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LASTING MACHINES

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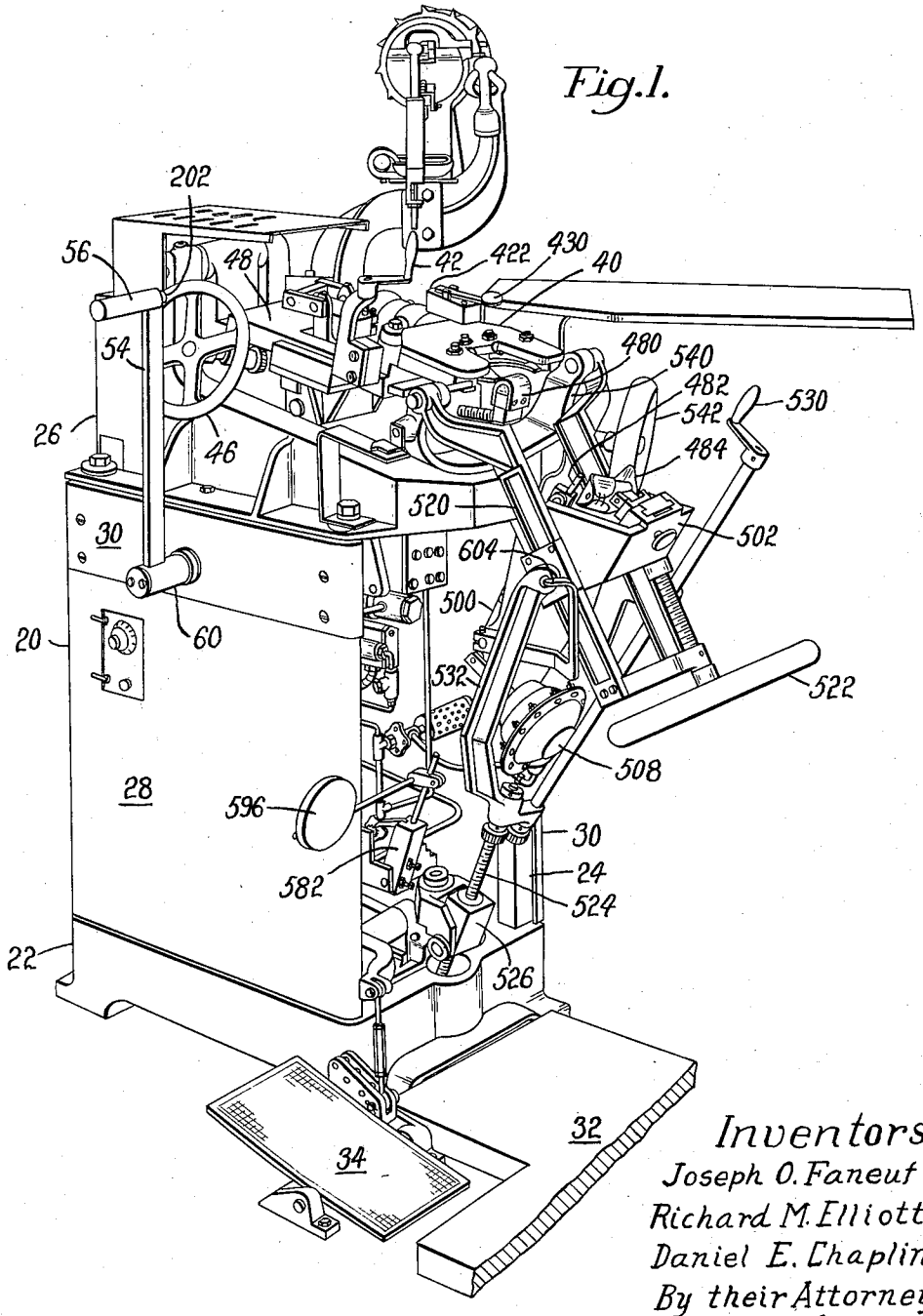
Fig. 1.



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By their Attorney
Everett D. Littlefield

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Fig. 2.

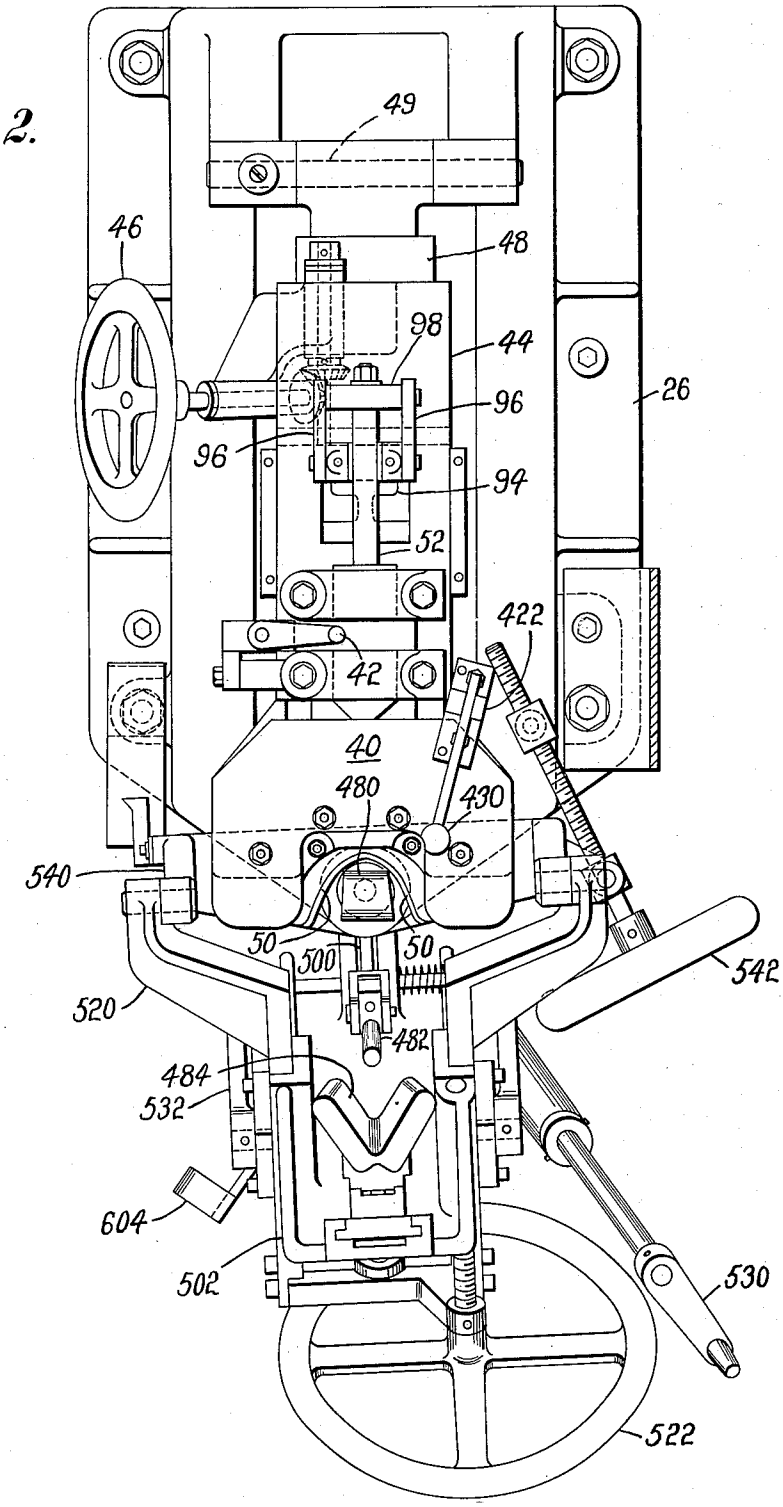

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Fig. 3.

