M. BROCK.

LASTING MACHINE.

APPLICATION FILED SEPT. 16, 1913. RENEWED JUNE 30, 1917.

1,267,370.

Patented May 28, 1918.

5 SHEETS—SHEET 1.

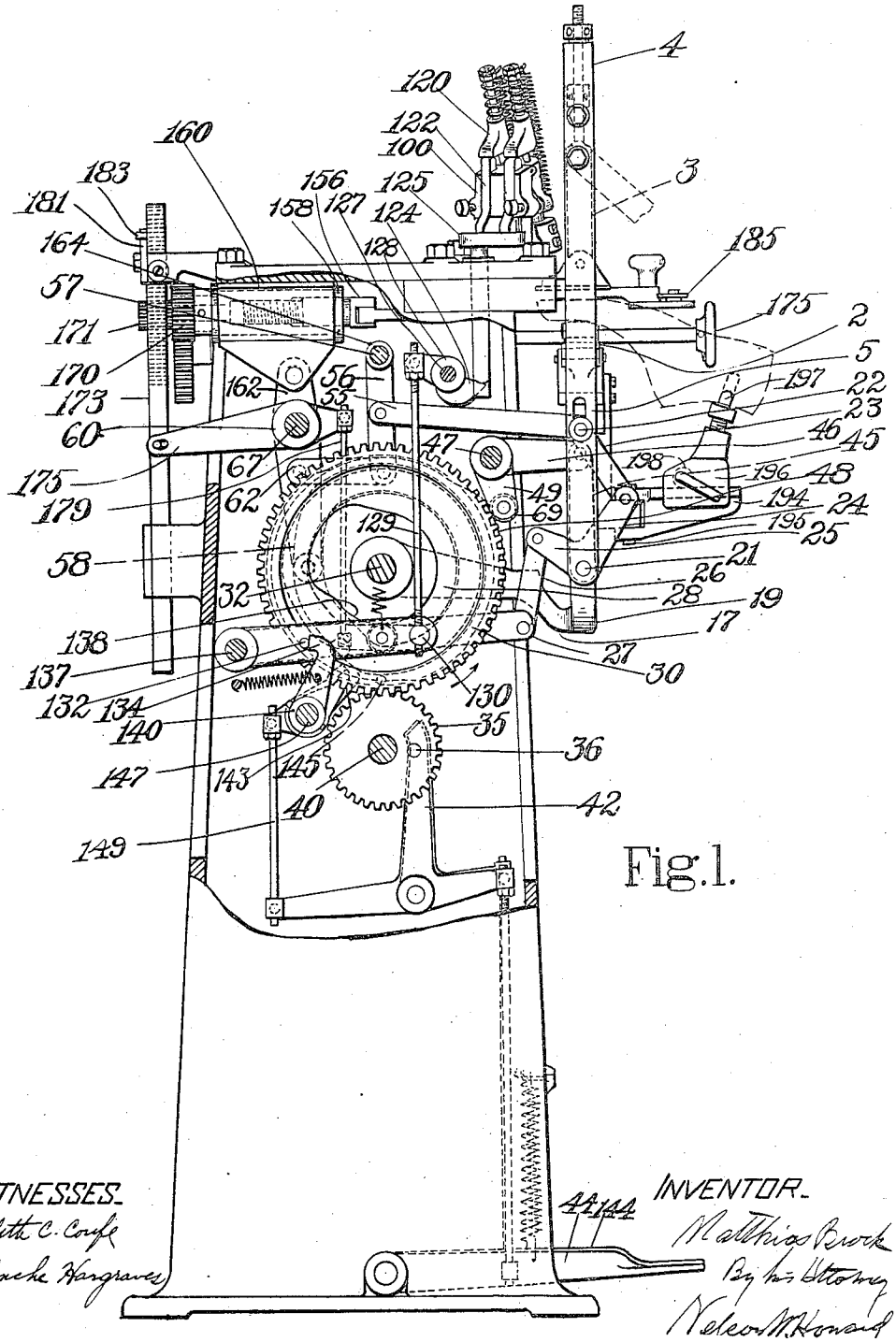


Fig. 1.

WITNESSES.

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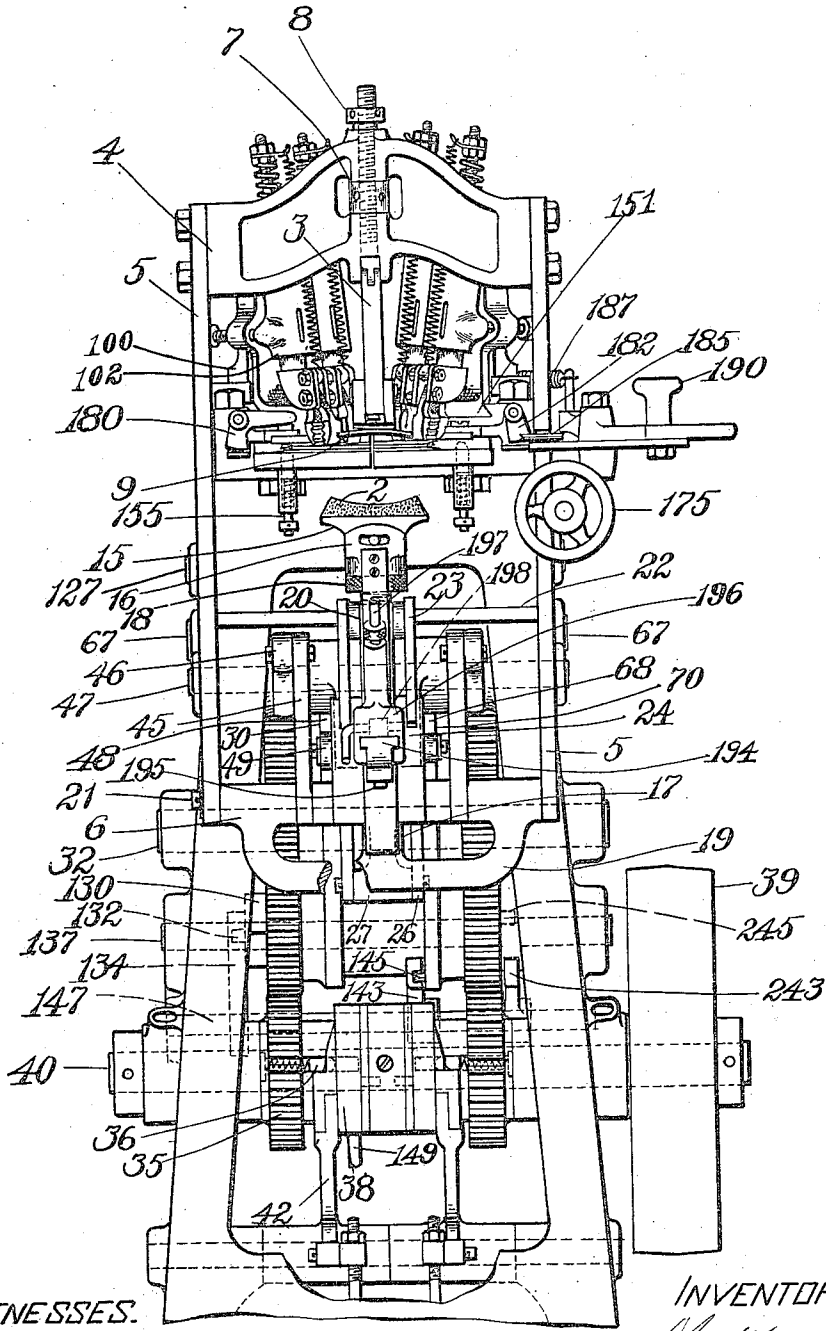


Fig. 2.

