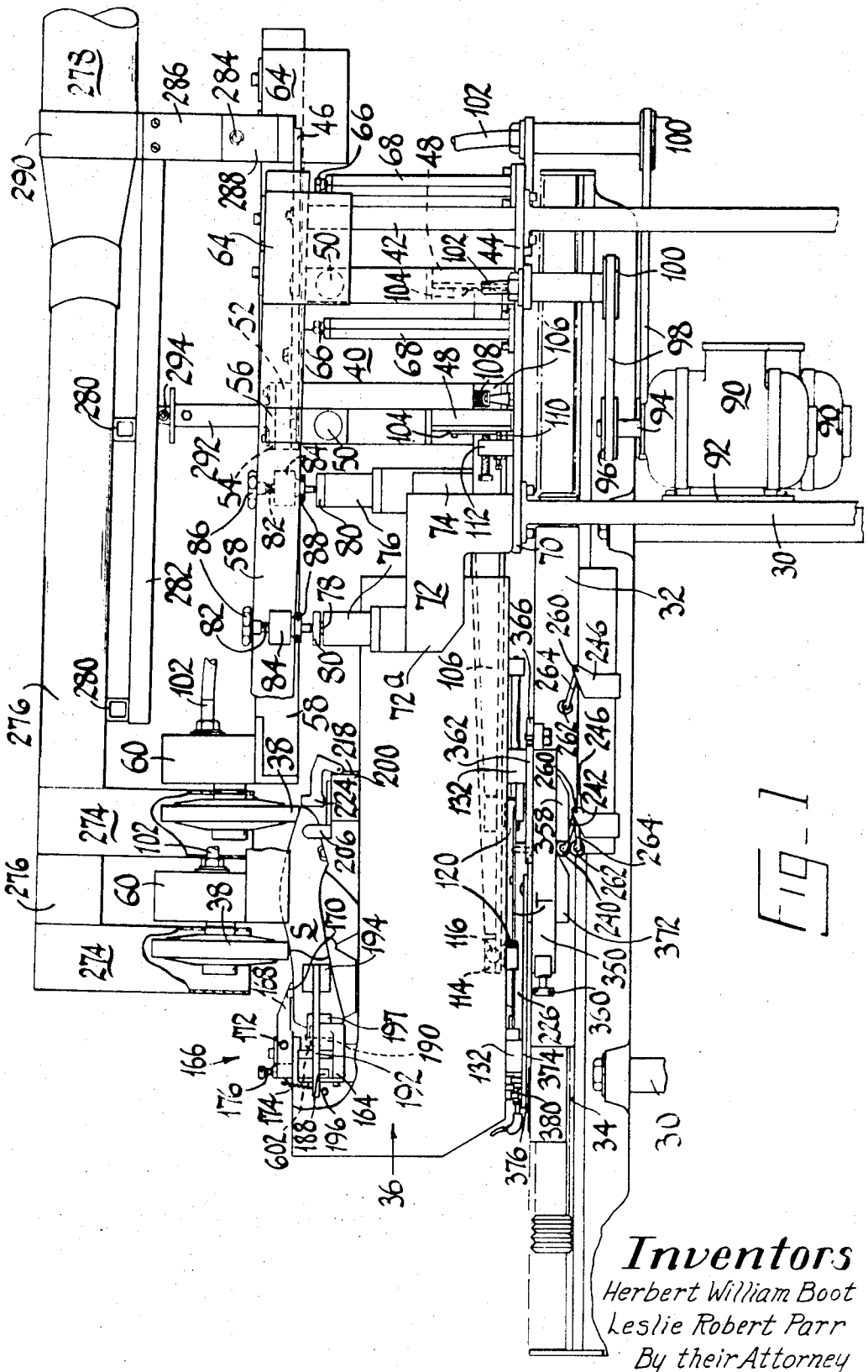

FIG. 1

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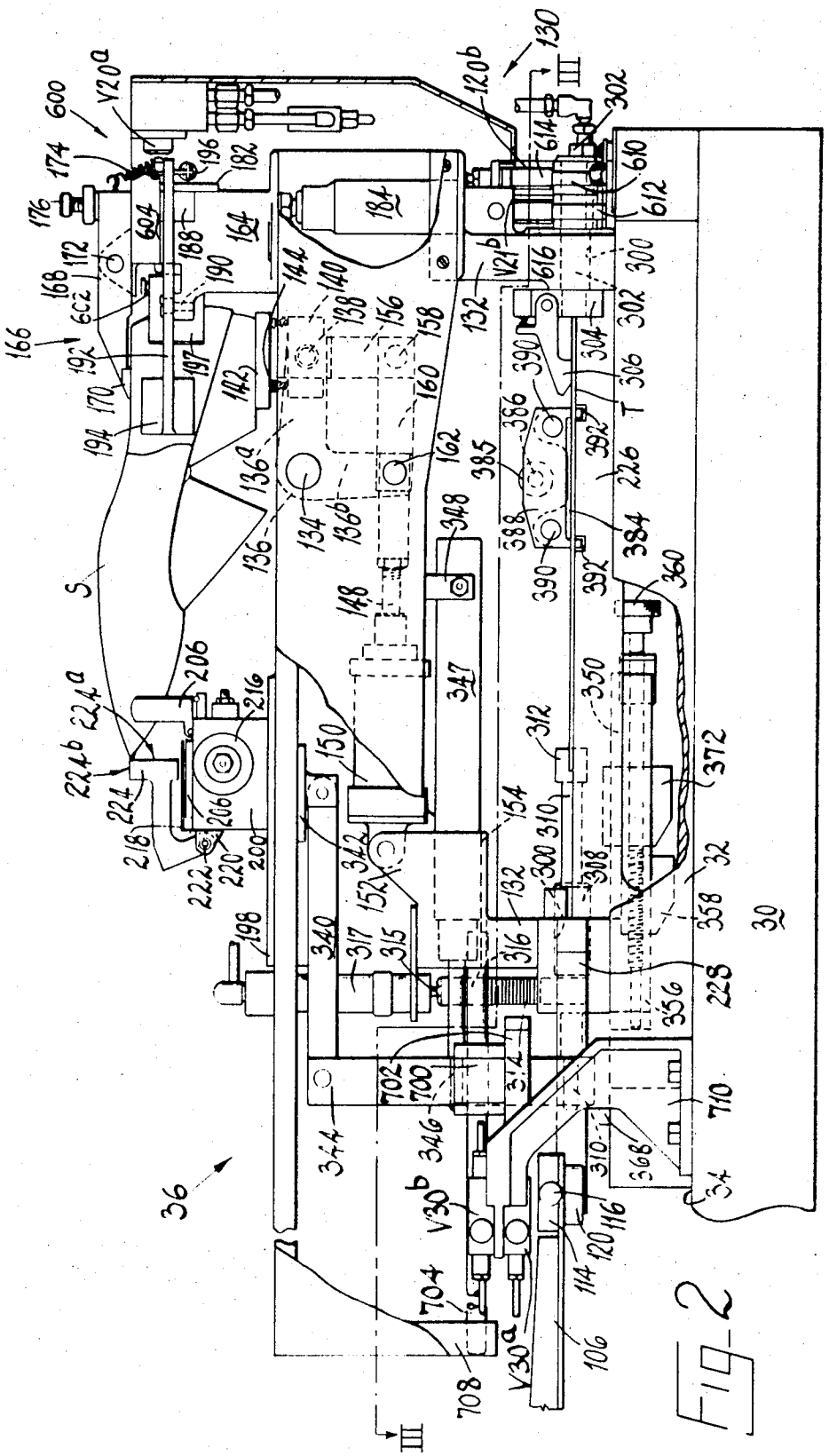
Leslie Robert Parr