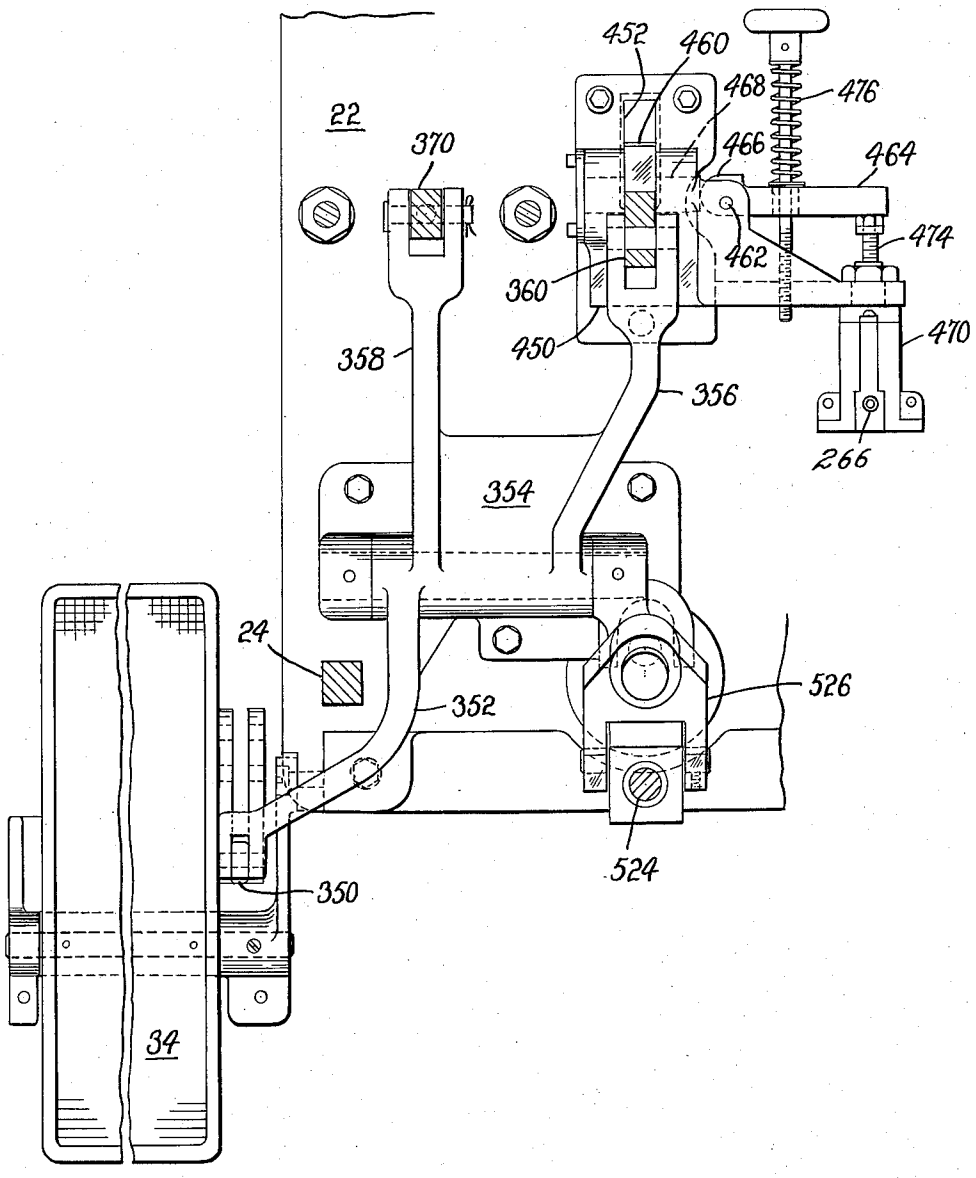

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Fig.4.

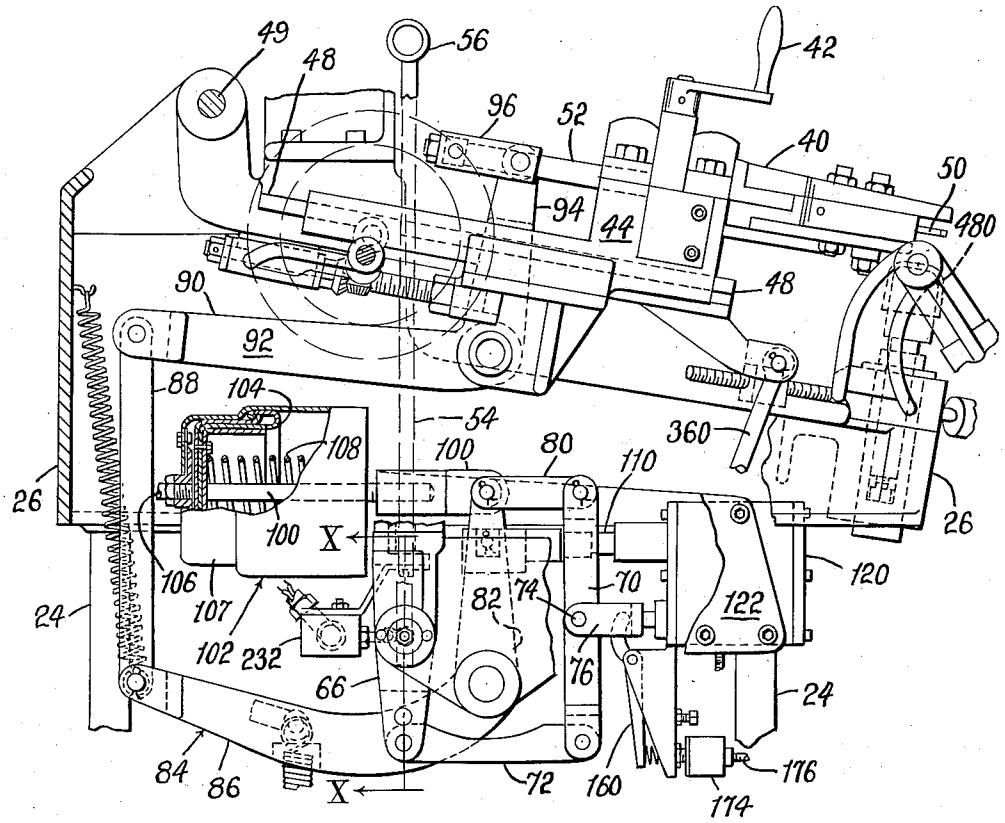

Fig.5.

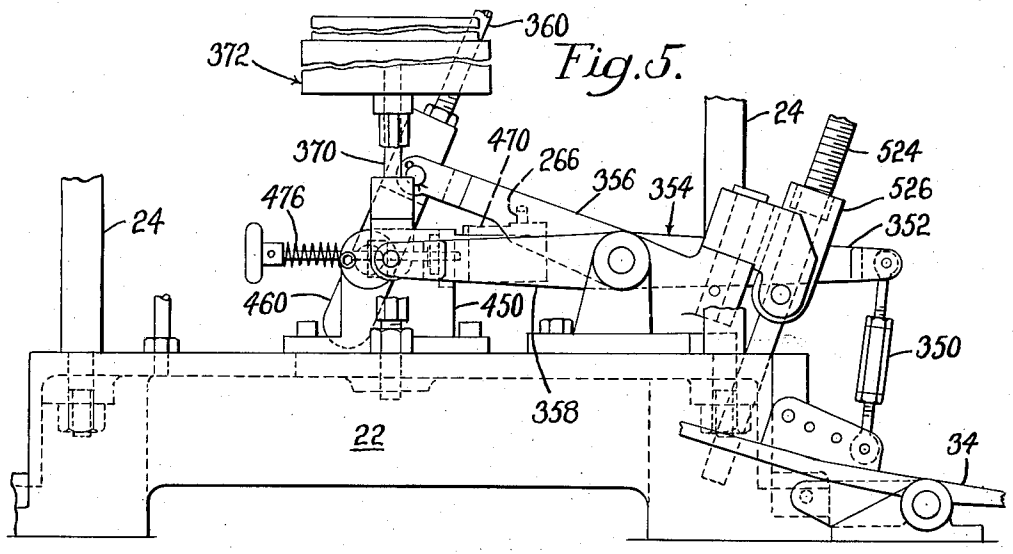

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Fig. 6.

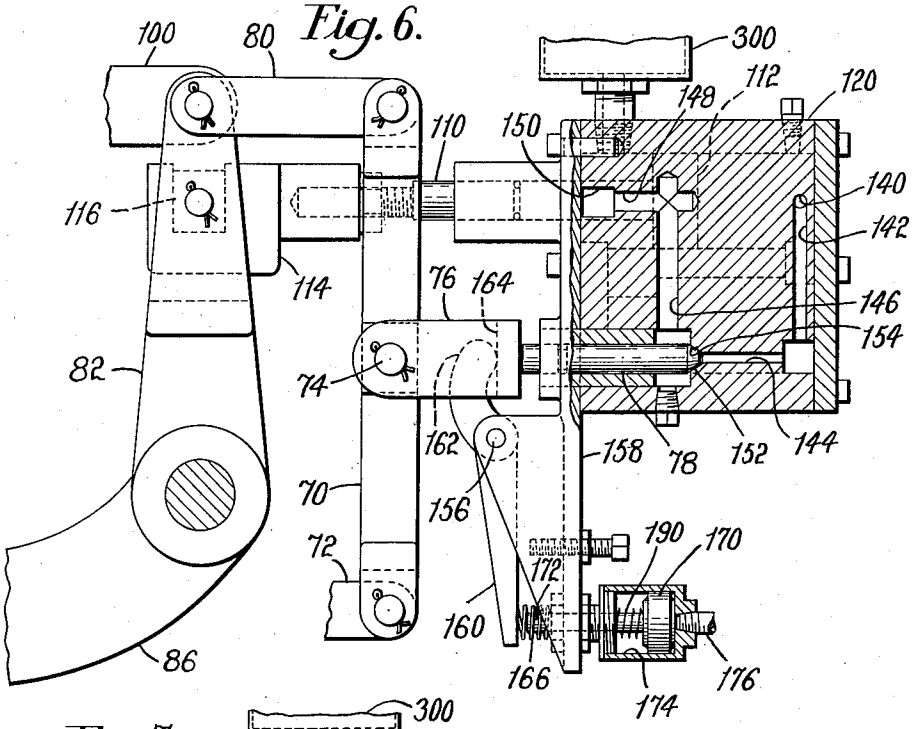

Fig. 7.

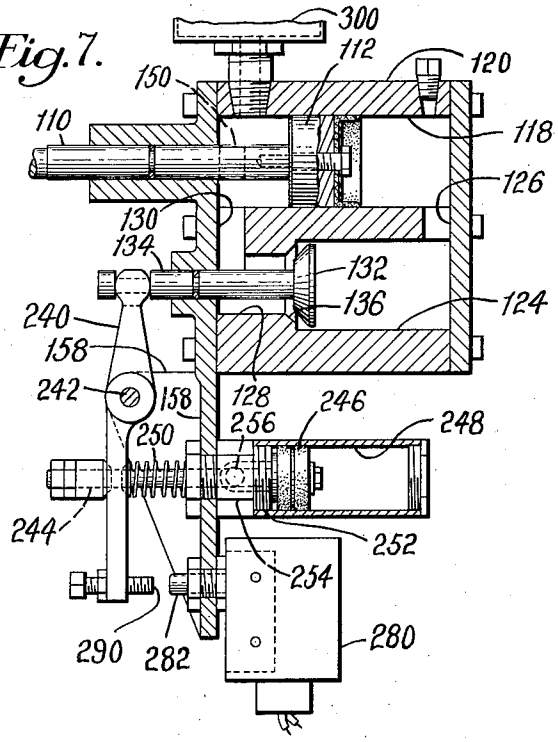

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Fig. 8.