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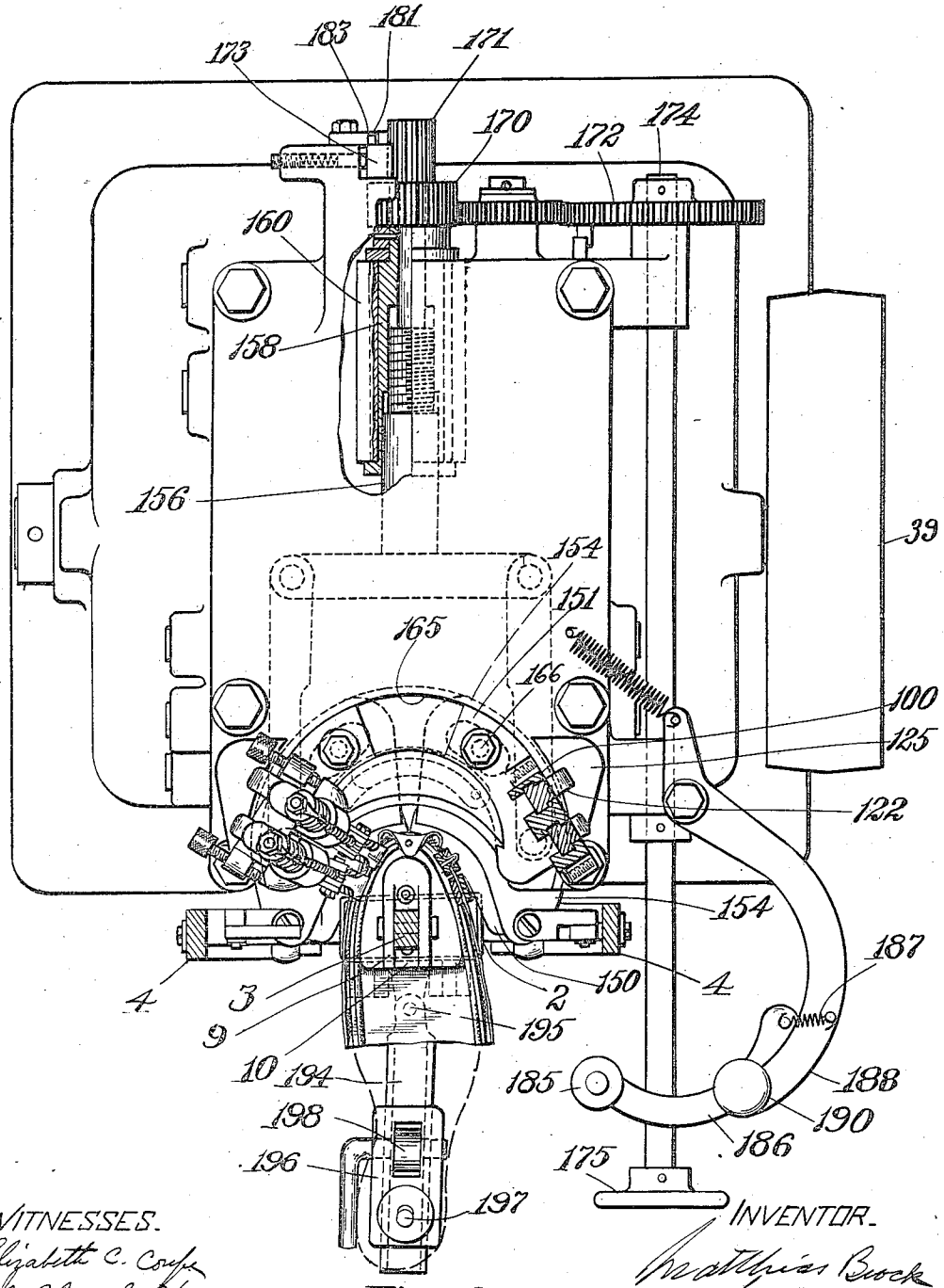


Fig. 3.

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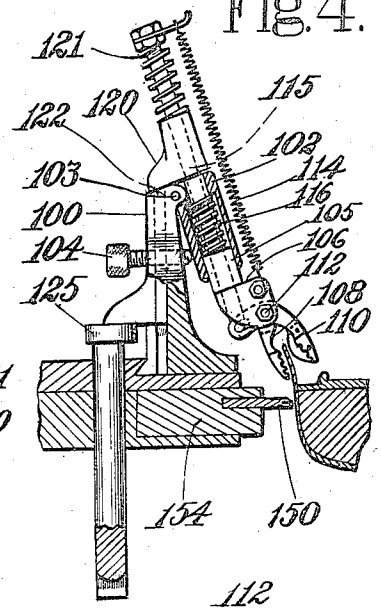
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5 SHEETS—SHEET 4.

Fig. 4.



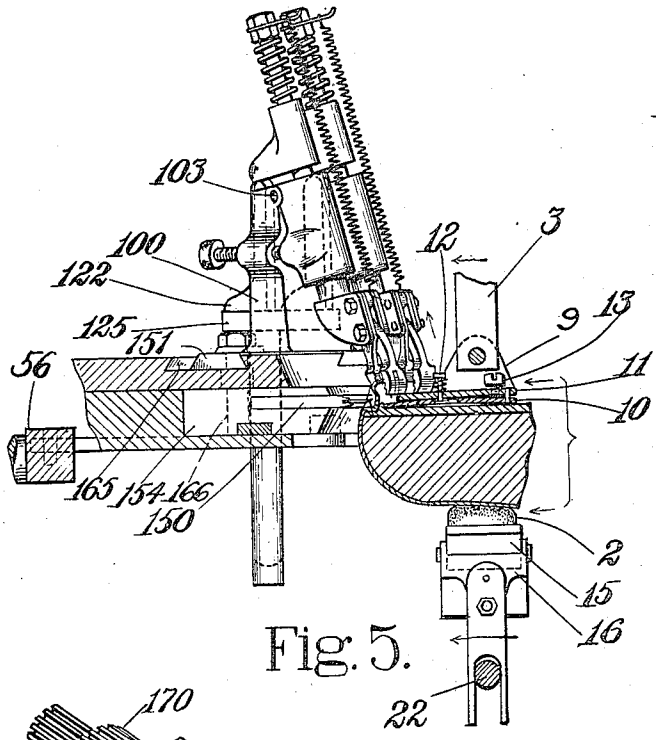


Fig. 5.

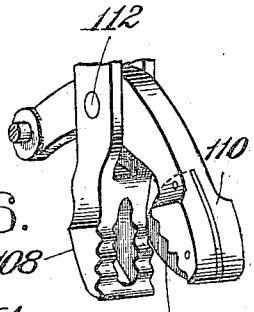


Fig. 6.

Fig. 7.

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5 SHEETS—SHEET 5.

