April 26, 1955 B. JORGENSEN 2,706,823

LASTING MACHINES

Filed Oct. 10, 1950 8 Sheets-Sheet 1

Fig.1

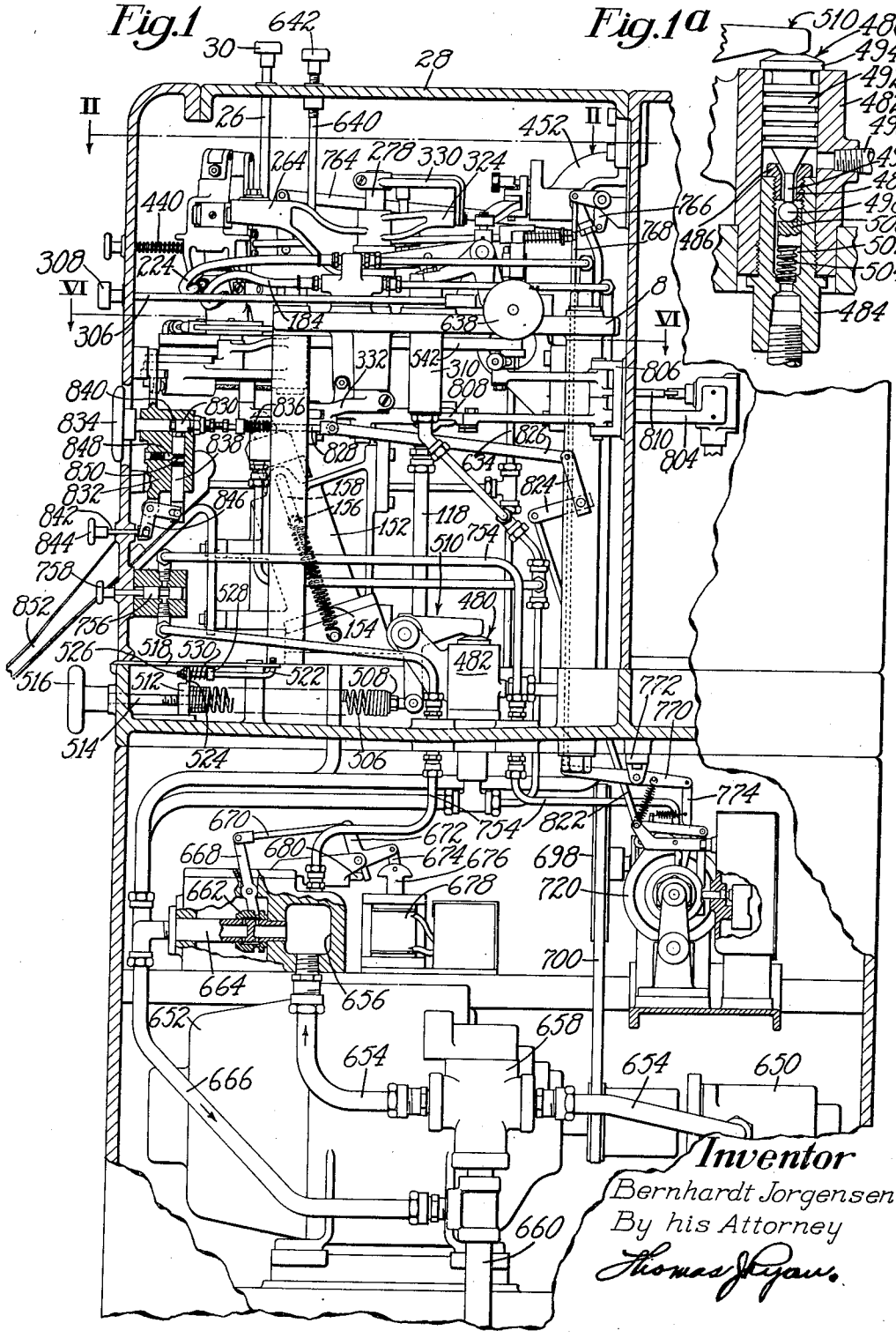


Fig.1a

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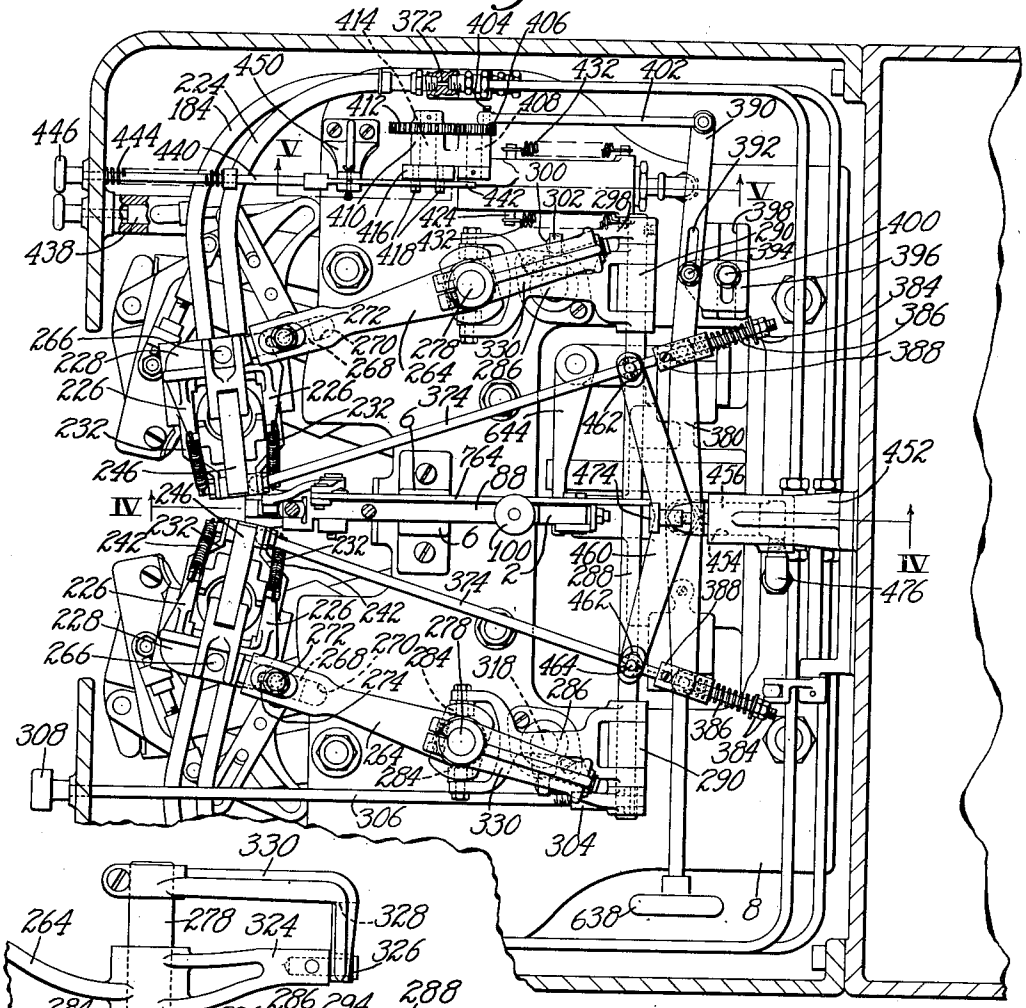
Thomas Hayes

April 26, 1955 B. JORGENSEN 2,706,823

LASTING MACHINES

Filed Oct. 10, 1950 8 Sheets-Sheet 2

Fig. 2



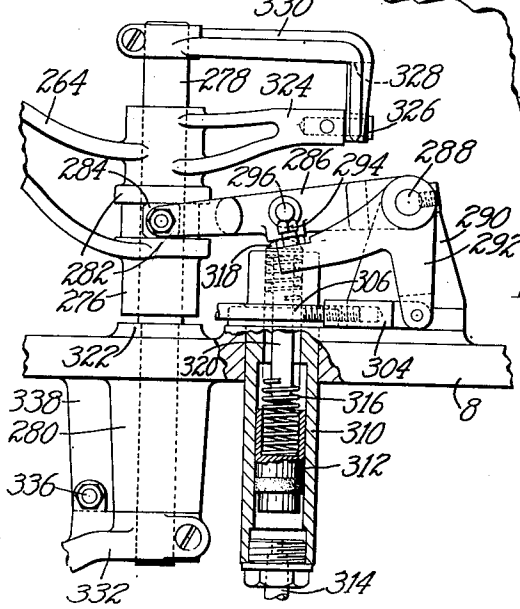


Fig. 3

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April 26, 1955 B. JORGENSEN 2,706,823

LASTING MACHINES

Filed Oct. 10, 1950 8 Sheets-Sheet 3

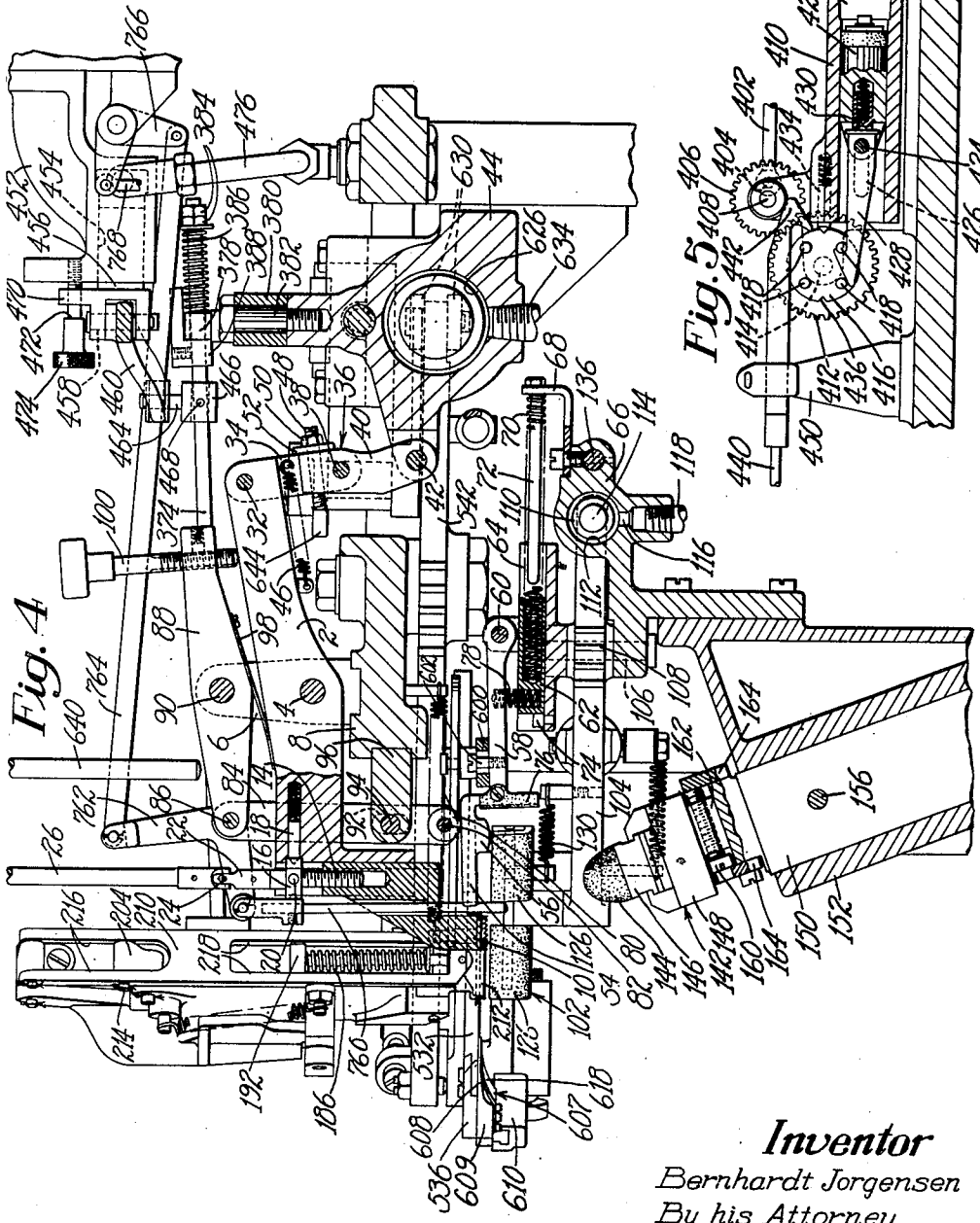


Fig. 4

Fig. 5

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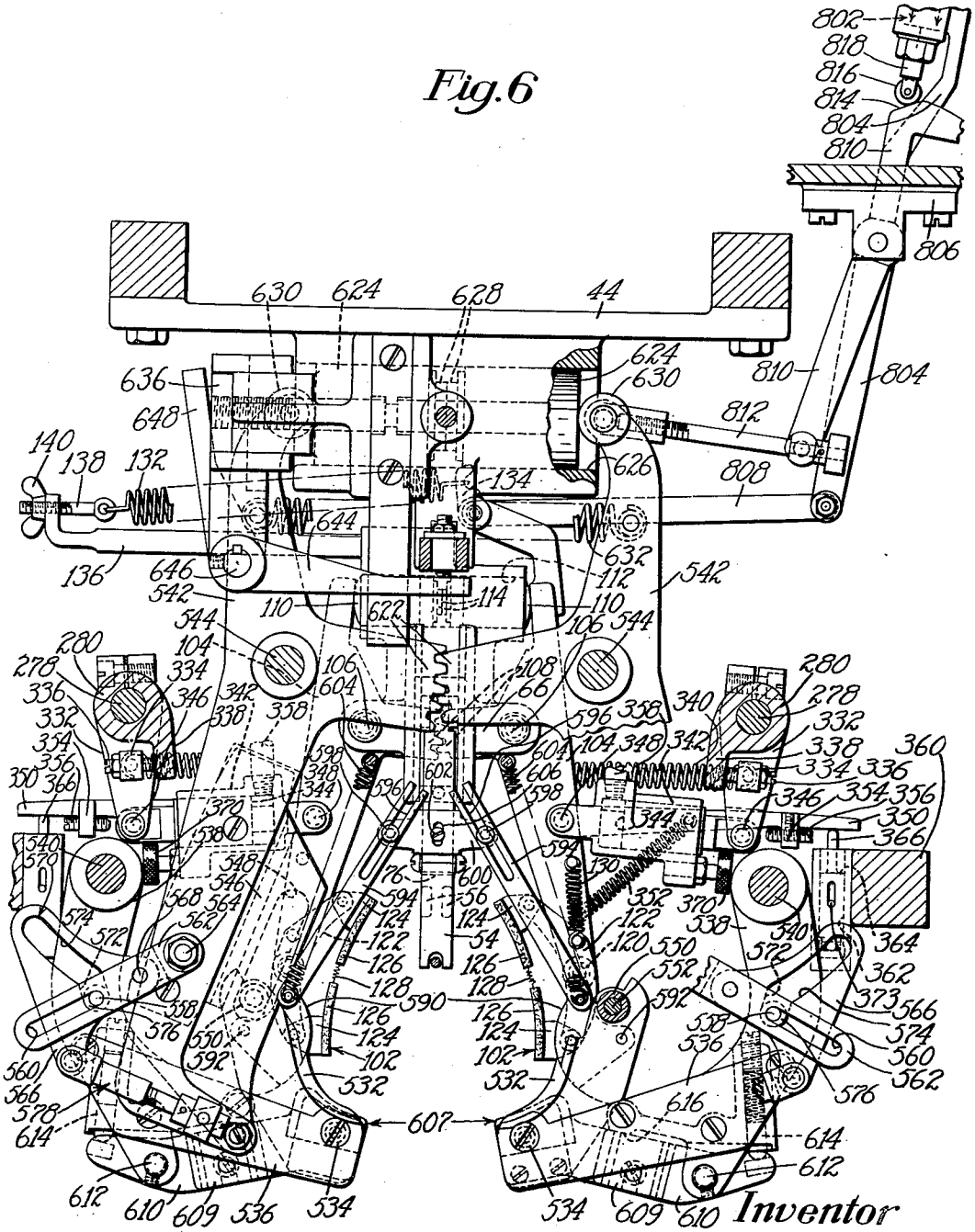
April 26, 1955 B. JORGENSEN 2,706,823

