

Feb. 5, 1963

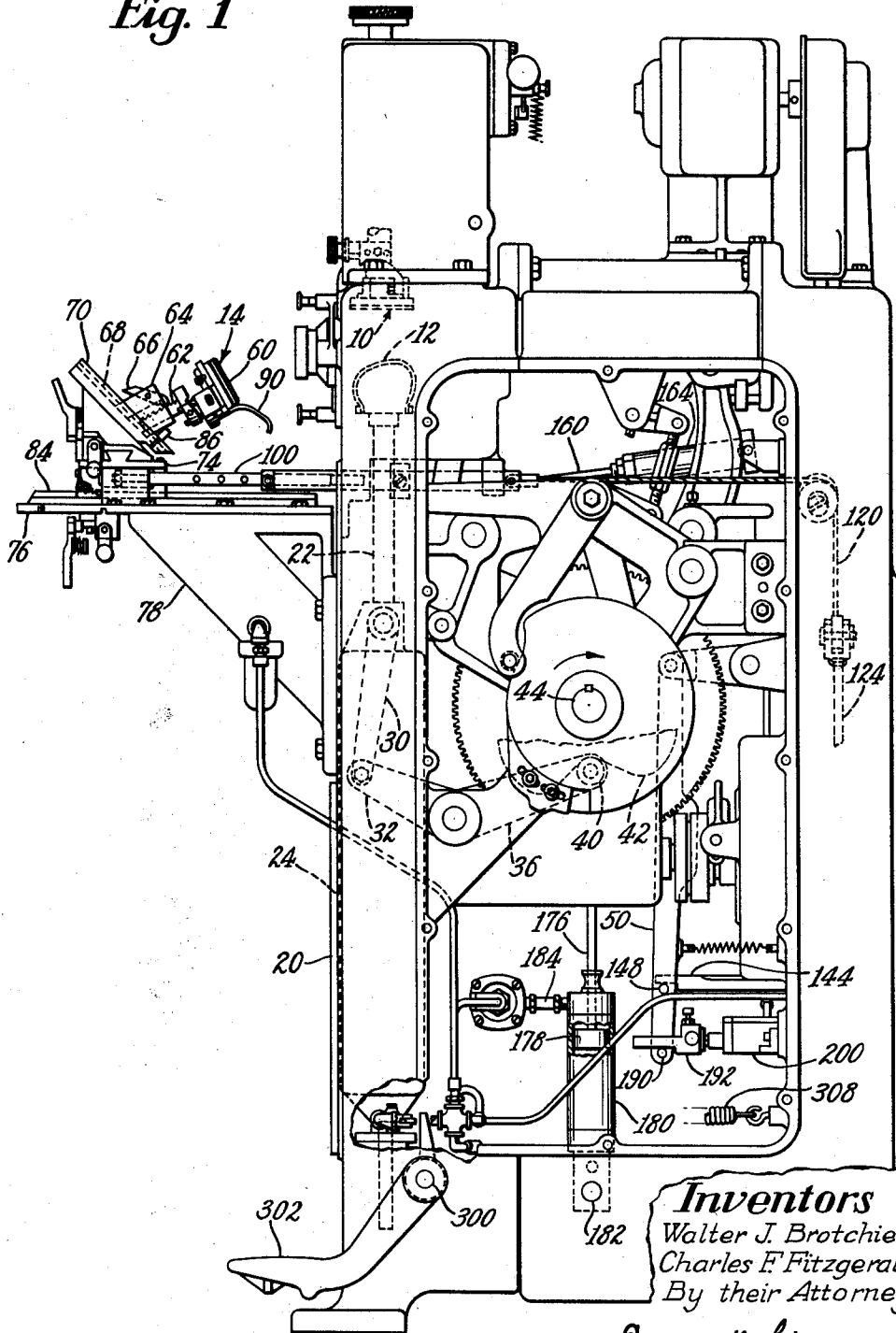
W. J. BROTCHE ET AL
SHOE SUPPORTING MECHANISMS

3,076,210

Filed June 21, 1961

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Fig. 1



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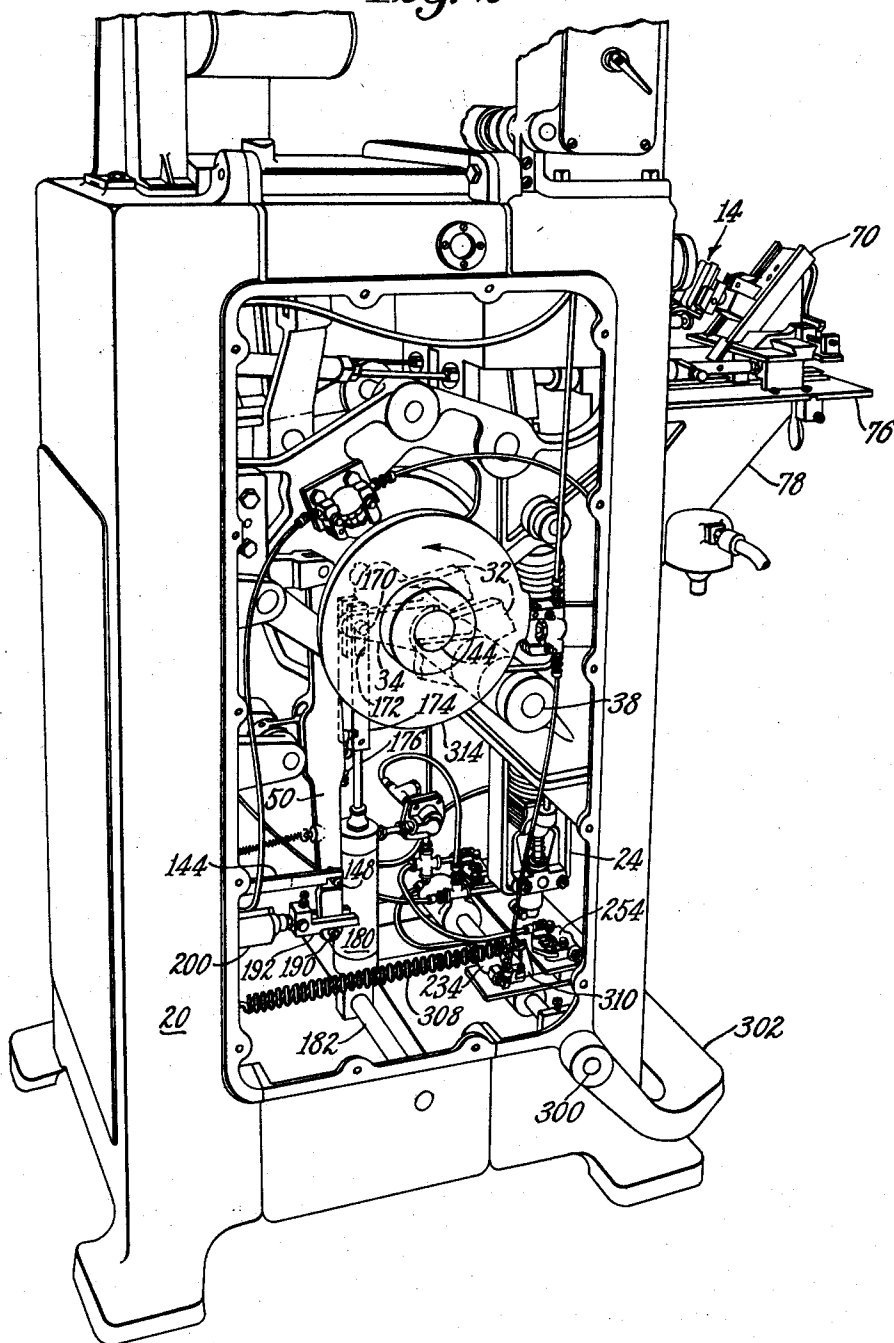
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Fig. 2