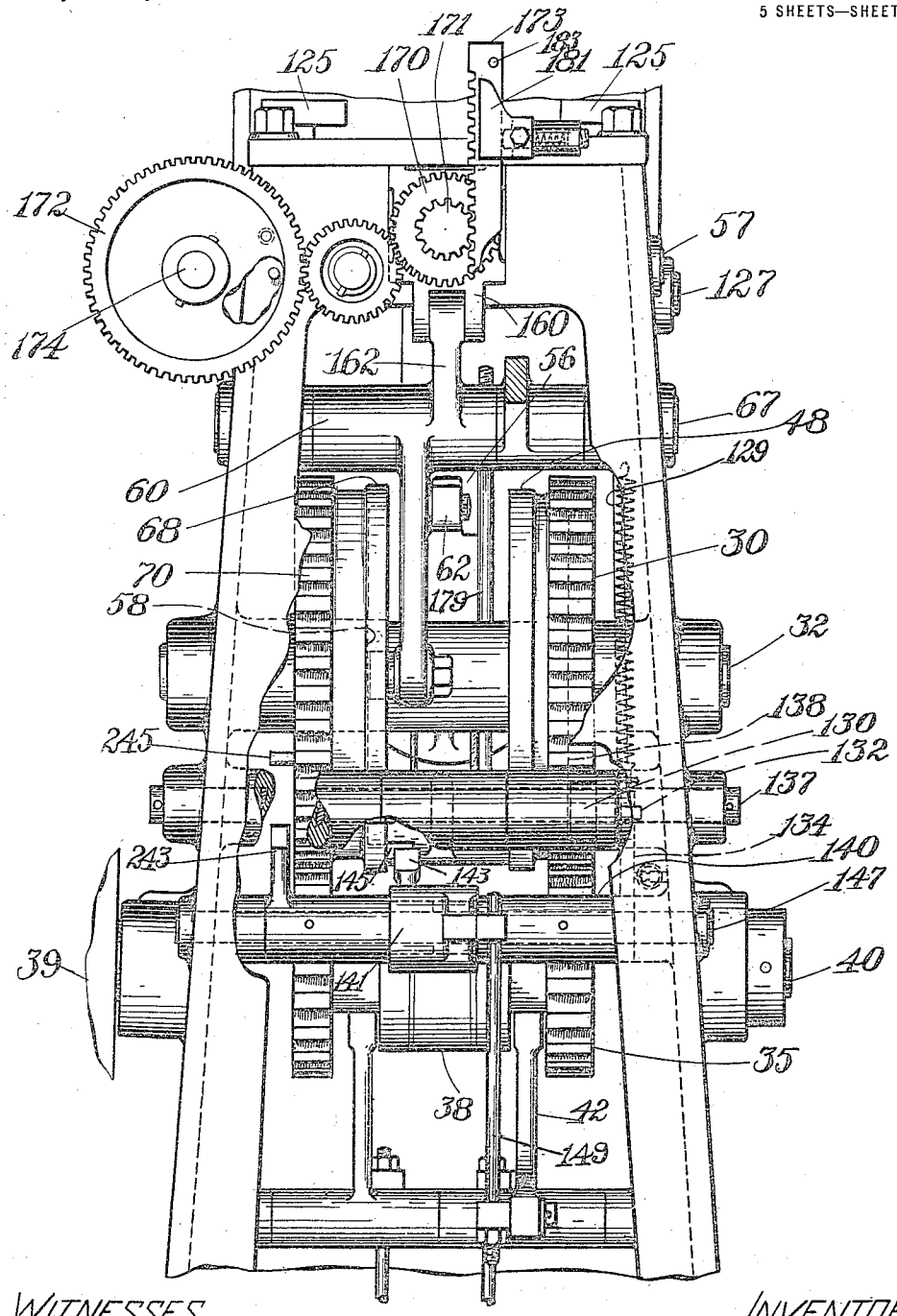


Fig. 8.

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UNITED STATES PATENT OFFICE.

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LASTING-MACHINE.

1,267,370. Specification of Letters Patent. Patented May 28, 1918.

Application filed September 16, 1913, Serial No. 790,029. Renewed June 30, 1917. Serial No. 177,994.

To all whom it may concern:

Be it known that I, MATTHIAS BROCK, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Lasting-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to lasting machines and particularly to machines of the type which employ end embracing wipers and an object of the invention is to provide an end lasting machine which is more or less automatic and the instrumentalities of which are so arranged and related that a toe portion, for example, of a shoe can be lasted and if desired fastened, with a high degree of effectiveness and a minimum of expenditure of time, labor and skill by the operator.

One important feature of the invention consists in the combination of toe lasting plates or wipers and means for operating them by power or otherwise, of shoe handling means and power driven or other means for operating the handling means to seize a shoe, vertically move the last with relation to the wipers and advance the last under the wipers. Grippers or their equivalent may or may not be employed to hold the margin of the upper while the shoe handling means depresses the last relatively to the wipers and the handling means may or may not raise the shoe to iron down the overwiped upper between the last bottom and the lower face of the wipers. The advance of the shoe under the wipers may conveniently take the place of the usual movement of the wipers lengthwise over the shoe. In a power driven machine there may advantageously be provision for the machine to come automatically to rest after the upper along the side faces of the toe has been prepared for the action of the wipers by the described movement of the shoe handling mechanism. Preferably, and in accordance with another feature of this invention, there are two separate power driven means for operating the shoe handling means to advance the shoe under the wipers and for closing the wipers. As I am advised, it is new in a lasting machine to provide separately controlled power driven means for operating the shoe handling means and for operating end lasting wipers. For effecting economy of time in operation, the wiper closing means may cause the shoe handling means to draw the shoe under the wipers and, after the wipers have closed, to raise the shoe for ironing down the overlasted upper materials automatically by compressing the overwiped upper against the bottom face of the wipers.

The wiper operating mechanism may come automatically to rest with the wipers closed over the shoe to give time for the upper fastening operation and, at the will of the operator, said mechanism will return the wipers to starting position and will automatically restart the shoe handling mechanism and cause it to restore the shoe to initial position and release it. As I am advised, it is new to provide wiper operating means arranged to cause shoe handling means automatically to become operatively connected with a source of power for proceeding with its work after the wipers have done their work.

An important feature of this invention is also found in the shoe handling means. This means is shown as comprising an unyieldingly mounted shoe bottom rest and an opposed toe rest which is unyieldingly actuated toward the bottom rest to clamp the shoe after which the said rests are positively actuated for giving the required movements to the shoe. As I am advised, it has not heretofore been proposed in an automatic toe lasting machine, to provide shoe handling means which clamps a toe rigidly and is positively operated to predetermine the position of the shoe during the lasting operation. It is also broadly new to provide automatic or other mechanism for operating the shoe handling means to advance the shoe under the wipers, as herein disclosed, in combination with means to operate the wipers, as for example, in time relation with the movement of the shoe handling means.

Others features of this invention are found in the grippers herein disclosed which have many novel characteristics of construction and arrangement and sustain many novel relations to the other instrumentalities of the machine. Advantageously the gripper mechanism comprises grippers arranged at the corners and sides of the toe but not at

the tip end of the toe. It is new to provide, in combination with toe lasting wipers, grippers or other means arranged to hold the edge of the upper at the corners or at the sides of the toe while shoe handling means is operated automatically to seize the shoe, depress the last with relation to the upper so held and then to advance the last. It is also new to provide mechanism comprising corner or side grippers and means to swing said gripper mechanism inwardly over the last bottom like an end lasting wiper swings, whether or not the grippers are connected with such wipers to partake of their movement and either with or without a last advancing movement in time relation with such swinging movement of the grippers mechanism. Another novel characteristic of a gripper used with a wiper is found in the provision of a vertical slot in one of the gripper jaws and a vertical crimping blade coöperating with the slotted jaw to gather the upper. This crimping action is particularly advantageous in the gripper located at the corner of the toe.

A further feature of this invention consists in the combination of wipers having binder wire carrying devices or formations, such for example as grooves in their acting edges, of means to place a toe binding wire in said devices or formations, as for example by bowing the wire progressively or otherwise and pressing it into the grooved edges of the wipers.

These and other features of the invention, including various combinations of parts and more important details of construction, will now be described in connection with drawings illustrating the preferred embodiment of the invention and will then be pointed out in the claims.

Figure 1 is a left hand side elevation of the machine;

Fig. 2 is a front elevation of the upper portion of the machine on a larger scale than Fig. 1;

Fig. 3 is a plan view of the machine;

Fig. 4 is a side elevation of one pair of corner grippers, partly in section, the gripper jaws being open;

Fig. 5 is a perspective view of the corner and side grippers for one side of the toe, the grippers being closed and holding the upper under tension ready for the advance of the last under the wipers;

Fig. 6 is a perspective view on a larger scale of one pair of corner grippers;

Fig. 7 is a perspective view of the toe wiper mechanism and of the mechanism for placing the toe binding wire in the binder holding grooves that are formed in the edges of the wipers;

Fig. 8 is a rear elevation of the machine, the frame being largely broken away to show the operating mechanism.

The automatically operated instrumentalities of the machine comprise three main groups; viz., the shoe handling mechanism, the gripper mechanism, and the wiper mechanism. For convenience these mechanisms and their respective actuating means will first be separately described and then their relation will be more fully stated in an explanation of the operation of the machine.

The shoe handling mechanism includes the toe rest 2 and the last depressor 3 carried in a frame of general rectangular shape shown best in Fig. 2 where 4 is the cross-head casting, 5, 5 are the side bars and 6 is the foot piece.