LASTING MACHINES

Filed Oct. 10, 1950

8 Sheets-Sheet 4

Fig. 6



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April 26, 1955 B. JORGENSEN 2,706,823

LASTING MACHINES

Filed Oct. 10, 1950 8 Sheets-Sheet 5

Fig. 7

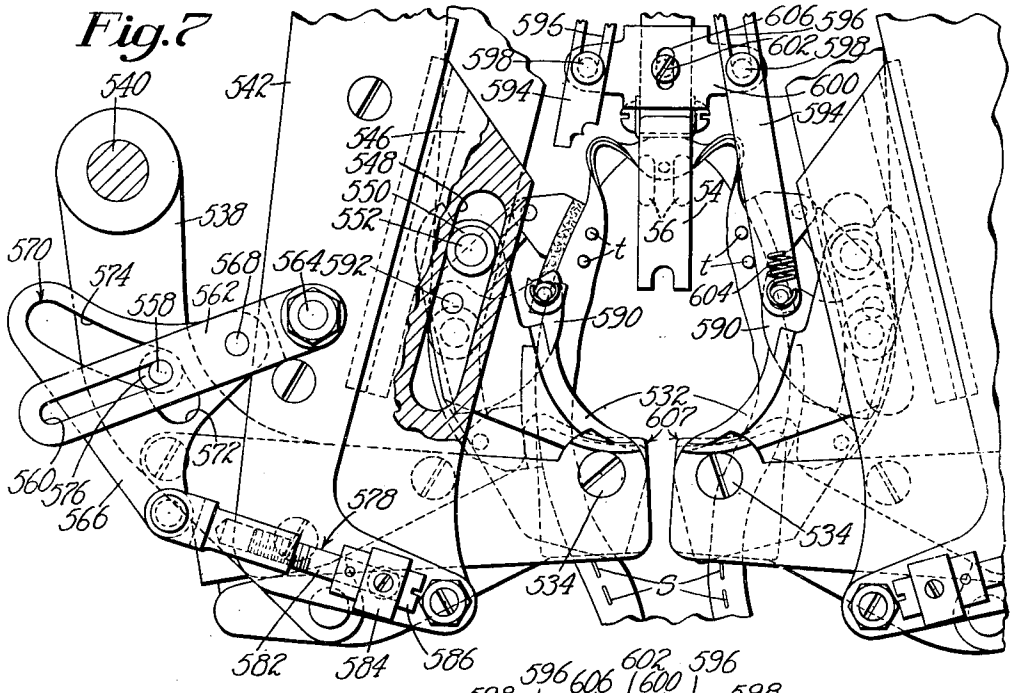
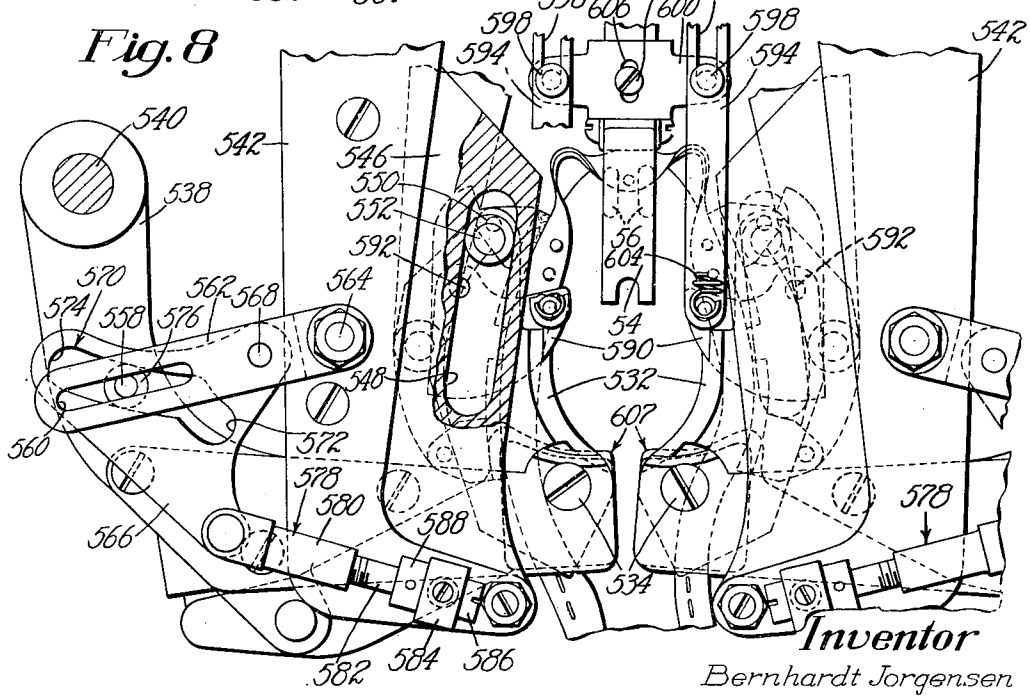


Fig. 8



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April 26, 1955 B. JORGENSEN 2,706,823

LASTING MACHINES

Filed Oct. 10, 1950 8 Sheets-Sheet 6

Fig. 9

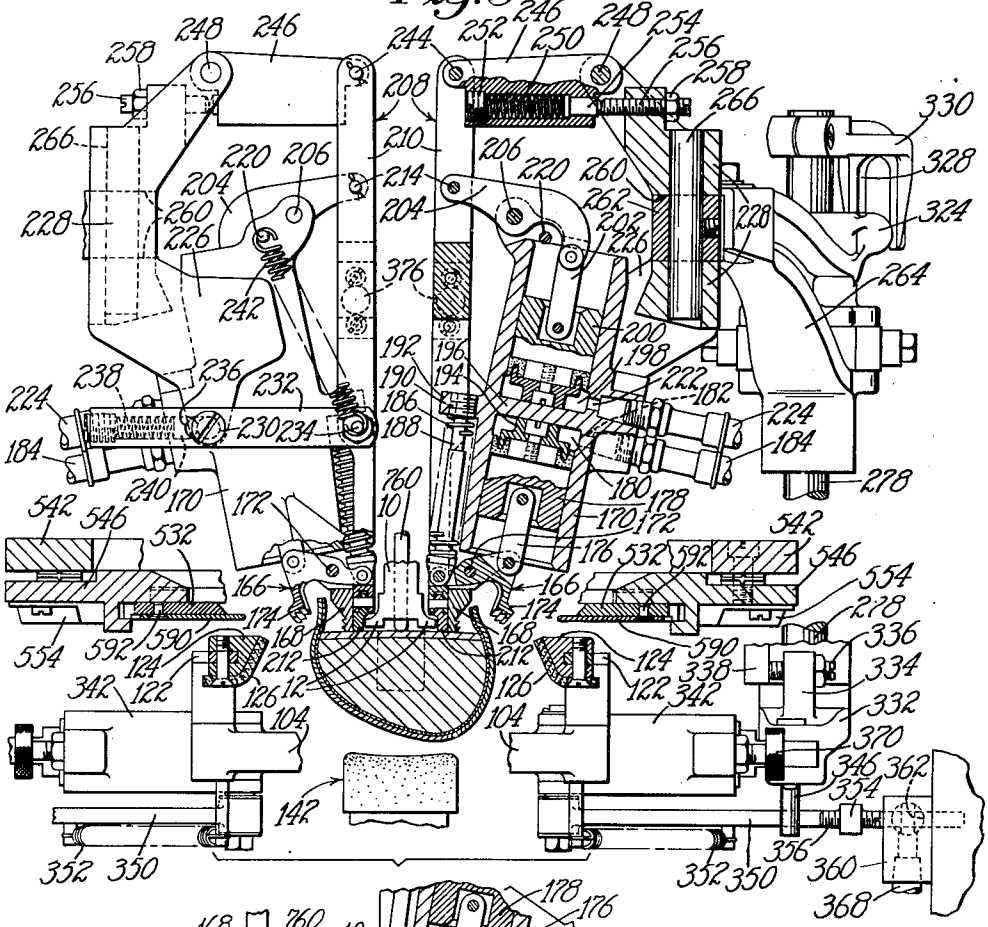
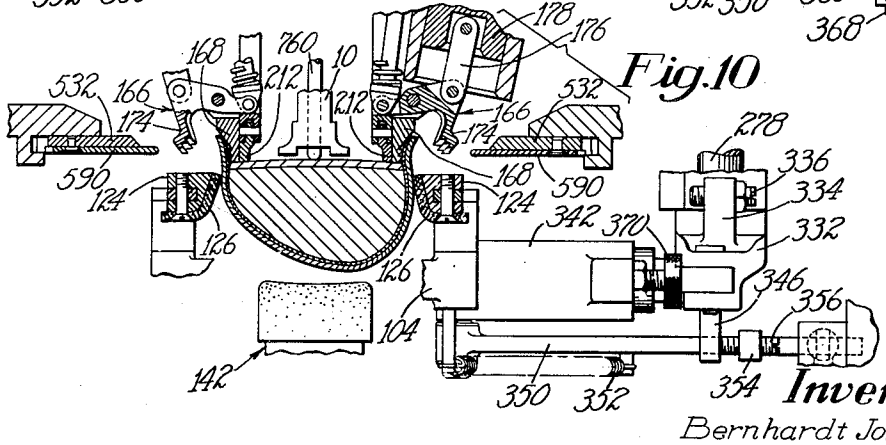


Fig. 10



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April 26, 1955 B. JORGENSEN 2,706,823

LASTING MACHINES

Filed Oct. 10, 1950 8 Sheets-Sheet 7

Fig.14

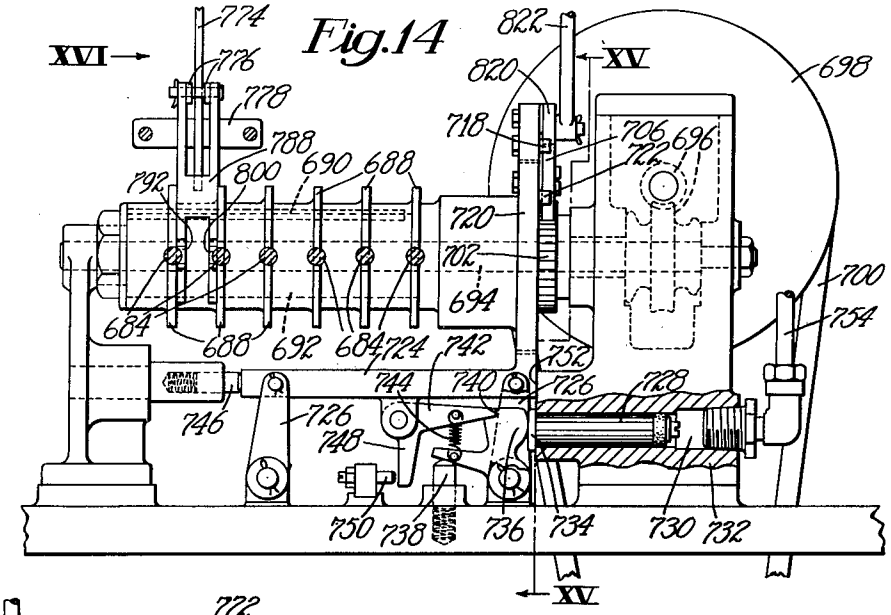


Fig.16

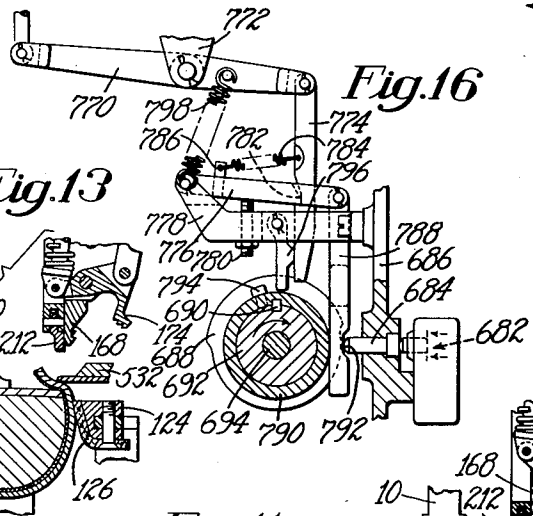
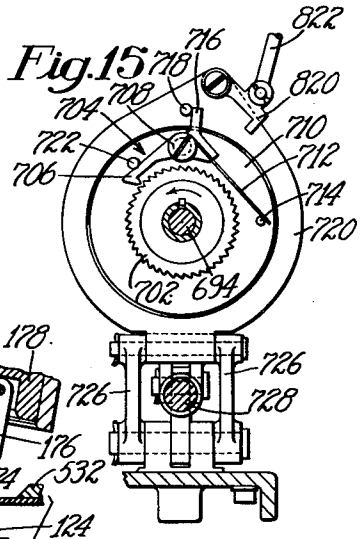


Fig.13

Fig.15



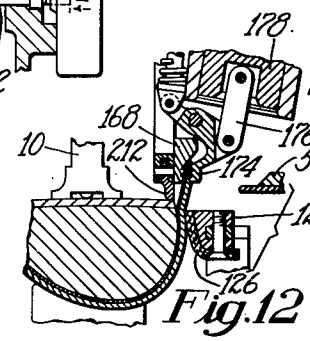
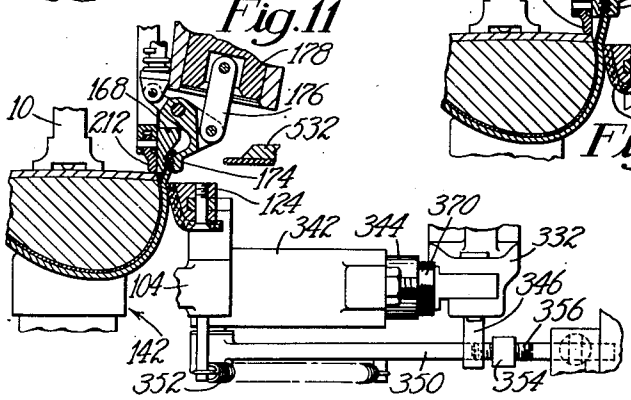


Fig.12

Fig.11



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April 26, 1955 B. JORGENSEN 2,706,823