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Fig. 3

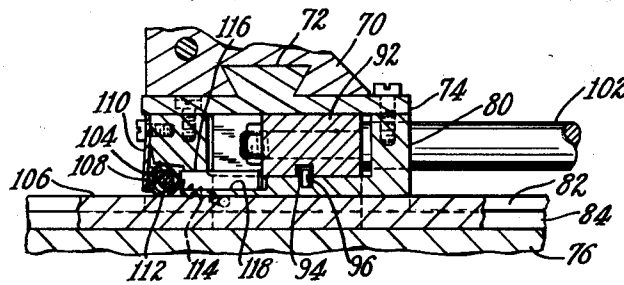
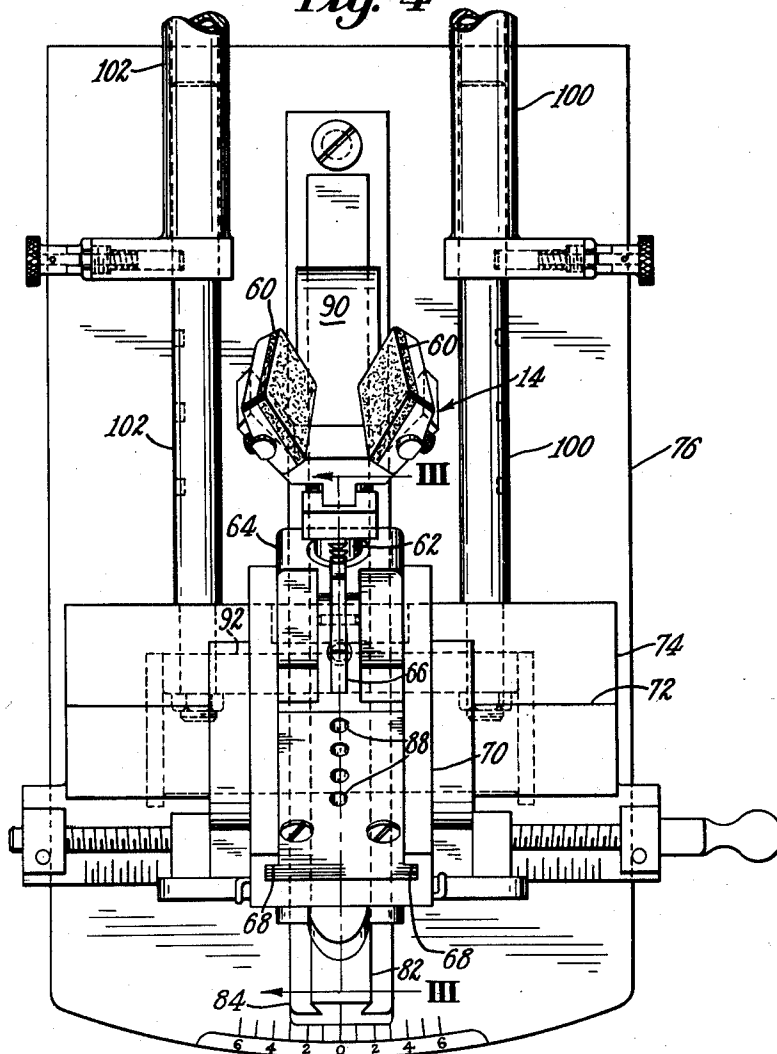


Fig. 4



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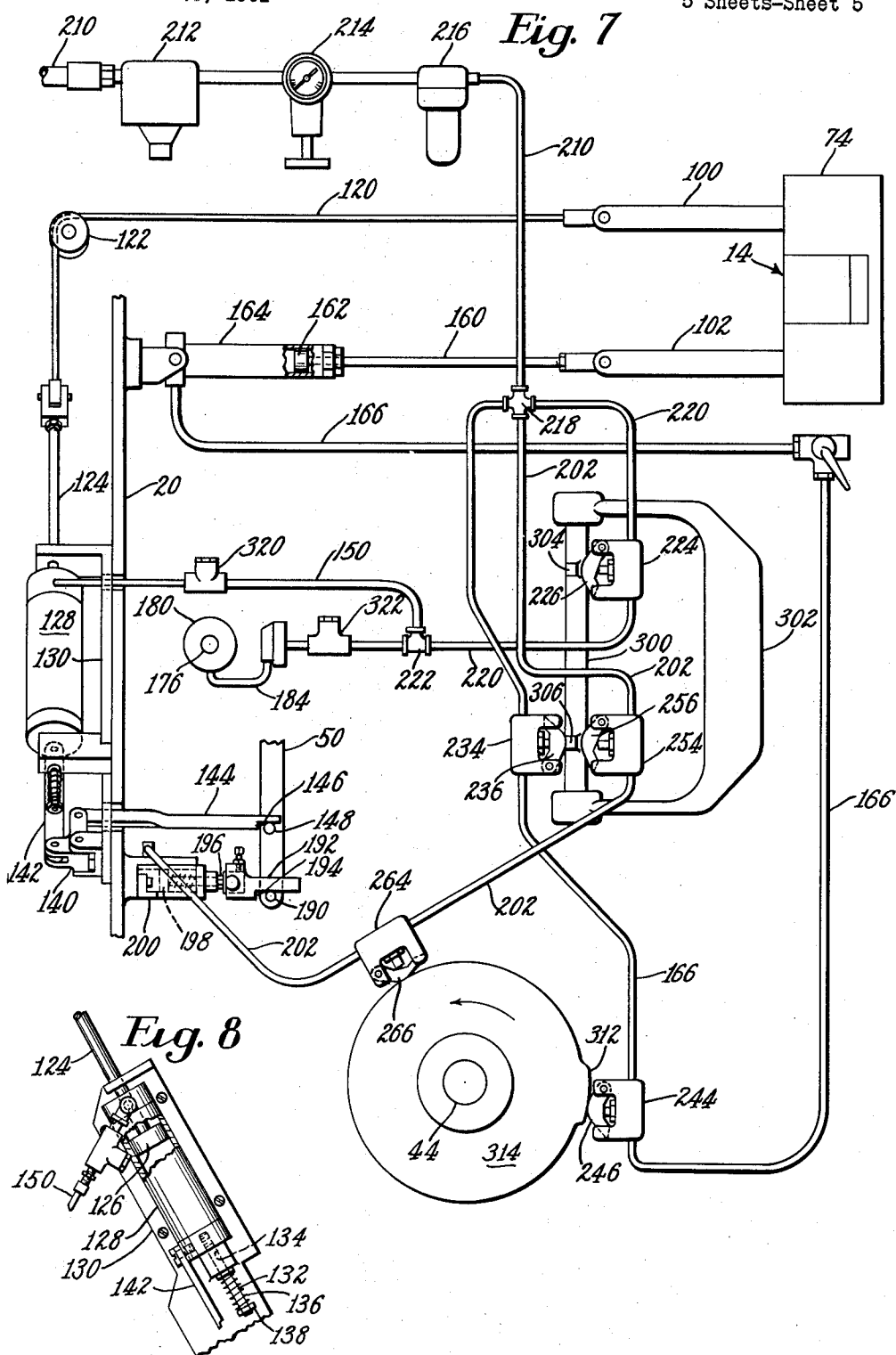
3,076,210