The last depressor is rigidly mounted in the cross-head 4, in which it is vertically adjustable by the nut 7 and is secured by a lock nut 8, and its foot 9, Figs. 3 and 5, is pivoted to its stem by a transverse pin while the sole engaging plate 10 thereof, which is contoured to fit snugly within the channel rib or lip of a welt shoe innersole, is made right or left and is removably attached to the foot by a stud 11, Fig. 5, and a headed spring pin 12 carried by the foot and fitting in a countersunk keyhole shaped slot in the plate, the spring on the pin allowing the plate to snap over the stud. The plate is concave on its lower face to apply pressure through its marginal portion to the innersole adjacent to the channel lip for holding the innersole down and resisting crumpling of the innersole at the channel while the upper is being lasted over the feather edge of the innersole. An adjustable stop screw 13 is arranged in the foot to contact by its head with the stem 3 to limit the tipping of the foot downwardly at its front end by gravity.

The toe rest 2 is a block of suitable material which will not bruise or abrade the shoe upper, and it may be rubber, set into a holder 15 that is guided in the head 16 to slide in an arc which preferably has its center in about the plane of the last bottom. The head is adjustable, by a screw and a nut 18, in the toe post 20 toward and from the last depressor to adapt it for the thickness of the style of last and if the block be of rubber it will yield enough to adapt the rest to two or more sizes of the same style of last. A fork, Fig. 5, depending from the head 16 embraces a rod 22 to prevent the head from turning.

The rod 22, guided in vertical slots, Fig. 1, in the side bars 5 of the shoe handling frame, extends through the post and to it are pivoted the upper ends of the members 23 of toggles, the lower members of which are arms 24 of angle levers 25 pivoted on the rod 21 of the foot piece 6 of the frame to lift the toe rest within the frame for clamping the shoe against the last depressor 3.

The foot piece comprises not only the rod

21 on which the angle levers are pivoted and which is pivoted in the lower ends of the side bars 5 but also a depending yoke 19, Fig. 2, from which extends a rigid arm 17 curved upwardly and then projected inwardly to a bearing on axle 32, Fig. 1, in the body of the machine. By this yoke and arm inward and outward movement of the fulcrum rod 21 for the toggle levers 25 is prevented while there is freedom for swinging movement of the shoe handling frame to carry the shoe into and out of the machine and for vertical movement of the frame. The normal vertical position of the shoe handling frame is determined by link connections 45 with arms 46 of a rocking sleeve that turns on a pivot rod 47 and has a depending arm 49 engaged by an edge cam face 48 of a cam block 30 that is turned on the axle 32. This cam block 30 has gear teeth by which it is turned by a pinion 35 of one-half its peripheral size. The pinion 35 is formed on a sleeve that carries a spring-pressed clutch pin 36 by which the pinion may be coupled to a collar 38 on the continuously running driving shaft 40 carrying the belt pulley 39. A clutch controller lever 42 for the described parts is formed with a pin retracting and seating wedge on its upper arm and its other arm is connected to a treadle 44, Fig. 1.

The angle levers 25 above mentioned are connected by links 26, Fig. 1, with a lever 27 that extends from a rod 137 at the back of the machine and has a roll standing in a cam track 28 cut into the inner face of the cam block 30. Movement transmitted from this cam track straightens the toggle for raising the toe post, the latter having a slotted connection at its lower end with the rod 22 to clamp the shoe up against the unyielding and then stationary last depressor. After the grippers have seized the margin of the upper that extends about the toe, the shoe handling frame with the toe rest and last depressor, is moved downward to stretch the upper between the grippers and the last by a continued movement transmitted from the cam groove 28 through the lever 27, which, after straightening the toggles, engages the arm 17 to draw down the foot piece 6 and the entire handling frame and the shoe on the last now held by the frame. The edge cam face 48 is shaped to permit this downward movement of the shoe handling frame.

By this movement the shoe is carried down until the plane of its bottom face, determined by the last depressor, is below the plane of the wipers. All this occurs during one-half rotation of the cam block 30, produced by one complete rotation of the driving shaft 40, and here the cam block is stopped by the withdrawal of the clutch pin 36 and its arrest by the clutch controller lever 42 which, after the depression of its treadle, will have been returned to proper position by a suitable spring.

After the now stretched upper has been inspected the shoe handling frame is swung inwardly toward the body of the machine to move the shoe longitudinally under the wipers by links 55, Fig. 1, extending from the rod 22 backwardly into the machine to a lever 56 depending from rocking sleeve 164 on a pivot rod 57 and connected by other links 62 with a depending arm of a rocking sleeve shaft 60 fulcrumed on the pivot rod 67, said arm having a roll standing in a track 58 cut in the side of a cam block 70 the driving connections for which will be described in connection with the wiper mechanism.

The shoe handling frame is further elevated after the shoe has been moved under the wipers, the wipers having meanwhile been closed, to compress the overwiped upper and innersole between the wipers and the last bottom. For this purpose the rocking sleeve, that has the depending arm 49 and is connected to the shoe handling frame by the arm 46 and the links 45, has a second depending arm 69 bearing a roll which is engaged by an edge cam face 68 formed on the cam block 70. It will be understood that the cam track 28, by which the shoe handling frame is sustained while no other devices are upholding or uplifting it, is so formed with relation to the edge cam face 68 as to permit the described elevating movement, and that the edge cam face 68 has a low portion which permits the depressing movement effected by the track cam 28, the cam blocks 30 and 70 being each at rest while the other is moving.

The grippers comprise jaws arranged in a line corresponding approximately to the curvature of the toe and include one pair of jaws located to engage the upper at each corner of the toe and, preferably, also one pair located to engage the upper at or near the rear end portion of each wiper, making four in all, there being no gripper to pull the upper at the end of the toe where it is expected that the toe gripper of the pulling over machine will have stretched the upper sufficiently so that no pulling by a gripper is needed in this lasting machine. It is regarded as probable that modifications varying widely from the illustrated construction and arrangement of grippers may be employed in this machine to secure the advantages herein obtained and the invention is therefore to be considered as limited in this respect only as required by the broad terms of the generic claims.

The two grippers or two pairs of jaws for each side of the work are mounted on a carrier 100 to which each gripper guide 102 is pivoted at 103 to swing in and out about an

axis approximately tangential to the adjacent edge of the toe and located high above the shoe bottom. An abutment screw 104 for each gripper determines the normal upper seizing position of the jaws individually for the size and shape of the toe. Within each guide 102 slides endwise a gripper stem 105 that can turn on its longitudinal axis for allowing the jaws to adjust themselves to the direction of strain. The stem has a foot 106 in the front edge of which, and offset inwardly from the axis of the stem, is secured a rigid jaw 108 to engage the outer side of the upper. The pivoted inner jaw 110 is formed as an angle lever fulcrumed at 112 and its outwardly projecting arm extends through the foot 106 and is pivoted to an operating rod 115 that extends up through the guide 102 and a jaw opening spring 114 pulls the rod downwardly. Within the guide 102 the stem is encircled by a spring 116 that holds the stem 105 and the jaws down in shoe receiving position until the jaws have firmly gripped the upper after which it yields for the upper pulling movement.

The closing of the jaws is effected by a shouldered block 120 that embraces the operating rod 115 and acts upwardly upon it through a cushioning spring 121. The shoulder of the block is engaged by a slide 122 that is confined in the carrier 100 and rests down upon the broad head of a plunger 125, there being one plunger for the two grippers at the same side of the work. The plungers extend down and rest on arms 124 of a rocking sleeve 128 on pivot rod 127. Another arm of the rocking sleeve 128 is connected by a rod 129 with a lever 130 that is fulcrumed on pivot rod 137 and has a roll standing in a cam track 138 in the outer face of the cam block 30.

Through these connections the cam block 30 closes the grippers to seize the margin of the shoe upper and then slightly uplifts them to straighten up the stock after the shoe has been clamped by the rise of the toe rest and before the shoe is drawn down by the depression of the shoe handling frame during the second part of the movement of lever 27 derived from cam track 28.