By their Attorney

Cornelius A. Cleary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182
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164
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V21b
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168
172
190
144
140
138
156
158
132
302
166
192
197
142
160
390
304
306
T
170
194
136a
162
385
386
392
226
134
136b
348
388
384
136
390
392
360
S
148
347
350
206
216
312
372
224a
224b
150
154
224
206
310
218
220
200
222
342
152
300
308
32
198
340
317
315
316
132
358
30
356
228
702
700
710
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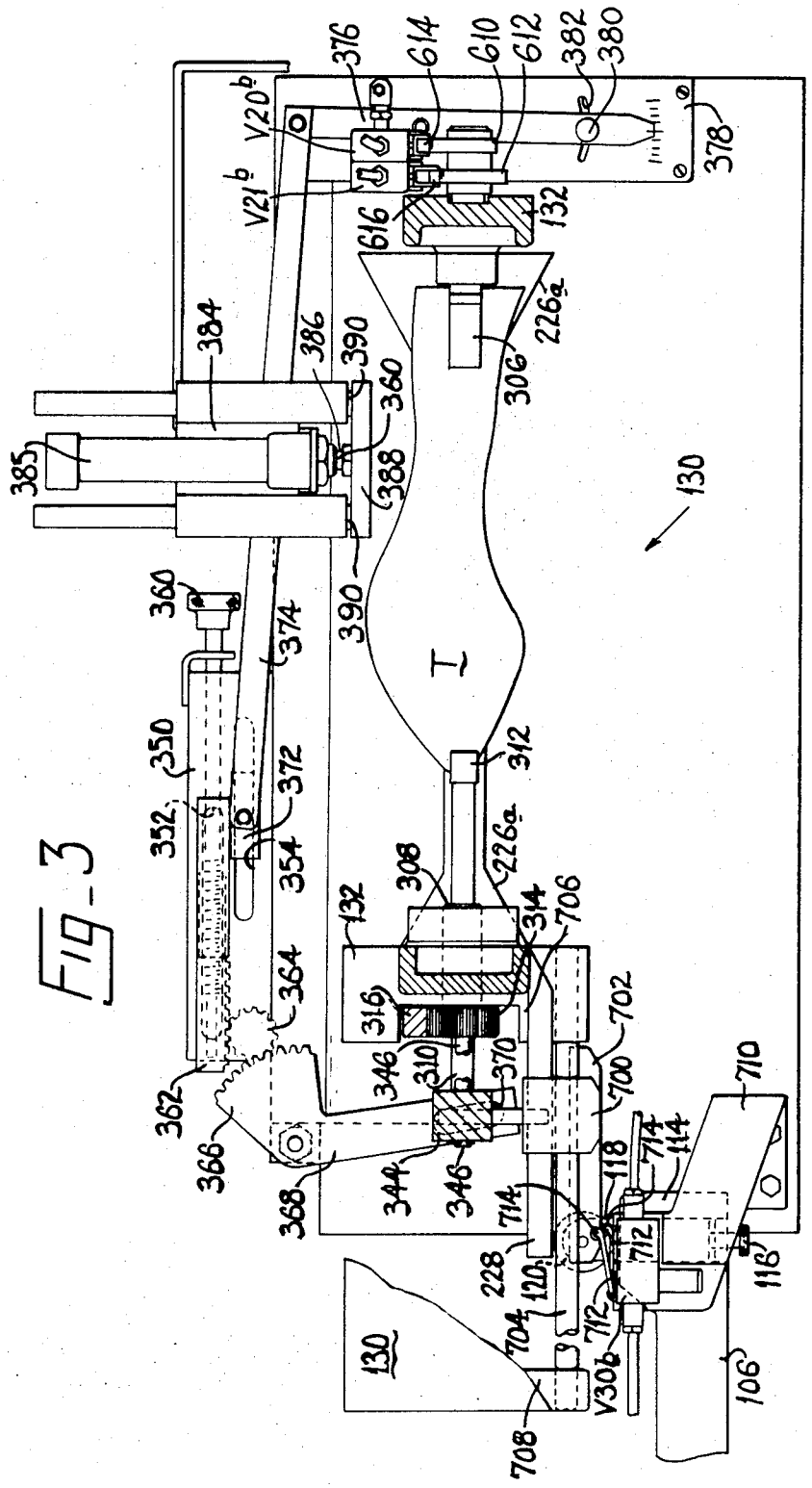
346
368
310
36
V30b
704
34
116
120
114
V30a
106
708
III

FIG. 2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V21b
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226a
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388
130
374
350
352
372
354
364
362
366
368
344
346
310
316
308
312
314
706
702
700
710
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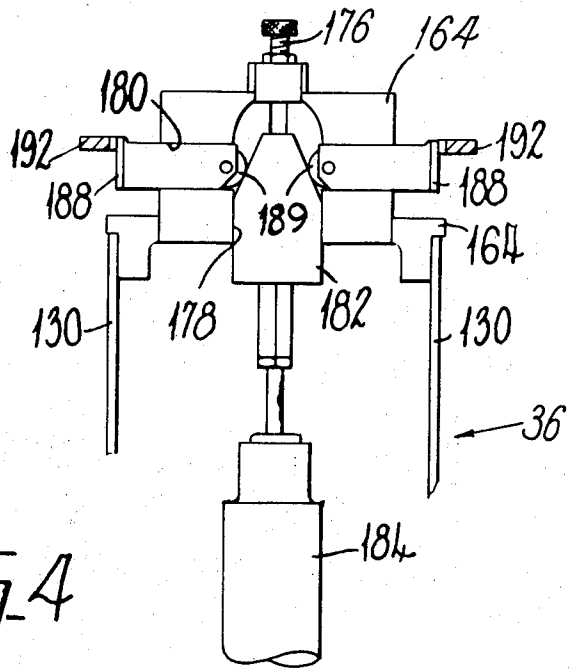
714
114
118
712
228
120
704
708
V30b
106

FIG-3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164
180
192
192
188
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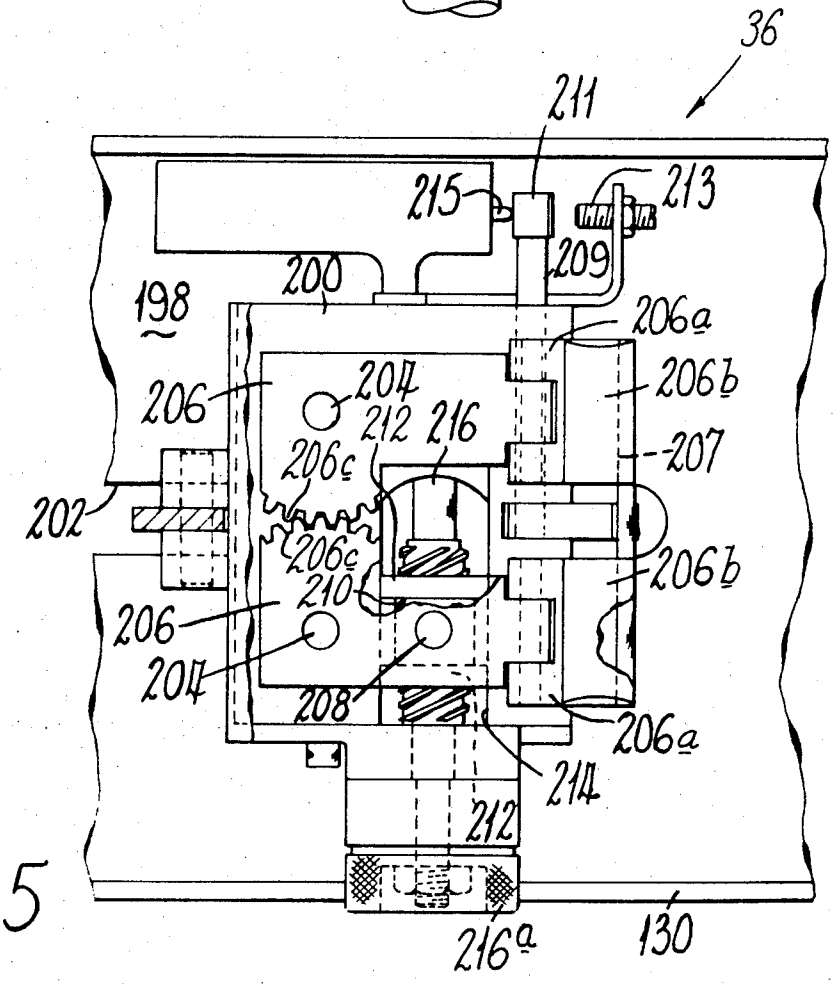
189
164
130
178
182
130
36
184

Fig-4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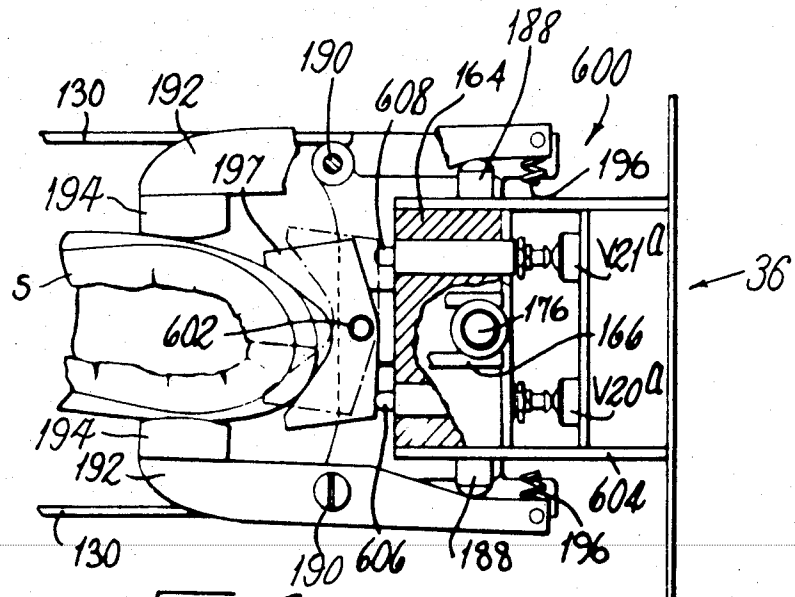
213
209
200
198
206a
206
204
206b
212
216
207
206c
202
206c
206b
210
206
204
208
206a
214
212
216a
130

Fig-5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V21a
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176
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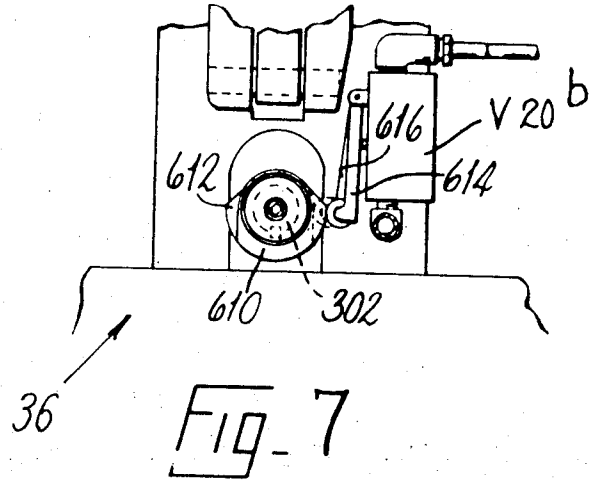
166
V20a
194
192
604
130
190
606
188
196