SHOE SUPPORTING MECHANISMS

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Fig. 7



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3,076,210

SHOE SUPPORTING MECHANISMS

Walter J. Brothie and Charles F. Fitzgerald, Beverly, Mass., assignors to United Shoe Machinery Corporation, Flemington, N.J., a corporation of New Jersey
Filed June 21, 1961, Ser. No. 118,579
22 Claims. (Cl. 12—8.8)

This invention relates to shoe supporting mechanism and is herein illustrated as embodied in improved mechanism for supporting a shoe in a toe lasting machine of the type disclosed in United States Letters Patent No. 2,596,169, issued May 13, 1952, on an application filed in the names of Leonard E. Proulx and Roscoe L. Hill. It is to be understood that the improved shoe supporting mechanism of this invention is not limited to use in a toe lasting machine of this particular type or to the exact mechanical construction shown.

In toe lasting machines of the type disclosed in the mentioned patent, the shoe being lasted is held in position to be acted upon by toe lasting instrumentalities including a pair of toe embracing wipers and a retarder, by means of a relatively fixed shoe rest having an operating surface against which the toe end of the shoe is clamped by a toe rest and by a heel rest in engagement with the heel end of the shoe, the toe rest and heel abutment being operable by mechanism controlled by cams associated with a main cam shaft, rotation of which is initiated through a clutch actuated by a foot treadle, as will be understood by reference to the Proulx et al. patent. When placing a shoe in the machine, the operator locates its toe end laterally and the shoe longitudinally by bringing the toe end of the shoe into engagement with the retarder and then, after elevating the shoe to bring the forepart of the bottom of the insole into engagement flatly with the operating surface of the shoe rest, he depresses the treadle to start the machine. At the beginning of the operating cycle, the toe rest is elevated to clamp the shoe yieldingly, under relatively light pressure, against the shoe rest, and shortly thereafter the heel abutment is moved into engagement with the heel end of the shoe, thereby swinging the heel end of the shoe into its proper lateral position, in the manner explained in the Proulx et al. patent. Later, in the operating cycle, the toe rest is urged more forcibly into engagement with the toe end of the shoe in order to support the shoe against downward pressure applied thereon by the wipers. If the operator is careful to hold the toe end of the shoe against the retarder, to resist a slight tendency for the shoe to be moved rearwardly by a wedging action set up by pressure of the toe rest against the shoe, and to see that the bottom of the forepart of the insole is held flatly against the operating surface of the shoe rest both longitudinally and laterally, the shoe will be clamped and held in proper position relatively to the lasting instrumentalities by the shoe rest, toe rest, and heel abutment, and a satisfactory lasting operation will result. On the other hand, however, if the operator is not careful about these things, it is possible that the shoe may not be properly positioned but instead may be displaced rearwardly away from the retarder, or tipped slightly away from full flat engagement with the operating surface of the shoe rest, either in a longitudinal or lateral direction, with the result that the lasting instrumentalities, i.e., the wipers and the retarder, are not fully effective to perform their respective lasting operations in the most satisfactory manner. It is, therefore, a principal object of this invention to provide a novel and improved mechanism for supporting a shoe to be lasted in a toe lasting machine of the type here under consideration which is adapted to assure a proper positioning and clamp-

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of the shoe to be lasted without the need for unusual care or effort on the part of the operator.

With the foregoing object in view, and in accordance with features of this invention, in the herein illustrated shoe supporting mechanism, which, in common with the shoe supporting mechanisms of toe lasting machines of the type here under consideration, has a shoe rest, a toe rest, and a heel abutment, the power operated means provided for moving the toe rest against the shoe to clamp the toe end of the shoe flatly against the shoe rest and for moving the heel abutment into engagement with the heel end of the shoe, are so arranged that the forces exerted by the toe rest and the heel abutment are equalized and any tendency for the shoe to be displaced rearwardly by the toe rest is resisted immediately and equally by the heel abutment. More particularly, fluid pressure operated means are provided for moving the toe rest and heel abutment into engagement with the shoe and these fluid pressure operated means are supplied with fluid under pressure from a common source so that the pressure of the operating fluid in each of the means is equalized. Preferably, when pressure of the operating fluid builds up to a predetermined value the clutch of the machine is automatically tripped to initiate rotation of the main cam shaft of the machine. During the following operating cycle, the heel abutment is held in operative position against the heel end of the shoe by a mechanical locking device while the toe rest is controlled by cams associated with the main cam shaft and in the same manner as in the machine of the Proulx et al. patent.

In the shoe supporting mechanism of this invention, the toe rest is preferably arranged to engage the toe end of the shoe slightly before the heel abutment is brought into engagement with the heel end of the shoe, thereby to overcome any tendency for the heel abutment, in engaging the shoe, to push it forcibly against the retarder, which could result in damaging the upper, especially with extremely pointed lasts. Also, if the operator is not holding the shoe with the bottom of its forepart flatly in engagement with the operating surface of the shoe rest, the toe rest in moving upwardly into engagement with the shoe will tend to level the shoe against the shoe rest. In order to facilitate this action when, as is usually the case, the operator is holding the shoe up against the shoe rest but with its heel end slightly lower than it should be for flat engagement of the bottom of the forepart of the insole with the operating surface of the shoe rest, the heel abutment is mounted in guideways formed on its supporting member for sliding movement in a direction extending upwardly and away from the heel end of the shoe. When the heel abutment is brought initially into engagement with the heel end of the shoe, as the result of movement of its supporting member by the fluid pressure operated means, the inclination of the mentioned guideways is such that the heel abutment will slide upwardly, carrying with it the heel end of the shoe, until the bottom of the forepart of the insole of the shoe lies flatly against the operating surface of the shoe rest. Now, the component of force tending to cause the heel abutment to slide upwardly in its guideways becomes insufficient to swing the shoe beyond this position against the force which is being exerted on the toe end of the shoe by the toe rest and accordingly the shoe is thus located and held in proper level position for the most effective operation of the lasting instrumentalities.

The above and other objects and features of the invention will appear in the following detailed description of the preferred embodiment thereof which is illustrated in the accompanying drawings, and will be pointed out in the claims.