LASTING MACHINES

Filed Oct. 10, 1950 8 Sheets-Sheet 8

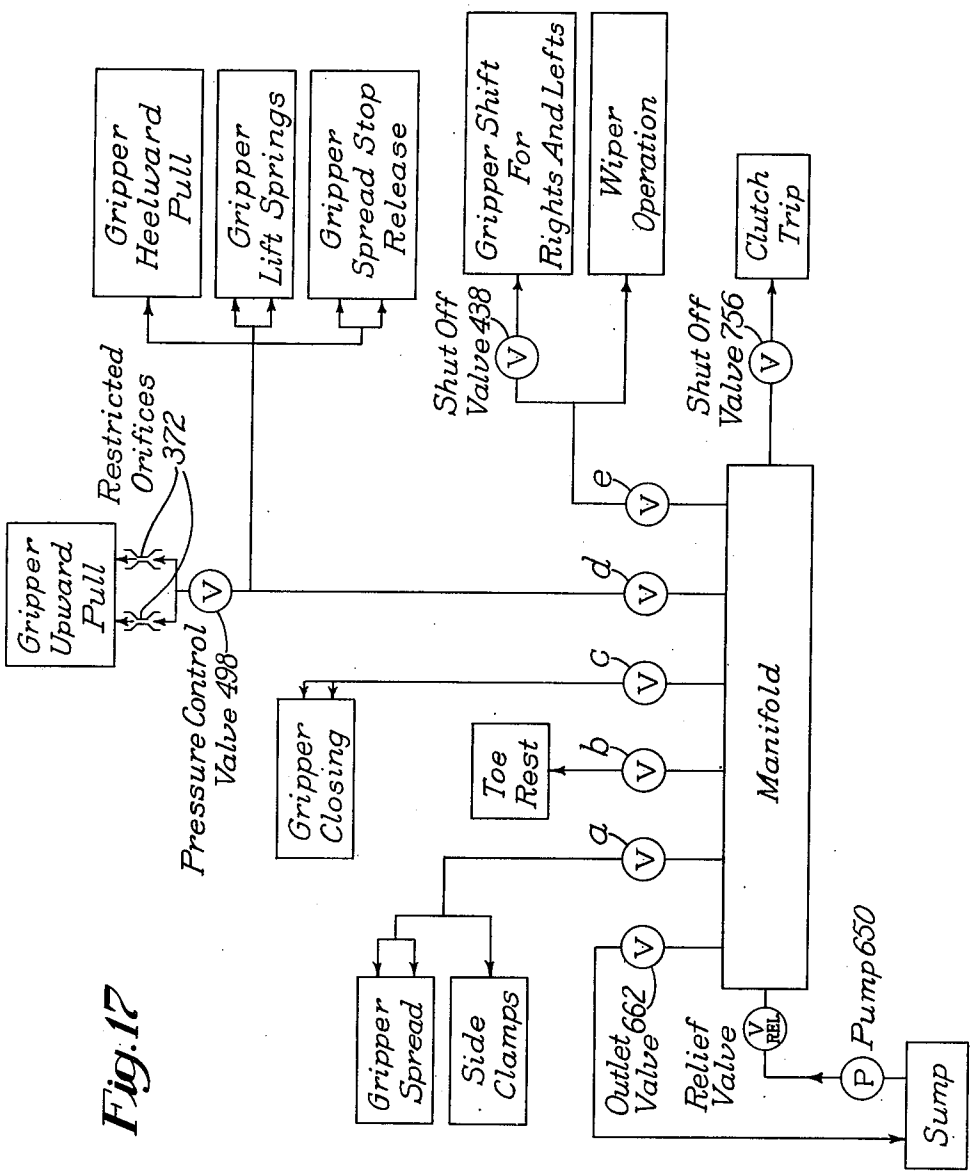


Fig. 17

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United States Patent Office 2,706,823 Patented Apr. 26, 1955

2,706,823

LASTING MACHINES

Bernhardt Jorgensen, Marblehead, Mass., assignor to United Shoe Machinery Corporation, Flemington, N. J., a corporation of New Jersey

Application October 10, 1950, Serial No. 189,407

24 Claims. (Cl. 12—10.1)

This invention relates to lasting machines and is herein shown as embodied in a machine for lasting the ball portions of shoes from the toe-end portions to the shank portions. In its general organization this machine is similar to that shown in an earlier patent of mine, No. 2,614,275, granted October 21, 1952, and in some aspects the invention provides improvements in that earlier machine. It is to be understood, however, that this is only an illustrative embodiment and that with respect to various novel features the invention is not limited to the particular organization shown.

In general accordance with the disclosure of the earlier patent, the machine herein shown in provided with grippers which grip the margin of the upper at the opposite sides of the ball portion of the shoe and pull the upper heightwise of the last, and with wipers which after the pulling of the upper wipe its margin inwardly over an insole on the last and cause it to adhere to the insole, the grippers and wipers and other elements of the machine being operated by fluid pressure. To facilitate insertion of the margin of the upper between the jaws of the grippers by the presentation of the shoe to the machine, the grippers are so positioned initially that their inner jaws, which engage the inner surface of the margin of the upper, are located substantial distances inwardly from the edge of the insole, and before they grip the upper the grippers are moved by fluid-pressure means outwardly away from each other widthwise of the shoe to positions in which their inner jaws are adjacent to the edge of the insole. Such outward movements of the grippers are limited by stops positioned as determined by side clamp members which engage the opposite sides of the shoe and centralize the shoe between them. It may sometimes happen that cement applied to the shoe will have caused the upper to adhere prematurely to the edge face of the insole in one or more locations along the ball portion of the shoe. The present invention accordingly provides for movement of the grippers still farther outwardly after they have gripped the margin of the upper to insure detachment from the edge of the insole of any portion of the upper which may thus have adhered prematurely thereto. To this end, the construction shown includes fluid-operated members which at the proper time displace the above-mentioned stops and thus cause the grippers to be moved farther outwardly by the fluid-pressure means acting thereon, other stops being provided for limiting the further outward movements of the grippers. Conveniently conduits conducting the fluid to the members which displace the stops are in open communication with conduits conducting fluid to means for imparting the upper-pulling movements heightwise of the last to the grippers, thus avoiding the use of a special valve for controlling the flow of fluid to those members. It is desirable, however, that the further outward movements of the grippers shall take place prior to any substantial pull on the upper heightwise of the last, and in order thus to time the different operations the flow of fluid to the means for moving the grippers heightwise of the last is suitably retarded. The invention further provides a novel construction and arrangement of means for imparting the outward movements to the grippers and for limiting those movements, the limiting stops being connected to lever arms which are swung inwardly widthwise of the shoe to apply the side clamp members to the shoe and being therefore positioned widthwise of the shoe by those arms, as are also cylinders containing pistons by

which the outward movements are imparted to the grippers.

In general accordance with the disclosure of the earlier patent, the machine is provided with means for moving the grippers heightwise of the last to pull the upper by a purchase on the bottom of the shoe through holddowns associated with them and engaging the margin of the insole. As distinguished, however, from the prior disclosure in the construction herein shown the purchase on the bottom of the shoe is a positive one, and associated with the fluid-pressure means whereby the movements heightwise of the last are thus imparted to the grippers is automatic means for limiting, as variably determined by preliminary adjustment, the pressure of the fluid effective thus to operate the grippers independently of the pressure effective to operate other parts of the machine. More particularly, automatic valve means is provided for interrupting the flow of the operating fluid to the gripper-operating means when the pressure of the fluid acting on the grippers reaches an adjustably predetermined limit below the pressure at the source of fluid supply. Combined with the means for operating the grippers by a positive purchase on the shoe the pressure-controlling means thus provided permits the force of the pull applied by the grippers to the upper to be determined with great precision in accordance with the character of the upper materials.

In view of the differences in the contours of right and left shoes, it is desirable that the grippers shall be differently positioined in operating on a left shoe than in operating on a right shoe. In further general accordance, therefore, with the disclosure of the earlier patent, the grippers are supported for swinging movements about axes extending heightwise of the shoe in such manner as to change their positions lengthwise of the shoe and their angular relation to the longitudinal median line of the forepart of the shoe, and they are connected respectively to the opposite ends of a lever by which they may be swung simultaneously in opposite directions. In the construction herein shown provision is afforded for swinging this lever automatically in opposite directions, to position the grippers for operating alternately on right and left shoes in successive cycles of operations of the machine, by intermittent movements in one direction of a rotatable member connected to the lever. Additionally, means is provided whereby the operator is enabled to rotate this member at will and theeby to position the grippers for operating on either a right shoe or a left shoe selectively, provision also being afforded for preventing, if desired, the automatic rotation of the member. For varying, moreover, the extent of the movements imparted to the grippers in adjusting them for right and left shoes, the above-mentioned lever is arranged to be operated through the movement of another lever having an adjustably variable fulcrum.

Under some conditions it may be desirable to impart to the upper through the grippers a short pull lengthwise of the last in the direction of its heel end in addition to the pull heightwise of the last. The machine herein shown is accordingly provided with means for thus moving the grippers lengthwise of the last in a heelward direction in predetermined time relation to their movemeans heightwise of the last. For the purpose in view a fluid-operated member is arranged thus to act on the grippers through a portion of the means above described whereby they are differently positioned for operating on right and left shoes, the timing being such that the grippers are thus moved lengthwise of the last prior to any substantial pull on the upper heightwise of the last. Provision is further afforded for rendering this fluid-operated member inoperative, if desired, and for thereby eliminating the movements of the grippers lengthwise of the last.

The above and other features of the invention, including various novel details of construction and combinations of parts, will now be more particularly described with reference to the accompanying drawings and thereafter pointed out in the claims.

In the drawings,

Fig. 1 is a view mainly in right-hand side elevation of the machine in which the invention is herein shown as embodied, with parts broken away;

Fig. 1*a* is a vertical sectional view of pressure-controlling means shown in Fig. 1;

Fig. 2 is mainly a plan view of the upper portion of the machine, with parts in section on the line II—II of Fig. 1;

Fig. 3 is a view in right-hand side elevation of a portion of the structure shown in Fig. 2, with parts broken away;

Fig. 4 is a vertical section substantially on the line IV—IV of Fig. 2;

Fig. 5 is a section on the line V—V of Fig. 2;

Fig. 6 is mainly a plan view of the wipers and their operating mechanism and of portions of the structure associated therewith, parts being in section on the line VI—VI of Fig. 1;

Figs. 7 and 8 are views generally similar to a portion of Fig. 6, but showing the parts as they appear at different times in the operation of the machine;

Fig. 9 is a view partly in front elevation and partly in section, showing the grippers and other parts as they appear immediately after the presentation of a shoe to the machine but before the parts have started to operate;

Fig. 10 is a view similar to a portion of Fig. 9, showing the parts as they appear when the grippers are about to grip the upper;

Figs. 11, 12 and 13 are views similar to a portion of Fig. 10 with the parts as they appear at different times in the operation of the machine;

Fig. 14 is a view mainly in rear elevation of means shown in Fig. 1 for controlling the operation of the machine, with parts broken away;

Fig. 15 is a section on the line XV—XV of Fig. 14;

Fig. 16 is a view in elevation in the direction of the arrow XVI in Fig. 14, with parts broken away; and

Fig. 17 is a diagrammatic view illustrating the relation of the fluid-pressure system of the machine to the parts operated by the fluid pressure.

For positioning the shoe heightwise in the machine there is provided a forwardly and rearwardly extending lever **2** (Fig. 4) which is pivotally mounted substantially midway between its front and rear ends on a pin **4** supported in two members **6** (Fig. 2) extending upwardly at opposite sides of the lever **2** from a substantially horizontal frame casting **8** to which they are secured. Mounted for adjusting movement upwardly or downwardly in a guideway in the front end of the lever **2** is a shoe rest member **10** on the lower end of which are formed two presser feet **12** spaced apart widthwise of the shoe as shown in Fig. 9 and arranged to engage the insole at the ball portion of the shoe, these presser feet having insole-engaging teeth thereon and by reason of their spaced relation serving further to position the shoe with respect to lateral tipping movement. The member **10** is adjustable heightwise of the shoe relatively to the lever **2** by means of a screw **14** which is threaded therein, the screw having a head **16** a portion of which lies in a slot in the lever **2** to prevent upward or downward movement of the screw relatively to the lever. To assist in holding the member **10** in adjusted position there is mounted in the lever **2** a spring-pressed pin **18** having a conical front end arranged to enter one or another of a plurality of recesses **20** in the head of the screw. Secured to the upper end of the screw is a member **22** connected by a universal joint **24** to a rod **26** extending upwardly through an opening in a top frame plate **28** (Fig. 1), the rod having on its upper end a knob **30** for turning it.

Pivotally mounted on a pin **32** in the rear end of the lever **2** at the opposite sides of the lever respectively are two downwardly extending links **34** of a toggle **36**, the lower ends of these links being pivotally connected by a pin **38** to a toggle link **40** which is pivotally mounted at its lower end on a pin **42** in a casting **44** on the frame. Connected to the lever **2** and to the links **34** is a spring **46** which tends to straighten the toggle **36**. Threaded in the upper end of the link **40** is a screw **48** on which is mounted a lock nut **50** in engagement with a washer **52**. This washer overlaps portions of the link **40** and of the two links **34** and accordingly limits straightening of the toggle under the influence of the spring **46**. Initially, the toggle is in its straightened position, as shown in Fig. 4, and accordingly the shoe rest member **10** is held positively against any upward movement in response to pressure of the shoe thereon.

Further to assist in positioning the shoe there is provided another shoe-rest member **54** on which are two downwardly extending bosses **56** (Fig. 6) spaced apart

widthwise of the shoe and having smooth faces arranged to engage the toe end of the insole. The member **54** is of angular shape to provide a downwardly extending portion from which extends rearwardly an arm **58** pivotally mounted at its rear end on a pin **60**, this pin being supported in lugs extending upwardly from a slide **62** which is guided for forward and rearward movements in a holder **64** fast on a casting **66** on the frame. Mounted in a socket in the slide **62** and abutting at its rear end against a bracket **68** secured to the casting **66** is a spring **70** a portion of which surrounds a positioning rod **72** secured to and extending forwardly from the bracket **68**. This spring tends to move the slide **62** in a forward direction, its forward movement being limited by its engagement with a stop **74** on the holder **64**. Secured on the downwardly extending portion of the angular shoe-rest member **54** is a piece of leather **76** arranged to engage the toe-end face of the shoe when the operator presents the shoe to the machine, and in thus presenting the shoe the operator will move the member **54** and the slide **62** more or less in a rearward direction against the resistance of the spring **70** by the pressure of the toe-end face of the shoe thereon for a purpose more particularly hereinafter explained.

Mounted in a socket in the slide **62** is a spring **78** which tends to swing the shoe-rest member **54** in an upward direction about the pin **60** and holds it against a roll **80** mounted on a pin **82** which is supported in the lower ends of two links **84** extending upward respectively at opposite sides of the lever **2**. These links are pivotally connected at their upper ends by a pin **86** to the front end of a forwardly and rearwardly extending lever **88** pivotally mounted substantially midway between its front and rear ends on a pin **90** in the upper ends of the members **6**. Extending through vertical slots **92** in the two links **84** is a pin **94** supported in a member **96** which is fast on the casting **8**, this pin-and-slot arrangement permitting limited upward and downward movements of the links. Secured to the rear arm of the lever **88** is a leaf spring **98** which bears on the front arm of the lever **2** and tends to swing the lever **88** in a clockwise direction with reference to Fig. 4 as permitted by the slots **92** and the pin **94**. Threaded in the rear end of the lever **88** is a screw **100** arranged to engage the upper face of the rear arm of the lever **2** and thereby to limit any swinging movement of the lever **88** relatively to the lever **2** under the influence of the spring **98**. It will be evident that by means of the screw **100** the lever **88** may be adjusted relatively to the lever **2** to determine adjustably the position heightwise of the machine of the shoe-rest member **54** which engages the toe end of the shoe independently of adjustment of the shoe-rest member **10** which engages the ball portion of the shoe.