Fig. 6


V 20 b
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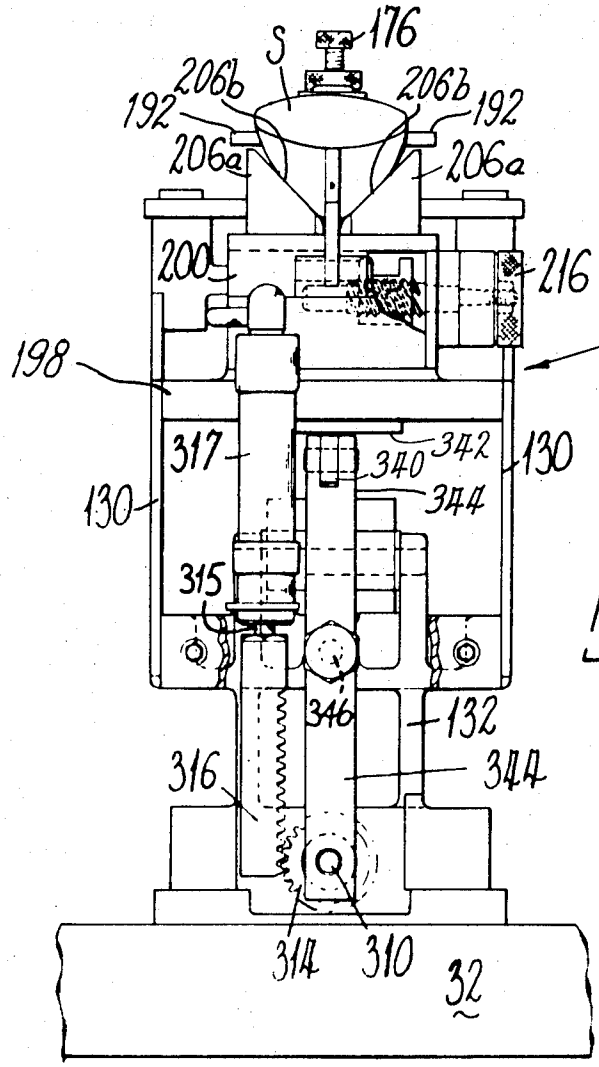
614
610
302
36

Fig. 7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176
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192
192
206a
206a
200
216
36
198
317
342
340
130
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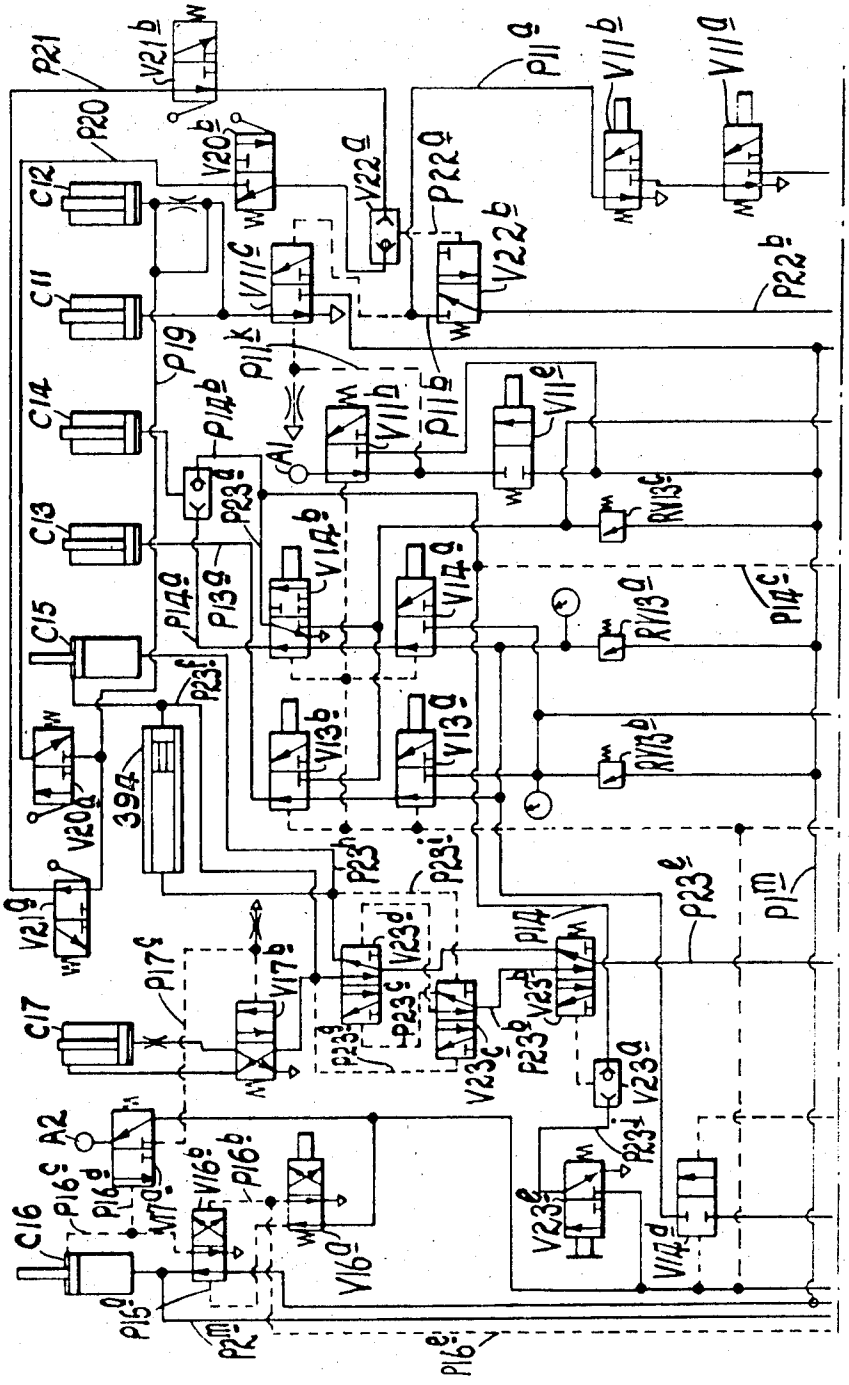
344
315
346
132
316
344
314
310
32

Fig. 8

FIG-9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P20
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C12
C11
C14
C13
C15
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P19
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P23f
P23g
V14b
V14a
V13b
V13a
394
V20a
V21a
P17c
V17b
P23h
P23i
P23j
V23d
V23c
P23k
V23b
P23b
V23a
P23l
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V11b
P11k
P11b
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P14
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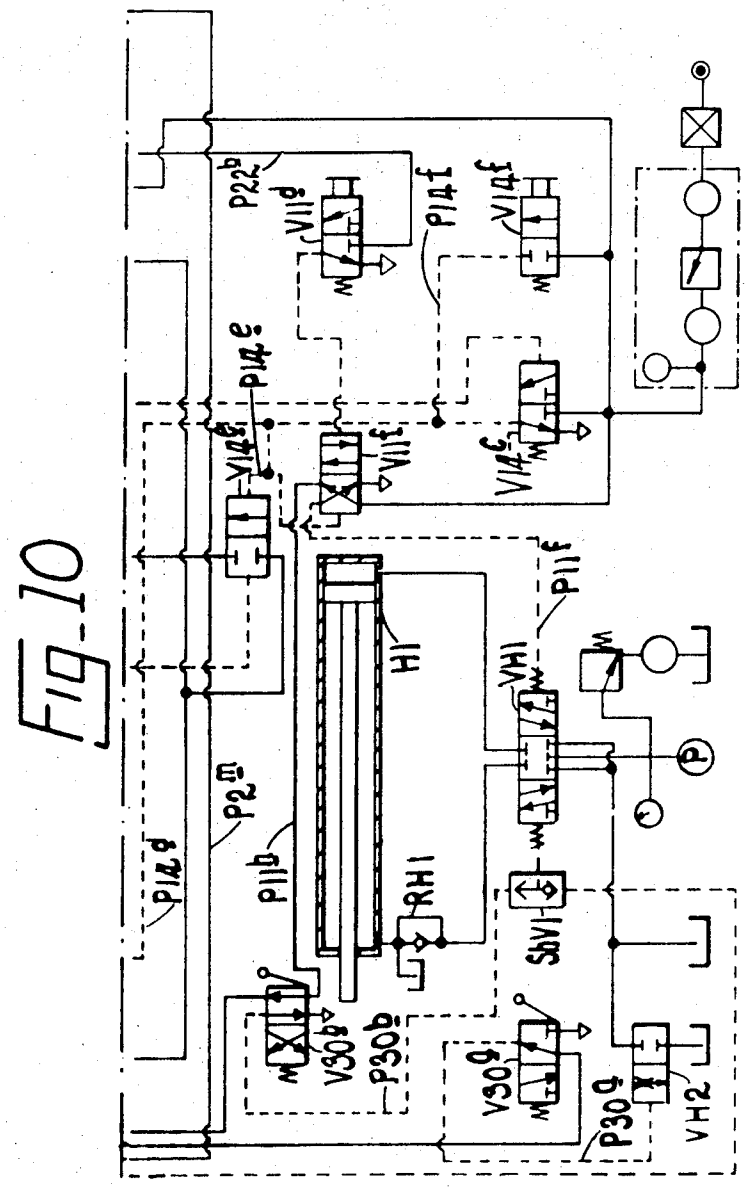
V11a
P11a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V111d
P114f
V114f
P114e
V114e
V111e
P111f
H1
VH1
P2m
P111b
P112d
RH1
SOV1
V308
P308
V309
P309
VH2

Fig. 10

AUTOMATIC BOTTOM ROUGHING MACHINE

BACKGROUND OF THE INVENTION

This invention is concerned with improvements in or relating to apparatus suitable for use in the manufacture of shoes, more especially apparatus suitable for use in operating on marginal portions of shoe bottoms. The term "shoe" is herein used generically as indicating outer footwear generally and as including portions or components of outer footwear as, for example, assembled uppers and the like, in the course of manufacture.