In the drawings,
FIG. 1 is a view in side elevation of a toe lasting machine provided with a shoe supporting mechanism embodying the features of this invention;

FIG. 2 is a view in perspective of the machine shown in FIG. 1 as seen from the opposite side of the machine and at a slightly smaller scale;

FIG. 3 is a view in section substantially on line III—III of FIG. 4 and looking in the direction of the arrows;

FIG. 4 is a plan view at an enlarged scale of a portion of the shoe supporting mechanism;

FIGS. 5 and 6 are schematic views in side elevation of the shoe supporting mechanism showing parts in different positions assumed during the operation of the machine;

FIG. 7 is a schematic view of the fluid pressure system and other operating mechanism associated with the shoe supporting mechanism; and

FIG. 8 is a detail view of a part of the operating mechanism associated with the shoe supporting mechanism.

Referring to FIG. 1 of the drawings, the shoe supporting mechanism in common with the shoe supporting mechanisms disclosed in the patents mentioned above, comprises a shoe rest 10, a toe rest 12, and a heel abutment, indicated generally by the reference character 14. The shoe rest is secured to and held rigidly by the frame of the machine, herein indicated generally by the reference character 20, and comprises a plate-like member provided with an operating surface 16, FIGS. 5 and 6, preferably formed on a strip 17 of relatively hard rubber for engaging the bottom face of the forepart of the insole of a shoe S pressed thereagainst by the toe rest 12. The toe rest is mounted on the upper end of a rod 22 which, in turn, is supported by means of springs, not shown, contained within a yoke member 24, this yoke member corresponding to the yoke member 42 of the arrangement disclosed in Patent No. 2,224,146, mentioned below, and the springs which are not shown corresponding to the springs 54, 56 of the mentioned patent. Connected to this yoke member by means of spaced parallel links 30, only one of which appears and is shown in dotted lines in FIG. 1, are two arms 32, 32, FIG. 2, of a lever which has a third arm 34 and a fourth arm 36, FIG. 1. This lever is journaled on a cross shaft 38, carried by the frame 20. The arm 36 carries at its outer end a cam roller 40 and this cam roller is acted upon by a peripheral cam 42, fast on a main cam shaft 44 of the machine. The cam 42 corresponds to the cam provided for operating the rockshaft 48 of the machine shown in Patent No. 2,224,146, issued December 10, 1940, on an application filed in the name of Fred C. Eastman, and preferably is so shaped as to operate the toe rest generally in the manner disclosed in Patent No. 2,596,169, referred to above, during a single revolution of the main cam shaft 44.

In common with the earlier constructions shown in the mentioned patents, the main cam shaft 44 of the machine carries various other cams for operating toe wipers 46 and a retarder 48, FIGS. 5 and 6, by means of which the upper materials are shaped around the toe end of the last and then wiped inwardly over and pressed against the bottom of the insole at the toe end of the shoe in an automatic operating cycle which is effected during a single complete revolution of the main cam shaft 44. Also, the herein illustrated machine has a clutch mechanism for controlling the operation of the main cam shaft generally in the same manner as in these prior machines, this mechanism including a clutch operating lever herein indicated by the reference character 50 and corresponding to the lever 464 of the machine of Patent No. 2,596,169 and a clutch control cam, not shown, which is also mounted on the main cam shaft.

The heel abutment 14 includes two angularly disposed pressure pads 60, 60 which are carried on the outer end of a post 62 which is adjustably mounted in a carriage 64 by means including a pawl 66, see FIG. 1 and FIG. 4.

The carriage 64, in turn, is slidably mounted in inclined guideways 68, 68 formed in a block 70 which is mounted for lateral adjusting movement on a dovetail guide 72 formed on a second carriage 74, FIG. 4. This carriage is mounted for movement longitudinally of a table 76 which is supported on the frame 20 by means of angle plates 78, FIG. 1. The arrangement so far described corresponds, in general, to that disclosed and claimed in Patent No. 2,596,169, mentioned above. Secured to the table 76 is a U-shaped guide block 80, FIG. 3, which cooperates with a dovetail guide 82 formed on a member 84 which is pivotally mounted for swinging movement on the carriage 74 by mechanism, not shown, but which corresponds to that provided in the machine disclosed in the last-mentioned patent, to which reference may be made for details not herein described. For holding the carriage 64 in selected positions along the inclined guideways 68, 68 in the block 70, a pin 86, FIG. 1, may be inserted in any one of several holes 88, 88 formed in the block 70, FIG. 4. Preferably, and in the construction herein illustrated, a curved spring-like abutment member 90 is associated with the heel abutment pads 60, 60, see FIGS. 1 and 4.

Received between the lower side of the carriage 74 and the upper surface of the U-shaped guide block 80 there is a crossbar 92 which has on its lower side a recess 94. Projecting into this recess is a pin 96 which is of somewhat smaller diameter than the width of the recess and is carried by the guide member 80. Connected to the opposite ends of the crossbar 92 are two operating rods 100, 102 which correspond to the operating rods 82, 82 of the machine shown in Patent No. 2,596,169 and each of which includes two telescopic sections relatively adjustable to accommodate shoes which differ substantially in size. At one end, the guide member 80 is cut away so as to provide a recess having an upper surface 104 which is inclined relatively to the upper surface 106 of the member 84 and a hollow locking roller 108 is confined within this recess by means of a cover plate 110, FIG. 3. Extending through and projecting at each end beyond this roller is a pin 112 between the opposite ends of which and anchor pins on the member 80 are stretched two tension springs, one of which appears in FIG. 3 and is identified by the reference character 114. These springs yieldingly urge the roller 108 to the right against a release pin 116 which is fitted in a recess 118 in the member 80 and interposed between the roller 108 and the crossbar 92.

As will be apparent, when the crossbar 92 is moved to the right, FIG. 3, thus to urge the heel abutment against the heel end of a shoe in the machine, after a slight lost motion, the left-hand end of the recess 94 will engage the pin 96 and thus transmit movement of the crossbar to the guide member 80 and thence to the parts carried thereby, including, of course, the heel abutment 14. The springs 114 will keep the locking roller snugly in position so as immediately to lock the U-shaped member 80 against movement in the opposite direction, in response to pressure exerted on the heel abutment 14 by the heel end of the shoe. However, when the crossbar 92 is positively moved to the left in FIG. 3, thus to retract the heel abutment away from engagement with the heel end of the shoe, during the lost motion which now occurs between the crossbar and the member 80 in the opposite direction, the release pin 116 will be urged to the left thereby to move the locking roller 108 out of locking position, thus to release the U-shaped member 80, together with the parts carried thereby, for movement to the left by the crossbar.