While the shoe is held by the operator after it has been presented to the machine it is automatically positioned widthwise in proper relation to the lasting instrumentalities by opposite side clamps **102**. These side clamps include levers **104** (Fig. 6) pivotally mounted between their front and rear ends on vertical studs **106** supported in the casting **66**. Formed on the levers **104** are gear sectors **108** in engagement with each other to equalize the movements of the levers. The rear ends of the levers are in engagement with the rounded outer ends of pistons **110** movable toward and from each other in a cylinder **112** formed in the casting **66**. Bosses **114** of reduced diameter formed on the inner ends of the pistons provide an annular space between the pistons for the admission of operating fluid when the pistons are in their innermost positions. Fluid is thus admitted between the pistons through a port **116** (Fig. 4) from a pipe line **118** leading from the source of fluid supply. Pivotally mounted on a vertical pin **120** supported on the front end of each lever **104** in the construction herein shown is a curved bar **122** extending substantially equal distances forwardly and rearwardly of the pin, and pivotally mounted on each end of this bar to swing about an axis extending heightwise of the shoe is a block **124** to which is secured a strip of leather **126** arranged to engage the shoe upper. As shown in Fig. 6, the two leather strips at each side of the shoe extend toward each other beyond the blocks **124**, and connected to the ends of the strips which are nearest to each other is a light spring **128** which steadies the blocks **124** and prevents either of them from swinging too far about

its connection with the bar **122** when there is no shoe in the machine. Connected, moreover, to each lever **104** and to the bar **122** thereon near the pin **120** is a spring **130** which prevents uncontrolled swinging movement of the bar about the pin **120** and holds it approximately in the relation to the lever **104** which it assumes when clamping the shoe. It will be evident that the foremost blocks **124** and their leather facings clamp the shoe at the opposite sides of its ball portion and that the rearmost blocks and their facings clamp it at the opposite sides of the toe. By this construction the shoe is centralized bodily widthwise and is held firmly in the position thus determined in the desired relation to the lasting instrumentalities. For returning the levers **104** upon release of the fluid from the cylinder **112** there is provided a spring **132** connected at one end to a rearward extension **134** of the right-hand lever and at the other end to a rod **136** secured in the casting **66** (see Fig. 4). The connection between the spring and this rod comprises an eye-bolt **138** and a hand nut **140** threaded thereon for adjusting the tension of the spring.

After the shoe has been positioned laterally as above described by the side clamps **102** it is clamped against the shoe rest members **10** and **54** by a toe rest **142**. This toe rest comprises a rubber pad **144** mounted on a holder **146** guided for tipping movement about an axis extending lengthwise of the shoe in a block **148** which is mounted on the upper end of a piston **150** movable upwardly in a forwardly inclined direction in a cylinder **152** to the lower end of which fluid is admitted at the proper time from the source of supply. Such upward movement of the piston is effected against the resistance of a pair of return springs **154** connected to opposite ends of a pin **156** which extends through slots **158** in the cylinder **152**. If there is no shoe in the machine the upward movement of the piston is limited by engagement of the pin with the cylinder at the upper ends of the slots. The block **148** is adjustable relatively to the piston **150** in directions lengthwise of the shoe by means of a screw **160** which is threaded in a downwardly extending portion **162** of the block and is confined against lengthwise movement by a pair of plates **164** in engagement with its opposite ends, these plates being secured to a reduced upper end portion of the piston. Access to the front end of the screw for a tool for turning it is afforded by a hole extending through the front plate **164**.

For pulling the upper the machine is provided with a pair of grippers **166** (Fig. 9) arranged to grip the margin of the upper respectively at the opposite sides of the ball portion of the shoe in locations between portions of the upper previously fastened to the insole by side pulling-over tacks *t* (Fig. 7) and, it may be, by staples *s* used in lasting the shank portion of the shoe. These grippers and their operating and controlling means are in many respects similar to the disclosure of the previously mentioned patent but differ therefrom in other respects. Each gripper includes an inner jaw **168** arranged to engage the inner face of the margin of the upper and secured to the lower end of a cylinder casting **170** supported as hereinafter described. Pivotally mounted on a pin **172** for swinging movements toward and from the jaw **168** is an outer jaw **174** connected by a link **176** to a piston **178** mounted in a cylinder **180** formed in the lower end of the casting **170**, the piston being movable downwardly by operating fluid admitted above it to the cylinder to cause the jaws to grip the upper. The fluid is thus admitted to the cylinder **180** through a port **182** in the casting **170** from a flexible tube **184** to which fluid is admitted at the proper time from the source of supply. The swinging of the jaw **174** thus to grip the upper is effected in the construction herein shown against the resistance of a return spring **186** surrounding a rod **188** the lower end of which is pivotally connected to a tail portion of the jaw **174** and the upper end of which is mounted in an opening in a plug **190** threaded in a lug **192** on the cylinder casting **170**. The spring is confined between this lug and a head on the lower end of the rod **188** and accordingly is compressed as the jaw **174** is operated by downward movement of the piston **178**. It will be understood that the spring **186** holds the piston initially at the limit of its upward movement determined by engagement of a spacing member **194** thereon with a partition **196** formed in the cylinder casting **170**.

The pulling of the upper by each gripper is effected by moving the gripper and the cylinder casting **170** in an upward direction. For this purpose there is formed in the casting above the partition **196** another cylinder **198**, and movable in this cylinder is a piston **200** connected by a link **202** to one end of a lever **204** pivotally mounted substantially midway between its opposite ends on a pin **206** in the upper end of the casting **170**. When the piston is moved upwardly by fluid admitted to the cylinder **198** it acts through the lever to impart upward movement to the casting **170** and the gripper by a purchase on the bottom of the shoe through a holddown **208**. This holddown comprises a substantially vertical bar **210** having pivotally mounted on its lower end for tipping movement about an axis extending widthwise of the shoe an insole-engaging presser foot **212**. In the construction herein shown the lever **204** is pivotally connected directly to the holddown bar **210** by a pin **214** and accordingly the purchase on the bottom of the shoe in the operation of the gripper is a positive one. The holddown bar has in its upper portion a slot **216** (Fig. 4) into which the lever **204** extends and in its lower portion a slot **218** in which is located the previously mentioned spring **186** and rod **188**. A pin **220** mounted in the casting **170** serves to limit upward movement of the piston **200** if there is no shoe in the machine. Fluid is admitted to the cylinder **198** through a port **222** in the casting **170** from a flexible tube **224** to which fluid is delivered from the source of fluid supply. In the construction shown the admission of fluid to the cylinders **180** and **198** is controlled respectively by separate valves shown only diagrammatically at *c* and *d* in Fig. 17, and accordingly the time of the pull applied to the upper is determined independently of the time of the closing of the gripper jaws on the upper. Both grippers grip the upper simultaneously under control of the same valve and they both pull the upper simultaneously also under control of the same valve.

Substantially as shown in the previously mentioned application, each cylinder casting **170** is guided in its upward and downward movements by two arms **226** (Figs. 2 and 9) formed on a casting **228** supported as hereinafter described, the two arms **226** engaging flat faces formed on the opposite sides of the casting **170**. Pivotally mounted on studs **230** on these arms are links **232** located respectively at the opposite sides of the casting **170** and pivotally connected at their inner ends by studs **234** to the opposite sides of the holddown bar **210**. These links, therefore, connect the lower portion of the holddown bar to the casting **228** and assist in controlling the bar with respect to movements widthwise of the shoe. Each link has therein a short slot **236** through which the stud **230** extends to permit a limited relative movement of the holddown bar and the casting **228** widthwise of the shoe. Mounted in each link is a spring **238** bearing at one end on a pin **240** which is slidingly mounted in the link and engages the stud **230**. The spring, therefore, tends to move the link in an outward direction and holds it normally in the position in which the stud **230** is at the inner end of the slot **236**. Springs **242** connected to the previously mentioned pin **220** and to the studs **234** on the holddown bar **210** assist in moving the cylinder casting **170** downwardly after release of the upper by the gripper and also tend to swing the cylinder casting and the lever **204** in an inward direction about the pin **214** on the holddown bar, the inner gripper jaw **168** being thus held normally against the outer face of the lower end of the holddown bar. It will be evident that through the lever **204** the cylinder casting **170** and the gripper are supported on the pin **214** on the holddown bar.

In the construction herein shown each holddown bar **210** is pivotally connected at its upper end by a pin **244** to one end of a link **246** the other end of which is pivotally connected by a pin **248** to the casting **228**. Mounted in the link **246** is a spring **250** one end of which engages a plug **252** threaded in the link and the other end of which engages the enlarged head of a stud **254** slidingly mounted in the link. This stud is engaged on its outer end by a screw **256** which is threaded in the casting **228** and has thereon a lock nut **258**. It will thus be seen that any downward movement of the holddown bar **210** and the cylinder casting **170** supported thereon relatively

to the casting 228 from the position in which they are shown in Fig. 9 will result in compression of the spring 250. Accordingly the spring serves to support the holddown bar and the cylinder casting at a predetermined height relatively to the casting 228 when there is no shoe in the machine, the spring being strong enough for this purpose. It will also be evident that by turning the screw 256 the height at which the bar and the casting 170 are thus supported may be varied independently of corresponding adjustment of the other holddown bar and casting.

Each casting 228 has therein a recess 260 (Fig. 9) in which lies a block 262 supported by a forwardly and rearwardly extending arm 264 (Figs. 2 and 3). The block has fastened thereto a vertical pin 266 extending upwardly and downwardly into bores in the portions of the casting 228 above and below the block, the casting being mounted to swing about the pin to move the corresponding gripper and holddown in directions lengthwise of the shoe under control of means hereinafter described. Each block 262 has a rearwardly extending rectangular stem 268 (Fig. 2) mounted in a recess 270 in the front end of the arm 264 for forward and rearward adjusting movements, the stem having threaded therein a clamp screw 272 extending upwardly through a slot 274 in the arm 264 to secure the block in adjusted relation to the arm. It will be understood that by such movements of the block 262 the casting 228 and the parts, including the gripper, supported thereon may be adjusted bodily in directions lengthwise of the shoe.

At its rear end each arm 264 has a hub portion 276 (Fig. 3) mounted on a vertical rod 278 which extends downwardly through a bearing formed in the frame casting 8 and in a downwardly extending boss 280 on this casting. Mounted between flanges 282 on the hub portion of the arm are trunnion blocks 284 (Fig. 2) pivotally supported on the forked front end of a rearwardly extending arm 286 loosely mounted at its rear end on a shaft 288, this shaft being supported near its opposite ends in bearings formed in members 290 fast on the frame casting 8. As shown in Fig. 2, the arms 286 associated respectively with the opposite side grippers are located near the opposite ends of the shaft 288 and have forked rear ends embracing the bearing members 290. Fast on the right-hand end of the shaft 288 is a bell-crank lever 292 one arm of which has mounted thereon a screw 294 arranged to engage a pin 296 on the arm 286 adjacent thereto. Fast on the left-hand end of the shaft is an arm 298 provided with a screw 300 arranged similarly to engage a pin 302 on the arm 286 at that side of the machine. The other arm of the bell-crank lever 292 has pivotally mounted thereon a member 304 in which is threaded the rear end of a rod 306 extending forwardly through the front of the frame and having fast on its front end a knob 308 arranged to engage this portion of the frame. It will be evident that by swinging the bell-crank lever 292 in a clockwise direction with reference to Fig. 3 both the arms 286 may be raised to impart equal upward movements to the corresponding arms 264 and to the grippers and holddowns supported thereby, such movement for purposes of adjustment being imparted to the bell-crank lever by turning the rod 306 in one direction through the knob 308 on its front end. Similarly, in response to turning movement of the rod in the other direction the grippers and holddowns may be lowered by gravity. In this manner the inner jaws 168 of the grippers and the presser feet 212 of the holddowns may be positioned at the desired height, having regard to the vertical adjustment of the shoe-rest members 10 and 54.

When the grippers, after their pull on the upper, release it to permit its marginal portion to be wiped inwardly over the insole by the wipers hereinafter described, they are moved quickly upward, together with the holddowns 208 associated therewith, to insure against interference with the wipers. For this purpose, in the construction herein shown, there is mounted on the frame casting 8 below each arm 286 a cylinder 310, the cylinder associated with the right-hand arm 286 being shown in Fig. 3. Mounted in each cyinder 310 is a piston 312 movable upwardly by fluid admitted to the lower end of the cylinder from a pipe line 314. Mounted in a socket in the piston is a spring 316 the upper end of which is in engagement with the enlarged head 318 of a rod 320 extending downwardly within the spring but terminating short of the piston . The head 318 is in engagement with a boss formed on the arm 286, and accordingly the arm is swung upwardly by the spring to impart upward movement to the arm 264 along the rod 278 and thereby to raise the gripper and the holddown when the gripper releases the upper. To render the spring thus effective it is compressed by upward movement of the piston 312 prior to the release of the upper by the gripper. For this purpose fluid is admitted to each cylinder 310 simultaneously with its admission to the cylinders 198 to cause the grippers to pull the upper, as illustrated in the diagram (Fig. 17), the pipe 314 leading to each cylinder 310 being in communication with the fluid line leading to the cylinders 198. Because of the resistance of the upper to the pull of the gripper thereon the spring 316 tends to cramp the hub 276 of the comparatively long arm 264 on the rod 278 without adding appreciably to the force of the pull on the upper as long as the upper is held by the gripper. It will be evident that since the purchase of each gripper on the bottom of the shoe through the holddown associated therewith is, as hereinbefore explained, a positive one, no springs being interposed between the lever 204 and the holddown, prompt withdrawal of the holddown from the insole is insured simultaneously with the upward movement of the gripper by the action of the spring 316.

As shown in Fig. 3, each arm 264 is normally supported by the arm 286 associated therewith in a position in which the lower end of its hub 276 is spaced somewhat above a boss 322 on the casting 8, and this boss supports the rod 278 the portion of which above the boss is of slightly greater diameter than the portion extending downwardly through the casting 8. Integral with the hub 276 is a rearwardly extending arm 324 provided on its rear end with a roll 326 which lies in a vertical slot 328 formed in a downwardly extending portion of a bracket 330 secured to the upper end of the rod 278. Accordingly, any turning movement of the rod 278 is accompanied by a swinging movement of the arm 264 widthwise of the shoe. Secured to the lower end of the rod 278 is an arm 332 (Figs. 3 and 6), and threaded in a lug 334 on this arm is a screw 336 arranged to engage a web 338 formed on the boss 280 extending downwardly from the casting 8 to determine adjustably the limit of inward swinging movement of the arm 264. Connected to the two arms 332 is a spring 340 which tends to swing them in inward directions and holds the screws 336 normally against the webs 338. The two screws 336 are so adjusted that initially the presser feet 212 of the holddowns 208 and the inner jaws 168 of the grippers are positioned substantial distances inwardly from the opposite side edges of the insole, as shown in Fig. 9. This facilitates the positioning of the more or less inwardly inclined portions of the margin of the upper materials at the ball portion of the shoe between the open jaws of the grippers when the shoe is presented to the machine. At the time in the operation of the machine when the side clamps 102 are moved inwardly as hereinbefore described to position the shoe between them, the grippers and the holddowns are moved outwardly widthwise of the shoe to positions in which the inner jaws 168 of the grippers are over the extreme edge portion of the insole, as illustrated in Fig. 10, the grippers as thus positioned being ready to grip the upper. For this purpose, in the machine herein shown, there is associated with each arm 332 a cylinder 342, a piston 344 being mounted in the cylinder and pivotally connected by a pin 346 to the arm 332. The cylinder 342 is pivotally mounted by means of a pin 348 on the side clamp lever 104 at the same side of the machine. Also pivotally mounted on each pin 348 is an arm 350 normally held by a spring 352 against a downwardly extending end portion of the pin 346. Mounted in a lug 354 on this arm is a stop screw 356 arranged to engage the lower end portion of the pin 346 to limit the swinging movement of the arm 332 when fluid is admitted to the cylinder 342 and thus to determine the position of the gripper when its inner jaw 168 is over the extreme edge portion of the insole as above described. It will be evident that since the arm 350 which supports the stop screw 356 is connected by the pin 348 to the side clamp lever 104, it assumes a position determined by this lever when the shoe is engaged by the side clamps, thus insuring that whatever may be the width of the shoe the outward movement of the gripper and the holddown will be

stopped with the inner jaw of the gripper precisely in the desired relation to the edge of the insole. Fluid is admitted to the two cylinders **342** from conduits **358** supplied with fluid from the line leading to the cylinder **112**, so that the outward movements of the grippers and holddowns take place simultaneously with the inward movements of the side clamps **102**.