Various apparatus suitable for use in performing a roughing operation on marginal portions of shoe bottoms have been proposed, for example, in U.S. Pat. No. 3,233,438 issued Feb. 8, 1966 to P. T. Hansen et al, and U.S. Pat. No. 3,518,851 issued July 7, 1970 to H. W. Boot et al, the latter pertaining to a modification of the apparatus disclosed in the earlier patent. Each of the apparatus disclosed above comprises a shoe support in the form of a box-like structure for supporting, bottom uppermost, a last carrying a shoe upper, tool supporting means comprising two support arms, mounted for pivotal movement about horizontal and vertical axes for supporting two rotary roughing tools in the form of radial wire brushes, fluid pressure operated means for moving the shoe support in a path extending generally lengthwise of a shoe supported thereby beneath the tools supported by the tool supporting means, the tools being supported in tandem relation along the path of the shoe support, and means, including two sensing devices, one associated with each tool, arranged to cooperate with cam means in the form of a template supported by template supporting means associated with the shoe support, for moving the tools widthwise of the path of the shoe support when the shoe support is moved along its path, in the operation of the apparatus, whereby the tools are caused to operate progressively along opposite marginal portions of the bottom of a shoe supported by the shoe support.

In the operation of the apparatus referred to above, after the shoe support has moved in one direction along its path to carry a shoe supported thereby beneath the tools as aforesaid, it is then returned in an opposite direction along said path to a loading/unloading position which is the same for all styles and sizes of shoe. The arrangement is such that this position is determined in relation to the end portion located remote from the tool supporting means, viz. the heel end portion of a shoe supported by the shoe support. Since, however, this position is the same for all styles and sizes of shoe to be operated upon, and this means that the largest size of shoe has to be accommodated, there will be excessive travel of the shoe support when operating on a small-sized shoe. In the course of a working day a substantial time is thus taken up by such ineffective travel of the shoe support when operating on shoes less than the largest size.

It accordingly is one of the various objects of the present invention to provide an improved apparatus suitable for use in performing operations on marginal portions of shoe bottoms wherein operating time is utilized more efficiently than in previous apparatus.

BRIEF DESCRIPTION OF THE INVENTION

The invention provides apparatus suitable for use in operating on marginal portions of shoe bottoms comprising a shoe support, tool supporting means, means for effecting relative movement between the shoe support and the tool supporting means in one direction whereby, when the apparatus is in use, a tool supported by the tool supporting means is caused to operate progressively along a marginal portion of a shoe supported by the shoe support, and thereafter in an opposite direction, and includes novel means whereby such relative movement in an opposite direction can be appropriately arrested. The arrangement is such that, when the apparatus is in use, the effective position of the arresting means is set according to the position in the shoe support of the end portion, nearer to the tool supporting means, of a shoe supported by the shoe support.

More specifically, the present invention comprises an apparatus for use in advantageously performing a roughing operation along opposite marginal portions of bottoms of shoe uppers. The apparatus includes a shoe support for supporting, bottom uppermost, a last carrying a shoe upper, tool supporting means for supporting two rotary roughing tools and fluid pressure operated means for effecting movement of the shoe support, along a feed path extending generally lengthwise of a shoe supported by the shoe support. When the apparatus is in use, tools supported by the tool supporting means are caused to operate progressively along opposite marginal portions of the bottom of a shoe supported by the shoe support. Thereafter, the shoe support is moved in an opposite direction by the operating means. The apparatus also includes means for supporting a template selected according to the style of shoe to be operated upon, and sensing means for cooperating with a template supported by the template supporting means. The template supporting means is arranged beneath a shoe supported by the shoe support and is mounted for movement with the shoe support. The sensing means is operatively connected with the tool supporting means and comprises two rolls arranged to engage with opposite edges of a template supported as aforesaid, each roll being connected to a tool supported by the tool supporting means. The sensing means is thus effective, in cooperation with a template supported by the tool supporting means to control the tool supporting means so that the tools follow a path corresponding to the shape of the marginal portions of the bottom of a shoe supported by the shoe support, as the latter carries the shoe beneath the tools as aforesaid.

The apparatus for this invention further includes arresting means whereby movement of the shoe support in said opposite direction can be properly arrested. The arrangement is such that, when the apparatus is in use, the arresting means is set according to the position in the shoe support of the end portion, nearer to the tool supporting means, viz. the toe end portion, of a shoe supported by the shoe support. The arresting means of the apparatus may comprise a switch arrangement including a control valve for controlling the flow of pressure fluid to the fluid pressure operated means for moving the shoe support as aforesaid, and an actuator arrangement for said switch arrangement, the actuator

arrangement comprising an actuator member adjustably positioned on the shoe support in a position determined by the style and size of a selected template supported by the template supporting means. The switch and actuator arrangements of the arresting means are so positioned relative to one another that the control valve is arranged to be actuated by the actuator member, as the shoe support is moved in said opposite direction, when the toe end portion of a shoe supported by the shoe support has reached a "datum" line; with the toe end portion of the shoe at said "datum" line the shoe can be removed and a further shoe of similar size can be placed in the shoe support.

The apparatus may also include as an added feature decelerating means whereby movement of the shoe support in said opposite direction can be decelerated prior to being arrested as aforesaid. The decelerating means also may comprise a switch arrangement and an actuator arrangement therefor, the actuator arrangement comprising an actuator member secured to the switch actuator member for adjustment therewith, and the switch arrangement comprising a restrictor valve by which the flow of pressure fluid to said fluid pressure operated means for moving the shoe support is restricted.

The shoe support of the apparatus may include two devices by which opposite end portions, viz. the toe and heel end portions, of a shoe can be supported, the arrangement being such that the one of said devices by which the end portion, nearer the tool supporting means, as shown, the toe end portion, of a shoe can be supported, is mounted for adjusting movement relative to the other of said devices, viz. the heel end portion supporting device. The toe end portion supporting device of the shoe support is positionable or adjustable in the shoe support according to the size and style of a template supported by the template supporting means. When the apparatus is in use, the position of the toe end portion supporting device is adjusted at the same time as the switch arrangements of the arresting and decelerating means are positioned; a common locating arrangement may be provided for this purpose.

The construction and arrangement of the apparatus of the invention is such that the movement of the shoe support may be restricted to a minimum path length determined according to the size of shoe being operated upon. In this way excessive travel of the shoe support along the feed path may be minimized, thus insuring longer effective operating time in the course of a working day.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is hereinafter described with reference to the following drawings illustrating an embodiment of the apparatus of the invention in which:

FIG. 1 is a schematic front view in elevation, with portions broken away of the apparatus;

FIG. 2 is a schematic, rear view in elevation of parts of the illustrative apparatus showing the shoe support, template supporting means and locating arrangement of said apparatus;

FIG. 3 is a section taken along the line III—III of FIG. 2;

FIG. 4 is a fragmentary schematic end view of a heel clamp arrangement of the shoe support of the apparatus;

FIG. 5 is a fragmentary schematic top view of a toe end portion supporting device of the shoe support of the apparatus;

FIG. 6 is a fragmentary schematic plan view of a heel end portion supporting device of the shoe support and the shoe sensing arrangement thereof of said apparatus;

FIG. 7 is a fragmentary schematic end view of the template sensing arrangement of the illustrative apparatus;

FIG. 8 is a schematic end view of the shoe support and the template supporting means showing details of the template rotating means of the illustrative apparatus; and

FIGS. 9 and 10 together form a diagram of a fluid pressure control circuit of the illustrative apparatus.

GENERAL ARRANGEMENT

The illustrative apparatus, which is an apparatus suitable for use in performing a roughing operation on marginal portions of shoe bottoms in preparation for the attachment of outsoles thereto by means of cement, comprises a frame **30** (of which upstanding frame members are shown), see FIG. **1**, a table **32** mounted for sliding movement in a rectilinear path along an upper horizontal surface **34** of the frame **30** and carrying a shoe support generally designated **36** for supporting, bottom uppermost, a last carrying a shoe S to be operated upon, and means for mounting roughing tools in the form of two radial wire brushes **38** in tandem relationship along the path of movement of a shoe supported by the shoe support, so that in the operation of the illustrative apparatus the brushes **38** are caused to operate progressively along opposite marginal portions of the bottom of the shoe as the support **36** is moved as aforesaid.

BRUSH SUPPORTING MEANS

The brush supporting means of the illustrative apparatus comprises a column **40** (see FIG. **1**) and an upstanding support member **42** both mounted centrally of the apparatus on a plate **44** secured on the frame **30** and in turn supporting, at the upper ends thereof, a plate **46**. Mounted in bearings of pivotal movement in the plates **44, 46**, one at either side of the frame **30**, are two upstanding support members **48**, a left-hand one of said members (viewing FIG. **1**) being disposed forwardly of a right-hand one thereof and each member carrying a bracket **50** provided, at the upper end portion thereof, with a transverse pivot pin **52** on which is pivotally mounted a block **54**. Each block **54** has fixedly secured thereon, by means of an angle member **56**, an arm **58** carrying, at its left-hand end (viewing FIG. **1**), a reduction gear box **60** an output shaft of which is operatively connected with one of the radial wire brushes **38**, the mounting for the brushes **38** being such that they are readily removable from said shafts. At the opposite end of each arm **58** is secured a suitable counterweight **64**, each arm **58** being so pivoted on its pin **52** that when a brush **38** is supported thereby as aforesaid, the weight of the brush is sufficient to cause the arm to pivot in a counterclockwise direction (viewing FIG. **1**). When no brush is supported as aforesaid, the counterweight **64** causes the arm **58** to pivot in an opposite direction to an extent determined by an adjustable screw **66** carried at the upper end portion of an upstanding post **68** supported on the plate **44**, there

being one post 68 mounted at each side of the frame 30.

