

A. L. RUSSELL.
 MACHINE FOR USE IN THE MANUFACTURE OF BOOTS AND SHOES.
 APPLICATION FILED DEC. 21, 1908.

1,060,710.

Patented May 6, 1913.

3 SHEETS—SHEET 1.

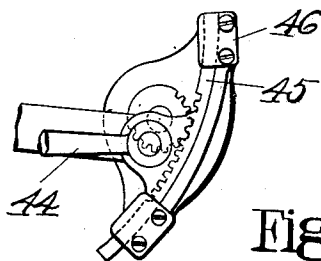
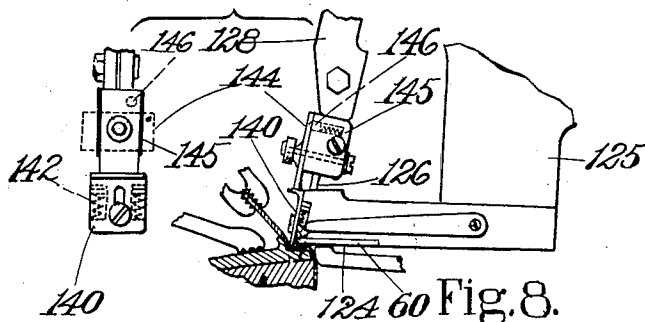


Fig. 9.

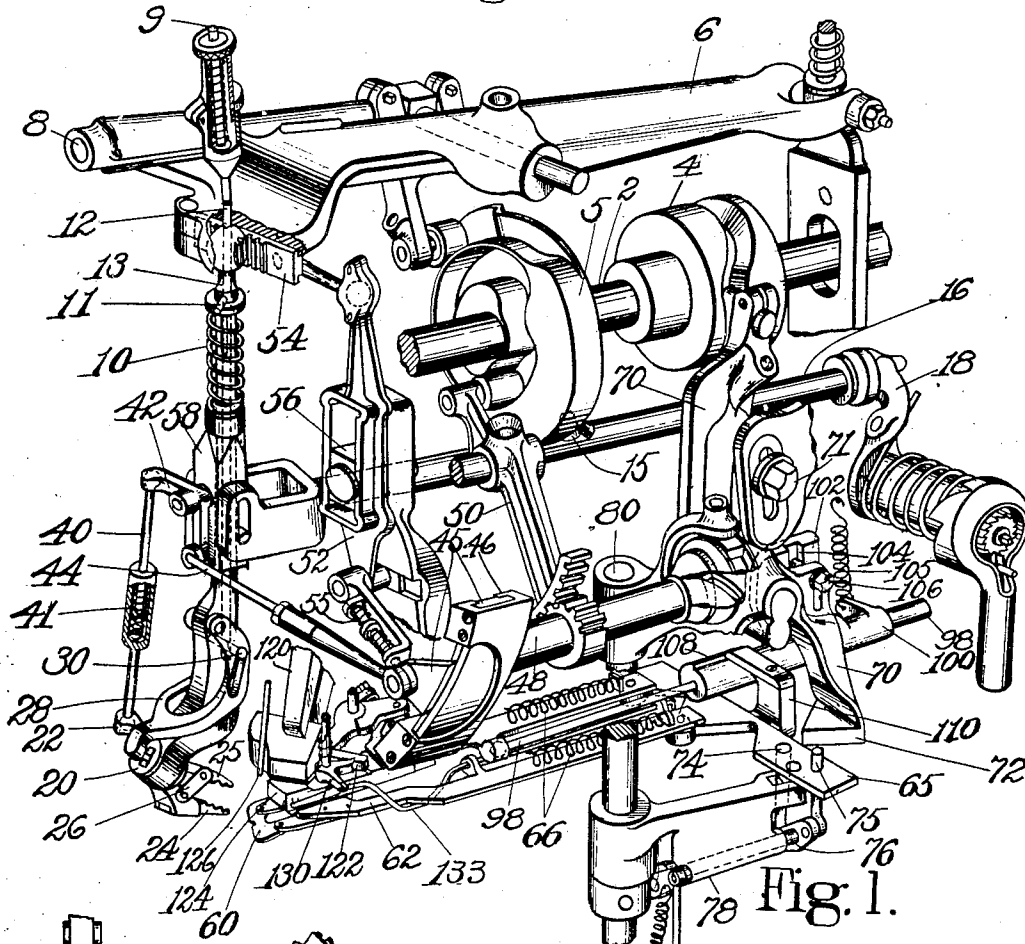


Fig. 1.

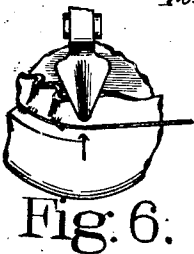


Fig. 6.

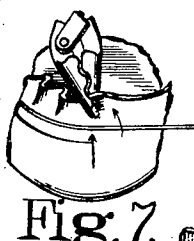


Fig. 7.

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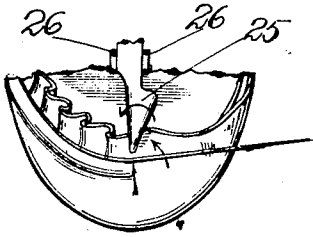


Fig. 4.