Mounted on the frame near the outer end of each arm **350** is a block **360** in which is formed a cylinder **362**, and mounted in this cylinder is a piston **364** having a stem **366** of reduced diameter arranged to engage the front face of the outer end portion of the arm **350**. Fluid is admitted to each cylinder **362** from a pipe **368** (Fig. 9) in communication with the fluid line leading to the cylinders **198** in which the gripper-operating pistons **200** are mounted. The pressure of the fluid, therefore, becomes effective on the pistons **364** at the same time as on the pistons **200**, and by the movements of the pistons **364** the arms **350** are swung rearwardly against the resistance of the springs **352** to displace the stop screws **356** from engagement with the pins **346**. The effect of this is to release the pistons **344** and thereby to cause the fluid, still effective on these pistons, to swing the arms **332** farther outwardly, such further movements of the arms being limited by engagement of the pistons **344** with the heads of stop screws **370** threaded in the cylinder castings **342**. In this manner the grippers and the holddowns are moved farther outwardly from the positions in which they are shown in Fig. 10 to positions such as illustrated in Fig. 11, thus bringing the presser feet **212** of the holddowns into positions over the extreme edge portion of the insole. Such further outward movements of the grippers, previously closed on the upper, renders them effective to detach the upper from the edge of the insole if the upper has adhered prematurely thereto. Notwithstanding the fact that the pressure of the fluid becomes effective on the gripper-operating pistons **200** at the same time as on the pistons **364**, the additional outward movements of the grippers to cause them thus to detach the upper from the edge of the insole take place prior to any substantial upward pull on the upper, the flow of the fluid to the cylinders **198** being retarded as compared with the flow to the cylinders **362** by restricted orifices **372** (Figs. 2 and 17) through which the fluid flows to the cylinders **198**. To limit the movement of each piston **364** it carries a pin **373** extending into a slot in the wall of the cylinder **362**. It will be understood that when the fluid is released from the cylinders **362** the pistons **364** are returned by the arms **350** under the influence of the springs **352**.

As previously stated, the castings **228** supporting the grippers and the holddowns are mounted for swinging movements about the vertical pins **266**. Since these pins are located farther outwardly widthwise of the machine than the grippers, any such movement of either supporting casting results in bodily movement lengthwise of the shoe of the corresponding gripper and holddown and in a change in the angular relation of the gripper and holddown to the longitudinal median line of the forepart of the shoe. To control the grippers and the holddowns with respect to such swinging movements rods **374** (Fig. 2) are connected respectively by ball joints **376** (Fig. 9) to the holddown bars **210** and extend therefrom rearwardly and somewhat outwardly widthwise of the machine. Near their rear ends these rods extend through members **378** (see Fig. 4) which are mounted for turning movements about vertical axes on the opposite ends of a lever **380** pivotally mounted midway between its opposite ends on a stud **382** threaded in the casting **44**. The openings in the members **378** through which the rods extend are large enough to permit such swinging of the rods as results from upward and downward movements of the grippers. Between the members **378** and nuts **384** on the rear ends of the rods **374** are compression springs **386**, and secured to each rod is a block **388** arranged to engage the front face of the member **378**, the block having a portion extending rearwardly over this member. It will thus be seen that swinging movement of the lever **380** in one direction or the other imparts forward movement to one of the rods **374** by engagement of the corresponding member **378** with the block **388** on this rod and equal rearward movement to the other rod through the spring **386**. In this manner the grippers and the holddowns are shifted into positions appropriate for operating on right and left shoes. That is, the gripper which is to grip and pull the upper at the inner side of either shoe is positioned nearer the toe end of the shoe than the gripper at the outer side and its jaws are positioned at a different angle to the longitudinal median line of the forepart of the shoe than the jaws of the outer side gripper, as required by the shape of the shoe, the holddown being correspondingly adjusted with the gripper.

In the machine herein shown mechanism is provided for swinging the lever **380** automatically to shift the grippers and the holddowns as above described in each cycle of operations of the machine, so that they will be in positions for operating on a right shoe in one cycle of operations and in positions for operating on a left shoe in the next cycle. This mechanism includes a lever **390** having therein a slot **392** through which extends a pin **394** mounted on a holder **396**, this holder being adjustable in directions lengthwise of the lever **390** along a guideway **398** in the frame casting **8** and held in adjusted position by a screw **400**. The pin **394** thus provides a fulcrum for the lever **390** which is adjustable to vary relatively the effective lengths of the two arms of the lever. At its right-hand end the lever **390** is pivotally connected to the left-hand end of the lever **380**, and at its left-hand end it is connected by a link **402** to a crank pin **404** eccentrically mounted on a gear wheel **406**. This gear wheel is fast on a shaft **408** mounted to turn in a casting **410** fast on the frame casting **8** and is in mesh with the teeth of a larger gear wheel **412** fast on a shaft **414** also mounted in the casting **410**. On the opposite end of this shaft from the gear wheel is secured a disk **416** having thereon four pins **418** located equal distances apart around its center. Mounted in a cylinder **420** formed in the casting **410** is a piston **422** which carries a pin **424** extending through slots **426** in opposite sides of the cylinder. Pivotally mounted on the pin **424** is a latch **428** arranged to act on the pins **418** in succession and thereby to turn the disk **416** each time a distance such as to impart to the crank pin **404** a movement of 180°. Mounted in the piston **422** is a spring-pressed pin **430** which engages a flat face on the latch **428** and holds the latch normally upraised in a position such as indicated in Fig. 5. Upon forward movement of the piston the latch is deflected downwardly by the next pin **418** until it snaps upwardly into position to connect with this pin, after which it acts to turn the disk **416** as above described in response to rearward movement of the piston effected by springs **432** (Fig. 2) connected to the pin **424**. The forward movement of the piston to carry the latch into position to connect with the next pin **418** is limited by engagement of the pin **424** with the cylinder **420** at the front ends of the slots **426**. To determine more definitely the position of the disk **416** after each movement thereof by the latch **428** and to hold it when the latch is moved forwardly into position to connect with the next pin **418**, there is mounted in the casting **410** a spring-pressed detent **434** having a V-shaped end arranged to enter one or another of four V-shaped recesses **436** in the periphery of the disk. Operating fluid is admitted to the cylinder **420** from a fluid line leading to means hereinafter described for operating the wipers. It will thus be seen that after operating on a right or a left shoe the grippers are shifted near the end of the cycle of operations of the machine into positions for operating on the other shoe of the pair in the next cycle. It will also be understood that the extent of such movements of the grippers depends upon the adjustment of the fulcrum pin **394** along the slot **392** in the lever **390**.

To prevent, if desired, the automatic shifting of the grippers for right and left shoes there is provided a shut-off valve **438** (Figs. 2 and 17) which may be used to prevent admission of fluid to the cylinder **420**. There is further provided means whereby the operator may at any time prior to the operation of the machine on a shoe shift the grippers manually into positions to operate on a right shoe or a left shoe selectively. For this purpose there is slidingly mounted in the front of the frame a rearwardly extending rod **440** the rear end of which is formed to serve as a latch **442** for engaging one or another of the pins **418** and for thereby turning the disk **416** in the same direction as it is turned by the latch **428**. By forward movement of the rod **440** it serves to turn the disk as described, such forward movement being imparted to it against the resistance of a spring **444** by means of a knob **446** on its front end. When the operator releases the knob the rod is returned by the spring, the latch being deflected upwardly by engagement with

the next pin until it arrives in position to connect therewith. To permit such upward deflection of the latch the front end of the rod is mounted loosely in the frame. To guide the rod for upward and downward swinging movements a flattened portion thereof extends through a vertical slot formed in a bracket 450 on the casting 8, this bracket normally supporting the rod and the latch. It will be understood that when the disk 416 is moved by the manually operated latch 442 the pins 418 pass idly over the other latch 428, and that when the disk is turned by this latch the pins pass idly under the latch 442.

Under some conditions it may be desirable for the grippers in the upper-pulling operation to apply to the upper a short pull lengthwise of the last toward its heel end. For this purpose there is mounted on the frame of the machine a casting 452 (Figs. 2 and 4) in which is formed a cylinder 454, and mounted in this cylinder for forward and rearward movements is a piston 456. Pivotally mounted on the front end of the piston to swing about a vertical pin 458 is a lever 460 in the opposite ends of which are slots 462. Extending upwardly into these slots are pins 464 formed on blocks 466 through openings in which the rods 374 extend, the blocks being connected to the rods by pivot pins 468. The openings in the blocks are large enough to allow for the upward and downward swinging movements of the rods 374. It will thus been seen that in response to forward movement of the piston 456 the rods 374 are moved equal distances forwardly against the resistance of the springs 386 to swing the grippers and the holddowns in forward directions about the pins 266. The limit of such forward movements of the grippers is adjustably determined by engagement of a lug 470 on the piston 456 with a shoulder 472 on a screw 474 threaded in the casting 452. The cylinder 454 is in communication through a pipe 476 with the fluid line leading to the cylinders 198 in which the gripper-operating pistons 200 are mounted and leading also to the cylinders 362 in which are the pistons 364 for displacing the stops 356 and for thus causing the grippers to pull the upper outward from the edge of the insole. Accordingly the forward movements of the grippers toward the heel end of the last take place simultaneously with their outward movements away from the edge of the insole, both these movements taking place prior to any substantial pull of the grippers on the upper heightwise of the last by reason of the fact that the flow of the fluid to the cylinders 198 is retarded as hereinbefore explained. It will be understood that the pivotal mounting of the lever 460 on the piston 456 permits the grippers to be shifted to different positions for right and left shoes in the manner hereinbefore described and that the forward movements are imparted to the grippers by the piston 456 regardless of the positions of the grippers. If it is not desired to impart such forward movements to the grippers the screw 474 is turned to such an extent as to prevent any movement of the piston 456.

In order to determine variably the force of the pull of the grippers on the upper the machine herein shown is provided with pressure-controlling means 480 (Figs. 1 and 1*a*) for carrying the pressure of the fluid effective in the cylinders 198 on the gripper-operating pistons 200 independently of the pressure acting on other elements of the machine. This pressure-controlling means includes a cylinder 482 supported on the frame and having threaded in its lower end a tubular member 484 which receives fluid under pressure from the source of supply. Threaded in the upper end of this member is a nipple 486 provided with a port 488 for the passage of the fluid. Above the nipple 486 the cylinder 482 is in communication through a pipe 490 with the cylinders 198. Slidingly mounted in the upper end of the cylinder is a piston 492 normally positioned as determined by engagement of a flange 494 on its upper end with the top of the cylinder and controlled as hereinafter described. Extending downwardly from the piston through the port 488 is a stem 496 of smaller diameter than the port. Below this stem is a ball shut-off valve 498 mounted in a valve cage 500 which is movable upwardly and downwardly in a passageway 502 in the nipple 484 and is smaller than the diameter of the passageway. Below the valve cage is a spring 504 which acts on the cage to hold the value 498 against the lower end of the stem 496. With the parts positioned normally as shown the fluid may pass the valve 498 on its way to the cylinders 198. As soon, however, as the pressure of the fluid effective in these cylinders becomes great enough the piston 492 rises and the spring 504 acts in response to such upward movement of the piston to raise the valve 498 and to cause it to close the port 488, thus shutting off the flow of the fluid to the cylinders 198. Such upward movement of the piston 492 is effected against the resistance of a tension spring 506 (Fig. 1). Screwed into one end of this spring is a nipple 508 pivotally connected to one arm of a bell-crank lever 510 the other arm of which bears on the top of the piston 492. Screwed into the other end of the spring is a nipple 512, and threaded in this nipple is a rod 514 which extends through a bearing in the frame and has fast on its outer end a hand wheel 516 for turning it, the hand wheel bearing against the frame. It will thus be seen that by turning the rod 514 the tension of the spring 506 may be varied to vary the amount of pressure required to raise the piston 492 and thereby to vary the force of the pull applied by the grippers to the upper. It will be understood that the pressure thus effective to raise the piston is somewhat less than the pressure of the fluid at the source. In order to afford the operator an indication of the condition of the spring 506 with respect to adjustment, there is provided a horizontal bell-crank lever 518 one arm of which serves as a pointer adjacent to a numbered scale (not shown) and the other arm of which is pivotally connected to a rod 522 extending through a lug 524 on the nipple 512 and having on one end a nut 526 in engagement with the lug. Between the lug and a collar 528 fast on the rod 522 is a compression spring 530 which may yield if the bell-crank lever 516 encounters resistance in its movement in one direction.

The wipers for wiping the marginal portion of the upper inwardly over the insole after the pulling of the upper by the grippers include what may be termed, for purposes of designation, main wipers 532 (Figs. 6, 7 and 8), each of these wipers having a wiping edge arranged to extend lengthwise of the shoe and curved to extend also inwardly widthwise of the shoe heelwardly of the ball line. Each wiper 532 is pivotally mounted at its front end to swing widthwise of the shoe about a stud 534 carried by the inner end of a bar or plate 536 secured on the upper face of a forwardly and inwardly curved arm 538 of which it serves as an extension, the arm being mounted to swing about a vertical pin 540 on the frame casting 8. By means hereinafter described the two arms 538 are swung inwardly toward the shoe to impart bodily inward movements to the wipers by forwardly and rearwardly extending levers 542 which are pivotally mounted between their front and rear ends to swing about studs 544 extending downwardly from the frame casting 8. Secured to each lever 542 underneath is a plate 546 having therein a slot 548 arranged to extend lengthwise of the shoe, and lying in this slot is a roll 550 (Figs. 7 and 8) mounted on a stud 552 extending upwardly from the rear end of the corresponding wiper 532. By reason of the locations of the pins 540 the wiper 532 carried by each arm 538 has a substantial component of bodily movement lengthwise of the shoe toward its toe end as it is carried inwardly by the arm, and during this movement of the arm the rear end of the wiper is guided and controlled by the slot 548, the roll 550 moving rearwardly along the slot. Through the roll, moreover, the rear end of the wiper is moved inwardly by the lever 542 as the arm 538 is swung inwardly. For maintaining the wipers in a heated condition each plate 546 has secured thereto underneath an electrical heating element 554 (Fig. 9).