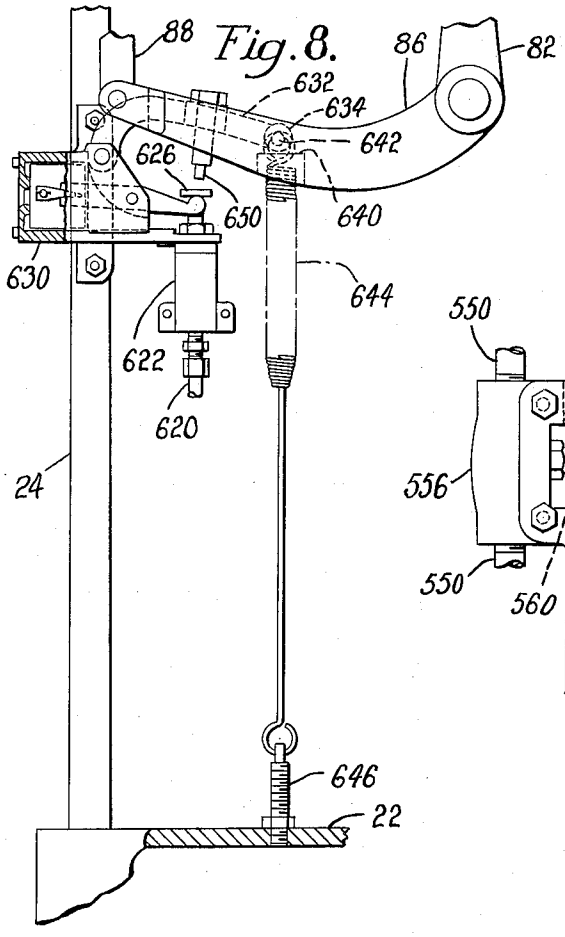
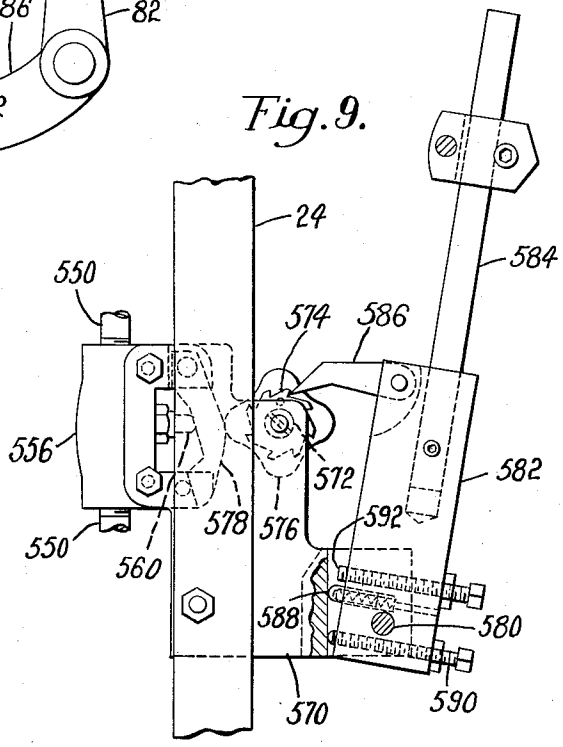


Fig. 9.



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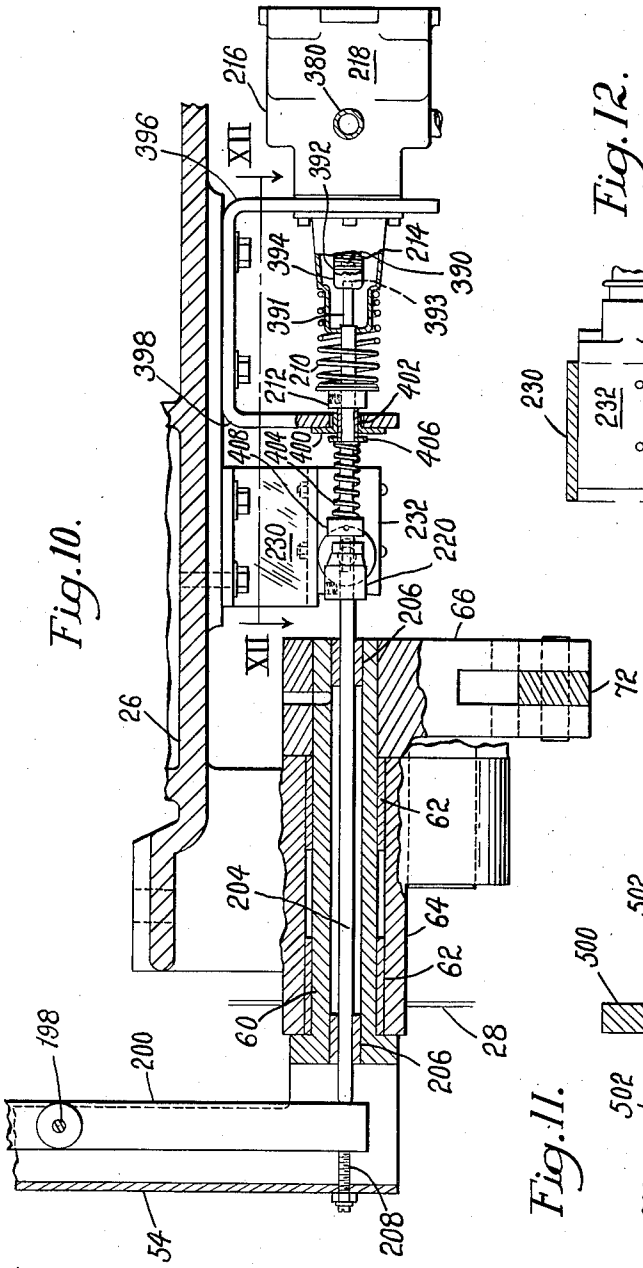

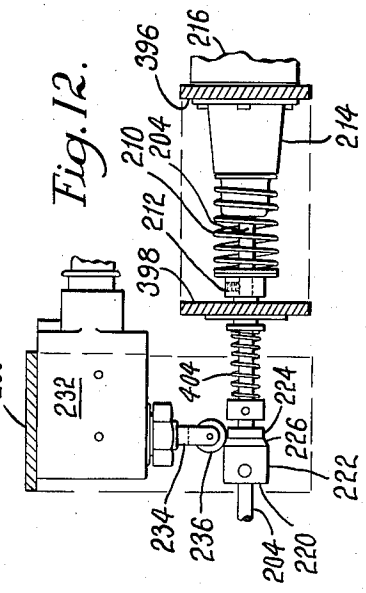

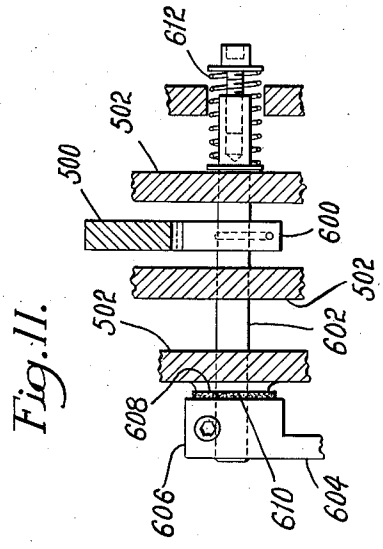

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Fig. 13.

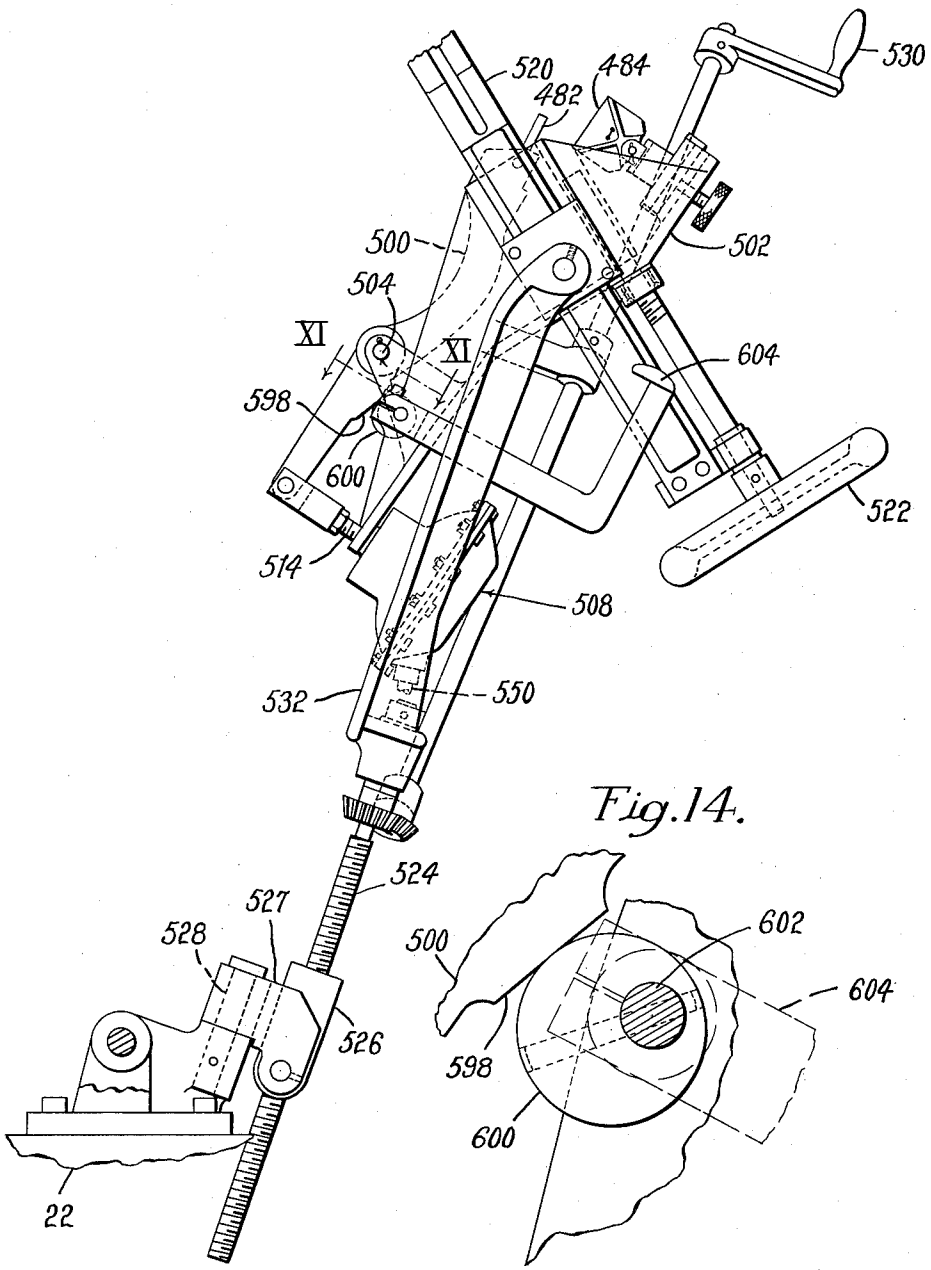

Fig. 14.