For moving the crossbar 92 to the right, FIGS. 1 and 3, upwardly as viewed in FIG. 4, thus to move the heel abutment 14 against the heel end of a shoe, there is connected to the rod 100 by means of a flexible cable 120, which is trained over a pulley 122, FIG. 7, the rod 124 of a piston 126, FIG. 8. This piston is received within a cylinder 128 which is slidably supported on a bracket 130, at one end by the piston rod 124 and at the other

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end by means of a stud 132 which extends through a guide bore 134 formed in the bracket member. This cylinder is yieldably held in the position in which it is shown in FIGS. 7 and 8 by means of a compression spring 136 which is interposed between a nut 138 on the stud and a portion of the bracket 130. Pivotally mounted on an extension of the bracket 130 is a bell-crank lever 140, one arm of which is connected to the cylinder 128 by means of a link 142. Connected to the other arm of this bell-crank lever is a second link 144 which is formed with a shouldered portion 146 which rests on a pin 148 carried by the clutch operating lever 50, FIG. 7. With this arrangement, when fluid under pressure is admitted to the cylinder 128 through a conduit 150, the heel abutment will be moved to the right, FIG. 1, and to the left, FIG. 7, until it engages the heel end of the shoe, whereupon the cylinder 128 will yield upwardly as the spring 136 is compressed. As the result of such upward movement of the cylinder 128, link 144 will move to the right so that its shoulder portion 146 will engage the pin 148 and swing the lever 50 to the right, thus engaging the clutch and initiating rotation of the main cam shaft 44. Connected to the other heel abutment operating rod 102 is the piston rod 160 of a piston 162. This piston is received within a cylinder 164 which is pivotally mounted on a portion of the machine frame 20, FIGS. 1 and 7. As will be quite apparent, when fluid under pressure is admitted to the cylinder 164 through a conduit 166, the heel abutment will be moved away from the shoe to retracted position in which it is shown in FIGS. 1 and 2 of the drawings.

Referring to FIG. 2, the arm 34 of the four-armed lever, which has been mentioned above, carries a trunnion pin 170 which projects through slots 172 formed in the upper bifurcated end of a link 174 which is pivotally connected at its lower end to the rod 176 of a piston 178, see FIG. 1. This piston is received within a cylinder 180 which is pivotally mounted at its lower end on a cross shaft 182 secured to the machine frame 20. When fluid under pressure is admitted to the cylinder 180, above the piston 178, through a conduit 184, the four-arm lever (arms 32, 32, 34 and 36) will be swung in a clockwise direction (FIG. 1) and counterclockwise direction (FIG. 2) thereby to elevate the toe post 12 and to clamp the toe end of a shoe placed upon the toe rest against the shoe rest 10, this clamping force being applied yieldingly through the action of a spring, not shown, contained within the yoke 24 and corresponding to the spring 86 of the machine disclosed in Patent No. 2,224,146, mentioned above. The clutch operating lever 50 carries a second pin 190, FIG. 7, and is adapted to be actuated to initiate rotation of the main cam shaft 44 by means of a second link 192 which has a shouldered end 194 resting on this pin. The link 192 is pivotally connected on the outer end of the rod 196 of a piston 198. This piston is received within a cylinder 200 mounted on the frame 20 of the machine and one end of a conduit 202 is connected to this cylinder.

The flow of fluid under pressure to, and exhaust from, the several cylinders 128, 164, 180 and 200, which have been mentioned above, are controlled in the following manner. A main supply conduit 210 is connected to a source of fluid under pressure, i.e., compressed air, not shown, and this conduit, in which there are interposed a filter 212, a pressure regulating valve 214, and an oiling device 216, leads to a cross fitting 218 from which a conduit 220 and the two previously mentioned conduits 166 and 202 extend, FIG. 5. The conduit 220 leads to a T-fitting 222 where it is connected to the previously mentioned conduits 150 and 184. A two-way valve 224 of conventional construction and having an operating lever 226 is interposed in the conduit 220, while two similar two-way valves are interposed in each of the conduits 166 and 202, see valve 234 with lever 236 and valve 244 with lever 246 in conduit 166, and valve 254 with

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lever 256 and valve 264 with lever 266 in conduit 202. As suggested above, these valves are all of the same construction and are adapted to permit flow of fluid under pressure through the valve when the operating levers are actuated, see valve 234 and 244 in FIG. 7; and to shut-off flow of fluid under pressure through the valve and connect the outlet side of the valve to exhaust, when the operating levers are released, see valves 224, 254 and 264, FIG. 5.

Pivotally mounted on the lower portion of the front of the machine frame 20 by means of a cross shaft 300 to which it is secured, there is a treadle 302, FIGS. 1, 2 and 7. Fastened to this cross shaft in spaced relation thereon are two vertically extending arms 304 and 306. A coil spring 308, stretched between a third arm 310 fast on the cross shaft 300 and the frame of the machine, FIG. 2, tends to hold the treadle in the elevated position in which it is shown and with the arm 306, which is interposed between the operating levers of the valves 234 and 254, holding the valve 234 and the conduit 166 in open position, FIG. 5. The other valve 244 which is interposed within this conduit is also held in open position, before rotation of the main cam shaft 44 is initiated, by means of a rise 312 formed on a control cam 314 fast on the shaft 44.

Accordingly, when treadle 302 is released, air under pressure will be admitted to the cylinder 164 through the conduit 166 and valves 234 and 244 and the heel abutment will be moved to its retracted position by the piston 162, as shown in FIG. 7. Now, upon depression of the treadle 302, valve 234 will be closed by means of a self-contained spring as the arm 306 moves away from the operating lever 236 and, at the same time, valves 224 and 254 will be opened by the arms 304 and 306, in a manner which will be apparent from an inspection of FIG. 7. Inasmuch as valve 264 will now be closed, no air under pressure will flow through the conduit 202 to the cylinder 200. However, upon the opening of the valve 224, air under pressure will flow through the conduit 220 to the T-fitting 222 and thence through conduits 150 to the cylinder 128 and through conduit 184 to cylinder 180. Conventional flow control valves 320, 322 are interposed, respectively, in the conduits 150 and 184, and these flow control valves are so adjusted that the piston 178, FIG. 1, is first operated to elevate the toe rest 12 and to clamp the toe end of a shoe held on the toe rest firmly against the shoe rest 10. Immediately thereafter, air under pressure in the cylinder 128 will move the piston 126 therein downwardly, FIG. 8, thus drawing the heel abutment 14 into engagement with the heel end of the shoe, FIGS. 5 and 6. As pressure of the air within the cylinders 128 and 180 builds up, the cylinder 128 will be moved downwardly against the resistance of spring 136 and, acting through the link 142, bell-crank lever 140 and link 144, will eventually actuate the lever 50 to trip the clutch and initiate rotation of the main cam shaft 44.

Just as soon as the cam shaft 44 begins to rotate, cam 42 will come into engagement with the roller 40 and thus take control over the toe rest to operate it in the same manner during the automatic operating cycle as is done in the machine shown in Patent No. 2,596,169, mentioned above, and Patent No. 2,224,146 referred to therein. As in these prior machines, the clutch is disengaged and the cam shaft is brought to a stop at an intermediate point in the automatic operating cycle by means of a control cam, not shown, on the cam shaft 44. When this occurs the rise 312 on the cam 314 will have arrived in a position to engage the lever 266 and open the valve 264. Accordingly when the treadle 302 is again depressed to continue the automatic operating cycle, and valve 254 is again opened, air under pressure will be admitted to the cylinder 200 to cause the piston 198 to swing the lever 50 in a direction to trip the clutch and thus initiate further rotation of the cam shaft 44, which rotation continues until cam 314 returns to the position

shown in FIG. 7 at the conclusion of the operating cycle. Treadle 302 having been released by the operator, air under pressure will be admitted through conduit 166 and valves 234 and 244 which are now opened to the cylinder 164 causing piston 162 to retract the heel abutment 14 away from the shoe. The toe rest will also have been lowered by the action of the cam 42 immediately before the cam shaft 44 came to a stop so that the shoe is released for removal from the machine.