The left-hand end (viewing FIG. 1) of the plate 44 is formed with two integral projections 70, one at either side of the plate, on which are mounted supporting brackets 72, 74, the left-hand bracket 72 having a forwardly projecting portion 72*a*. Mounted on the forwardly projecting portion 72*a* and on the right-hand bracket 74 are cylinders 76 in each of which is accommodated, for sliding heightwise movement under air under pressure, a piston (not shown), the pistons and cylinders constituting left-hand and right-hand piston and cylinder arrangements C13 and C14 (FIG. 9). Each piston has a piston rod 78 which is provided with an enlarged head portion 80 arranged to be engaged by a lower end portion, of reduced diameter, of an adjustable screw 82. The screws 82 are mounted in threaded bores formed in blocks 84 brazed onto the arms 58, each screw being provided with a knob 86 to facilitate turning and with a knurled locknut 88 threaded thereon to cooperate with the block 84 to secure the screw 82 in adjusted position.

The brushes 38 of the illustrative apparatus are caused to rotate by means of two electric motors 90, the arrangement of only one of which is shown in FIG. 1. Each is mounted on supports 92 depending from the frame 30, a drive shaft 94 of each motor carrying a pulley 96 connected by means of a belt 98 with a pulley 100 supported on the frame 30 and connected through a flexible drive cable 102 to the gear box 60. The brushes are caused to rotate in such a manner that as they each operate along a marginal portion of a shoe bottom as aforesaid, when the illustrative apparatus is in use, they effect an inward wiping action on said marginal portion.

Each support member 48 of the illustrative apparatus has secured thereto, at its lower end portion, a plate 104 to which is secured an end portion of an elongated arm 106. The arms 106 are urged inwardly towards one another, i.e. about the axes of the members 48, by means of springs 108, inward movement of each arm being limited by engagement of the plate 104 with an adjustable stop screw 110 (one only shown in FIG. 1) mounted in a block 112 secured on the table 44. Mounted at the end portion, remote from the plate 104, of each arm 106 is a block 114 (see also FIGS. 2 and 3) which in turn supports a slide 118 (see FIG. 3) for sliding movement transversely of the block 114. An adjusting screw 116 is provided for effecting such movement of the slide. The slide 118 carries at an underside thereof a roll 120 which is arranged, when the illustrative apparatus is in use, to engage with an edge portion of a template T, as will hereinafter be described.

The illustrative apparatus is also provided with dust extracting means comprising two hoods 274 (FIG. 1) which are arranged over the brushes 38, the hoods being mounted at left-hand end portions of tubes 276 which are connected, at their rearward end portions, to a tube 278 in turn connected, by means of a flexible hose (not shown) to a dust extraction unit (not shown). The tubes 276 are supported on cross arms 280 secured on arms 282 mounted, for pivotal movement about a cross shaft 284, on a support bracket 286, the shaft 284 being supported in a bracket 288 mounted on the plate 46. The tube 278 is also supported on the bracket 286 by means of a clip 290. Also supported on the plate 46 is an upstanding post 298 at the upper end of which is carried a stop pin 294 for limiting pivotal movement of the arms 282 in an anticlockwise direction (viewing FIG. 1) and thus determining the lowermost position of the hoods 274.

SHOE SUPPORT

The shoe support 36 (FIGS. 1 and 2 and also 4-8) of the illustrative apparatus comprises a box-like structure 130 supported on two support members 132 secured to the table 32 (FIGS. 1 and 2). Supported between side walls of the structure 130 is a cross shaft 134 (FIG. 2) on which are supported, spaced apart, two bell crank levers 136 (FIG. 2) each having a substantially horizontal arm 136*a* and a depending arm 136*b*. Pivotally mounted on a shaft 138 supported between end portions of the arms 136*a* of the bell crank levers is a block 140 on which is supported a plate 142, forming part of a heel end portion supporting device of the shoe support 36. Four springs 144 are provided which act between the block 140 and the plate 142 to urge the latter upwardly. Supported by the arms 136*b* of the bell crank levers is a short shaft (not shown) to which is operatively connected one end of a piston rod 148 (FIG. 2) of a piston (not shown) accommodated in a cylinder 150 which is pivotally mounted on a block 152 fixedly secured to a plate 154 part of the structure 130, the piston and cylinder 150 constituting piston and cylinder arrangement C11 (FIG. 9). Supported on the shaft 138 are upper end portions of two links 156, spaced at either side of the block 140, the lower end portions of the links supporting a shaft 158 to which end portions of two links 160 are connected. Opposite end portions of the links 160 are supported on shafts 162 mounted in the side walls of the structure 130. The bell crank levers 136 and links 156, 160 are so arranged that, upon actuation of the piston and cylinder arrangement C11, the block 140 and plate 142 supported thereon are caused to move heightwise of the structure 130.

Mounted above the plate 142 on a block 164 (FIGS. 1, 2 and 4) secured on the structure 130 is a foot generally designated 166 and comprising two arms 168 supporting a transverse shoe engaging member 170. The arms 168 are mounted for pivotal movement about a pin 172 supported in the block 164 and are urged in a counterclockwise direction (viewing FIG. 1) by means of a spring 174 acting between the block and the arms, an adjustable stop screw 176 being mounted in the arms for limiting counterclockwise movement thereof. The block 164 is also provided with a vertical bore 178 (FIG. 4) opening into a transverse bore 180 formed therein. A plunger 182 constituted by a piston rod of a piston (not shown) accommodated in a cylinder 184, which is fixedly secured in the structure 130 (the piston and cylinder constituting piston and cylinder arrangement C12 (FIG. 9)), is slidable in the vertical bore 178 and two slide blocks 188, each carrying a roll 189 at its inward end portion, are mounted in the traverse bore 180, one at either side of the vertical bore 178. Mounted on the block 164, one at either side of the foot 166, for pivotal movement about pins 190, are two arms 192 (FIGS. 1, 2 and 6) each of which carries a

heel clamping member **194** in the form of a plate The ends of the arms **192** remote from the members **194** are connected by means of a spring **196** (FIGS. **1** and **6**) and thus the members **194** are urged away from one another, forward end portions of the arms **192** being arranged to engage with ends of the slide blocks **188** whereby to limit movement of the members **194** away from one another (FIG. **6**). Upon actuation of piston and cylinder arrangement C12, the plunger **182** is effective, through the rolls **189**, to cause sliding movement of the slide blocks **188** in the transverse bore **180** of the block **164** whereby to cause the arms **192** to pivot about the pins **190**. In this way the heel end portion of the shoe S positioned in the shoe support can be clamped by the members **194**.

The box-like structure **130** is also provided with a cover plate **198** (FIGS. **2** and **5**) on which a toe end portion supporting device, including a toe support block **200**, is mounted for sliding movement fore and aft, a guide slot **202** (FIG. **5**) being provided in the plate for the block. Supported on the upper surface of the block **200** are two shoe engaging members **206** mounted for pivotal movement about pins **204** mounted in the block **200** (FIG. **5**). Forward end portions of the members **206** carry support elements **206***a* (FIG. **8**) mounted for pivotal movement, about an axis extending transversely of the shoe support, and having inclined inwardly facing shoe engaging surfaces **206***b* (FIGS. **5** and **8**) which form a V for accommodating a toe end portion of the shoe placed, bottom uppermost, in the shoe support. Mounted on the block **200** beneath the elements **206***a* and spring urged into engagement with the under-surfaces thereof is a bar **207** (FIG. **5**) mounted for pivotal movement on a shaft **209** which extends transversely of the block **200** and projects therebeyond at one end. A depending arm **211** (FIG. **5**) is secured at the projecting end and is arranged to engage with a stop screw **213** secured on the block by means of a bracket, whereby to limit upward movement of the bar **207**, and to be swung, upon depression of the elements **206***a*, into engagement with a plunger **215** of a valve V11*a* (FIG. **9**) also mounted on the block.

One of said members **206** has mounted therein a depending pin **208** which projects into a groove **210** formed in an upper surface of a slide block **212** mounted in a channel **214** formed therefor in the block **200** (FIG. **5**). An adjusting screw **216**, provided with a knurled head **216***a*, is captive in the block and threadedly engaged in the slide block **212** so that rotation of the screw causes movement of the slide block in the channel **214** and thus also pivotal movement of the right hand member **206**. The members **206** are provided with rack portions **206***c* (FIG. **5**) which extend inwardly towards one another and intermesh so that pivotal movement of the right hand member is effective to cause pivotal movement of the left hand member to take place also. Thus the surfaces **206***b* of the two members **206** can be moved towards and away from one another by rotation of the screw **216**.

Also secured on the block **200** is an angle support member **218** (FIGS. **1** and **2**) formed with a lug portion **220** on which is pivotally supported, on a pin **222**, a toe end locating member **224** which extends forwardly over the block **200** and is provided with a flat toe end engaging face **224***a* (FIG. **2**). The member **224** is so constructed and arranged in relation to the brushes **38** of the illustrative apparatus that an upper face **224***b* (FIG. **2**) thereof is located slightly below the lowest position of the brushes **38** and provides a gauge for determining the heightwise position of the shoe to be operated upon.

The block **164** also supports a V-shaped shoe heel engaging member **197** (FIGS. **1**, **2** and **6**) forming part of a shoe heel locating device generally designated **600**, said heel clamp **197** being mounted for pivotal movement on a pin **602** (FIG. **6**) between two positions, a first of which is shown in full line and a second in chain-and-dot line in FIG. **6**. Supported in the block **164** adjacent the clamp **197** is a shoe sensing arrangement constituted by two shoe sensing devices comprising two plungers **606**, **608** (FIG. **6**) a first one, **606**, of which is depressed when the heel clamp is moved to its first position and a second one, **608**, of which is depressed when the heel clamp is moved to its second position. Both plungers **606**, **608** are urged towards the shoe (to the left, viewing FIG. **6**) by springs (not shown) mounted on the plungers and acting between them and the block **164**. The plungers are arranged, when depressed, to actuate pneumatic valves V20*a*, V21*a*, respectively. Thus when a left shoe is placed in the illustrative shoe support (as shown in FIG. **6**), the heel clamp is moved into its first position and thus, through the plunger **606**, valve V20*a* is actuated. Similarly when a right shoe is so supported, valve V21*a* is actuated.