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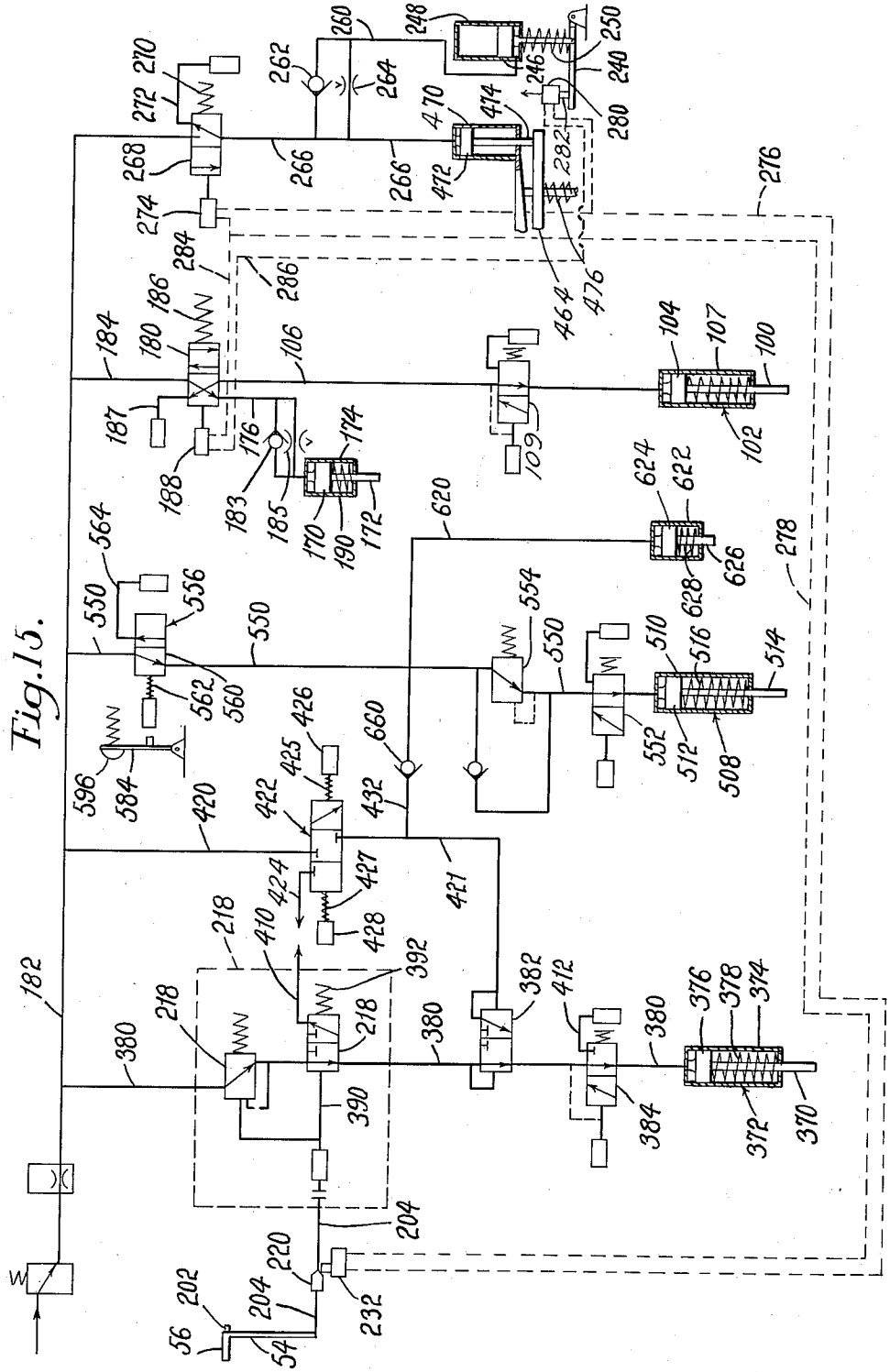

United States Patent Office

2,982,980

Patented May 9, 1961

2,982,980

LASTING MACHINES

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Filed Apr. 29, 1953, Ser. No. 731,686

12 Claims. (Cl. 12—12.4)

This invention relates to lasting machines, and particularly to novel and improved power operated mechanism for advancing and closing the wipers of a lasting machine. While the invention is herein illustrated as embodied in a toe lasting machine of the type disclosed in United States Letters Patent No. 2,926,367, granted March 1, 1960, on an application filed in the names of Andrew J. Gilbride and Adelbert W. Rockwell, Jr., it will be understood that, in its broader aspects, the invention is not limited in utility to a lasting machine of that particular type or to the exact mechanical construction shown.

As will be understood by persons skilled in the art and especially by those who have operated toe lasting machines of the so-called "bed" type, the advancing and closing of the toe lasting wipers by means of manually operated mechanism to wipe the lasting margin of the upper materials inwardly over the bottom of the toe end of an insole on a last, after the upper materials have been shaped to the last during the upwiping operation, involves a very considerable physical effort on the part of the operator. Also, it is important that the wiper advancing and closing mechanism be entirely free from any restraint other than that which may be imposed by the operator while the upper materials are being shaped to the last, during the upwiping operation, as a result of relative heightwise movement between the wipers and the toe end of the shoe being lasted. To relieve the operator of this effort while at the same time avoiding the imposition of any restraint on the wiper advancing and closing mechanism which would detract in the slightest manner from the sense of "feel" involved in the manual control of the wipers during the upwiping operation, the toe lasting machine which is disclosed in the above-identified patent is provided with power operated means which may be selectively rendered operative to advance and close the wipers in response to the actuation of a control member conveniently located on the handle of a lever associated with the manually operable wiper advancing and closing mechanism. Thus, and as will be clearly understood by reference to the mentioned patent, the operator has at his command a source of power which can immediately be rendered operative for advancing and closing the wipers to wipe the lasting margin of the upper materials inwardly over the toe end of the insole of a shoe while at all other times the manual operation of the wipers is unrestrained and the desirable sense of "feel" fully retained.

Although the prior arrangement just referred to represents a very distinct improvement over the manually operated wiper advancing and closing mechanism usually provided in toe lasting machines of this type, it has been found by actual experience that when the power operated means is rendered operative, the toe wipers are advanced and closed rather quickly and without any appreciable effort on the part of the operator so that, in order to control the movement of the wipers, the operator is required to apply a resisting force on the wiper operating handle and/or to retard the movement of the wipers

by causing them to bear more heavily on the upper materials. While such a control of the wiper movements is possible, especially with a skillful operator, such control is not always wholly satisfactory, particularly when it may be desired to stop and to hold the wipers in a predetermined position as, for example, when tacks or other fastenings are to be inserted to secure the upper materials in lasted position, permanently or temporarily.

It is, therefore, a principal object of this invention to provide a novel and improved power operated mechanism for advancing and closing the wipers of a toe lasting machine which affords all of the advantages of the prior arrangement mentioned above and, at the same time, provides an easy and positive control of the power movements of the wipers. With this purpose in view and in the herein illustrated machine, there is associated with a power operated mechanism for advancing and closing the wipers of a lasting machine, which is adapted selectively to be rendered operable in response to the actuation of a control member by the operator of the machine, means for controlling the power movements of the wipers in accordance with movements of the same hand lever which is used for manually advancing and closing the wipers. More particularly, a fluid pressure actuated means is provided for advancing and closing the wipers under the control of a push button carried by the handle of the manual wiper operating lever and a fluid dashpot is arranged to control the power movements of the wipers in response to a bleeding of fluid from one side of a piston to the other through a bleed valve adapted to be controlled jointly by the position of the hand lever and the position of the wipers so that a feed-back or servo action is obtained. The arrangement is such that, in response to an initial movement of the push button, the fluid pressure actuated means is rendered operative as is also the fluid dashpot and the wipers will be advanced and closed by the fluid pressure actuated means exactly in accordance with movements of the hand lever by the operator. Thus, although the wipers are now advanced and closed by power and without any appreciable effort on the part of the operator, he still has exactly the same control over their movements as he would have if he were moving them by hand and he can readily stop movement of the wipers and hold them in any desired position on the toe end of the shoe. As in the prior arrangement, upon release of the push button the power operated means is rendered inoperable and manual operation of the wipers again permitted.

In the machine of the above-mentioned patent, power operated means are also provided for effecting relative movement between the wipers and a shoe being lasted in a direction to cause the wipers to press the overlasted upper materials against the bottom of the insole on the shoe and this power operated means is adapted to be rendered operative in response to the axial movement of a plunger mounted in the handle associated with the hand lever provided for advancing and closing the wipers. Preferably, and in the herein illustrated machine, this same plunger is arranged to render the power operated mechanism for advancing and closing the wipers operative in response to an initial movement thereof while a continued movement of this same plunger is utilized to render the power operated means for effecting relative heightwise movement of the wipers operative and to control the action thereof.