Referring especially to FIGS. 5 and 6, in presenting a shoe to the machine, after turning the upper materials, indicated generally by the reference characters U, back away from the toe end of the last, the operator will bring the last into engagement with the retarder 48 and will swing the forepart of the bottom of the last up into engagement with the operating surface 16 of the shoe rest 10. It will, of course, be understood that the block 70 will have been shifted laterally, one way or another from the centered position shown in FIG. 4 to accommodate either a right or a left shoe, and the guide member 84 will have been swung to the proper angular position for the particular style of last, in the manner explained in Patent No. 2,596,169, before the shoe is thus presented to the machine. Now, upon depression of the treadle 302, the toe rest 12 will be elevated by the piston 178 into engagement with the toe end of the shoe and, as pressure of the operating fluid builds up in the cylinder 180, the toe rest will tend to urge the forepart of the shoe into engagement with the operating surface 16 of the shoe rest 10, or to hold the forepart of the shoe flatly against the shoe rest if it has been placed flatly against it by the operator. Shortly after the toe rest comes into engagement and begins to apply pressure against the toe end of the shoe, the delay being dependent upon the relative settings of the flow control valves 322 and 320, the heel abutment 14 will be moved into engagement with the heel end of the shoe by the piston 126 as fluid under pressure enters the cylinder 128. By this time, however, the shoe rest will be exerting pressure against the toe end of the shoe so that any tendency for the heel abutment to nudge the shoe S to the right, FIGS. 5 and 6, which could result in damage to the extreme toe end of a pointed last, is avoided. As pressure of the operating fluid now builds up and equalizes within the cylinders 180 and 128, the shoe is pressed more firmly against the shoe rest by the toe rest, while the heel abutment is pressed more firmly against the heel end of the shoe. However, inasmuch as the forces exerted by the toe rest and heel abutment are equalized, there will be no tendency for the shoe to be moved in either direction longitudinally relatively to the shoe rest by any wedging action of the toe rest on the toe end of the shoe or by the longitudinal force exerted on the heel end of the shoe by the heel abutment.

In FIG. 5 the shoe S is shown as held against the shoe rest 10 with its heel end a little lower than it should be, with the result that the bottom of the forepart of the shoe does not lie flatly against the surface 16 of the shoe rest. For purposes of illustration, this condition is exaggerated and actually it would probably not be noticeable to the operator that he was not holding the bottom of the shoe flatly against the shoe rest. However, even a slight downward displacement of the heel end of the shoe can result in an uneven action of the wipers of the machine on the upper materials as they are advanced and closed. Arrows *a* and *b*, in FIGS. 5 and 6, indicate the direction of forces applied, respectively, by the toe rest and heel abutment on the shoe. The heel rest 14 is initially held in a desired heightwise position relatively to the heel end of the shoe by the pin 86 and when the heel rest comes into engagement with the heel end of the shoe there will be a component of force on the carriage 64 tending to cause this carriage to slide upwardly along the guideways 68 in the block 70, see arrow *c*. Now, if the bottom of the forepart of the shoe is being held flatly against the operating surface 16 of the shoe rest 10

by the pressure exerted thereon by the toe rest, this component of force will be insufficient to overcome the frictional resistance to movement of the carriage along the guideways and the resistance of the shoe to swinging movement in a clockwise direction about the left-hand edge of the shoe rest against the force applied to the toe end of the shoe by the toe rest. As has already been indicated, the pressure exerted on the shoe in the directions of the arrows *a* and *b* builds up equally and the angular disposition of guideways 68, 68 is such that the component *c* which is proportional to force *b* never reaches a value sufficient to tip the shoe in a clockwise direction out of flat engagement with the shoe rest against which it is being held by the toe rest. On the other hand, if the shoe is being held in a position with its heel end a little lower than it should be, as shown in exaggerated manner in FIG. 5, as the heel abutment engages the shoe, the carriage 64, together with the heel abutment which is mounted thereon, will be caused to slide upwardly along the guideway 68 on the block 70 by the component of force indicated by the arrow *c* until the bottom of the forepart of the shoe does lie flatly against the shoe rest, as indicated in FIG. 6, thus leveling of the shoe bottom on the shoe rest in a longitudinal direction is automatically obtained and assured.

As is described above, the operating surface 16 of the shoe rest is preferably formed by a strip of relatively hard rubber (80-90 Durometer) which, while presenting a firm surface for engagement with the bottom of the forepart of the insole of the shoe, is sufficiently resilient to permit the embedding of the head of a tack or similar insole fastening therein. Accordingly, if a shoe is presented to the machine having an insole tack in its toe portion which is not fully driven or which is tipped so as to project upwardly from the insole, as the bottom of the forepart of the insole is pressed firmly against the operating surface 16 of the shoe rest, the head of such a tack will sink readily into the rubber strip without any such tendency to rock or tip the shoe laterally, as would be the case with an operating surface formed out of metal or other unyielding material. Moreover, the rubber surface has a relatively high coefficient of friction which tends to resist movement of the shoe relatively to the shoe rest when it is pressed against the shoe rest by the toe rest.

After the shoe has been clamped against the shoe rest by the toe rest and the heel abutment has been pressed firmly against the heel end of the shoe, the clutch of the machine will be tripped in response to pressure of the operating fluid building up in the cylinder 128 and rotation of the main cam shaft 44 will be initiated. During the automatic operating cycle which follows, the toe to rest will be operated by the usual cam actuating mechanism in the manner explained in the Proulx et al. patent and the heel abutment will be held rigidly against the shoe by the locking roller 108. Thus, the action of the shoe supporting mechanism in supporting the shoe during the overwiping and bedding actions of the wipers provided in the prior machine is retained, while the advantages of the improved arrangement, described above, are also obtained.

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

1. In a toe lasting machine having lasting instrumentalities, power means for operating said lasting instrumentalities during an automatic operating cycle, a control member movable to initiate an automatic operating cycle of said instrumentalities by the power means, means for supporting a shoe in position to be acted upon by said lasting instrumentalities including a relatively fixed shoe rest, a toe rest mounted for movement to clamp the toe end of a shoe against the shoe rest, a heel abutment movable into engagement with the heel end of the shoe to hold it against heelward movement, power operated

2. In a toe lasting machine having lasting instrumentalities, power means for operating said lasting instrumentalities in an automatic operating cycle, a control member movable to initiate an automatic operating cycle of said instrumentalities by said power means, means for supporting a shoe in position to be acted upon by said lasting instrumentalities including a relatively fixed shoe rest, a toe rest mounted for movement to clamp the toe end of a shoe against the shoe rest, power operated means for moving said toe rest, means for effecting movement of said control member to initiate an automatic operating cycle of the machine when the force exerted by the toe rest reaches a predetermined value.