TEMPLATE SUPPORTING MEANS

The illustrative apparatus also comprises means for supporting the template T beneath the shoe S supported by the shoe support **36**. Each support member **132** of the shoe support **36** is provided with a bore **300** (FIGS. **2** and **3**), located on an axis extending lengthwise of the support. Accommodated within the bore **300** formed in the right-hand support member **132** (viewing FIG. **2**) is a short shaft **302** which supports one end of a casting **226**, extending between the two support members, and also a support block **304**, formed integral with the casting, for a latch member **306** which is spring urged in a counterclockwise direction (viewing FIG. **2**), into engagement with a template T when one is placed in operating position, a slot being provided in said support block **304** for receiving a projecting portion of the template to facilitate accurate location of the latter. Accommodated within the bore **300** formed in the left-hand support member **132** (viewing FIG. **2**) is a sleeve **308** on which the other end of the casting **226** is supported and which supports a shaft **310** (FIG. **8**) accommodated within a channelled portion in the casting, the shaft **310** being provided at one end with a slotted nosepiece **312** for engaging with a notch formed in the template. The shaft **310** also has fixedly secured thereon a pinion **314** (FIG. **8**) which meshes with a vertical rack member **316** secured on a piston rod **315** which is movable heightwise of the shoe support and is accommodated with its piston (not shown) in a cylinder **317** (the piston and cylinder **317** constituting piston and cylinder arrangement C15). As will be hereinafter described in detail, heightwise movement

of the rack member **316** is effective to cause the casting **226**, and also the template T supported thereby, to be rotated about the axis of the bores **300**.

The casting **226** is provided at its ends with flared portions **226***a* (see FIG. **3**) which facilitate control of the rolls **120**, and thus of the brushes **38**, when these approach the template and shoe, in the operation of the apparatus, and also when the rolls run off the template after having tracked along opposite sides thereof. In addition, a guide member **228** is provided, secured to the left hand flared portion **226***a* (viewing FIG. **3**) and is arranged to be engaged by one of the rolls **120**, as shown in said figure, when the shoe support is in a loading position.

Mounted on an extended end portion, remote from the template, of the short shaft **302** are two cam members **610**, **612** (FIGS. **2**, **3** and **7**) forming part of two template sensing devices. When the template supporting means, and thus the template T, are in a first position, a first one **610** of said cam members causes a pivoted arm **614** to be depressed (as shown in FIG. **7**) to actuate valve V**20***b* and, when in a second position, a second one **612** of said members causes a pivoted arm **616** to be depressed to actuate valve V**21***b*. In the illustrative apparatus the template sensing devices are so arranged that when the template supporting means is in its first position the template T supported thereby is arranged to enable a roughing operation to be performed on a left shoe and in its second position on a right shoe.

TEMPLATE AND SHOE SENSING ARRANGEMENTS (AND TEMPLATE REVERSAL)

In operating the illustrative apparatus the operator first ensures that a selected template T corresponding in respect of size and style to the shoe to be operated upon is located in the template supporting means. In the illustrative apparatus, templates are exchanged when the casting **226** is in the position shown in FIG. **2**, that is, when the template supporting means is in its first position and thus the apparatus is set for an operation on a left shoe. The operator then places a shoe in the shoe support, the toe end portion thereof thus operating valve V**11***a* (see FIGS. **9** and **10**), and then operates manually operable valve V**11***b* to allow air under pressure to operate valve V**11***c*. Air from main pressure line P**1***m* thus passes through valve V**11***c* to piston and cylinder arrangements **C11** and **C12** whereby in sequence the plate **142** urges the shoe against the foot **166** and the arms **192** against the sides of the shoe.

Assuming that the shoe is a right, with the indicator **394** (FIG. **9**) indicating that the template is set for a "right" operation and with valve V**21***b* actuated by the cam **612**, engaging of the heel end portion of the shoe with the heel clamp **197** (FIG. **6**) causes the heel clamp **197** to be moved to its second position and thus causes valve V**21***a* to be actuated. Air under pressure is thus admitted, from the line leading to piston and cylinder arrangement **C12**, along line **P19**, through valve V**21***a*, along line **P21**, and through valve V**21***b* to shuttle valve V**22***a*. Air under pressure passing through valve V**22***a* operates pilot valve V**22***b* to allow air under pressure from valve V**11***b* to pass along line P**22***b* to valve V**11***d*. The illustrative apparatus is now ready for a cycle of operation to be performed upon manual operation of valve V**11***d* by the operator.

If the template T is set for a "left" operation, with valve V**20***b* operated as aforesaid, when a left shoe is placed in the shoe support, valve V**20***a* is also operated to allow air under pressure to pass from line **P19** along line **P20**, through valve V**20***b*, to shuttle valve V**22***a* and thus to enable pilot valve V**22***b* to be operated as aforesaid. If, however, the template is set for a "left" operation and a right shoe is placed in the shoe support or vice versa no air will be allowed to pass to valves V**22***a* and V**22***b* and thus valve V**11***d* will not operate to initiate a cycle of operation of the illustrative apparatus.

Towards the end of a cycle of operation of the illustrative apparatus, valve V**14***b* is tripped as the second brush **38** reaches the end of its traverse to cause the brush to be raised and also to cause the shoe support to return to its initial position; operation of valve V**14***b* also allows air under pressure to pass along line P**23***a* through shuttle valve V**23***a* to cause pilot valve V**23***b* to move from its position shown in FIG. **9** to allow air under pressure to pass therethrough along line P**23***b*, through valve V**23***c* and along line P**23***c* to pilot valve V**23***d* which is thus moved from its position shown in FIG. **9**. When, as described below, later in the cycle valve V**14***b* is re-set upon actuation of valve V**30***b*, along line P**23***d* through valve V**23***d* and along line V**23***f* to the upper end of piston and cylinder arrangement **C15** and the indicator **394**, thus to turn the template T through 180° and change the position of the indicator to indicate the opposite shoe. At the same time air from line P**23***f* passes along pilot line P**23***g* to valve V**23***c* to cause it to move to the right (viewing FIG. **9**) in readiness for the next cycle of operation of the illustrative apparatus.

In the next cycle of operation, the same sequence of operations takes place except that the valve V**23***c* is now positioned to allow air under pressure to cause valve V**23***d* to move back to its position shown so that air from line P**23***d* now passes along line P**23***h* to the lower end of piston and cylinder arrangement **C15** and to the indicator **394** and also along pilot line P**23***i* to move valve V**23***c* back to its position shown.

Thus for successive signals received from valve V**14***b* the template T is caused to be reversed through 180°. If, as above referred to, the template setting and a shoe placed in the shoe support do not correspond with one another, the template T is reversed by operation of manually operable valve V**23***e* which allows air under pressure to pass along line P**23***j* to valve V**23***a*.

It will thus be apparent that the illustrative apparatus is prevented, when the template T is in one setting, from operating on an opposite shoe, means being provided, however, whereby the template can be simply and quickly reversed so as not to impede longer than necessary the operation of the apparatus.

TOE END PORTION SUPPORTING DEVICE LOCATING FROM THE TEMPLATE

The illustrative apparatus also includes means whereby the block **200** of the toe end portion support device can be accurately located lengthwise of the shoe support by means of the template T positioned therebeneath. For this purpose a link **340** (FIGS. **2** and **8**) is connected at one end to a lug **342** formed on the undersurface of the block **200**, and, at the other, to an upper end of an upstanding arm **344** the lower end of

which receives a left-hand end portion, of reduced cross section, of the shaft **310**. Secured at an intermediate portion of the arm **344** is a piston rod **346** which is connected to a piston accommodated in a cylinder **347** (FIG. **2**) (the piston and cylinder constituting piston and cylinder arrangement **C16**), the cylinder **347** being supported, at its left-hand end (viewing FIG. **2**) on the plate **154** and at its right-hand end by brackets **348** secured to the side walls of the structure **130**. Thus on operation of the piston and cylinder arrangement **C16** the block **200** is moved along with the rod **310** with its nosepiece **312** for engaging template T. Movement of the block **200** towards the heel support is limited by engagement of the nosepiece **312** with the template whereby the block **200** is accurately located lengthwise of the shoe.

BRUSH PRESSURE VARIATION

Secured on the side of the table **32** is a block **350** (FIGS. **1** and **3**) including a pair of slots **352**, **354**. Mounted for sliding movement in the slot **352** is a support member **356** (FIG. **2**) for a cam member **358** (FIGS. **1** and **2**), an adjusting screw **360** being captive in the support member **356** and in the block **350** and threaded into the cam member **358** for adjusting the position of the latter relative to the support member **356**. The support member **356** is mounted on the under-surface of a rack member **362** (FIGS. **1** and **3**) slidable on the upper surface of the block **350** and arranged to mesh with a pinion **364** (FIG. **3**) supported on the block **350**. The pinion **364** is arranged to mesh with a gear segment **366** formed integral with one arm of a bell crank lever **368** pivotally mounted on the table **32**. The other arm of the bell crank lever **368** is provided with a slot **370** by which it is connected to the lower end portion of the arm **344**. Thus movement of the arm **344**, upon operation of the piston and cylinder arrangement **C16**, is further effective to cause the bell crank lever **368** to pivot and, through the gear segment **366**, pinion **364** and rack **362**, to move the support member **356** and cam member **358**, thus to position the latter according to the size of shoe to be operated upon. Arranged in the path of the cam member **358** and mounted on pins **260** which are secured in brackets **246**, are two rolls **262** (FIG. **1**). The rolls are supported on trip arms **264** pivotal movement of which under the influence of the cam member **358** is effective to operate, in sequence, valves V13*a* and V14*a* (FIG. **9**) which are effective, through piston and cylinder arrangements **C13** and **C14**, to cause control of the pressure applied by the brushes **38** to be switched from valve RV13*a* to valve RV13*b* whereupon the brushes are caused to exert increased pressure on the shoe bottom, as will be hereinafter described. The positioning of the cam member **358** as aforesaid, and thus the timing of the variation in pressure applied to the brush supporting arms **102** may be so arranged that, in an operation on a ladies' high heel shoe, when the highest region of the shoe bottom is reached by the brushes **38**, control of the pressure applied thereby is switched from valve RV13*a* to RV13*b*. Fine adjustment of such positioning for different styles of shoe is effected by the adjusting screw **360**. Alternatively, the variation in pressure may occur, in an operation on a so-called "flattie" shoe, when the heel seat portion of the shoe bottom is reached by the brushes.