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

In the drawings,

Fig. 1 is a view in perspective of a machine embodying the features of this invention;

Fig. 2 is a plan view at an enlarged scale of a portion of the machine shown in Fig. 1 with certain parts omitted and others broken away;

Fig. 3 is a plan view also at an enlarged scale of certain operating mechanism forming part of the machine with some parts shown in horizontal section;

Fig. 4 is a view in side elevation of a portion of the machine with parts of the frame broken away to expose operating mechanism contained therein;

Fig. 5 is a view in side elevation of certain operating mechanism located in the lower portion of the machine with a housing member associated with the frame omitted;

Fig. 6 is a view in side elevation and at an enlarged scale of a portion of the operating mechanism shown in Fig. 4, with certain parts in vertical section;

Fig. 7 is a view in side elevation similar to that of Fig. 6 but with certain parts shown in vertical section on a different vertical plane;

Fig. 8 is a view in side elevation of a portion of the machine showing a part of its operating mechanism;

Fig. 9 is a view in side elevation and at an enlarged scale of another part of the operating mechanism;

Fig. 10 is a view in front elevation and at an enlarged scale of still another portion of the machine and showing certain parts in vertical section substantially on line X—X of Fig. 4 and looking in the direction of the arrows;

Fig. 11 is a view of another portion of the machine in section substantially on line XI—XI of Fig. 13 and looking in the direction of the arrows;

Fig. 12 is a view of a portion of the mechanism illustrated in Fig. 10 shown in horizontal section substantially on line XII—XII of Fig. 10 and looking in the direction of the arrows;

Fig. 13 is a view in side elevation and at an enlarged scale of a shoe supporting jack forming part of the machine shown in Fig. 1;

Fig. 14 is a view inside elevation and at a still further enlarged scale of a portion of the aforementioned jack shown in Fig. 13; and

Fig. 15 is a diagrammatic view of the fluid pressure system associated with the operating mechanisms of the machine.

Referring to these drawings, and especially to Fig. 1, the lasting machine therein illustrated is in general constructed like the machine of the above-mentioned patent. Thus it comprises a main frame, indicated generally by the reference character **20**, of fabricated construction and including a base casting **22**, on which there is supported by means of posts **24**, **24**, Figs. 4 and 5, an upper casting **26**, and sheet metal side closure members **28**, **30**, Fig. 1. Associated with the base casting **22** is a platform **32** on which a foot treadle **34** is pivotally mounted. A wiper head **40** is rotatably mounted, for angular adjustment by means of a handle **42**, Fig. 2, on a carriage **44** which, in turn, is slidably mounted, for linear adjustment by means of a hand wheel **46**, Figs. 1 and 2, on an arm **48** supported for pivotal movement on the upper casting **26** by means of a cross shaft **49**. The toe lasting wipers **50**, **50** of this machine are mounted on carriers, not shown, and are adapted to be advanced and closed by means of cam slots in these carriers and rolls carried by the wiper head, not shown, and in response to axial movement of a wiper operating rod **52**, Figs. 2 and 4, by means including a hand lever **54** having a handle, or hand grip portion **56**, Fig. 1.

The hand lever **54** is of hollow, open-sided construction, Fig. 10, and has an integrally formed shaft portion **60** by means of which it is pivotally mounted in bearing bushings **62**, **62**, carried by a downwardly extending portion **64** of the frame casting **26**. Secured to the shaft **60** is a downwardly extending arm **66** which is connected to the lower end of a differential or feed back lever **70** by means of a link **72**, Figs. 4 and 6. The lever **70** is pivotally mounted on a pin **74** carried by a bifurcated block **76** formed on the end of a bleed valve **78**, Fig. 6. As

will presently appear, the bleed valve **78** is normally held on its seat when the wipers are being operated manually so that the pin **74** forms a fixed fulcrum for the lever **70**. At its upper end, the lever **70** is connected, by means of a link **80**, to the upwardly extending arm **82** of a bell-crank **84** having another arm **86**. This arm of the bell-crank lever **84** is, in turn, connected by means of a link **88** to an arm **90** of a bell-crank lever **92** having another arm **94** which is connected by means of a pair of links **96**, **96** and a cross block **98** to the wiper operating rod **52**, Fig. 2. As will be apparent, when the pin **74** is held stationary, movement of the hand lever **54** forwardly from the position in which it is shown in Figs. 1 and 4, will result in the advancing and closing of the wipers **50**, **50** in the usual manner, while rearward movement of this hand lever will retract and open the wipers.

Also connected to the arm **82** of the bell-crank lever **84** are the operating rod **100** of a fluid pressure actuator, indicated generally by the reference character **102**, Fig. 4, and including a flexible diaphragm **104**, a fluid pressure supply conduit **106**, a cylinder **107**, and a return spring **108** and the rod **110** of a hydraulic control piston **112**, Figs. 4, 6 and 7, this piston rod being connected to the arm **82** by means of a yoke-like member **114** and a block **116**, rotatably mounted on the arm **82**, Fig. 6. The piston **112** is slidable within a cylindrical bore **118** formed in a housing **120** which is supported on the machine frame by means of a bracket piece **122**, Fig. 4. Piston **112** and cylinder bore **118** constitute a fluid dashpot. Directly below the cylindrical bore **118** is a cylindrical chamber **124** which is in communication with the bore **118**, on the right-hand side of the piston **112**, through a passageway **126**. Passageways **128** and **130** lead from the chamber **124** to the cylindrical bore **118** at the left-hand side of the piston **112** and a conical by-pass valve **132**, having a stem **134**, is adapted to be moved against a conical valve seat **136**, to shut off flow of liquid through the passageways **128** and **130**. Communication between the two ends of the cylindrical bore **118**, on the opposite sides of the piston **112**, is also provided by another series of passageways **140**, **142**, **144**, **146**, **148** and **150**, Fig. 6, flow through these passages, however, being normally shut off by the aforementioned bleed valve **78** which has a conical end **152** adapted to engage a conical valve seat **154**. Pivotally mounted, by means of a pin **156**, on a bracket **158** associated with the housing **120**, is a clamp lever **160** having an upper rounded end **162** adapted to cooperate with a surface **164** on the block **76**. Bearing against the lower end of this lever is a compression spring **166** which functions to hold the valve **78** yieldingly against its seat, and the pivot pin **74** yieldingly in the position in which it is shown.

For holding the valve **78** positively against its seat and the pivot pin **74** fixed in the position shown, a fluid pressure operated piston **170** having a piston rod **172**, adapted to engage the lower end of the lever **160**, is provided. This piston is slidably received within a cylinder **174** to which fluid under pressure is admitted through a conduit **176**. As will presently appear, the flow of fluid under pressure to the conduit **176** is controlled by a reversing valve **180**, Fig. 15, which is connected to a main pressure line **182** by means of a branch line **184**. A coil spring **186** urges the valve to the position in which it is shown in Fig. 15, thereby to admit fluid under pressure to the cylinder **174** through conduit **176** in which there are interposed a check valve **183** and an adjustable restriction **185**. For moving this valve to its other position in which the cylinder **174** is connected to an exhaust line **187** and the branch line **184** connected to the conduit **106**, leading to the fluid pressure actuator **102**, through a quick dump valve **109**, diagrammatically illustrated in Fig. 15, a solenoid **188** is provided. When the cylinder **174** is thus connected to exhaust, a coil spring **190** urges the piston **170** to the position in which it is shown

in Fig. 6, thereby withdrawing the left-hand end of the piston rod **172** from engagement with the lower end of the lever **160** and releasing this lever to the action of the spring **166**.

Referring to Fig. 10, there is pivotally mounted within the open side of the hand lever **54**, on a pin **198**, another lever **200** which carries at its upper end an offset cylindrical portion **202**, Fig. 1, this cylindrical portion extending beyond the inner end of the hand grip **56** to serve as a control plunger or push button. Bearing against the lower end of this lever is the left-hand end of a control rod **204** which is mounted for axial sliding movement within the hub portion **60** by means of guide bushings **206, 206**. This rod is urged to the left, thereby to hold the lower end of the lever **200** in engagement with an adjustable stop screw **208**, by means of a compression spring **210**, interposed between a collar **212**, secured to the rod and a shoulder formed on the cover portion **214** of the housing **216** of a pressure regulator valve **218**. Also secured to the rod **204** is a larger collar **220** having two cylindrical portions **222, 224** and an intervening conical cam portion **26**, Fig. 12. Supported on a bracket **230**, mounted on a portion of the machine frame, is a microswitch **232** having an operating plunger **234** carrying a roller **236**.

The stem **134** of the conical valve **132**, mentioned above, is connected to the upper arm of a lever **240** which is pivotally mounted, by means of a pin **242** on the aforementioned bracket **158**, Fig. 7. Connected to the lower arm of this lever is the rod **244** of a piston **246** which is slidably received within a cylindrical **248**. A compression spring **250**, interposed between the bracket **158** and the lever **240**, tends to hold the parts in the positions in which they are shown in Fig. 7 and with the piston **246** bearing against the head **252** of a guide bushing **254**. Leading into the cylinder **248**, through the aforementioned guide bushing, is a passageway **256** which is connected to a conduit **260**, Fig. 15. This conduit, in turn, is connected through a suitable check valve **262** and adjustable restriction **264** to a conduit **266** leading to a two-way valve **268**, which is connected to the main pressure line **182**. This valve is normally positioned, by means of a spring **270**, so as to connect the conduit **266** to an exhaust line **272**, but is adapted to be shifted, by means of a solenoid **274**, to another position in which the conduit **266** is connected to the main pressure line **182**. This solenoid is adapted to be connected, through leads **276, 278**, to a source of electrical energy, not shown, when the switch **232**, mentioned above, is closed.