4. In a toe lasting machine having lasting instrumentalities, power means for operating said lasting instrumentalities in an automatic operating cycle, a control member movable to initiate an automatic operating cycle of said instrumentalities by said power means, means for supporting a shoe in position to be acted upon by said lasting instrumentalities including a relatively fixed shoe rest, a toe rest mounted for movement to clamp the toe end of a shoe against the shoe rest, a heel abutment movable into engagement with the heel end of the shoe to hold it against heelward movement, fluid pressure operated means for moving said toe rest, fluid pressure operated means for moving the heel abutment, means for interconnecting said two fluid pressure operated means so as to equalize the forces applied to the shoe by the toe rest and heel abutment, and means for effecting movement of said control member to initiate an automatic operating cycle of the machine when these forces reach a predetermined value.

5. In a toe lasting machine having lasting instrumentalities, power means for operating said lasting instrumentalities in an automatic operating cycle, a control member movable to initiate an automatic operating cycle of said instrumentalities by said power means, means for supporting a shoe in position to be acted upon by said lasting instrumentalities including a relatively fixed shoe rest, a toe rest mounted for movement to clamp the toe end of a shoe against the shoe rest, fluid pressure operated means for moving said toe rest, and means for effecting movement of said control member to initiate an automatic operating cycle of the machine when the force exerted by the toe rest reaches a predetermined value.

6. In a toe lasting machine having lasting instrumentalities, power means for operating said lasting instrumentalities in an automatic operating cycle, a control member movable to initiate an automatic operating cycle of said instrumentalities by said power means, means for supporting a shoe in position to be acted upon by said lasting instrumentalities including a relatively fixed shoe rest, a heel abutment movable into engagement with the heel end of a shoe to hold it against heelward movement,

5 reaches a predetermined value.
7. In a toe lasting machine having lasting instrumental-
10 ties, power means for operating said lasting instru-
mentalties in an automatic operating cycle, a control
member movable to initiate an automatic operating cycle
15 of said instrumentalities by the power means, means for
supporting a shoe in position to be acted upon by said
lasting instrumentalities, including a relatively fixed shoe
rest, a toe rest mounted for movement to clamp the toe
end of a shoe against the shoe rest, a heel abutment mov-
20 able into engagement with the heel end of the shoe to
hold it against heelward movement, power operated means
for moving said toe rest, power operated means for mov-
ing the heel abutment, means for interconnecting said
two power operated means so as to equalize the forces
25 applied to the shoe by the toe rest and heel abutment,
means for effecting movement of said control member to
initiate an automatic operating cycle of the machine
when these forces reach a predetermined value, and
means associated with the power means for operating
said toe rest to hold the toe end of the shoe against the
shoe rest during said automatic operating cycle of the
machine.

8. In a toe lasting machine having lasting instrumentalities, power means for operating said lasting instrumentalities in an automatic operating cycle, a control member movable to initiate an automatic operating cycle of said instrumentalities by the power means, means for supporting a shoe in position to be acted upon by said lasting instrumentalities, including a relatively fixed shoe rest, a toe rest mounted for movement to clamp the toe end of a shoe against the shoe rest, power operated means for moving said toe rest, means for effecting movement of said control member to initiate an automatic operating cycle of the machine when the force exerted by the toe rest reaches a predetermined value, and means associated with the power means for operating said toe rest to hold the toe end of the shoe against the shoe rest during said automatic operating cycle of the machine.

9. In a toe lasting machine having lasting instrumentalities, power means for operating said lasting instrumentalities in an automatic operating cycle, a control member movable to initiate an automatic operating cycle of said instrumentalities by the power means, means for supporting a shoe in position to be acted upon by said lasting instrumentalities, including a relatively fixed shoe rest, a toe rest mounted for movement to clamp the toe end of a shoe against the shoe rest, a heel abutment movable into engagement with the heel end of the shoe to hold it against heelward movement, fluid pressure operated means for moving said toe rest, fluid pressure operated means for moving the heel abutment, means for interconnecting said two fluid pressure operated means so as to equalize the forces applied to the shoe by the toe rest and heel abutment, means for effecting movement of said control member to initiate an automatic operating cycle of the machine when these forces reach a predetermined value, and means associated with the power operated means for operating said toe rest to hold the toe end of the shoe against the shoe rest during said automatic operating cycle of the machine.

10. In a toe lasting machine having lasting instrumentalities, power means for operating said lasting instrumentalities in an automatic operating cycle, a control member movable to initiate an automatic operating cycle of said instrumentalities by the power means, means for supporting a shoe in position to be acted upon by said lasting instrumentalities, including a relatively fixed shoe rest, a toe rest mounted for movement to clamp

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the toe end of a shoe against the shoe rest, fluid pressure operated means for moving the toe rest, means for effecting movement of said control member to initiate an automatic operating cycle of the machine when the force exerted by the toe rest reaches a predetermined value, and means associated with the power operated means for operating said toe rest to hold the toe end of the shoe against the shoe rest during said automatic operating cycle of the machine.

11. In a toe lasting machine having lasting instrumentalities, power means for operating said lasting instrumentalities in an automatic operating cycle, means for supporting a shoe in position to be acted upon by said lasting instrumentalities including a relatively fixed shoe rest, a toe rest for clamping the toe end of a shoe against the shoe rest and a heel abutment movable into engagement with the heel end of the shoe to hold it against heelward movement, a power operated member movable in one direction for thus moving the heel abutment against the shoe, said power operated member being also movable in the opposite direction to withdraw the heel abutment away from the heel end of the shoe, means for locking the heel abutment against movement away from the heel end of the shoe during operation of said lasting instrumentalities by the power means, and means associated with said locking means for rendering the locking means operable in response to movement of the power operated member in a direction to bring the heel abutment into engagement with the heel end of the shoe and for rendering it inoperable in response to movement of the power operated member in the opposite direction to withdraw the heel abutment away from the shoe.

12. In a toe lasting machine having lasting instrumentalities, power means for operating said lasting instrumentalities in an automatic operating cycle, means for supporting a shoe in position to be acted upon by said lasting instrumentalities including a relatively fixed shoe rest, a toe rest for clamping the toe end of a shoe against the shoe rest and a heel abutment movable into engagement with the heel end of the shoe to hold it against heelward movement, a fluid pressure operated member movable in one direction for thus moving the heel abutment, said fluid pressure operated member being also movable in the opposite direction to withdraw the heel abutment away from the heel end of the shoe, means comprising a roller for locking the heel abutment rigidly against movement away from the heel end of the shoe during the operation of said lasting instrumentalities by the power means, and means associated with said locking roller for rendering it operable in response to movement of the fluid pressure operated member in a direction to bring the heel abutment into engagement with the heel end of the shoe and to render it inoperable in response to movement of said fluid pressure operated member in the opposite direction to withdraw the heel abutment away from the shoe.