In the other slot **354** formed in the block **350** is slidably mounted a second cam member **372** (FIGS. **1**, **2** and **3**) which is pivotally mounted at one end of a link **374** (FIG. **3**) the other end of which is connected to one end of a lever **376** (FIG. **3**) pivotally mounted on the upper surface of an extension of the table **32**. The other end of the lever **376** is in the form of a pointer which moves over a scale **378** (FIG. **3**), a clamping screw **380** and slot **382** being provided for securing the lever, and thus the cam member **372**, in adjusted position. In the path of the cam member **372** are arranged two rolls **240** (FIG. **1**) which are mounted on trip arms **242** arranged to pivot about pins (not shown, but coincident with the pins **260**) secured in the brackets **246**. Pivotal movement of the arms **242** under the influence of the cam member **372** is effective to operate in sequence, valves V13*b* and V14*b* (FIG. **9**) which, as hereinafter described, are effective, through piston and cylinder arrangements **C13** and **C14**, to cause control of the pressure applied by the brushes **38** to be switched from valve RV13*b* to valve RV13*c*, whereupon the brushes are raised out of shoe engaging position. Thus, by the setting of the cam member **372**, the timing of the lifting of the brushes **38** out of engagement with the shoe bottom is determined. In this way it is possible, for example, to select either an "all round" roughing operation or a "breast-line to breast-line" operation.

DECELERATING AND ARRESTING MEANS FOR DECELERATING AND ARRESTING RETURN MOVEMENT OF THE SHOE SUPPORT

The illustrative apparatus includes arresting means whereby the movement of the shoe support **36** to carry the shoe S from beneath the brushes **38** can be arrested, the shoe support **36** coming to rest at the end of a cycle of operation of the apparatus, in a loading/unloading position determined according to the style and size of shoe supported by the shoe support. In the operation of the illustrative apparatus, a "datum" line is established to which the end portion, nearer to the brushes **38**, of a shoe supported by the shoe support (viz. the toe end portion) is located when the shoe support **36** is in said position, regardless of the style and size of such shoe. To achieve this datum line, the loading/unloading position of the shoe support for any given style and size of shoe is determined with reference to the template T corresponding to said shoe.

Secured to the upstanding arm **344**, which forms part of the locating arrangement for locating the block **200** of the toe end portion supporting device, are two actuator members in the form of cam members **700**, **702** (FIGS. **2** and **3**) mounted one above the other. The upper cam member **700**, which forms part of the arresting means, is mounted for sliding adjusting movement, together with the arm **344**, along a rod **704** (FIG. **3**) secured at one end in a lug **706** formed on the left-hand support member **132** (viewing FIGS. **2** and **3**) and at the other end to an end plate **708** forming part of the structure **130**. The lower cam member **702**, which forms part of the decelerating means, is secured to the member **700** for adjusting movement therewith. Supported by a bracket **710** mounted on the frame **30** are two valves V30*a*, V30*b* arranged one above the other. Valve V30*a* forms part of the decelerating means and valve V30*b* part of the arresting means. The valves are

each provided with a trip arm **712** which carries a cam member engaging roll **714**, the rolls **714** of valves V**30***a* and V**30***b* lying respectively, in the paths of cam members **702** and **700**.

In the operation of the illustrative apparatus, as the shoe support is caused to return to its loading/unloading position, after a roughing operation has been performed on the bottom of a shoe supported thereby, firstly the cam member **702** engages and actuates valve V**30***a* to move it into its position shown in FIG. **10**, from which position it is urged by a spring when not engaged by the cam member. Actuating valve V**30***a* admits air under pressure from main line P**1***m* along a line P**30***a* to switch hydraulic valve VH2 from its shut-off position (shown in FIG. **10**) to a restricted bleed-off position, so that fluid under pressure from hydraulic pump P is bled off and thus causes deceleration of the shoe support to be effected.

As the shoe support continues its return movement the upper cam member **700** engages and actuates valve V**30***b* which is thus returned to its position shown in FIG. **10**. Actuating valve V**30***b* causes line P**30***b* to be exhausted and hydraulic valve VH1 is thus returned to a central, shut-off, position so that movement of the shoe support is arrested.

It will be appreciated that since the position of the upstanding arm **344** varies according to the style and size of the template T supported by the template supporting means, the position of the cam members **700**, **702** will also be thus varied. Since the datum line referred to above is determined by the actuation of valve V**30***b* (actuation of which causes the return movement of the shoe support to be arrested), it is apparent that the datum line is determined according to the particular template T carried by the template supporting means, said template being, of course, selected according to the style and size of shoe being operated upon.

TEMPLATE EJECTION

When it is desired to exchange one template for another, piston and cylinder arrangement C**16** is operated to cause the rod **310** to be withdrawn and template ejecting means is then brought into operation. This means includes a block **384** (FIGS. **2** and **3**) mounted on the frame **30** and supporting a cylinder **385** forming part of piston and cylinder arrangement C**17** the piston (not shown) of which is connected to a piston rod **386** carrying an ejector member **388**. Two rods **390** are connected to the ejector member and slidable in bores formed in the block **384** for guiding the ejector member **388** and grooves **392** (FIG. **2**) are formed in the casting **226** to allow the passage of depending portions of the member **388** during an ejection operation.

When the operator wishes to change templates, he first has to ensure that the template supported by the template supporting means is in a position on top of the casting **226** (as shown in FIG. **2**) so that it can be readily removed. For the template T to be in this position valve V**23***d* has to be shifted to the right (viewing FIG. **9**) from its position shown in that figure. (It will be appreciated that valve V**23***d* alternates between its two positions in successive cycles of the illustrative apparatus.)

Having established that the template is supported as desired, the operator operates treadle operated valve V**16***a* to allow air along pilot line P**16***b* to reverse valve V**16***b* and thus allow air from main line P**1***m* along lines P**16***c* and P**16***d* to reverse the flow of air to piston and cylinder arrangement C**16** and to operate valve V**17***a*. Operation of valve V**17***a* allows air from accumulator A**2**, which is pressurized through valves V**11***f* and V**30***b* from main line P**1***m*, along pilot line P**17***a* to operate valve V**17***b* whereby the flow of air to piston and cylinder arrangement C**17** is reversed and the ejecting means thus operated. When the air from the accumulator A**2** is exhausted, valve V**17***b* is returned to its position shown in FIG. **9** and the ejecting means is withdrawn. Operation of valve V**16***a* is also effective, through pilot line P**16***e* and shuttle valve ShV1, to operate three-position hydraulic valve VH1 to move it to the right (viewing FIG. **10**) from its central position. In this way, hydraulic fluid is admitted from pump P through said valve VH1 to the left hand end (viewing FIG. **10**) of piston and cylinder arrangement H1 thus to cause the shoe support to be moved to the limit of travel thereof away from the tool supporting means. Thus the largest size of template can be accepted in the template supporting means.

OPERATION

A cycle of operation will now be described with particular reference to FIGS. **9** and **10**.

Conveniently in a cycle of operation of the illustrative apparatus, the operator first ensures that a correct template T is mounted in the template supporting means and that such template is correctly oriented according to whether the apparatus is set for a next operation to be performed on a left or right shoe, as indicated by the indicator **394**. If the template does not match the shoe next to be operated upon, it is ejected by the template ejecting means and replaced, as above described.

When the shoe support is in its loading/unloading position, valve V**30***b* is held in the position shown in FIG. **10** and thus allows air under pressure from main line P**1***m* via valve V**11***f* to pass along line P**30***c*, through valve V**16***a* and along line P**16***a* to hold valve V**16***b* in its position shown in FIG. **9** whereby air under pressure is allowed to pass therethrough to the lower end of piston and cylinder and arrangement C**16** and also into line P**2***m*. The operator also ensures that regulator valves RV**13***a*, RV**13***b* and RV**13***c* are correctly adjusted to the desired pressures.

The operator then takes the shoe and places it, bottom uppermost, with its toy in the V formed by the elements **206***a* of the toe support and with its heel on the plate **142**. As stated above, placing the toe of the shoe causes valve V**11***a* to operate to allow air from line P**2***m* therethrough to manually operable valve V**11***b* which the operator actuates when the shoe has been positioned in the shoe support. Operation of valve V**11***b* allows air to pass through pilot line P**11***a* to operate valve V**11***c* and also along line P**11***b*. Operation of valve V**11***c* allows air to pass to piston and cylinder arrangements C**11** and C**12** whereby in sequence the plate **142** urges the shoe against the foot **166** and the side clamps clamp the shoe. If the shoe is not correctly positioned, release valve V**11***e* is manually operated

which allows air from main line P1*m* to pass along line P11*k* to return valve V11*c* and thus piston and cylinder arrangements C11, C12 to their positions shown in FIG. 9.