The solenoid **188**, referred to above, is connected to the leads **276, 278** through a microswitch **280**, having a plunger **282**, and leads **284, 286**. As is shown in Fig. 7, the lever **240** carries at its lower end an adjustable abutment screw **290** in line with the plunger **282**. Referring to Figs. 10 and 12, it will be seen that a very slight initial movement of the plunger **202**, Fig. 1, against the resistance of the spring **210**, is sufficient to cause the roller **236** to ride up the conical surface **226** on the bushing **222** thereby closing the switch **232** and energizing the solenoid **274**. The valve **268** now moves to a position to admit fluid under pressure from the main pressure line **182** to the cylinder **248** to move the piston **246** to the right, Fig. 7, and thus draw the valve **132** against its seat **136**. Such movement of this piston also closes the microswitch **280**, thereby energizing the solenoid **188** which shifts the valve **180** to a position in which the conduit **106** is connected to the main pressure line, through the conduit **184**, while the conduit **176** is connected to the exhaust line **187**. The spring **190** now moves the piston **170** to the position in which it is shown in Fig. 6, thus releasing the lever **160** to the action of the spring **166**.

Now, as the operator swings the hand lever **54** to the right, Figs. 1 and 4, the bleed valve **78** will be withdrawn from its seat, thus permitting operating fluid, supplied to the cylinder **118** from a reservoir **300**, to flow from the right-hand side of the piston **112** to the left-hand side thereof. Accordingly, the fluid pressure actuator **102**, which was energized when fluid under pressure was admitted to the conduit **106**, is able to move the wiper operating rod **52** to the right, Fig. 4, thereby advancing and closing the wipers **50, 50**. However, because of the differential effect of the lever **70**, such movement of the wiper operating rod **52** immediately tends to close the valve **78** so that a servo or feed back action is provided. In other words, the wiper operating rod **52** is moved to the right by the fluid pressure actuator **102** to an extent determined by the extent of movement of the hand lever **54** itself by the operator. Upon release of the plunger **202**, to the action of the spring **210**, the rod **204** is returned to the position in which it is shown in Fig. 10, thereby discontinuing the operation of the fluid pressure actuator **102** and causing the valve **132** to be moved to the open position shown in Fig. 7. Manual operation of the wiper operating mechanism is now permitted in the usual manner, with the fulcrum pin **74** of lever **70** held in a fixed position by the action of piston **170**.

Referring to Fig. 5, the foot treadle **34** is connected, by means of a link **350**, to one arm **352** of an operating lever **354**, which has two other arms **356, 358**, Fig. 3. Extending between the arm **356** of the above-mentioned lever and the other end of the wiper head supporting arm **48**, Fig. 4, is a link **360**, so that the wiper head **40**, together with the wipers **50, 50**, may be moved in a heightwise direction, relatively to the toe end of a shoe being lasted, by means of the foot treadle in the usual manner. As in the machine shown in the above-mentioned patent, power-operated means are also provided for effecting such heightwise movements to the wiper head and wipers, at the will of the operator. Thus, the operating rod **370** of a fluid-pressure actuator, indicated generally by the reference characters **372** and which is similar in construction to the actuator **102** and diagrammatically illustrated in Fig. 15, as including a cylinder **374**, piston **376** and return spring **378**, is connected to the arm **358** of the lever **354**. This actuator is adapted to be connected to the main pressure line **182** by means of a conduit **380** and pressure regulator valve **218**, a shuttle valve **382** and a so-called quick-dump valve **384**. The valve **218**, diagrammatically illustrated in Fig. 15, which serves both as a control valve and a pressure regulator valve, is a commercial type available in the market and is similar to the pressure regulator valves **208** and **222** of the machine disclosed in the above-mentioned application. This valve has an operating stem **390** which is adapted to be moved to the right, Figs. 10 and 15, against the resistance of a return spring **392**. The effect of such movement of the stem **390** is, first to permit flow of air under a minimum pressure through the valve and then to cause the pressure of the air delivered from the valve to increase in direct proportion to the extent of movement of this stem, all in the same manner as the valves **208** and **222** and explained in detail in the above-mentioned patent.

As is shown in Fig. 10 of the drawings, the control rod **204** has a right-hand end portion **391** of reduced diameter which, when the parts are in the positions shown, is spaced a short distance from the bottom of a recess **393** formed in a head **394** on the stem **390**. The valve **218** is supported in a bracket having two arms **396** and **398**, in the latter of which there is mounted a guide bushing **400** for a sleeve **402** slidable on the rod **204**. This sleeve is urged yieldingly into engagement with the collar **212**, mentioned above, by means of a compression spring **404** which is interposed between a flange **406** on this sleeve and the collar **408** on the rod **204**. When the parts are in the position shown in Fig. 10, the flange **406** is spaced from the guide bushing **400** by a distance substantially equal to the distance from

the end of the rod 204 to the bottom of the recess 393. When the rod 204 is displaced to the right, in response to an initial movement of the control plunger 202, Fig. 1, just far enough to close the switch 232 and thereby render the fluid pressure actuator 102 operative to advance and close the wipers 50, 50 in response to the movement of the hand lever 54, in the manner explained above, the flange 406 will just engage the guide bushing 400 and the end 391 of the rod 204 will just contact the bottom of the recess 393. Now, upon a continued movement of the rod 204 by the plunger 202, against an additional resistance set up by the spring 404, the valve 218 will be opened to admit fluid under pressure to the actuator 272 through the conduit 380 and valve 382, 384, which are at this time open to permit the flow of fluid under pressure therethrough.

As will be apparent, upon admission of fluid under pressure to this actuator the wiper head and wipers will be moved downwardly under power to cause the wipers to press the upper materials against the bottom of the toe end of the shoe being lasted with a force which can be increased, as desired, by a further movement of the rod 204 to the right by means of the plunger 202. Upon return of this plunger to a position where the valve 218 is again closed by the action of the spring 392, the fluid pressure actuator 372 will be connected to an exhaust line 410 associated with this valve and manual movement of the wiper head by means of the foot treadle again permitted; the quick dump valve 384 now functioning to connect the actuator 372 directly to another exhaust line 412 thereby to facilitate such manual movement of the wiper head by the foot treadle.

Fluid under pressure from the main supply line 182 may also be supplied to the actuator 372 through the shuttle valve 382, conduits 420, 421 and a manually operable valve 422, Fig. 15. This valve, which is diagrammatically illustrated in Fig. 15 may be considered as having a spool which is adapted to be moved in one direction, against resistance of a spring 427, from the position indicated in Fig. 15, wherein the flow of fluid under pressure from the conduit 420 to the conduit 421 is shut off to a position in which the conduits 420 and 421 are connected through this valve, by means of a plunger 426, and to be moved in the opposite direction, against the resistance of a spring 425, to a position in which the conduit 421 is connected to an exhaust line 424, by means of a plunger 428. For thus operating this valve, which for the sake of convenience is mounted on the wiper head 40, Fig. 1, an operating lever 430 is provided, this lever being so arranged as to actuate the plunger 426 when its right-hand end is depressed and to operate the plunger 428 when its right-hand end is elevated. Accordingly, at the conclusion of the lasting operation, the operator may continue the so-called "bedding" action, initiated in response to movement of the plunger 202, as explained above, by depressing the lever 430. Now, fluid under pressure will be admitted to the conduit 421 and this fluid under pressure will actuate the shuttle valve 382 to shut off communication between the two portions of conduit 380, which are connected to this shuttle valve, and at the same time to connect the actuator 372 to the conduit 421, which is, of course, in communication with the main pressure line 182. Upon release of the lever 430 the spool valve 422 will be returned to the position indicated in Fig. 15, thus trapping fluid under main line pressure in the actuator 372. This "bedding" action will now continue until the spool of the valve 422 is moved, by the plunger 428, to a position to connect the conduit 421 to exhaust, which can be done by elevating the lever 430, or until this conduit is otherwise placed in communication with exhaust through a branch line 432 in a manner which will appear below.

Referring to Fig. 3, the herein illustrated machine is shown as provided with a friction locking device for resisting heightwise movement of the wiper head during the overwiping action. This device comprises a guide bracket 450, supported on the base portion 22 of the frame of the machine and having a rectangular shaped opening 452 for receiving a downwardly extending portion 460 of the above-mentioned link 360, which is provided with flat sides to fit within this opening. Pivotally mounted on the bracket 450, by means of a pin 462, is a lever 464 having an eccentrically disposed cam surface 466. This camming surface is adapted to bear against one end of a friction block 468, the other end of which engages one side of the downwardly extending portion 460 of the link 360. Also supported on the bracket 450 is a cylinder 470 in which there is mounted a piston 472 (Fig. 15) having a piston rod 474 bearing against the lever 464 (Fig. 3). An extension of the conduit 266, which has been referred to above, is connected to the cylinder 470 and when fluid under pressure is admitted to this conduit in response to the initial movement of the control plunger 202, in the manner explained above, the piston 472 will be moved upwardly (Fig. 3), downwardly (Fig. 15), thereby swinging the lever 464 in a counterclockwise direction (Fig. 3) against the resistance of a return spring 476 and causing the camming surface 466 to press the friction block 468 against the downwardly extending portion 460 of the link 360. Accordingly, during the advancing and closing of the wipers by power under the control of the hand lever 54, heightwise movement of the wiper head is effectively prevented by the frictional resistance thus provided in addition to the pressure applied by the operator on the treadle 34. However, this frictional resistance is readily overcome by the force applied to the wiper head by the fluid pressure actuator 372 during the "bedding" down action.