The gripper closing lever 130 has a stud 132 located to be engaged by a spring-impelled latch 134 on a sleeve 140 that is pinned on an axle 147. To this axle is also pinned a second sleeve, Fig. 8, from which extends an arm 243 into the path of a stud 245 on the outer side of the cam block 70. The arrangement operates to lock the grippers closed while the cam block 30 turns beyond the closing point to where the roll on lever 130 is in a wide part of its cam track. Thereafter and subsequent to the beginning of the operation of the wipers the cam block 70, through its stud 145, disengages the latch 134 from lever 130 to permit the grippers to open and free the edge of the upper for the completion of the over lasting operation of the wipers.

The wiper plates 150 are vertically slotted at their rear ends to embrace studs 152 in the slotted wiper carriers 154 in the front ends of which are mounted upwardly spring pressed locking pins 155 to engage pin holes in the wiper plates and lock the plates into the carriers.

The wiper carriers 154, Fig. 3, have outer edge faces curved about a point located at the meeting edges of the wipers and the carriers are guided in similarly shaped ways in the machine head where they are confined by the cover plate. Each carrier 154 is connected by a link with the cross-head of a plunger 156 that has a threaded adjustment in a sleeve 158 confined in a block 160 that can slide in the machine head and is actuated by an arm 162 of the rocking sleeve 60 that turns on the pivot rod 67 and has a depending arm with a roll standing in the cam track 58 as described in connection with the inward movement of the shoe handling frame, see also Fig. 7.

These connections operate to close the wipers, but not to advance them, while the shoe handling frame draws the shoe into the machine and under the wipers.

The gripper carriers 100 for each side of the work are connected to the respective wiper carriers 154, the gripper carriers having for this purpose bases 151 guided in arc-shaped ways 165 in the cover plate and connected by bolts 166 extending through slots in the cover plate to the wiper carriers 154. Thus the grippers partake of the closing movement of the wipers. They, like the wipers, have no movement longitudinally of the shoe but the shoe has the described advancing movement relatively to the grippers just before the grippers release the upper.

The wipers and the grippers are adjusted for sizes of toes by the sleeve 158 and its threaded connection with plunger 156, the sleeve having a pinion 170 connected by an idler with a gear 172 on the hand shaft 174 to the front end of which is attached a hand wheel 175. This adjusting mechanism may be used to move the wipers manually after their automatic closing movement if supplemental operation of them should in any case be found necessary.

It may be advantageous to have the wipers stand wide open in shoe receiving position to give abundant clearance for the work of positioning the upper within the grippers. It is desirable, however, that the wipers stand close to the last at the end of the jacking operation and preparatory to their lasting movement. To secure these results without excessive use of the adjustment pro-

vided by the hand wheel 175, which it will be understood is to be used whenever needed to position the wipers preparatory to their lasting movement, the pinion 170 has an extension 171. This extension is engaged by a rack 173 connected, Fig. 1, with a lever arm 175 of sleeve shaft 60, another arm of which is connected by rod 179 with the jacking lever 27 to close the wipers a limited distance by movement derived from the cam block 30 during the jacking of the shoe. A wedge 181 stands in the path of a pin 183, Fig. 8, on the rack bar 173 and withdraws the bar from the pinion 171 at the end of the downward stroke of said bar so as to leave the pinions 171 and 170 free to be adjusted by the hand wheel 175.

The cam block 70 by which is effected the final closing of the wipers, the advance of the shoe into the machine, the release of the grippers and the ironing down lift of the shoe, is given rotary movement from the driving shaft 40 through a clutch connection with the collar 38 on said shaft manipulated by a clutch, controller and treadle 144 similar to the clutch, the controller and the treadle 44 described in connection with the cam block 30. The cam block 70 carries a pin 145 to engage an arm 143 on a sleeve 141 that turns on the sleeve 140 and its companion sleeve, Fig. 8, and is connected by a rod 149 with a rearwardly extending arm, Fig. 1 of the clutch controller lever 42. By this arrangement the cam 70, during the second half of its rotation in which the pin 145 is timed to engage arm 143, trips the clutch for cam block 30 and causes that cam block 30 to complete its rotation for automatically unjacking the shoe and returning the parts controlled by that cam block to starting position.

The wipers are grooved in their operative edges to carry a toe binding wire which is led from a reel, not shown, on the left hand side of the machine through a friction guide 180 located in the plane of the groove to a clamp 182 which is located in the plane of the groove at the right hand side of the machine. The clamp and the friction guide position the wire in a line across the open wipers. A binder bending and placing roll 185 is mounted on a curved arm 186 that is pivoted to a curved arm 188 which is in turn pivotally supported on the right hand side of the machine head as shown in Fig. 3, a spring 187 being provided to hold arm 186 normally swung to the right toward the arm 188. The binder placing roll 185 is of less thickness than the depth of the groove in the wipers and it is located in the same plane in which is the groove in the wipers and in which the guide 180 and clamp 182 hold the wire. By a handle 190 on the arm 188 the operator swings the arm to cause the roll, which has a grooved peripheral edge, to engage the wire, bend it, and carry it into the groove of the wipers. The jointed connections of arms 186 and 188 and the spring 187 cause the roll to thrust the wire into the right hand wiper first and then to roll along and bend the wire and seat it in the left hand wiper. In this wire placing operation the required quantity of wire is drawn through the friction guide and bowed into the groove in the wipers where it is retained automatically because its ends are confined against movement.

The jaw 108 of the corner grippers preferably has a vertical slot through it as shown best in Fig. 6 and the coöperating jaw at 110 has a vertical crimping plate 111 which moves into the slot when the jaws are closed and thereby gathers the edge portion of the upper at the corner of the toe and holds it in that condition for the action of the wipers. It is found that this combination of toe embracing wipers with grippers constructed and operating as described at the corners of the toe is effective to produce smoothly lasted toes in a lasting machine of the type herein shown.

A support for the rear part of the last may or may not be attached to the toe post 20 for vertical movement as in Figs. 1 and 3 where it is shown as comprising a rearwardly projecting bar 194 pivoted to the toe post at 195 at a point which is approximately under the joint of the last, or the point of intersection of the median lines of the forepart and the heel part of a crooked last. The upper face of bar 194 constitutes a downwardly and rearwardly inclined guideway for a block 196 upon which a last pin 197 is carried at an angle to compensate for the spring of the last and hold the shoe with the bottom of its toe end in a plane parallel with the plane of the wipers. The last pin braces the shoe against rearward displacement between the toe rest and the last depressor during the advance of the last under the wipers. An eccentric friction lock 198 clamps the block 196 on bar 194 at the right distance from the toe rest for the length of the shoe and the upward inclination of said bar 194 compensates for differences in height or thickness of large and small shoes.

The bar of the last depressor or bottom rest 3 may be jointed to allow the depressor to swing out and up to the position shown in dotted lines, Fig. 1, to facilitate insertion of the shoe.

In the use of the machine it is contemplated that a pulled-over shoe in which the toe tack, as well as the side tacks, may remain will be inserted endwise between the toe rest 2 and the bottom rest 3, the toe rest being in the depressed position shown in Fig. 1. This will bring the shoe into the