Extending upwardly from each arm 538 in fixed relation thereto is a pin 558 having a reduced upper end portion lying in a slot 560 formed in a link 562 which is pivotally mounted on a stud 564 on the corresponding wiper-operating lever 542. The link 562 is made in two parts spaced vertically from each other, the two parts acting as one. Between the two parts of the link is a plate 566 pivotally mounted on a pin 568 on the link to swing relatively to the link. Formed in this plate is a slot 570 which includes a comparatively short portion 572 and a longer curved portion 574 in angular relation to each other. Lying in this slot is a roll 576 mounted on the reduced upper end portion of the pin 558. The plate 566 is controlled with respect to swinging movement about the pin 568 by a link 578 which connects it to the front end of the lever 542. This link includes a member 580 pivotally mounted on the plate 566 and a screw 582

threaded in this member and extending through a block 584 pivotally mounted on the lever 542. An enlarged head 586 on the screw engages one side of the block 584 and a collar 588 fast on the screw engages the other side of the block. It will therefore be evident that by turning the screw 582 the plate 566 may be adjusted about the pin 568.

From Fig. 6 it will be understood that when the parts are in starting positions the roll 576 on each pin 558 lies in the shorter portion 572 of the slot 570, this portion of the slot being in such relation to the link 562 that as the front arm of the lever 542 begins to swing inwardly the link acts positively through the plate 566 on the pin 558 to swing the wiper-carrying arm 538 in an inward direction, thus causing the wiper 532 to be moved inwardly with a component of movement toward the toe end of the shoe to wipe the upper over the insole. By reason of the manner in which the wiper is controlled by the slot 548 in the plate 546 it receives at this time no substantial swinging movement about the stud 534 as it is moved bodily inward. Since the link 578 is pivotally connected to the lever 542 at a greater distance from the fulcrum of the lever than the link 562 and since the link 562 is controlled by the upper end of the pin 558 in the slot 560, the lever 542 in its swinging movement acts through the link 578 to swing the plate 566 progressively about the pin 568 in the link. When the parts, therefore, have arrived in the positions indicated in Fig. 7 the roll 576 is at the junction of the two portions 572 and 574 of the slot 570 in the plate. As the lever 542 thereafter continues its swinging movement it is no longer effective to swing the arm 538, since by reason of the position of the portion 574 of the slot 570 and the continued swinging movement of the plate 566 about the pin 568 the plate no longer applies to the roll 576 any force tending to swing the arm 538 farther inward. The arm, therefore, remains stationary while the other parts move from the positions in which they are shown in Fig. 7 to those in which they are shown in Fig. 8, the link 562 being moved inward relatively to the pin 558 and the plate 566 continuing to swing about the pin 568. In this manner the wiper 532 is swung inwardly by the lever 542 about the stud 534 to complete the wiping operation, especially in locations forwardly of the ball line. While the arm 538 is swung no farther inwardly at this time, it is locked positively against any retractive movement by reason of the fact that the slot 560 in the link 562 and the portion 574 of the slot 570 in the plate 566 are in crosswise relation to each other. That is, the pin 558 cannot move outward along the slot 560 because of the position of the roll 576 in the slot 570. The construction thus provided affords insurance that regardless of the resistance of the shoe the wipers 532 will always be moved inwardly to the desired limits by the arms 538 before they are swung about the studs 534 to complete the wiping operation.

Each wiper 532 has in its lower face a recess in which is mounted a supplemental wiper 590 arranged to extend nearer to the toe end of the shoe for the purpose of varying the range of action of the wipers lengthwise of the shoe. The wiper 590 in the construction shown has an arcuate wiping edge of convex contour and is pivotally mounted on a pin 592 in the wiper 532 to expose more or less of its wiping edge rearwardly beyond the wiper 532. Pivotally connected to the two wipers 590 are rearwardly extending links 594 provided with slots 596 in which lie studs 598 extending upwardly from a crossbar 600 secured by a screw 602 to the rearwardly extending arm 58 (Fig. 4) of the shoe-rest member 54. As hereinbefore explained, when the operator presents a shoe to the machine he positions its toe-end face against the leather facing 76 on this member and moves the member more or less in a rearward direction against the resistance of the spring 70. Accordingly, the studs 598 are moved more or less rearwardly by this member as determined by the position of the shoe. Springs 604 connected to the wipers 590 tend to move them in rearward directions about the pins 592 and hold them initially in positions in which comparatively long portions of their wiping edges are exposed. It will be understood that when the wipers 532 are moved inwardly by the arms 538 with substantial components of rearward movement lengthwise of the shoe the wipers 590 receive the same movements until the rearward movements of the links 594 are stopped by engagement of the studs 598 with the links at the front ends of the slots 596. Thereafter the wipers 590 receive no further components of movement lengthwise of the shoe during any further such movements of the wipers 532. In this manner the distance lengthwise of the shoe of the engagement of the wipers with the upper is variably determined in operating on shoes of different sizes and insurance is afforded that the engagement of the wipers with the upper will terminate at the same distance from the end of the toe regardless of any variations in the positions of different shoes lengthwise in the machine, the position of each shoe in that respect being determined by sight with reference to the grippers. If the shoes operated upon, therefore, have at the sides of the toes upstanding pulling-over tacks *t* (Fig. 7), insurance will be afforded that the wipers will not hit these tacks. In order to vary the distance from the end of the toe at which the wipers terminate their engagement with the upper, the crossbar 600 has therein a slot 606 through which the screw 602 extends to permit it to be adjusted relatively to the shoe-rest member 54.

By reference to Fig. 6 it will be seen that the above-mentioned links 594 diverge from each other initially in directions toward the heel end of the shoe, and by the operation of the wipers they are swung into substantially parallel relation to each other, as illustrated in Fig. 8. Accordingly, after the movements of the supplemental wipers 590 toward the toe end of the shoe have been stopped by engagement of the studs 598 with the links in the manner above described, the links act during further inward movements of the wipers, especially the swinging movements thereof about the studs 534 after the termination of their bodily inward movements, to move the supplemental wipers 590 relatively to the wipers 532 in directions toward the heel end of the shoe. This serves to counteract any tendency of the wipers 590 to deflect the margin of the upper toward the toe end of the shoe in the wiping operation.

To afford better insurance that the portions of the margin of the upper in locations where the bottom of the inverted shoe slopes downward heelwardly of the ball line will be properly wiped inwardly over the insole and secured to the insole by adhesion, there is provided under the front end portion of each wiper 532 an auxiliary wiper 607 (Figs. 4 and 6). This wiper includes a thin plate 608 formed on a block 609 and engaging the wiper 532 in the vicinity of the stud 534. The block 609 is detachably mounted on an arm 610 which is pivotally mounted on a stud 612 on the arm 538 to swing in directions lengthwise of the shoe. A spring-pressed pin 614 in the arm 538 engages the outer end of the arm 610 and tends to swing the wiper 607 in a rearward direction toward the toe end of the shoe, the normal position of this wiper relatively to the wiper 532 being determined by engagement of the arm 610 with a shoulder 616 on the arm 538. The wiper 607, as shown in Fig. 4, further includes under the plate 608 a thin plate 618 which is curved to present a concave face toward the portion of the margin of the shoe bottom on which it acts and is resiliently flexible to permit it to adjust itself to the contour of the shoe bottom. It will be understood that the action of the auxiliary wiper on the shoe results from the swinging movement of the arm 538, this wiper being wedged inwardly between the front end portion of the wiper 532 and the downwardly inclined margin of the shoe bottom. The movement of the wiper 607 lengthwise of the shoe may be stopped by the resistance of the shoe before the arm 538 completes its movement, whereupon the spring-pressed pin 614 yields to permit continued movement of the arm 538.

The levers 542 by which the wipers are operated as above described have formed thereon gear sectors 622 in engagement with each other to equalize the swinging movements of the levers. For operating the levers there are provided two pistons 624 mounted in a cylinder 626 formed in the casting 44, the pistons having at their inner ends bosses 628 of reduced diameter to provide an annular space to receive operating fluid when the pistons are in engagement with each other at the limits of their inward movements. At its outer end each piston engages a pair of rolls 630 mounted on the rear end of the corresponding lever 542. A spring 632 connected to the levers 542 serves to retract the wipers and to return the pistons to their innermost positions. Operating fluid is admitted to the cylinder 626 from a pipe line 634 (Figs. 1

and 4) leading from the source of supply. The outward movements of the pistons in operating the wipers are limited by their engagement with stop blocks 636, one of which is shown in Fig. 6, these blocks being adjustable toward and from each other by a hand wheel 638 (Fig. 2) through means not herein shown in detail but constructed substantially as shown in the previously mentioned patent.

When the wipers have substantially completed their operative movements the toggle 36 (Fig. 4) is broken by means hereinafter described to release the lever 2 and thereby to permit the shoe to be forced more firmly up against the wipers by the toe rest 142 which is subject to the force of the operating fluid. Such release of the lever 2 permits upward movement of the shoe rest member 10 which is mounted on this lever and engages the ball portion of the shoe. Since the other shoe-rest member 54 engaging the toe end of the shoe is controlled by the lever 2 through the links 84, the lever 88 and the screw 100, as hereinbefore explained, the release of the lever 2 by the toggle also permits upward movement of the member 54. To insure, however, that adequate pressure will be applied by the wipers to the portions of the margin of the upper located near the beginning of the shank portion of the shoe, the construction is such as to prevent the member 54 from being moved as far upwardly by the pressure of the shoe thereon as the member 10. For this purpose there is threaded in the previously mentioned top frame plate 28 a vertical rod 640 having a knob 642 on its upper end for turning it, the lower end of the rod being located over the front arm of the lever 88 to limit adjustably as desired the upward movement of the shoe-rest member 54.

For breaking the toggle 36 to cause the shoe to be forced more firmly up against the wipers as above described, there is provided an arm 644 (Figs. 4 and 6) arranged to engage the front end of the screw 48 mounted in the toggle link 40. This arm is fast on a short shaft 646 mounted to turn in an extension of the left-hand stop block 636 and having fast on its lower end another arm 648 arranged to be engaged by one of the rolls 630 on the rear end of the left-hand wiper-operating lever 542. The arm 648 is so positioned on the shaft relatively to the arm 644 as to prevent the breaking of the toggle until the wipers have nearly completed their operative movements. Since the shaft 646 is carried by the adjustable stop block 636, the proper time relation between the termination of the movements of the wipers and the breaking of the toggle is maintained whatever may be the adjustment of the stop block.

The means provided for developing fluid pressure and for controlling the flow of the operating fluid, preferably light oil, to and from the different cylinders for operating the parts described is generally similar to the means provided for the same purpose in the machine shown in the previously mentioned patent, but differs therefrom in some respects. A pump 650 (Fig. 1) driven continuously by an electric motor 652 draws oil from a sump shown diagrammatically in Fig. 17 and delivers it through a pipe line 654 to a manifold 656. When the machine is in operation the fluid is thus maintained under pressure in the manifold, the maximum pressure of the fluid being determined by a spring-controlled relief valve shown diagrammatically in Fig. 17, this valve being mounted inside of a coupling 658 (Fig. 1) and permitting the excess fluid delivered by the pump to return to the sump through a pipe 660. In order to save power when the machine is idle the fluid is permitted at that time by a valve 662 to return from the manifold to the sump without the development of any substantial pressure in the manifold. This valve corresponds to the valve 506 shown in the previously mentioned patent and therefore will not be described in detail. It will be understood that as shown in Fig. 1 it is in open position, thus permitting escape of the fluid from the manifold through a tube 664 and a pipe 666 communicating with the above-mentioned pipe 660 leading to the sump. The valve is slidingly mounted on the tube 664 and when moved toward the left with reference to Fig. 1 closes the outlet from the manifold. The valve is thus moved by a lever 668 connected by a link 670 to one arm of a bell-crank lever 672 the other arm of which is connected by a short link 674 to the movable element 676 of a solenoid 678. When the electrical circuit of the solenoid is closed, therefore, the valve 662 is moved into position to close the outlet from the manifold and thus to cause the development of fluid pressure therein. When the circuit is broken the valve is returned into position to release the fluid from the manifold by a spring-pressed pin 680 acting on the bell-crank lever 672.

For controlling the flow of operating fluid to and from the different cylinders to operate the parts hereinbefore described the machine is provided with other valves herein shown only diagrammatically in Fig. 17 at *a*, *b*, *c*, *d* and *e*, the operations resulting respectively from the opening of these different valves being indicated graphically on the diagram. Each of these valves, which is substantially like the valve 546 shown in the previously mentioned patent, is similar in construction to the valve 662 and is operated electrically by a solenoid like the solenoid 678 associated with the valve 662, except that it is normally in closed position and is moved to open position by the solenoid. Associated respectively with the different solenoids, including the solenoid 678, are a plurality of electrical switches, the switch for controlling the circuit of the solenoid 678 being shown at 682 in Fig. 16. These switches are closed by pins 684 slidably mounted in a bracket 686 on the frame and are opened automatically by spring means when permitted by the pins. Associated respectively with the different pins for engaging and controlling them are a plurality of cams 688 secured by a key 690 on a drum 692 rotatably mounted in the construction herein shown on a stationary shaft 694. Also rotatable about this shaft and driven continuously through worm gearing 696, a pulley 698 and a belt 700 by the electric motor 652 is a ratchet wheel 702 which serves as part of a clutch 704 (Fig. 15). Arranged to cooperate with the ratchet wheel is a pawl 706 pivotally mounted on a stud 708 carried by a flange 710 formed on the drum 692. A leaf spring 712 mounted on a tail portion of the pawl 706 and engaging a pin 714 on the flange 710 tends to swing the pawl into engagement with the ratchet wheel to cause the drum and the cams thereon to be turned by the ratchet wheel. Initially, however, a lug 716 on the tail portion of the pawl is engaged by a pin 718 mounted on a ring 720 extending around the flange 710 to disconnect the pawl from the ratchet wheel, a pin 722 on the flange 710 engaging the pawl to limit its movement away from the ratchet wheel and cooperating with the pin 718 to determine the initial position of the drum and the cams. To actuate or trip the clutch and thus to start the cycle of operations of the machine the ring 720 is moved toward the left with reference to Fig. 14 to withdraw the pin 718 from engagement with the lug 716 and thus to cause the pawl 706 to be moved by the spring 712 into engagement with the ratchet wheel. In the construction herein shown the ring 720 has integral with the lower portion thereof a bar 724 extending lengthwise of the shaft 694 and supported by parallel links 726 which are pivotally mounted for swinging movements in directions lengthwise of the shaft. The ring is moved as above described by a piston 728 mounted in a cylinder 730 which is formed in a casting 732, this piston having on its outer end a flange 734 arranged to engage the casting to limit its inward movement in the cylinder. The outer end of the piston is in engagement with an upwardly extending arm of a bell-crank lever 736 the other arm of which is engaged by a spring-pressed pin 738 to hold the upwardly extending arm against the piston. Formed in the upwardly extending arm of the bell-crank lever is a notch 740 in which normally lies the end of a pawl 742 pivotally mounted on the bar 724, a spring 744 being connected to the pawl and to the bell-crank lever 736 to hold the pawl in the notch. It will thus be seen that the piston 728 acts through the bell-crank lever 736 and the pawl 742 to move the ring 720 in the direction to trip the clutch 704, this movement of the ring being effected against the resistance of a spring-pressed pin 746 engaging the end of the bar 724. After the tripping of the clutch a downwardly extending tail 748 on the pawl 742 is acted upon by a fixed pin 750 to withdraw the pawl from the notch 740 and thus to cause the ring 720 to be returned by the spring-pressed pin 746 to its normal position to cause the pawl 706 to be disengaged from the ratchet wheel 702 at the end of the cycle. The normal position of the ring is determined by its engagement with a stop face 752 on the casting 732. Upon release of the fluid from the cylinder 730 the piston 728 is returned by the spring-pressed pin 738.