As in the machine disclosed in the above-mentioned patent, the toe end of each shoe being lasted is clamped against a toe reset 480 by means of a shoe supporting last pin 482 and a heel abutment 484, Figs. 1, 2 and 13. The last pin and heel abutment are associated with a jack construction which is, in all essential respects, like that of the machine disclosed in the mentioned patent and hence will be only briefly described herein. Referring to Fig. 13, the last pin 482 is pivotally mounted on the upper end of a lever 500 which in turn is supported on a frame-like member 502 by means of a rockshaft 504. This lever is adapted to be swung in a clockwise direction, Fig. 13, to force the heel end of a shoe mounted on the last pin 482 against the heel abutment 484, thereby causing the toe end of the shoe to be forcibly clamped against the toe rest 480, by means of a fluid pressure actuator which is indicated generally by the reference character 508 and diagrammatically illustrated in Fig. 15 as including a cylinder 510, piston 512, piston rod 514, and return spring 516. The frame-like member 502 is slidably associated with a yoke member 520 for adjustment therealong by means including a hand wheel 522 and is supported for heightwise adjustment by means of a screw 524, supporting blocks 526, 527, swivel pin 528, a crank handle 530, and a second yoke-like member 532, while the first-mentioned yoke member 520 is mounted on a third yoke member 540 for swinging movement about a vertical axis passing through the shoe rest 480, by means of a hand wheel 542, all generally in the same manner as is explained in the aforementioned patent.

For admitting fluid under pressure to the actuator 508, a conduit 550 connected thereto leads to the main pressure line 182 through a quick dump valve 552, a manually adjustable pressure regulating valve 554, and a manually operable off-on valve 556, which may be of any suitable type and is diagrammatically illustrated in Fig. 15 as having a plunger 560 which may be moved against the resistance of a return spring 562 from a position in which that portion of the conduit which leads downwardly away

from this valve is connected to an exhaust line 564 and flow through this valve is shut off, to the position shown in Fig. 15 in which the exhaust line is shut off and flow through this valve permitted. For thus operating this valve plunger so as to connect the cylinder 510 alternately to the main supply line 182 and to the exhaust line 564, the following arrangement is provided.

Referring to Fig. 9, the valve 556 is conveniently supported on one of the posts 24, associated with the machine frame, which post also carries a bracket 570. Rotatably mounted on this bracket is a cross shaft 572 carrying a ratchet wheel 574 and a four-pointed cam 576. Associated with the valve 556 is an operating arm 578 adapted to bear on one side against the plunger 560 and on its other side against the cam 576. Pivotally mounted on the bracket 570, by means of a pin 580, is a block 582 which carries an upwardly extending rod 584. Mounted on this block is a pawl 586 the operating end of which rests on the periphery of the ratchet wheel 574 which, as shown, is provided with eight teeth. A spring-pressed plunger 588 is arranged to swing the block 582, together with the rod 584, in a clockwise direction, Fig. 9, to the extent determined by a first stop screw 590, while movement of the block and rod in the opposite direction is limited by a second stop screw 592 to an angular extent just sufficient to cause the pawl 586 to rotate the shaft 572, ratchet wheel 574, and cam 576 one-eighth of a turn. Accordingly, as the rod 584 is repeatedly swung in a counterclockwise direction and released, by means of a knee pad 596 attached thereto, see Fig. 1, operating fluid from the main pressure line, suitably regulated as to a desired pressure by the manually adjustable valve 554, will be admitted to the cylinder 510 and then this cylinder will be connected to exhaust, in a manner which should be readily understood.

For the purpose of speeding up the jacking operation and to prevent interference between the toe end of the lasted shoe and the wipers, the extent of return swinging movement of the lever 500, together with the last pin 482 which is carried thereby, by means of the spring 516 when the cylinder 510 is connected to exhaust, may be restricted in the following manner. Formed on the lever 500 is a flat surface 598, Figs. 13 and 14, which engages the periphery of a stop cam 600 to limit such return movement of the lever. This cam is fast on a cross shaft 602 which is journaled in portions of the frame-like member 502, Fig. 11. Also secured to this shaft is an operating arm 604 having a hub portion 606, and secured to one face of this hub portion is a friction disk 608 which is adapted to be held yieldingly in contact with a flat surface 610, formed on a portion of the frame-like member 502, by means of a spring 612, thereby to hold the operating arm 604 and also the stop cam 600 frictionally in any position of adjustment. With this arrangement, when the machine is being used to last relatively small shoes, the stop cam 600 would be so positioned as to limit considerably the return movement of the lever 500 (i.e., counterclockwise swinging movement of this lever as viewed in Fig. 13) to an extent just sufficient to withdraw the heel end of a shoe on the last pin 482 from engagement with the heel abutment 484. Thus, when the next shoe is placed on the last pin, only a slight clockwise swinging of the lever 500 will be required to clamp the toe end of the shoe against the toe rest 480. Also, the shoe is not displaced far enough toeward to be engaged by the retracted and opened wipers as the wiper head 40 is lowered by release of the treadle 34. As will be readily apparent, when the size of the shoes being lasted increases, the heel will be adjusted away from the wipers, by hand wheel 522, and the stop cam 600 will be suitably adjusted to provide the desired amount of return swinging movement of the lever 500.

The conduit 432, mentioned above, is connected to the conduit 550 as is another conduit 620, see Fig. 15. The conduit 620 leads to a cylinder 622 in which there is a piston 624 having a piston rod 626 and a return spring 628. Referring to Fig. 8, the cylinder 622 is supported on one of the posts 24, associated with the machine frame, by means of a bracket 630 on which there is pivotally mounted an arm 632 carrying at its outer end an offset roller 634. The arm 86 of the lever 84, which is associated with the wiper advancing and closing mechanism as explained above, is provided with an offset abutment 640 which is in vertical alinement with the roll 634. Connected at its upper end to a pin 642, extending from the end of the arm 632, is a tension spring 644 the lower end of which is anchored to a screw 646 threaded into the base portion 22 of the machine frame. As will be apparent, the spring 644 exerts a force on the lever 84 tending to swing that lever in a counterclockwise direction thereby to retract and open the wipers. During the operation of the machine, however, this spring is rendered ineffective to exert any force on the lever 84 in the following manner.

The end of the piston rod 626 is enlarged, as indicated in Fig. 8, and is in substantial vertical alinement with an abutment screw 650 which is threaded through the arm 632. Accordingly, when fluid under pressure is admitted through valve 556 on the conduit 550 to the actuator 508, for the purpose of jacking the shoe in the manner described above, fluid under pressure will also be admitted through conduit 620 to the cylinder 622, thereby elevating the piston 624 and its rod 626, as viewed in Fig. 8, and swinging the arm 632 in a counterclockwise direction far enough to carry the roll 634 well away from the abutment 640 on the lever 84. Advancing and closing of the wipers by means of the hand lever 54, or under power in the manner explained above, is now permitted without any interference from the spring 644. However, at the conclusion of the lasting operation, when the shoe is released by connecting the conduit 550 to exhaust, through the action of the valve 556, the cylinder 622 will also be connected to exhaust, thereby releasing the arm 632 and permitting the spring 644 to act on the lever and retract and open the wipers automatically.

As suggested above, the "bedding" action which is initiated in response to the depression of the lever 430, associated with the valve 422, Figs. 1 and 2, will be continued until the conduit 421 is connected to exhaust, either by elevation of the lever 430 or through the branch conduit 432. It will be noted that this conduit, in which there is located a check valve 660 opening toward the conduit 550, Fig. 15, will be connected to exhaust, together with the conduit 550, through the action of the valve 556 to release the shoe. Thus, at the conclusion of each lasting operation, the operator, merely by pushing on the knee pad 596, will discontinue the "bedding action," release the shoe, and cause the wipers to be retracted and opened by the spring 644. At this point in the lasting operation, the overwiping action will have been completed and the operator will have released the control plunger 202, thus connecting conduits 106 and 266 to exhaust, and also the handle 56. Accordingly, all parts are returned to their original positions and all operating cylinders, except the cylinder 170, will be connected to exhaust.

While the mode of operation of the herein illustrated machine should be apparent from the above description, it will now be briefly outlined. After having made suitable adjustments of the wiper head 40, by means of the handle 42 and hand wheel 46, and of the heel abutment 484 and last spindle 482, by means of the hand wheel 522, handle 530, and hand wheel 542, the operator will place a shoe to be lasted on the spindle and then will strike the knee pad 596 thereby causing the shoe to be clamped in place against the heel abutment 484 and toe rest 480 by means of the actuator 508. Now, the operator elevates the wipers 50, 50 by means of the foot treadle 34 and advances and closes the wipers around the toe end of

the shoe manually by means of the hand lever **54** to effect the upwiping operation in the usual manner, during which he has the same "feel" with respect to the action of the wipers on the toe end of the shoe as in bed lasting machines of the well-known type now used in the trade.

At the conclusion of this upwiping operation, the overwiping operation is commenced by the advancing and closing of the wipers to wipe the lasting margin of the upper materials inwardly over the bottom of the toe end of the shoe. To facilitate this action, the operator moves the control plunger or button **202** with his thumb just far enough to close the switch **232**, indicated to him by the added resistance set up by the spring **404**, and thus activates the fluid pressure actuator **102** and its associated dashpot by the closing of the by-pass valve **132** and the release of the bleed valve **78**, in the manner explained above. The advancing and closing movements of the wipers **50**, **50** are now effected by power, thus relieving the operator of the effort which otherwise would be required. However, because of the feed back or servo action which is provided, the operator has just as complete control over the advancing and closing movements of the wipers as he would have if he were moving them directly by hand. Accordingly, he can bring the wipers to a stop at any time and hold them in any desired advanced and closed position with extreme ease and accuracy. During the overwiping operation, the operator may augment the downward pressure which he may be exerting on the upper materials through the action of the foot treadle by means of a further movement of the control plunger **202**, against the resistance of the spring **404**, to render the actuator **372** operative and he may regulate the force applied on the upper materials by the extent of such further movement of this plunger.