relation to the wipers and grippers which is best illustrated in Fig. 4. The wipers may or may not closely embrace the shoe at this time. In turn work they should not do so because the projecting edge of the sole of a turn shoe would be in the way during the depression of the last within closely embracing wipers. In welt and McKay work an upward wipe along the side face of the last can be obtained for preparing the upper for overlaying if the wipers are made to embrace the toe snugly well below its bottom before the machine is started. Setting of the wipers for this purpose is effected by hand wheel 175. When ready to proceed with the lasting the left hand starting treadle 44 will be depressed and the operating mechanism will cause the toe rest to rise and clamp the shoe against the bottom rest by reason of the straightening of the toggle 23, 24. Thereupon the grippers will close and be slightly uplifted to straighten up the upper. After the grippers have closed the entire shoe handling frame, including the toe rest and the bottom rest, is moved downwardly to depress the last to a plane in which the shoe bottom is slightly below the wipers. During this movement of the last the grippers tighten the upper to prepare the upper along the side of the last for the overlaying operation of the wipers and then the machine is brought automatically to rest by the action of the clutch controlling lever 42 upon the clutch pin 36. The operator now examines the shoe to ascertain that it is in stretched condition so that when the upper is overlaid by the action of the wipers it will be smooth and free from wrinkles. It will be seen from Fig. 5 that for this purpose the machine is constructed with clearance about the toe so that the operator can, with his fingers, feel the upper entirely around the toe of the last. When the shoe is found to be in condition for the operation to proceed, the right hand starting treadle 144 is depressed and the cam block 70 thereby started into motion, the cam block 30 which alone was previously actuated through one-half only of a revolution now remaining at rest. The first action of the machine now is to advance the shoe toward and under the wipers. The wipers are closed without advancing, the closing movement preferably taking place substantially simultaneously with the advance of the shoe, the grippers partaking of the closing movement of the wipers and after this movement has proceeded far enough for the upper to become gripped between the wipers and the last bottom, the grippers are caused to release their hold upon the upper. Finally the shoe is given a slight upward movement to compress the overwiped upper against the bottom face of the wipers. The machine will now come to rest automatically if the operator has removed his foot from the treadle 144. While the machine is at rest, the toe binding wire at the right hand side of the machine, Fig. 7, may be pulled out of the clamp 182 and anchored to a tack at the right hand side of the shoe bottom and then pulled out of clamp 180 and drawn tight around the toe to fasten the upper in the position in which it is being held by the wipers. In another use for which the machine is adapted the free end of the toe binding wire will be anchored to a pulling-over tack at one side of the shoe before the upper is wiped over the innersole and at the proper time, and without stopping the machine, after the upper has been overwiped, the wire will be tightened by tension applied to it at the other side of the shoe and will be held while the machine releases the shoe, after which it can be anchored at the second side of the toe by a skilful operator without objectionable loss of tension. If, however, the machine has been stopped for toe wiring, the operator a second time depresses the right hand treadle 144 and again starts the cam 70. The first result is to lower the shoe by a positive downward movement of the shoe handling frame. Thereafter the wipers begin to back off and the shoe to retreat from under the wipers. During this movement of the cam block 70 the tripping devices 132, 134 cause the clutch controlling lever 42 to be automatically tripped for starting the cam block 30 which now completes its revolution to actuate the shoe handling means to return the shoe handling means to initial position and operates it to release the shoe whereupon the machine comes to rest with the parts in the positions from which they started. After the shoe has been removed and before another shoe is put into the machine, the toe binding wire will be drawn into the clamps 180, 182 and the wire placing means 185 manipulated to bend the wire into bowed form and place it in the wire holding groove in the acting edges of the wipers.

Having explained the nature of the invention and how it may be embodied in the best form now known to me, I claim as new and desire to secure by Letters Patent of the United States protection commensurate to the real breadth of the invention and intend that the following claiming clauses shall be construed to give effect to this purpose.

1. In a lasting machine, the combination with toe lasting plates or wipers and means for operating them, of shoe handling means and means for operating it to seize a shoe, vertically move the last with relation to the wipers and advance the last under the wipers.

2. In a lasting machine, the combination with toe lasting plates or wipers and means for operating them, of shoe handling means

and means for operating it to seize a shoe, depress the last with relation to the wipers, advance the last under the wipers and then raise the last against the wipers.

3. In a lasting machine, the combination with toe lasting plates or wipers, and power driven means for operating them, of shoe handling means and means for operating it to seize a shoe, vertically move the last with relation to the wipers and advance the last under the wipers.

4. In a lasting machine, the combination with toe lasting plates or wipers and means for operating them, of shoe handling means and power driven means for operating it to seize a shoe, vertically move the last with relation to the wipers and advance the last under the wipers.

5. In a lasting machine, the combination with toe lasting plates or wipers and shoe handling means, of independently controlled power driven means for operating the wipers to do their work and for operating the handling means to seize a shoe, vertically move it with relation to the wipers and advance it under the wipers.

6. In a lasting machine, the combination with toe lasting plates or wipers and shoe handling means, of power driven mechanisms for operating the wipers to do their work and for operating the handling means to seize a shoe and vertically move it with relation to the wipers, said mechanisms being subject to independent manual control and one of said mechanisms including means for relatively advancing the shoe and the wipers to overlay the upper at the end of the shoe.

7. In a lasting machine, the combination with toe lasting plates or wipers, and shoe handling means, of power means to operate it to seize a shoe, depress it with relation to the wipers to prepare the upper along the sides of the last for the overlaying operation of the wipers and then come automatically to rest, and separate power driven means for closing the wipers and causing the shoe handling means to advance the shoe under the wipers.

8. In a lasting machine, the combination with toe lasting plates or wipers, and shoe handling means, of power means to operate it to seize a shoe and depress the last with relation to the wipers to prepare the upper along the sides of the last for the overlaying operation of the wipers, and power driven means for closing the wipers and causing the shoe handling means to advance the shoe under the wipers.

9. In a lasting machine, the combination with toe lasting wipers and shoe handling means, of separately controlled power driven means for operating the handling means and for operating the wipers.

10. In a lasting machine, the combination with toe lasting wipers and shoe handling means, of separately controlled power driven means for operating the handling means and for operating the wipers, said wiper operating means serving to close the wipers and to cause the shoe handling means to advance the shoe under the wipers.

11. In a lasting machine, the combination with toe lasting wipers and shoe handling means, of means for operating the handling means and for operating the wipers, said wiper operating means serving to close the wipers while the shoe handling means moves the shoe forwardly under the wipers.

12. In a lasting machine, the combination with toe lasting wipers and shoe handling means, of separately controlled power driven means for operating the handling means and for operating the wipers, said wiper operating means serving to close the wipers and to cause the shoe handling means to raise the shoe automatically to compress the overwiped upper against the bottom face of the wipers.

13. In a lasting machine, the combination with toe lasting wipers and shoe handling means, of separately controlled power driven means for operating the handling means and for operating the wipers arranged to come automatically to rest with the shoe held ready for the operation of the wipers and again with the wipers closed over the shoe bottom preliminary to an upper fastening operation.

14. In a lasting machine, the combination with toe lasting wipers and shoe handling means, of separately controlled power driven means for operating the handling means and for operating the wipers arranged to come automatically to rest with the shoe held ready for the operation of the wipers.

15. In a lasting machine, the combination with toe lasting wipers and shoe handling means, of separately controlled power driven means for operating the handling means and for operating the wipers arranged to come automatically to rest with the shoe held ready for the operation of the wipers and optionally with the workman to come to rest again with the wipers closed over the shoe toe.

16. In a lasting machine, the combination with toe lasting wipers and shoe handling means, of separately controlled power driven means for operating the handling means and for operating the wipers arranged to come automatically to rest with the shoe held ready for the operation of the wipers and again with the wipers closed and upon being restarted to back off the wipers and automatically cause the shoe handling means to release the shoe.

17. In a lasting machine, the combination with toe lasting wipers and shoe handling means, of a source of power, and wiper oper-

ating means arranged to cause the shoe handling means to become operatively connected with the source of power for releasing a shoe after the wipers have done their work.

18. In a lasting machine, the combination with toe lasting wipers and shoe handling means, of a source of power with which said handling means can be connected for causing a shoe to be seized and held for the operation of the wipers, and separately controlled connections by which the wipers may be caused to do their work and then the shoe handling means be again connected automatically with the source of power and caused to release the shoe.

19. In a lasting machine, the combination with toe lasting wipers and operating means therefor, of shoe handling means comprising a vertically unyielding shoe bottom rest or hold-down, a vertically unyielding toe rest movable toward the hold-down to clamp a shoe, and means for moving said rest and hold-down together downwardly within the wipers a predetermined distance to bring the plane of the shoe bottom into lasting relation to the wipers.

20. In a lasting machine, the combination with toe lasting wipers and operating means therefor, of shoe handling means comprising a frame equipped with a bottom rest and a toe rest, means to move said rests relatively to clamp a shoe, and frame operating mechanism organized to move the shoe downwardly within the wipers to present the plane of the shoe bottom in a predetermined relation to the plane of the wipers.

21. In a lasting machine, the combination with toe lasting instrumentalities, of a shoe handling frame constructed and arranged to permit the shoe to be inserted endwise therethrough and comprising a shoe bottom rest and a toe rest movable in the frame to clamp the shoe.