As above described, if the template orientation matches the shoe place in the shoe support, air under pressure passes through the shuttle valve V22*a* along pilot line P22*a* and switches valve V22*b* from its position shown in FIG. 9 to allow air under pressure from line P11*b* along line P22*b* to operate valve V11*d*.

With the shoe correctly positioned valve V11*d* is operated manually to allow air through pilot line P11*d* to operate valve V11*f*. Operation of valve V11*f* allows air along pilot line P11*f* to hydraulic valve VH1, operation of which is effective to initiate movement of the table 32 to carry the shoe supported thereon beneath the brushes 38. At this time valves V13*a*, V13*b*, V14*a* and V14*b* are in positions shown in FIG. 9 with air passing therethrough from regulator valve RV13*a* along lines P13*a*, P14*a*, respectively, to piston and cylinder arrangements C13, C14. Thus the brushes 38 are being supported by the arrangements C13, C14 at a pressure regulated by valve RV13*a*. When the shoe support moves from the loading/unloading position, valve V30*b* is released and moves to the right from the position shown in FIG. 10. This causes valve V11*h* also to move from its position shown in FIG. 9 whereby air is admitted to accumulator A1.

As the shoe support 36 moves beneath the brushes progressively, firstly the cam member 358 operates valve V13*a* whereby air from regulator valve RV13*b* is then caused to pass through valve V13*b* and line P13*a* to piston and cylinder arrangement C13, and thereafter valve V14*a* is similarly operated, air from regulator valve RV13*b* passing through valve V14*b* and line P14*a* to piston and cylinder arrangement C14. After further movement of the shoe support valve V13*b* is operated by the cam member 372 whereby air under high pressure is passed from regulator valve RV13*c* along line P13*a* to piston and cylinder arrangement C13 to lift the brush out of engagement with the shoe bottom. Similarly the second brush is lifted when the cam member 372 operates valve V14*b* and air thus passes along line P14*b* to piston and cylinder arrangement C14.

Operation of valve V14*b* is also effective to allow air to pass along pilot line P14*c* to operate valve V14*c* whereby air from main line P1*m* passes along pilot lines P14*d*, P14*e*, P14*f* to operate valves V14*d*, V14*e* and to return valve V11*f* to its position shown in FIG. 10. Operation of valve V11*f* as aforesaid is effective to admit air under pressure along line P11*h*, through valve V30*b* (which is held by the cam in its position as shown in FIG. 10 when the shoe support is in its loading/unloading position but is moved to the right by a spring when the shoe support moves out of said position), and along line P30*b*, through the shuttle valve ShV1, to the left-hand end of valve VH1. Valve VH1 is thus moved to the right, line P11*f* being exhausted upon switching valve V11*f*, and fluid under pressure is admitted to the left-hand end of piston and cylinder arrangement H1, thus to return the shoe support to its loading/unloading position. Also, as set out above, operation of valve V14*b* is effective to set up a circuit for the reversal of the template through 180°

The movement of the shoe support is thus reversed, its return movement being at a faster speed than its movement to carry the shoe S beneath the brushes as aforesaid, which latter movement is restrained by means of a restrictor arrangement generally designated RH1 connected to the left hand end of piston and cylinder arrangement H1.

As the shoe support is caused to return, the cam member 702 engages and actuates valve V30*a* to move it into its position shown in FIG. 10, from which position it is urged by a spring when not engaged by the cam member. Actuating valve V30*a* admits air under pressure from main line P1*m* along a line P30*a* to switch hydraulic valve VH2 from its shut-off position (shown in FIG. 10) to a restricted bleed-off position, so that fluid under pressure from hydraulic pump P is bled off and thus causes deceleration of the shoe support to be effected.

As the shoe support continues its return movement the upper cam member 700 engages and actuates valve V30*b* which is thus returned to its position shown in FIG. 10. Actuating valve V30*b* causes line P30*b* to be exhausted and hydraulic valve VH1 is thus returned to its central shut-off position so that movement of the shoe support is arrested. Actuation of valve V30*b* is also effective to return valves V13*a*, V13*b*, V14*a*, V14*b*, V14*d*, V14*e* and V11*h* to their positions shown in FIGS. 9 and 10. Operation of valve V11*h* allows air from accumulator A1 through pilot line P11*k* to return valve V11*c* to its position shown in FIG. 9 and thus to exhaust piston and cylinder arrangements C11, C12 to release the shoe. Operation of the other four valves is effective to allow air from regulator valve RV13*a* once more to pass to piston and cylinder arrangements C13, C14. Return of valve V14*b* to its position shown is also effective to cause valve V23*b* to be returned to its position shown in FIG. 9 so that the flow of air to piston and cylinder arrangement C15 is reversed. The template T is thus rotated through 180°. In addition the indicator 394 is switched to indicate that the opposite shoe is next to be operated upon.

If at any time in a cycle of operation of the illustrative apparatus the operator wishes to curtail the operation, he operates manual return valve V14*f* which causes valves V14*d*, V14*e* and V11*f* to be operated to return the shoe support to its loading/unloading position and also ensures, through valves V14*d* and V14*e*, that air from regulator valve RV13*c* is admitted to piston and cylinder arrangements C13, C14 and that the brushes 38 are thus raised out of engagement with the shoe bottom.

It will thus be appreciated that using the illustrative apparatus, left and right shoes are operated upon alternately, such operation being controlled by means of the template, which is selected according to the style and size of the shoe being operated upon. It will also be appreciated that, when the illustrative apparatus is in use and a newly selected template has been positioned as aforesaid in the template supporting means, in the first subsequent cycle of operation the shoe support will start from a left-hand position (viewing FIG. 1) as far remote from the brushes as the construction of the illustrative apparatus allows, but thereafter is caused to return under the operation of valve V30*b* to a loading/unloading position determined, through the locating ar-

rangement aforementioned, according to the style and size of a template T supported by the template supporting means. Since the locating arrangement is also effective to locate the toe end portion supporting device of the shoe support, it will be appreciated that the loading/unloading position, at which the return movement of the shoe support is arrested, is set according to the position in the shoe support of the end portion, nearer to the brush supporting means, (viz. the toe end portion) of a shoe S supported by the shoe support.

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

1. Apparatus for use in operating on marginal portions of shoe bottoms comprising a shoe support, tool supporting means, means for effecting relative movement between the shoe support and the tool supporting means in one direction whereby, when the apparatus is in use, a tool supported by the tool supporting means is caused to operate progressively along a marginal portion of a shoe supported by the shoe support, and thereafter in an opposite direction, and means whereby such relative movement in the opposite direction can be arrested, the arresting means being adjustable to operate relative to the position of the end portion of the shoe nearer to the tool supporting means.

2. Apparatus according to claim 1 further including means for supporting a template, and sensing means for cooperating with the template supported by a template supporting means, the template supporting means cooperative with the shoe support and being operatively connected to the tool supporting means to control the tool supporting means so that a tool supported thereby follows a path corresponding to the shape of a marginal portion of the bottom of a shoe supported by the shoe support and operates progressively along said marginal portion.

3. Apparatus according to claim 2 wherein the arresting means comprises a switch arrangement and an actuator arrangement therefor which are positioned relative to one another according to the size and style of a template supported by the template supporting means.

4. Apparatus according to claim 3 wherein the actuator arrangement comprises an actuator member positioned on the shoe support in a position determined by the style and size of a template supported by the template supporting means.

5. Apparatus according to claim 3 wherein the switch arrangement comprises a control valve by which is controlled the means for effecting relative movement between the shoe support and the tool supporting means.

6. Apparatus according to claim 2 including decelerating means whereby relative movement in the opposite direction between the shoe support and the tool supporting means can be decelerated prior to being arrested.

7. Apparatus according to claim 6 wherein the decelerating means comprises a switch arrangement and an actuator arrangement therefor which are positioned relative to one another according to the style and size of a template supported by the template supporting means.

8. Apparatus according to claim 7 wherein the actuator arrangement comprises a actuator member positioned on the shoe support in a position determined by the size and style of a template supported by the template supporting means.

9. Apparatus according to claim 6 wherein the means for effecting relative movement between the shoe support and the tool supporting means is fluid pressure operated and a switch arrangement for the decelerating means is included which comprises a restrictor valve by which the flow of pressure fluid to said fluid pressure operated means is restricted.

10. Apparatus according to claim 2 wherein the shoe support includes two devices by which opposite end portions of a shoe can be supported, and the one of said devices by which the end portion, nearer to the tool supporting means of a shoe is supported, is mounted for adjusting movement relative to the other of said devices, said one device being positioned in the shoe support according to the size and style of a template supported by the template supporting means.

11. Apparatus according to claim 10 wherein the shoe support is movable relative to the tool supporting means along a path extending generally lengthwise of a shoe supported by the shoe support.

12. Apparatus suitable for use in operating on marginal portions of shoe bottoms comprising a shoe support, tool supporting means, means cooperating with the shoe support for supporting a template selected according to the style of shoe to be operated upon, sensing means operatively connected to the tool supporting means for cooperating with a template supported by the template supporting means, and means for effecting movement of the shoe support and the cooperating template supporting means relative to the tool supporting means, relative to the sensing means, in one direction, along a path extending generally lengthwise of a shoe supported by the shoe support whereby a tool supported by the tool supporting means operates progressively along a marginal portion of the bottom of a shoe supported by the shoe support, and for thereafter moving said shoe support in an opposite direction, and means for arresting movement of the shoe support moving in said opposite direction at a point in the path selectable according to the size and style of a template supported by the template supporting means.

13. Apparatus according to claim 2 wherein a pair of tools supported by the tool supporting means are caused to operate progressively along opposite marginal portions of the bottom of a shoe supported by the shoe support.

14. Apparatus according to claim 13 wherein the tools are rotary wire brushes, supported by the tool supporting means.

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