After the overwiping operation has been completed, and with the wipers pressed firmly against the overlasted upper materials, this so-called "bedding" action can be continued, in response to the depression of the lever **430**, by the actuator **372** under full pressure of fluid from the supply line **182** without any attention on the part of the operator who may now let go of the handle **56** and, if he so desires, take his foot off of the treadle **34**. To discontinue this "bedding" action and release the shoe which has been lasted for removal from the machine, thereby to make ready to last the next shoe, the operator again strikes the pad **596** with his knee. Just before doing this, however, the operator will commence to exert some force on the right-hand portion of the treadle **34**. In response to engagement of the knee pad the conduit **550** will be connected to exhaust, together with the actuator **372**, through conduits **421**, **432** and check valve **660** so that the wiper head may now be lifted by the pressure exerted on the foot treadle to elevate the wipers from the toe end of the lasted shoe. Now, inasmuch as conduits **106** and **266** were previously connected to exhaust upon release of the control plunger **202**, the wipers will be automatically withdrawn by the action of the spring **644**, Fig. 8, piston **622** having been withdrawn by spring **628**, thus returning all parts of the machine to their original positions and preparing the machine for the reception of the next shoe to be lasted.

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 lasting machine having wipers mounted for advancing and closing movements, mechanism for imparting such advancing and closing movements to said wipers including a manually movable member connected to said mechanism for advancing and closing the wipers, a power actuated device also connected to said mechanism for advancing and closing said wipers, mechanism for controlling said power actuated device including a member movable jointly by the manually movable member and by the power actuated device and adapted to determine the extent of movement of said wipers by the power actuated device in accordance with the extent of movement if the manually movable member, and means for selectively rendering the power actuated device operable or inoperable to provide for advancing and closing the wipers manually or under power at the will of the operator and under the control of said manually movable member.

2. In a lasting machine having wipers mounted for advancing and closing movements, mechanism for imparting such advancing and closing movements to said wipers including a manually movable member and a linkage connecting said member to the wiper advancing and closing mechanism, a fluid pressure actuated device connected to said linkage for advancing and closing said wipers, mechanism for controlling said fluid pressure actuated device including a member movable jointly by the manually movable member and by the fluid pressure actuated device and adapted to determine the extent of movement of said wipers by the fluid pressure actuated device in accordance with the extent of movement of the manually movable member, and means for selectively rendering the fluid pressure actuated device operable or inoperable to provide for advancing and closing the wipers manually or under power at the will of the operator and under the control of said manually movable member.

3. In a lasting machine having wipers mounted for advancing and closing movements, mechanism for imparting such advancing and closing movements to said wipers including a manually movable member connected to said mechanism for advancing and closing the wipers, a fluid pressure actuated device also connected to said mechanism for advancing and closing said wipers, mechanism for controlling said fluid pressure actuated device including a member movable jointly by the manually movable member and by the fluid pressure actuated device and adapted to determine the extent of movement of said wipers by the fluid pressure actuated device in accordance with the extent of movement of the manually movable member, and means including a control member carried by the manually movable member for selectively rendering the fluid pressure actuated device operable or inoperable to provide for advancing and closing the wipers manually or under power at the will of the operator and under the control of said manually movable member.

4. In a lasting machine having wipers mounted for advancing and closing movements, mechanism for imparting such advancing and closing movements to said wipers including a manually movable member and a linkage connecting said member to the wiper advancing and closing mechanism, a fluid pressure actuated device connected to said linkage for advancing and closing said wipers, mechanism for controlling said fluid pressure actuated device including a member movable jointly by the manually movable member and by the fluid pressure actuated device and adapted to determine the extent of movement of said wipers by the fluid pressure actuated device in accordance with the extent of movement of the manually movable member, and means including a control member carried by the manually movable member for selectively rendering the fluid pressure actuated device operable or inoperable to provide for advancing and closing the wipers manually or under power at the will of the operator and under the control of said manually movable member.

5. In a lasting machine having wipers mounted for advancing and closing movements, mechanism for imparting such advancing and closing movements to said wipers including a manually movable member and a linkage connecting said member to the wiper advancing and closing mechanism, a power actuated device connected to said linkage for advancing and closing said wipers, a fluid dashpot including a piston connected to

said power actuated device, means including a member movable jointly by said manually movable member and by the power actuated device for so controlling the action of said dashpot piston as to determine the extent of movement of the wipers by the power actuated device in accordance with the extent of movement of the manually movable member, and means for selectively rendering the power actuated device and the dashpot operable or inoperable to provide for advancing and closing the wipers manually or under power at the will of the operator and under the control of said manually movable member.

6. In a lasting machine having wipers mounted for advancing and closing movements, mechanism for imparting such advancing and closing movements to said wipers including a manually movable member connected to said mechanism for advancing and closing the wipers, a fluid pressure actuated device also connected to said mechanism for advancing and closing said wipers, a fluid dashpot including a piston connected to said fluid pressure actuated device, means including a member movable jointly by said manually movable member and by the fluid pressure actuated device for so controlling the action of said dashpot piston as to determine the extent of movement of the wipers by the fluid pressure actuated device in accordance with the extent of movement of the manually movable member, and means for selectively rendering the fluid pressure actuated device and the dashpot operable or inoperable to provide for advancing and closing the wipers manually or under power at the will of the operator and under the control of said manually movable member.

7. In a lasting machine having wipers mounted for advancing and closing movements, mechanism for imparting such advancing and closing movements to said wipers including a manually movable member connected to said mechanism for advancing and closing the wipers, a fluid pressure actuated device also connected to said mechanism for advancing and closing said wipers, a fluid dashpot including a piston connected to said fluid pressure actuated device, means including a member movable jointly by said manually movable member and by the fluid pressure actuated device for so controlling the action of said dashpot piston as to determine the extent of movement of the wipers by the fluid pressure actuated device in accordance with the extent of movement of the manually movable member, and means including a control member carried by the manually movable member for selectively rendering the fluid pressure actuated device and the dashpot operable or inoperable to provide for advancing and closing the wipers manually or under power at the will of the operator and under the control of said manually movable member.

8. In a lasting machine having wipers mounted for advancing and closing movements, mechanism for imparting such advancing and closing movements to said wipers including a manually movable member and a linkage connecting said member to the wiper advancing and closing mechanism, a fluid pressure actuated device connected to said linkage for advancing and closing said wipers, a fluid dashpot including a piston connected to said fluid pressure actuated device, means including a member movable jointly by said manually movable member and by the fluid pressure actuated device for so controlling the action of said dashpot piston as to determine the extent of movement of the wipers by the fluid pressure actuated device in accordance with the extent of movement of the manually movable member, and means including a control member carried by the manually movable member for selectively rendering the fluid pressure actuated device and the dashpot operable or inoperable to provide for advancing and closing the wipers manually or under power at the will of the operator and under the control of said manually movable member.

9. In a toe lasting machine having toe lasting wipers mounted for advancing and closing movements, mechanism for imparting such movements to said wipers including a manually movable member connected to said mechanism for advancing and closing the wipers, a normally inoperative power actuated device also connected to said mechanism for advancing and closing said wipers, a fluid dashpot having a piston connected to said power actuated device, a by-pass valve adapted when open to render the dashpot ineffective, a movable bleed valve for controlling the action of the dashpot piston, a differential lever pivotally mounted on said bleed valve, means for normally holding said bleed valve against movement to provide a fixed fulcrum for said differential lever during advancing and closing of the wipers by said manually movable member, and means including a control member carried by said manually movable member for simultaneously rendering said power actuated device operable, closing said by-pass valve, and releasing said bleed valve for movement by said manually operable member to control the extent of movement of the wipers by said power actuated device in accordance with the extent of movement of said manually movable member.

10. In a toe lasting machine having toe lasting wipers mounted for advancing and closing movements, mechanism for imparting such movements to said wipers including a manually movable member connected to said mechanism for advancing and closing the wipers, a normally inoperative fluid pressure actuated device also connected to said mechanism for advancing and closing said wipers, a fluid dashpot having a piston connected to said fluid pressure actuated device, a by-pass valve adapted when open to render the dashpot ineffective, a movable bleed valve for controlling the action of the dashpot piston, a differential lever pivotally mounted on said bleed valve, means for normally holding said bleed valve against movement to provide a fixed fulcrum for said differential lever during advancing and closing of the wipers by said manually movable member, and means for simultaneously rendering said fluid pressure actuated device operable, closing said by-pass valve and releasing said bleed valve for movement by said manually movable member to control the extent of movement of the wipers by said fluid pressure actuated device in accordance with the extent of movement of said manually movable member.

11. In a toe lasting machine having toe lasting wipers mounted for advancing and closing movements, mechanism for imparting such movements to said wipers including a manually movable member, and a mechanical linkage connecting said member to the wipers, a normally inoperative fluid pressure actuated device for advancing and closing said wipers, a fluid dashpot having a piston connected to said fluid pressure actuated device, a by-pass valve adapted when open to render the dashpot ineffective, a movable bleed valve for controlling the action of the dashpot piston, a differential lever pivotally mounted on said bleed valve and forming part of said mechanical linkage, means for normally holding said bleed valve against movement to provide a fixed fulcrum for said differential lever during advancing and closing of the wipers by said manually movable member, and means for simultaneously rendering said fluid pressure actuated device operable, closing said by-pass valve and releasing said bleed valve for movement by said manually movable member to control the extent of movement of the wipers by said fluid pressure actuated device in accordance with the extent of movement of said manually movable member.

12. In a toe lasting machine having toe lasting wipers mounted for advancing and closing movements, mechanism for imparting such movements to said wipers including a manually movable member and a mechanical linkage connecting said member to the wipers, a normally inoperative fluid pressure actuated device for ad-

vancing and closing said wipers, a fluid dashpot having a piston connected to said fluid pressure actuated device, a by-pass valve adapted when open to render the dashpot ineffective, a movable bleed valve for controlling the action of the dashpot piston, a differential lever pivotally mounted on said bleed valve and forming a part of said mechanical linkage, means for normally holding said bleed valve against movement to provide a fixed fulcrum for said differential lever during advancing and closing of the wipers by said manually movable member, and means including a control member carried by said manually movable member for simultaneously rendering said fluid pressure actuated device operable, closing said by-pass valve and releasing said bleed valve for movement

by said manually movable member to control the extent of movement of the wipers by said fluid pressure actuated device in accordance with the extent of movement of said manually movable member.

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