22. In a lasting machine, the combination with toe lasting instrumentalities, of a shoe handling frame constructed and arranged to permit the shoe to be inserted endwise therethrough and comprising a shoe bottom rest and a toe rest movable in the frame to clamp the shoe, and means for moving the frame to move the last relatively to the lasting instrumentalities in effecting the lasting operation.

23. In a lasting machine, the combination with toe lasting instrumentalities, of a shoe handling frame constructed and arranged to permit the shoe to be inserted endwise therethrough and comprising a shoe bottom rest and a toe rest movable in the frame to clamp the shoe, and means for imparting to the frame predetermined bodily movements up and down with relation to the lasting instrumentalities.

24. In a lasting machine, the combination with toe lasting instrumentalities, of a shoe handling frame constructed and arranged to permit the shoe to be inserted endwise therethrough and comprising a shoe bottom rest and a toe rest movable in the frame to clamp the shoe, and means for imparting to said frame and the clamped shoe up and down movements and inward and outward swinging movements relatively to the lasting instrumentalities.

25. In a lasting machine, the combination with toe lasting wipers and operating means therefor, of shoe handling means comprising a vertically rigid shoe bottom rest or hold-down, a toe rest movable toward the hold-down to clamp a shoe, means for moving said rest and hold-down together downwardly within the wipers a predetermined distance to bring the plane of the shoe bottom into lasting relation to the wipers, and means to move said rest unyieldingly upwardly to compress the shoe stock against the lower face of the wipers after the wipers have closed over the shoe bottom.

26. In a lasting machine, the combination with toe lasting wipers and operating means therefor, of shoe handling means comprising a vertically rigid shoe bottom rest or hold-down, a toe rest movable toward the hold down to clamp a shoe, means for moving said rest and hold-down together downwardly within the wipers a predetermined distance to bring the plane of the shoe bottom into lasting relation to the wipers, and means to move the rest and hold-down together to carry the shoe under the wipers.

27. In a lasting machine, the combination with horizontally acting toe lasting wipers, of a vertically rigid bottom rest and power mechanism operating to depress the rest to position the last with its bottom face in predetermined relation to the plane of the wipers and come to rest and then to advance the shoe under the wipers.

28. In a lasting machine, the combination with toe lasting wipers and means for closing and opening them, of shoe handling means and power driven operating mechanism therefor arranged to advance the shoe under the wipers.

29. In a lasting machine, the combination with toe lasting wipers and means for closing and opening them, of shoe handling means and means for automatically advancing the shoe under the wipers in time relation with the wiper closing movement.

30. In a lasting machine, the combination with toe lasting wipers and means for closing and opening them, of shoe handling means and means for automatically raising the shoe against the lower face of the wipers after the wipers have been closed and lowering the shoe again before the wipers are opened.

31. In a lasting machine, the combination with toe lasting wipers and means for closing and opening them, of shoe holding means including a bottom rest comprising a carrier supported to turn about a horizontal axis extending transversely of the shoe and a pressure plate attached thereto which is recessed or concaved on its lower face and has a local bearing line along its edge to engage the innersole adjacent to the channel lip around the toe.

32. In a lasting machine, the combination with toe lasting wipers and means for closing and opening them, of shoe holding means including a bottom rest, comprising a carrier supported to turn about a horizontal axis extending transversely of the shoe, a pressure plate contoured to fit against the channel lip around the toe, and spring latching means to retain said plate on the carrier.

33. In a machine of the class described the combination with toe lasting wipers, and means to hold the edge of the toe portion of the upper at the corners and the sides of the toe, of shoe handling means and automatic means for operating it to seize a shoe, depress the last with relation to the upper and then advance the last.

34. In a machine of the class described the combination with means to hold the edge of the toe portion of the upper at the corners of the toe, of shoe handling means and automatic means for operating it to seize a shoe, depress the last with relation to the upper and then advance the last under the upper holding means to overlay the edge of the upper on the last bottom.

35. In a machine of the class described the combination with grippers arranged to seize and hold the upper at the corners and the sides of the toe, and shoe handling means operating to depress the last and to advance it under the upper holding means, of means for swinging the corner and side grippers located at each side of the last inwardly over the last bottom.

36. In a toe lasting machine, the combination with toe embracing wipers, of a gripper mounted above a wiper to swivel on a vertical axis, and operating means to move the gripper and the wiper simultaneously in effecting an overwiping operation.

37. In a toe lasting machine, the combination with toe embracing wipers and means for operating the wipers, of a gripper mounted over a wiper and made to partake of the movement of the wiper, and means for moving the gripper relatively to the wiper to draw up the upper.

38. In a machine of the class described the combination with grippers arranged to seize and hold the upper at the corners and the sides of the toe, and shoe handling means operating to depress the last and to advance it under the upper holding means, of means for swinging the corner and side grippers located at each side of the last inwardly over the last bottom in time relation with the last advancing movement.

39. In a machine of the class described the combination with toe embracing wipers and means for closing them over the toe of a shoe, of grippers arranged above the wipers in position to seize and hold the upper at the corners of the toe, said grippers being connected with the wipers to partake of the closing movement of the wipers.

40. In a machine of the class described, the combination with toe embracing wipers movable over the toe of a shoe, of grippers arranged above the wipers in position to seize and hold the upper at the corners of the toe, and means for simultaneously swinging the wipers and the corner grippers in planes parallel with the shoe bottom to cause them to coöperate in working the upper under tension into lasted position.

41. In a machine of the class described, the combination with toe embracing wipers and means for closing them over the toe of a shoe, of grippers arranged above the wipers in position to seize and hold the upper at the corners of the toe, and connected power operating means by which the grippers are moved to coöperate with the wipers in working the upper under tension into lasted position.

42. In a machine of the class described the combination with toe embracing wipers and means for closing them over the toe of a shoe, of grippers arranged above the wipers in position to seize and hold the upper at the corners of the toe, and separate grippers similarly arranged at the sides of the toe, and connections from the wipers to the grippers by which the grippers close over the toe with the wipers.

43. In a machine of the class described, the combination with toe embracing wipers and means for closing them, of grippers arranged above the wipers in position to seize the upper at the opposite corners of the toe and hold it for the overlaying action of the wipers, said grippers comprising one jaw with a vertical slot through it and a coöperating jaw having a vertical crimping blade to gather the upper at the corners of the toe for the action of the wipers.

44. In a machine of the class described, the combination with toe embracing wipers and means for closing them, of grippers arranged above the wipers in position to seize the upper at the opposite corners of the toe and also grippers to seize the upper at the sides of the toe, and means to depress the last relatively to the wipers and the grippers for stretching the upper and positioning the

shoe, said corner grippers having crimping formations to gather the upper at the corners of the toe before it is stretched.

45. In a machine of the class described, the combination with toe embracing wipers and carriers therefor having wiper closing movements, of gripper carriers mounted on the wiper carriers, and a plurality of separate grippers mounted on each gripper carrier.

46. In a machine of the class described, the combination with toe embracing wipers and carriers therefor having wiper closing movements, of gripper carriers mounted on the wiper carriers, a plurality of separate grippers mounted on each gripper carrier, and means for relatively adjusting said grippers to adapt them for different shapes of shoe toes, said wipers being detachable and replaceable for different shapes of shoe toes.

47. In a machine of the class described, the combination with toe embracing wipers, carriers therefor having wiper closing movements, gripper carriers mounted on the wiper carriers, and a gripper pivoted on said carrier to swing in and out relatively to the wiper edge.

48. In a lasting machine, the combination with toe embracing wipers having grooved acting edges, of means to place a toe binding wire in the groove.

49. In a lasting machine, the combination with toe embracing wipers having grooved acting edges, of means to bow a toe binder and press it into the groove.

50. In a lasting machine, the combination with toe embracing wipers having grooved acting edges, of means mounted in operative relation to the wipers for movement to press a toe binding wire progressively into the groove.