13. In a toe lasting machine having lasting instrumentalities and power means for operating said instrumentalities in an automatic operating cycle, means for supporting a shoe against heelward movement during the operation of said instrumentalities including a heel abutment movable from a retracted position into engagement with the heel end of a shoe in the machine, a member movable in one direction thus moving the heel abutment, said member being also movable in the opposite direction to withdraw the heel abutment away from the heel end of the shoe, means for locking the heel abutment against movement away from the heel end of the shoe during the operation of said lasting instrumentalities and means associated with said locking means for rendering the locking means operable in response to movement of said member in a direction to bring the heel abutment into engagement with the heel end of the shoe and for rendering it inoperative in response to movement of said member in the opposite direction to withdraw the heel abutment away from the shoe.

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14. In a lasting machine having lasting instrumentalities and power means for operating said instrumentalities in an automatic operating cycle, means for supporting a shoe against heelward movement during the operation of said instrumentalities including a heel abutment movable from a retracted position into engagement with the heel end of a shoe in the machine, a member movable in one direction for thus moving the heel abutment, said member being also movable in the opposite direction to withdraw the heel abutment away from the heel end of the shoe, means comprising a roller for locking the heel abutment rigidly against movement away from the heel end of the shoe during the operation of said lasting instrumentalities, means associated with said locking roller for rendering it operable in response to movement of said member in a direction to bring the heel abutment into engagement with the heel end of the shoe and to render it inoperable in response to movement of said member in the opposite direction to withdraw the heel abutment away from the shoe.

15. In a toe lasting machine having lasting instrumentalities and means for supporting a shoe in position to be acted upon by said lasting instrumentalities including a relatively fixed shoe rest, a toe rest mounted for movement to clamp the toe end of a shoe against the shoe rest, a heel abutment movable in a direction extending lengthwise of the shoe into engagement with the heel end of the shoe to hold it against heelward movement, power operated means for moving the toe rest, power operated means for moving the heel abutment, and means supporting the heel abutment for movement heightwise of the shoe toward the shoe rest in response to pressure exerted on the heel end of the shoe by the heel abutment.

16. In a toe lasting machine having lasting instrumentalities and means for supporting a shoe in position to be acted upon by said lasting instrumentalities including a relatively fixed shoe rest, a toe rest mounted for movement to clamp the toe end of a shoe against the shoe rest, a heel abutment, a support for the heel abutment movable in a direction extending longitudinally of the shoe to bring the heel abutment into engagement with the heel end of the shoe to hold it against heelward movement, power operated means for moving the toe rest, power operated means for moving the heel abutment support, and means associated with the heel abutment support providing guideways extending upwardly and inclined away from the heel end of the shoe for guiding the heel abutment for movement thereon in a direction extending heightwise of the shoe toward the shoe rest in response to pressure exerted on the heel end of the shoe by the heel abutment.

17. In a toe lasting machine having lasting instrumentalities and means for supporting a shoe in position to be acted upon by said lasting instrumentalities including a relatively fixed shoe rest, a toe rest mounted for movement to clamp the toe end of a shoe against the shoe rest, a heel abutment movable in a direction extending longitudinally of the shoe into engagement with the heel end of the shoe to hold it against heelward movement, power operated means for moving the toe rest, power operated means for moving the heel abutment, said power operated means being so interconnected as to equalize the forces applied to the shoe by the toe rest and heel abutment, and means supporting the heel abutment for movement heightwise of the shoe toward the shoe rest in response to pressure exerted on the heel end of the shoe by the heel abutment.

18. In a toe lasting machine having lasting instrumentalities and means for supporting a shoe in position to be acted upon by said lasting instrumentalities including a relatively fixed shoe rest, a toe rest mounted for movement to clamp the toe end of a shoe against the shoe rest, a heel abutment, a support for the heel abutment movable in a direction extending longitudinally of the shoe to bring the heel abutment into engagement with the heel end

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of the shoe to hold it against heelward movement, power operated means for moving the toe rest, power operated means for moving the heel abutment support, said power operated means being so interconnected as to equalize the forces applied to the shoe by the toe rest and heel rest, and means associated with the heel abutment support providing guideways extending upwardly and inclined away from the heel end of the shoe for guiding the heel abutment for movement thereon in a direction extending heightwise of the shoe toward the shoe rest in response to pressure exerted on the heel end of the shoe by the heel abutment.

19. In a toe lasting machine having lasting instrumentalities and means for supporting a shoe in position to be acted upon by said lasting instrumentalities including a relatively fixed shoe rest, a toe rest mounted for movement to clamp the toe end of a shoe against the shoe rest, a heel abutment movable in a direction extending longitudinally of the shoe into engagement with the heel end of the shoe to hold it against heelward movement, fluid pressure operated means for moving the toe rest, fluid pressure operated means for moving the heel abutment, and means supporting the heel abutment for movement heightwise of the shoe toward the shoe rest in response to pressure exerted on the heel end of the shoe by the heel abutment.

20. In a toe lasting machine having lasting instrumentalities and means for supporting a shoe in position to be acted upon by said lasting instrumentalities including a relatively fixed shoe rest, a toe rest mounted for movement to clamp the toe end of a shoe against the shoe rest, a heel abutment, a support for the heel abutment movable in a direction extending longitudinally of the shoe to bring the heel abutment into engagement with the heel end of the shoe to hold it against heelward movement, fluid pressure operated means for moving the toe rest, fluid pressure operated means for moving the heel abutment support, and means associated with the heel abutment support providing guideways extending upwardly and inclined away from the heel end of the shoe for guiding the heel abutment for movement thereon in a direction extending heightwise of the shoe toward the shoe rest in response to pressure exerted on the heel end of the shoe by the heel abutment.

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21. In a toe lasting machine having lasting instrumentalities and means for supporting a shoe in position to be acted upon by said lasting instrumentalities including a relatively fixed shoe rest, a toe rest mounted for movement to clamp the toe end of a shoe against the shoe rest, a heel abutment movable in a direction extending longitudinally of the shoe into engagement with the heel end of the shoe to hold it against heelward movement, fluid pressure operated means for moving the toe rest, fluid pressure operated means for moving the heel abutment, said fluid pressure operated means being so interconnected as to equalize the forces applied to the shoe by the toe rest and heel rest and means supporting the heel abutment for movement heightwise of the shoe toward the shoe rest in response to pressure exerted on the heel end of the shoe by the heel abutment.

22. In a toe lasting machine having lasting instrumentalities and means for supporting a shoe in position to be acted upon by said lasting instrumentalities including a relatively fixed shoe rest, a toe rest mounted for movement to clamp the toe end of a shoe against the shoe rest, a heel abutment, a support for the heel abutment movable in a direction extending longitudinally of the shoe to bring the heel abutment into engagement with the heel end of the shoe to hold it against heelward movement, fluid pressure operated means for moving the toe rest, fluid pressure operated means for moving the heel abutment support, said fluid pressure operated means being so interconnected as to equalize the forces applied to the shoe by the toe rest and heel rest, and means associated with the heel abutment support providing guideways extending upwardly and inclined away from the heel end of the shoe for guiding the heel abutment for movement thereon in a direction extending heightwise of the shoe toward the shoe rest in response to pressure exerted on the heel end of the shoe by the heel abutment.

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