Fluid is delivered to the cylinder 730 from the manifold 656 through a pipe line 754. As will be evident

from Fig. 1, this pipe line is in open communication with the manifold, and accordingly the tripping of the clutch to start the cycle may be effected in response to the development of fluid pressure in the manifold upon the closing of the outlet valve **662**. Between the manifold and the cylinder **730**, however, there is interposed in the pipe line **754** a sliding shut-off valve **756** (Fig. 1) movable by means of a knob **758** on its front end into position to interrupt communication between the cylinder and the manifold. With the valve in this position, therefore, the development of pressure in the manifold will not result in the starting of the cycle. As will be more clearly evident hereinafter, this will enable the operator to observe the relation of the grippers and the holddowns associated therewith to the shoe after the grippers and the holddowns have been moved outwardly over the insole and the shoe has been engaged by the side clamps **102**. To start the cycle thereafter the operator will return the valve **756** into position to establish communication between the manifold and the cylinder **730**.

In general accordance with the disclosure of the previously mentioned patent, the movement of the valve **662** into position to close the outlet from the manifold and thus to cause the development of fluid pressure in the manifold is effected by the solenoid **678** in response to presentation of the shoe to the machine. For this purpose, in the construction herein shown, a rod **760** (Fig. 4) is mounted for upward and downward movements in the shoe rest member **10** and is pivotally connected at its upper end to one arm of a bell-crank lever **762** pivotally mounted on the pin **86** on the front end of the lever **88**. Extending rearwardly from the other arm of this bell-crank lever is a link **764** pivotally connected at its rear end to one arm of a bell-crank lever **766** pivotally mounted on the bracket **452**, the other arm of this bell-crank lever being pivotally connected to the upper end of a downwardly extending rod **768** (Fig. 1). This rod is pivotally connected at its lower end to one arm of a lever **770** pivotally mounted between its ends on a bracket **772** on the frame, and pivotally suspended on the other arm of this lever is a bar **774** extending downwardly (Figs. 14 and 16) through a slot in the rear end of an arm **776** pivotally mounted at its front end on an arm **778** projecting forwardly from the bracket **686**. The arm **776** normally rests on the upper end of a screw **780** in the arm **778** and a portion thereof extends into a notch **782** in the bar **774**, a spring **784** being connected to the bar **774** and to a pin **786** on the arm **776** to hold the bar in the relation to the arm **776** in which it is shown in Fig. 16. Pivotally suspended on the rear end of the arm **776** is another bar **788** which extends downwardly between two of the cams **688** in engagement with a sleeve **790** formed on one of these cams. It will be evident that upward movement of the rod **760** (Fig. 4) in response to pressure of the bottom of the shoe thereon after the operator has presented the shoe in the proper position lengthwise in the machine serves, through the connections described, to impart upward movement to the bar **774**, and by the upward movement of this bar the arm **776** and the bar **788** are moved upwardly. Formed in the bar **788** is a recess **792** in which lies initially the front end of that pin **684** which controls the switch **682**, this recess being so formed that by the upward movement of the bar **788** the pin is moved rearwardly to close the switch. As hereinbefore explained, such closing of the switch results in the movement of the valve **662** into position to close the outlet from the manifold and thus to cause the development of the fluid pressure. Shortly after the starting of the cycle in response to the actuation of the clutch **704** a stud **794** on the sleeve **790** acts through a member **796** which is pivotally mounted on the arm **778** to swing the bar **774** in a rearward direction and thus to disconnect it from the arm **776**, whereupon this arm is swung downwardly, partly by gravity and partly by the spring **784**, to return the bar **788** to its initial position. By that time, however, that cam **688** which is associated with the above-mentioned pin **684** has arrived in position to control the pin and thus to hold the switch **682** closed. In response to the release of the shoe after the lasting operation the bar **774** is moved downwardly into position to connect it again with the arm **776** by a spring **798** connected to the lever **770**.

Directly in response also to the presentation of the shoe to the machine fluid is admitted to the cylinders **342** (Fig. 6) to move the grippers and the holddowns associated therewith outwardly toward the edge of the insole in the manner hereinbefore described and to the cylinder **112** to move the side clamps **102** inwardly into engagement with the shoe. As will be evident from the diagram (Fig. 17) the admission of the fluid to these two cylinders is controlled by a single valve *a*. For the purpose in view, that pin **684** which is associated with the switch (corresponding to the switch **682**) associated with this valve is also controlled by the above-mentioned bar **788**, the bar having therein a recess **800** (Fig. 14) into which the front end of the pin initially extends. In response, therefore, to the upward movement of the bar this pin, as well as the pin which controls the switch **682**, is moved rearwardly to close the switch associated therewith, after which this switch is held closed by that one of the cams **688** which is next to the cam controlling the switch **682**. The other four cams **688** serve through the corresponding pins **684** both to close and to cause the opening of the switches associated therewith at the proper times in the cycle of operations.

In general accordance with the disclosure of the previously mentioned patent, the machine herein shown is provided with means for causing the release of the fluid from the cylinders **180** and for thereby causing the grippers to release the upper at a time determined by the positions of the side clamps **102** in engagement with the shoe. For this purpose the machine includes a switch **802** (Fig. 6) in the same circuit with that cam-controlled switch in response to the closing of which the fluid is admitted to the cylinders **180** to cause the closing of the grippers, the switch **802** being normally closed. In the construction herein shown the switch **802** is mounted on the rear end of a lever **804** pivotally mounted between its front and rear ends on a bracket **806** on the frame of the machine, the front end of this lever being connected by a link **808** to the rearward extension **134** of the right-hand side clamp lever **104**. Also pivotally mounted on the bracket **806** is a lever **810** the front end of which is adjustably connected by a link **812** to the rear end of one of the wiper-operating levers **542**. On the rear end of the lever **810** is a cam face **814** arranged to engage a roll **816** carried by a rearwardly movable switch-closing pin **818**. It will thus be seen that the position of the switch **802** is determined by the positions of the side clamps **102** in engagement with the shoe and will vary in operating on shoes of different widths. As the wipers are moved inwardly toward the shoe the cam face **814** acts on the pin **818** to open the switch **802** and thereby to cause the opening of the grippers at a time determined by the position of the switch. Whatever may be the width of the shoe, therefore, the grippers open and release the upper when the wipers have arrived in the desired relation to the edge of the shoe bottom, thus insuring the proper coordination between the release of the upper by the grippers and the beginning of the action of the wipers thereon.

Under some conditions it may be desired to bring the machine to a stop prior to the end of the cycle at the time when the wipers are in pressure-applying relation to the margin of the upper on the insole. For this purpose there is provided a stop member **820** (Fig. 15) pivotally mounted on the ring **720** for movement either into or out of the path of the lug **716** on the pawl **706**. When the stop member is in the path of the lug it will engage the lug and thereby disconnect the pawl from the ratchet wheel **702** at the above-mentioned time in the cycle. The stop member is connected by a link **822** to one arm of a bell-crank lever **824** (Fig. 1) the other arm of which is connected by a link **826** to the rear end of a forwardly extending rod **828**, the front end of this rod being connected to a pin **830** slidingly mounted in a bracket **832** on the frame. On the front end of the pin is a knob **834** by which the pin and the rod **828** may be moved rearwardly against the resistance of a spring **836**. With the parts in the positions shown the stop member **820** is in the path of the lug **716**, and accordingly the machine will come to a stop at the above-mentioned time in the cycle. The starting of the machine thereafter to cause it to complete the cycle is effected by pressure against the knob **834**, by which pressure the stop member **820** is swung upwardly to release the pawl **706**. If it is not desired that the machine shall come to a stop when the wipers are over the shoe the pin **830** may be locked in a position in which the stop member **820** is out of the path of the lug **716**. For this purpose there

is vertically movable in the bracket 832 a pin 838 the reduced upper end of which may enter a recess 840 in the pin 830 to hold the stop member 820 in an idle position. For moving the pin 838 upwardly or downwardly there is provided a pin 842 slidingly mounted in the frame and having a knob 844 on its front end, this pin being connected by a bell crank 846 to the lower end of the pin 838. To hold the pin 838 in its upraised locking position there is provided a spring-pressed detent 848 arranged to enter a recess 850 in the pin.

The manner of operation of the machine will now be briefly summarized. The operator first makes certain that the grippers and the holddowns are adjusted at the proper height relatively to the shoe rest 10 by the turning of the rod 306 (Fig. 2). Preferably the adjustment is such that the lower faces of the inner jaws 168 of the grippers and the lower faces of the presser feet 212 of the holddowns are slightly below the plane of the lower faces of the presser feet 12 of the shoe rest 10. The operator also ascertains whether the grippers are properly positioned to operate upon that shoe of a pair which he is first to present to the machine, and if not he so positions them by movement of the rod 440 (Fig. 2). In presenting the shoe the operator engages its toe-end face with the leather facing 76 on the shoe-rest member 54 and by such engagement moves this member in a rearward direction until the margin of the upper at the sides of the ball portion of the shoe is in proper relation to the grippers as determined by sight. By the movement thus imparted to the shoe-rest member 54 the studs 598 (Fig. 6) are adjusted to positions for properly determining thereafter the limits of movement lengthwise of the shoe of the supplemental wipers 590. Since the rod 760 (Fig. 4) extends initially downward not only beyond the shoe rest 10 but also beyond the inner jaws of the grippers, the shoe is held by the operator out of contact with these jaws until it has been properly positioned lengthwise as described, after which he moves it upwardly to cause these jaws to engage the insole, thereby raising the rod 760. Through the connections described this upward movement of the rod serves to raise the switch-controlling bar 788 (Fig. 16), and in response to this upward movement of the bar the switch 682 is closed to cause the valve 662 (Fig. 1) to close the outlet from the manifold 656 and thus to cause the development of fluid pressure in the manifold. Also in response to the upward movement of the bar 788 the switch controlling the valve *a* (Fig. 17) is closed to cause the grippers and the holddowns to be moved outwardly over the insole from the positions in which they are shown in Fig. 9 to the positions indicated in Fig. 10 and also to cause the side clamps 102 to be moved inwardly into clamping and positioning engagement with the sides of the shoe. If the valve 756 (Fig. 1) is so positioned as to interrupt communication between the manifold and the cylinder 730 (Fig. 14), the operator is now afforded the opportunity to determine whether the grippers and the holddowns are in proper relation to the shoe and, if not, to make any necessary correction. If conditions are satisfactory, he starts the cycle of operations by moving the valve 756 into position to establish communication between the manifold and the cylinder 730. If, on the other hand, this valve is initially so positioned that the manifold is in communication with the cylinder 730, the clutch 704 is tripped automatically to start the cycle in response to the development of pressure in the manifold. It will be understood that the side clamps 102 centralize the shoe between them and that since the stop screws 356 (Fig. 6) are positioned by the side clamp levers 104 the outward movements of the grippers and the holddowns over the insole by the action of the pistons 344 are limited as determined by the positions of the clamps.

Substantially at the beginning of the cycle of operations the stud 794 (Fig. 16) disconnects the bar 774 from the arm 776 and thus causes the switch-closing bar 788 to be moved downwardly to its initial position. By this time, however, the two switches which were closed by the upward movement of this bar are held closed by the appropriate cams 688 on the rotating drum 692. Substantially at the beginning of the cycle also the appropriate cam causes the admission of fluid to the cylinder 152 (Fig. 4) to move the toe rest 142 upwardly and thereby to force the shoe up against the shoe rest members 10 and 54, the grippers and holddowns being moved slightly upward by the shoe until the shoe is seated against these members. Thereafter the appropriate cam 688 causes the admission of fluid to the cylinders 180 for closing the grippers on the upper. This is followed by the admission of fluid by the valve *d* (Fig. 17) to the cylinders 198 for operating the grippers to pull the upper heightwise of the last, the grippers applying their pull to the upper by a positive purchase on the bottom of the shoe through the holddowns 208. The pressure of the fluid thus acting on the grippers is adjustably determined in the manner described by the valve means shown in Fig. 1*a*. As illustrated by the diagram (Fig. 17), the same cam-controlled valve *d* which admits fluid to the cylinders 198 admits it also to the cylinder 454 (Fig. 2) for imparting short upper-pulling movements lengthwise of the last toward its heel end to the grippers, to the cylinders 310 for compressing the springs 316 which act later to withdraw the grippers and the holddowns from the shoe and to the cylinders 362 (Fig. 6) for displacing the stop screws 356 and for thus causing the grippers and the holddowns to be moved still farther outwardly to positions determined by the stop screws 370, as illustrated in Fig. 11. As hereinbefore explained, the flow of the fluid to the cylinders 198 is so retarded by the restricted orifices 372 that the displacement of the stop screws 356 and the upper-pulling movements of the grippers toward the heel end of the last take place prior to any substantial pull of the grippers on the upper heightwise of the last. As hereinbefore explained, such movements of the grippers toward the heel end of the last may, if desired, be prevented by turning the screw 474 (Fig. 4) to such a position as to prevent any movement of the piston 456.

After the pulling of the upper by the grippers the appropriate cam 688 causes the admission of fluid to the cylinder 626 (Fig. 6) for operating the wipers. By the resulting inward swinging movements of the front arms of the levers 542 the wiper-carrying arms 538 are swung inwardly through the action of the links 562 and the plates 566 which connect the levers to these arms. The directions in which the arms 538 are thus moved is such that the main wipers 532 and the supplemental wipers 590 have substantial components of movement lengthwise of the shoe towards its toe end as they are moved bodily inward, the rolls 550 on the rear ends of the wipers 532 moving rearwardly along the slots 548 in the plates 546 carried by the levers 542 and the rear ends of these wipers, along with the supplemental wipers 590, being moved inwardly through these plates simultaneously with the swinging of the arms 538. The components of rearward movement imparted to the supplemental wipers 590 at this time cause the links 594 to move rearwardly until stopped by the studs 598 which thereby determine the limits of the rearward movements of the supplemental wipers. Substantially at the time when the wipers arrive in positions to act on the upper the grippers are opened to release the upper by reason of the opening of the switch 802 (Fig. 6), the time of the opening of the switch being determined by the positions of the side clamps 102, as hereinbefore explained. Immediately upon the release of the upper by the grippers the previously compressed springs 316 (Fig. 3) raise the arms 264 and thereby move the grippers and the holddowns upwardly to such positions as to insure against any interference between them and the wipers.