51. In a lasting machine, the combination with toe embracing wipers having grooved acting edges of means for holding the free end of a strand of toe binding wire, means for guiding the wire relatively to the vertical plane of the wiper and means arranged to act upon the wire between said holding and said guiding means to press it into the groove.

52. In a lasting machine, the combination with toe embracing wipers having grooved acting edges of means to bow a toe binder and press it into the groove comprising an arm pivotally supported to one side of the machine, a second arm adapted to press the wire into the groove and pivotally connected with the first arm, and a spring maintaining said arms in rotation for the first arm to engage the wipers near one side of the machine and permitting flexing of said arms to apply the wire progressively across the wipers.

53. In a machine of the class described, toe embracing wipers, means for closing the wipers including a plunger and operating means with which the plunger is adjustably connected for changing the limits of movement of the wipers for wide and narrow toes, and means extending to the operative position of the workman for effecting such adjustment.

54. In a machine of the class described, toe embracing wipers, means for closing the wipers including a plunger and operating means with which the plunger is adjustably connected for changing the limits of movement of the wipers for wide and narrow toes, power driven mechanism for actuating said operating means, and means extending within reach of the workman by which he can manipulate said adjustable connections to effect supplemental operation of the wipers.

55. In a machine of the class described, the combination with end embracing wipers and operating means for them, of means arranged to produce supplemental closing of the wipers over the shoe while they remain in substantially unchanged position longitudinally of the shoe.

56. In a machine of the class described, toe embracing wipers, means for closing the wipers including a plunger and operating means with which the plunger is adjustably connected for changing the limits of movement of the wipers for wide and narrow toes, and grippers connected with said wipers to be adjusted therewith for narrow and wide toes.

57. In a machine of the class described, the combination with toe embracing wipers and grippers which are separate from the wipers and are arranged over the wipers to engage the upper at the corners of the toe of the last, of means for turning the grippers to cause them to coöperate with the wipers in working the upper into lasted position over the toe of the last, and manually operable means for adjusting the positions of the grippers relatively for wide and narrow lasts.

58. In a machine of the class described, the combination with toe embracing wipers and grippers which are separate from the wipers and are arranged over the wipers to engage the upper at the corners of the toe of the last, of means for turning the grippers to cause them to coöperate with the wipers in working the upper into lasted position over the toe of the last, and manually operable means permitting adjustment of the grippers relatively to the wipers from and toward the center of the toe.

59. In a lasting machine, the combination with end lasting wipers and means for operating them, of shoe handling means including a hold-down, a vertically movable toe rest and a heel rest connected for vertical movement with the toe rest, and means for operating the handling means to seize a shoe, vertically move the last with relation

to the wipers and advance the last under the wipers.

60. In a lasting machine, the combination with toe embracing wipers and means for operating them, of shoe handling means including a hold-down and a toe rest, grippers arranged to engage the upper at the corners of the toe, and operating means for relatively moving the hold-down and toe rest to position the shoe with the bottom of its forepart in a predetermined plane while the upper is free in the grippers and then to close the grippers on the upper of the shoe so positioned.

61. In a lasting machine, the combination with toe embracing wipers and means for operating them, of shoe handling means including a hold-down and a toe rest, grippers arranged to engage the upper, and connected mechanism to operate the shoe handling means to predetermine the plane of the shoe bottom relatively to the grippers and then to close the grippers.

62. In a lasting machine, the combination with toe lasting plates or wipers and means for operating them, of shoe handling means and means for operating it to seize a shoe, vertically move the last with relation to the wipers and advance the last under the wipers, said shoe handling means including a brace to hold the last against rearward displacement therein during the advance of the last under the wipers.

63. In a lasting machine, the combination with toe lasting plates or wipers and means for operating them, of shoe handling means and means for operating it to seize a shoe, vertically move the last with relation to the wipers and advance the last under the wipers, said shoe handling means including a last pin and a carrier therefor mounted to partake of the vertical movement of the last and to have a lateral positioning movement for right and left lasts.

64. In a lasting machine the combination with end lasting wipers and means for operating them, of shoe handling means including a vertically movable toe rest, and a heel pin connected thereto to partake of such vertical movement and to have a lateral swinging movement to adapt it for supporting right and left crooked lasts the foreparts of which are supported in similar relation to the wipers.

65. In a lasting machine the combination with end lasting wipers, of shoe handling means and means to operate it to position a shoe, means for partially closing the wipers automatically while the shoe is being positioned, and independently operated means for further closing the wipers.

66. In a lasting machine the combination with end lasting wipers, of automatically operating means to close the wipers preliminarily around the toe of a shoe and come to rest, and separately operated means for further closing the wipers in lasting the toe.

67. In a lasting machine the combination with end lasting wipers, of automatically operating means to position the wipers preliminarily around the toe of a shoe and come to rest, means for manually adjusting the wipers to perfect their position, and means for closing the wipers automatically in lasting the toe when the machine is restarted.

68. In a lasting machine the combination with end lasting wipers, of operating mechanism including automatic means to close the wipers partially for positioning the wipers preliminary to the lasting operation and then to come to rest, means for manually perfecting the position of the wipers by more or less further closing them, and additional means for closing the wipers in lasting the toe.

69. In a lasting machine the combination with end lasting wipers and separate trains of automatically operating mechanism for partially closing the wipers to position them around the toe and for further closing the wipers in lasting the toe.

70. In a lasting machine the combination with shoe handling means and means to operate it to seize and position a shoe, of end lasting wipers and automatic means for operating them in lasting the toe, and automatically acting connections from said wiper operating means to cause the handling means to release the shoe after the wipers have done their work.

71. In a lasting machine the combination with shoe handling means to seize and position a shoe, of toe lasting wipers, a source of power, and independent trains of mechanism therefrom to the handling means and to the wipers.

72. In a lasting machine the combination with shoe handling means to seize and position a shoe, of toe lasting wipers, a source of power, separate trains of mechanism therefrom to the handling means and to the wipers, and independent clutch controls for said separate trains of mechanism.

73. In a lasting machine the combination with shoe handling means to seize and position a shoe, of toe lasting wipers, a source of power, independent trains of mechanism therefrom to the handling means and to the wipers, a clutch to control the train of mechanism to the shoe handling means and bring it to rest with the shoe clamped, a separate clutch to control the driving of the wiper operating mechanism, and an automatically acting connection from the wiper operating mechanism to the first mentioned clutch to cause the handling means to release the shoe.

74. A lasting machine having, in combination, shoe handling means and toe embracing wipers, and power driven operating mechanism for the handling means and the

wipers organized to come automatically to rest with the shoe held ready for the operation of the wipers and optionally again to rest with the wipers closed over the shoe bottom.

75. A lasting machine having, in combination, shoe handling means, toe embracing wipers, a source of power, and separately controlled mechanisms therefrom, the wipers and the handling means being so arranged that by the actuation of one of said mechanisms the shoe will be clamped in the handling means, vertically positioned relatively to the wipers, and then come to rest, and by the actuation of the other mechanism the handling means with the shoe will be drawn under the wipers, the wipers closed and the shoe raised to compress the overwiped upper against the bottom face of the wipers.

76. In a lasting machine, the combination with lasting instrumentalities, of shoe handling means which comprise opposed unyielding rests that are moved relatively toward one another to clamp the toe of the shoe and are then moved together to position the shoe for the operation of the lasting instrumentalities.

77. In a toe lasting machine, the combination with toe embracing wipers movable to close over the bottom of a shoe, of grippers arranged to hold the edge of the upper at the corners and sides of the toe, and means for swinging the grippers similarly to the swinging of the toe embracing wipers inwardly over the last bottom.

78. In a toe lasting machine, the combination with toe embracing wipers movable to close over the bottom of a shoe, a support for a last, and operating mechanism having connection with the wipers and with the support for moving the last forwardly toward the wipers in timed relation with the closing movement of the wipers.

79. A lasting machine having power driving means, shoe handling means, wipers, and wiper operating means arranged to cause the shoe handling means automatically to become connected with the power driving means and proceed with its work after the wipers have performed an operation.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MATTHIAS BROCK.

Witnesses:
EVERETT W. VARNEY,
HARLOW M. DAVIS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."