The first portion of the wiping operation of the wipers on the upper is effected by the above-described bodily movements thereof widthwise and lengthwise of the shoe, the auxiliary wipers 607 at this time being wedged yieldingly inward by the swinging of the arms 538 between the wipers 532 and the portions of the bottom of the shoe which are inclined downward heelwardly of the ball line. When the wipers have arrived substantially in the positions illustrated in Fig. 7, at which time the wiping operation has been substantially completed heelwardly of the ball line but only begun in locations nearer the toe end of the shoe, the swinging of the arms 538 ceases by reason of the relation of the plates 566 to the rolls 576 while the front arms of the levers 542 continue their inward swinging movements. In response to such further movements of these arms the wipers 532, together with the supplemental wipers 590, are swung inwardly about the studs 534, located at this time sub-

stantially at the heelward end of the ball portion of the shoe, through the action of the plates **546** on the rolls **550**, thus completing the wiping operation as illustrated in Fig. 8. As hereinbefore fully explained, the arms **538** are, through the action of the plates **566**, locked at this time against any retractive movements. As the wipers are thus swung inwardly the links **594** approach a parallel relation and thereby impart to the wipers **590** short heelward movements relatively to the wipers **532**. Substantially at the end of the wiping operation the toggle **36** (Fig. 4) is broken by the arm **644** to release the lever **2** and thereby also to release the lever **88**. This permits the shoe to be forced more firmly up against the wipers by the toe rest **142** to increase the pressure of the wipers on the margin of the upper. Since the rod **640** permits at this time only a very short upward movement of the shoe-rest member **54** which engages the bottom of the toe end of the shoe, while the shoe rest member **10** engaging the ball portion of the shoe can move farther upwardly, the tendency of the toe rest is to rock the shoe in the direction to raise its heel end and thus to insure that adequate pressure will be applied by the wipers to the portions of the margin of the upper near the beginning of the shank portion of the shoe.

If the parts shown in Fig. 1 for controlling the stop member **820** (Figure 15) are in the positions shown, this stop member acts on the clutch to stop the cycle of operations when the wipers are in pressure-applying relation to the margin of the upper over the insole. In that case the operator, after a few seconds, withdraws the stop member by pressure on the knob **834** (Fig. 1) to cause the machine to complete the cycle. If, however, the stop member **820** is held in an idle position by the action of the locking pin **838** (Fig. 1) on the pin **830**, the machine is not stopped with the wipers over the shoe but continues to the end of the cycle. Near the end of the cycle the shoe is released by the withdrawal of the wipers, the toe rest and the side clamps and falls upon a shoe receiver **852** (Fig. 1) constructed substantially as disclosed in the earlier patent. At the end of the cycle the valve **662** is returned automatically to its initial position to open the outlet from the manifold. Near the end of the cycle, moreover, release of the fluid from the cylinder **420** (Fig. 5), to which fluid was admitted to operate the piston **422** simultaneously with its admission to the cylinder **626** for operating the wipers, causes the latch **428** to be operated by the springs **432** to shift the grippers into positions to operate on the next shoe if the machine is to operate on right and left shoes alternately.

Novel features of the wiper-operating and controlling mechanism herein disclosed are claimed in a divisional application Serial No. 265,107, filed on January 5, 1952, upon which Letters Patent of the United States No. 2,663,037 were granted on December 22, 1953.

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

1. In a lasting machine, grippers for gripping the marginal portion of the upper of a shoe on a last at the opposite sides of the last respectively, means for moving said grippers heightwise of the last to pull the upper, mechanism for moving the grippers outwardly away from each other widthwise of the last toward the edge of the shoe bottom before they grip the upper, and means for causing said mechanism to move the grippers thereafter in the same directions farther outwardly in gripping engagement with the upper prior to any substantial pull on the upper heightwise of the last.

2. In a lasting machine, grippers for gripping the marginal portion of the upper of a shoe on a last at the opposite sides of the last respectively and for pulling the upper heightwise of the last, operating means for moving said grippers outwardly away from each other widthwise of the last toward the edge of the shoe bottom before they grip the upper, stop mechanism arranged to act in opposition to said operating means to limit such outward movements of the grippers, and means for displacing said stop mechanism to cause the grippers to be moved farther outwardly by said operating means after they have gripped the upper.

3. In a lasting machine, grippers for gripping the marginal portion of the upper of a shoe on a last at the opposite sides of the last respectively and for pulling the upper heightwise of the last, operating means for moving said grippers outwardly away from each other widthwise of the last toward the edge of the shoe bottom before they grip the upper, stop mechanism arranged to act in opposition to said operating means to limit such outward movements of the grippers, means for displacing said stop mechanism to cause the grippers to be moved farther outwardly by said operating means after they have gripped the upper, and additional stop mechanism for limiting such further outward movements of the grippers.

4. In a lasting machine, grippers for gripping the marginal portion of the upper of a shoe on a last at the opposite sides of the last respectively and for pulling the upper heightwise of the last, mechanism movable by pressure of operating fluid thereon to move said grippers outwardly away from each other widthwise of the last toward the edge of the shoe bottom before they grip the upper, and means for causing said mechanism to move the grippers thereafter in the same directions farther outwardly in gripping engagement with the upper.

5. In a lasting machine, grippers for gripping the marginal portion of the upper of a shoe on a last at the opposite sides of the last respectively and for pulling the upper heightwise of the last, fluid-operated means for moving said grippers outwardly away from each other widthwise of the last toward the edge of the shoe bottom before they grip the upper, means for limiting such outward movements of the grippers, and means for rendering said limiting means inoperative after the grippers have gripped the upper to cause them to be moved in the same directions farther outwardly by said fluid-operated means.

6. In a lasting machine, grippers for gripping the marginal portion of the upper of a shoe on a last at the opposite sides of the last respectively and for pulling the upper heightwise of the last, members movable by fluid pressure to move said grippers outwardly away from each other widthwise of the last toward the edge of the shoe bottom before they grip the upper, stops for limiting such outward movements of the grippers, and means for displacing said stops after the grippers have gripped the upper to cause them to be moved in the same directions farther outwardly by said fluid-operated members.

7. In a lasting machine, grippers for gripping the marginal portion of the upper of a shoe on a last at the opposite sides of the last respectively and for pulling the upper heightwise of the last, members movable by fluid pressure to move said grippers outwardly away from each other widthwise of the last toward the edge of the shoe bottom before they grip the upper, stops for limiting such outward movements of the grippers, means for displacing said stops after the grippers have gripped the upper to cause them to be moved in the same directions farther outwardly by said fluid-operated members, and additional stops for limiting such further outward movements of the grippers.

8. In a lasting machine, grippers for gripping the marginal portion of the upper of a shoe on a last at the opposite sides of the last respectively and for pulling the upper heightwise of the last, members movable by fluid pressure to move said grippers outwardly away from each other widthwise of the last toward the edge of the shoe bottom before they grip the upper, stops for limiting such outward movements of the grippers, and other fluid-operated members for displacing said stops after the grippers have gripped the upper to cause them to be moved in the same directions farther outwardly by said first-named members.

9. In a lasting machine, grippers for gripping the marginal portion of the upper of a shoe on a last at the opposite sides of the last respectively and for pulling the upper heightwise of the last, means for moving said grippers outwardly away from each other widthwise of the last toward the edge of the shoe bottom before they grip the upper, side clamp members arranged to engage the upper at the opposite sides of the last to position the shoe between them, arms mounted for swinging movements inwardly toward each other widthwise of the last to apply said clamp members to the upper, and stops connected to said arms in locations where the arms thus approach each other to be moved inwardly by the arms into positions to limit the outward movements imparted to the grippers.

10. In a lasting machine, grippers for gripping the marginal portion of the upper of a shoe on a last at the opposite sides of the last respectively and for pulling the upper heightwise of the last, means for moving said grippers outwardly away from each other widthwise of the last

toward the edge of the shoe bottom before they grip the upper, side clamp members arranged to engage the upper at the opposite sides of the last to position the shoe between them, arms mounted for swinging movements inwardly toward each other widthwise of the last to apply said clamp members to the upper, members pivotally connected to said arms to be moved inwardly by the arms, and stops carried by said members for limiting the outward movements imparted to the grippers.

11. In a lasting machine, grippers for gripping the marginal portion of the upper of a shoe on a last at the opposite sides of the last respectively and for pulling the upper heightwise of the last, fluid-operated means for moving said grippers outwardly away from each other widthwise of the last toward the edge of the shoe bottom before they grip the upper, side clamp members arranged to engage the upper at the opposite sides of the last to position the shoe between them, arms mounted to swing inwardly toward each other widthwise of the last to apply said clamp members to the upper, stops connected to said arms to be moved inwardly by the arms into positions to limit the outward movements imparted to the grippers, and means for displacing said stops after the grippers have gripped the upper to cause them to be moved in the same directions farther outwardly by said fluid-operated means.

12. In a lasting machine, grippers for gripping the marginal portion of the upper of a shoe on a last at the opposite sides of the last respectively and for pulling the upper heightwise of the last, side clamps arranged to engage the upper at the opposite sides of the last to position the shoe between them, said clamps being mounted to move inwardly toward each other widthwise of the last into engagement with the upper, cylinders connected to said clamps to be moved inwardly with them widthwise of the last, and pistons in said cylinders movable by pressure of operating fluid thereon to move said grippers outwardly away from each other widthwise of the last toward the edge of the shoe bottom before they grip the upper.

13. In a lasting machine, grippers for gripping the marginal portion of the upper of a shoe on a last at the opposite sides of the last respectively and for pulling the upper heightwise of the last, side clamps arranged to engage the upper at the opposite sides of the last to position the shoe between them, said clamps being mounted to move inwardly toward each other widthwise of the last into engagement with the upper, cylinders connected to said clamps to be moved inwardly with them widthwise of the last, pistons in said cylinders movable by pressure of operating fluid thereon to move said grippers outwardly away from each other widthwise of the last toward the edge of the shoe bottom before they grip the upper, and stops also connected to said clamps to be moved inwardly with them into positions to limit the outward movements imparted to the grippers.

14. In a lasting machine, grippers for gripping the marginal portion of the upper of a shoe on a last at the opposite sides of the last respectively and for pulling the upper heightwise of the last, side clamp members arranged to engage the upper at the opposite sides of the last to position the shoe between them, arms mounted for swinging movements inwardly toward each other widthwise of the last to apply said clamp members to the upper, cylinders pivotally connected to said arms to be moved inwardly by them widthwise of the last, pistons in said cylinders movable by pressure of operating fluid thereon to move said grippers outwardly away from each other widthwise of the last toward the edge of the shoe bottom before they grip the upper, and devices also pivotally connected to said arms to be moved inwardly by them into positions to limit the outward movements imparted to the grippers.

15. In a lasting machine, grippers for gripping the marginal portion of the upper of a shoe on a last at the opposite sides of the last respectively, fluid-operated mechanisms associated respectively with said different grippers for moving them heightwise of the last to pull the upper by a positive purchase on the bottom of the shoe, a source of fluid under pressure for thus operating said mechanisms, and valve means for automatically interrupting the flow of operating fluid to said mechanisms when the pressure of the fluid acting thereon reaches a variably predetermined limit below the pressure at said source to cause said fluid-operated mechanisms to exert an unyielding pull on the upper.

16. In a lasting machine, grippers for gripping the marginal portion of the upper of a shoe on a last at the opposite sides of the last respectively, fluid-operated mechanisms associated respectively with said different grippers for moving them heightwise of the last to pull the upper by a positive purchase on the bottom of the shoe, a source of fluid under pressure for thus operating said mechanisms, a valve past which the fluid flows to said mechanisms, a member movable against yielding resistance by the pressure of the fluid effective on said mechanisms to cause said valve to close when said pressure reaches a predetemined limit below the pressure at said source to cause said fluid-operated mechanisms to exert an unyielding pull on the upper, and means for adjustably varying the resistance to the movement of said member to limit the intensity of the pull applied by the grippers.

17. In a lasting machine, grippers for gripping the marginal portion of the upper of a shoe on a last at the opposite sides of the ball portion of the shoe respectively and for pulling the upper in the course of a cycle of power operations of the machine, means supporting said grippers for movements to different positions for operating on right and left shoes respectively, a lever connected to the grippers for moving them into positions to operate on a right shoe by its swinging movement in one direction and into positions to operate on a left shoe by its reverse movement, a member rotatable intermittently in one direction to swing said lever successively in opposite directions, and automatic means for thus rotating said member to position the grippers for operating alternately on right and left shoes in successive cycles of operations of the machine.

18. In a lasting machine, grippers for gripping the marginal portion of the upper of a shoe on a last at the opposite sides of the ball portion of the shoe respectively and for pulling the upper in the course of a cycle of power operations of the machine, means supporting said grippers for movements to different positions for operating on right and left shoes respectively, a lever connected to the grippers for moving them into positions to operate on a right shoe by its swinging movement in one direction and into positions to operate on a left shoe by its reverse movement, a member rotatable intermittently in one direction to swing said lever successively in opposite directions, a device mounted for reciprocatory movements thus to rotate said member, and means for operating said device in each cycle of operations to position the grippers for operating alternately on right and left shoes in successive cycles.

19. In a lasting machine, grippers for gripping the marginal portion of the upper of a shoe on a last at the opposite sides of the ball portion of the shoe respectively and for pulling the upper in the course of a cycle of power operations of the machine, means supporting said grippers for movements to different positions for operating on right and left shoes respectively, a lever connected to the grippers for moving them into positions to operate on a right shoe by its swinging movement in one direction and into positions to operate on a left shoe by its reverse movement, a member rotatable intermittently in one direction to swing said lever successively in opposite directions, automatic means for thus rotating said member to position the grippers for operating alternately on right and left shoes in successive cycles of operations of the machine, and additional means movable by the operator to rotate said member and thereby to position the grippers for operating on either a right shoe or a left shoe selectively.

20. In a lasting machine, grippers for gripping the marginal portion of the upper of a shoe on a last at the opposite sides of the ball portion of the shoe respectively and for pulling the upper in the course of a cycle of power operations of the machine, means supported said grippers for movements to different positions for operating on right and left shoes respectively, automatic means for thus moving said grippers in one cycle of operations into positions for operating on a right shoe and in the next cycle into positions for operating on a left shoe, means for alternatively preventing such automatic movements of the grippers, and additional means movable by the operator for positioning the grippers to operate on either a right shoe or a left shoe selectively when their automatic positioning movements are thus prevented.

21. In a lasting machine, grippers for gripping the

marginal portion of the upper of a shoe on a last at the opposite sides of the ball portion of the shoe respectively and for pulling the upper, a lever connected at its opposite ends respectively to the different grippers for moving them simultaneously in opposite directions lengthwise of the last and for thereby positioning them for operating on right or left shoes, another lever for operating said first-named lever, a member having a predetermined range of movement for operating said other lever and for thereby moving the grippers to their different positions, and means providing a fulcrum for said other lever shiftable to vary the extent of the movements imparted to the grippers by said member.

22. In a lasting machine, grippers for gripping the marginal portion of the upper of a shoe on a last at the opposite sides of the ball portion of the shoe respectively, fluid-operated means for moving said grippers heightwise of the last to pull the upper, and a member connected to both said grippers and movable by the pressure of operating fluid thereon to move them in a direction toward the heel end of the last and thereby to cause them to pull the upper also in that direction.

23. In a lasting machine, grippers for gripping the marginal portion of the upper of a shoe on a last at the opposite sides of the ball portion of the shoe respectively and for pulling the upper heightwise of the last, means including members connected respectively to the different grippers for moving them in opposite directions simultaneously lengthwise of the last to different positions for operating on right and left shoes, and power-operated means arranged to act through said members to move both grippers simultaneously lengthwise of the last toward its heel end to cause them to pull the upper also in that direction.

24. In a lasting machine, grippers for gripping the marginal portion of the upper of a shoe on a last at the opposite sides of the ball portion of the shoe respectively and for pulling the upper heightwise of the last, means including rods connected respectively to the different grippers for moving them simultaneously in opposite directions lengthwise of the last to different positions for operating on right and left shoes, a lever connected at its opposite ends to said rods, and a fluid-operated member connected to said lever between its opposite ends for moving said lever bodily lengthwise of the last toward its heel end to cause the grippers to pull the upper also in that direction.

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