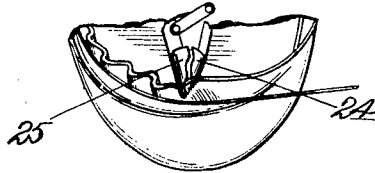


Fig. 5.

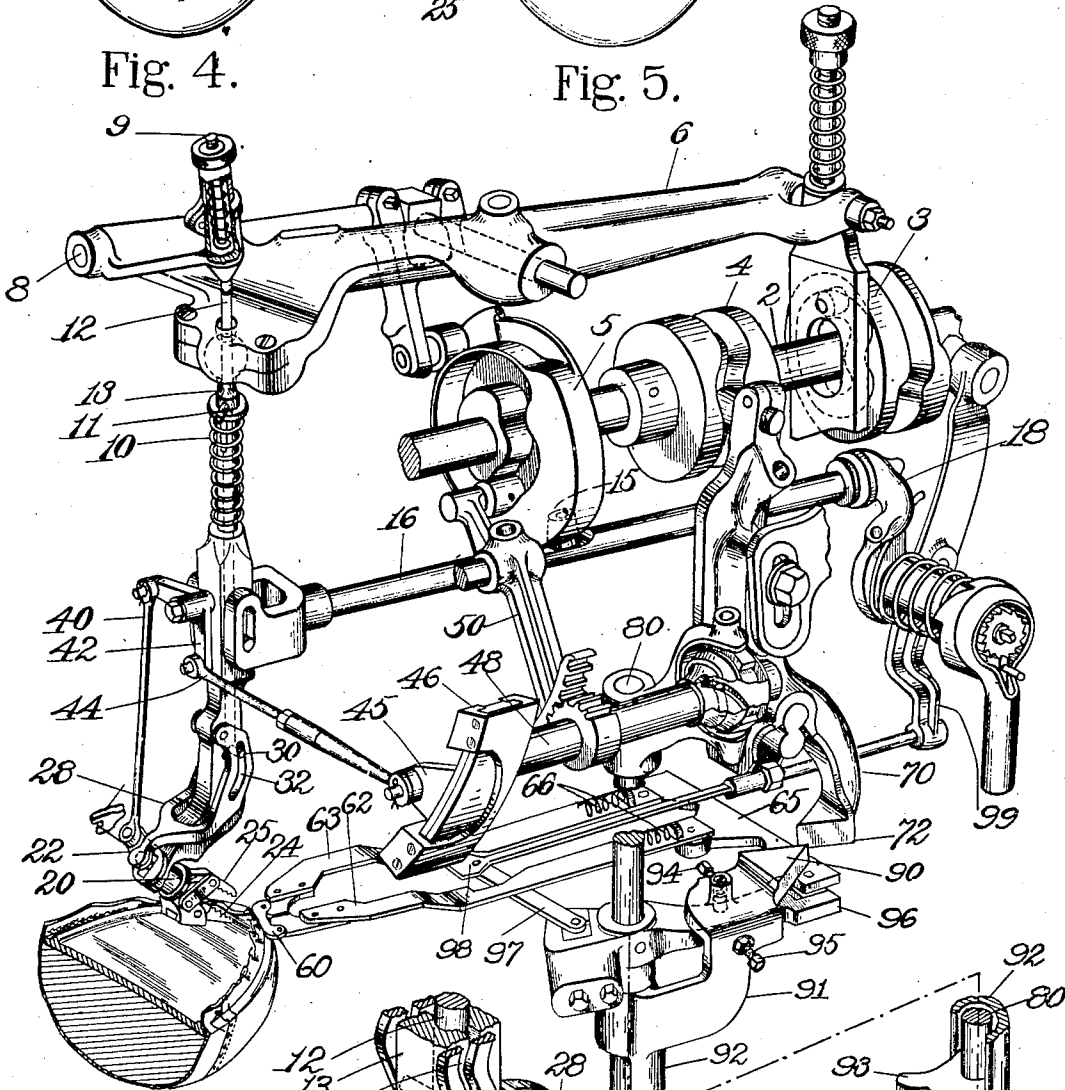


Fig. 2.

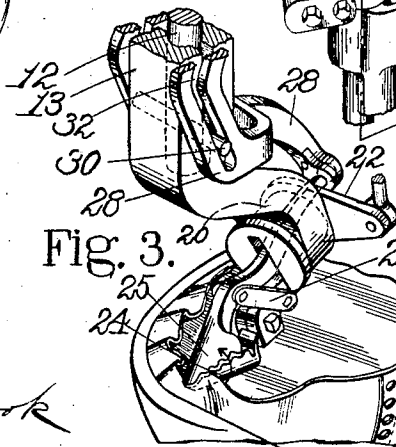
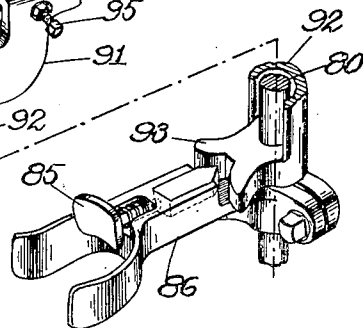


Fig. 3.



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3 SHEETS-SHEET 3.

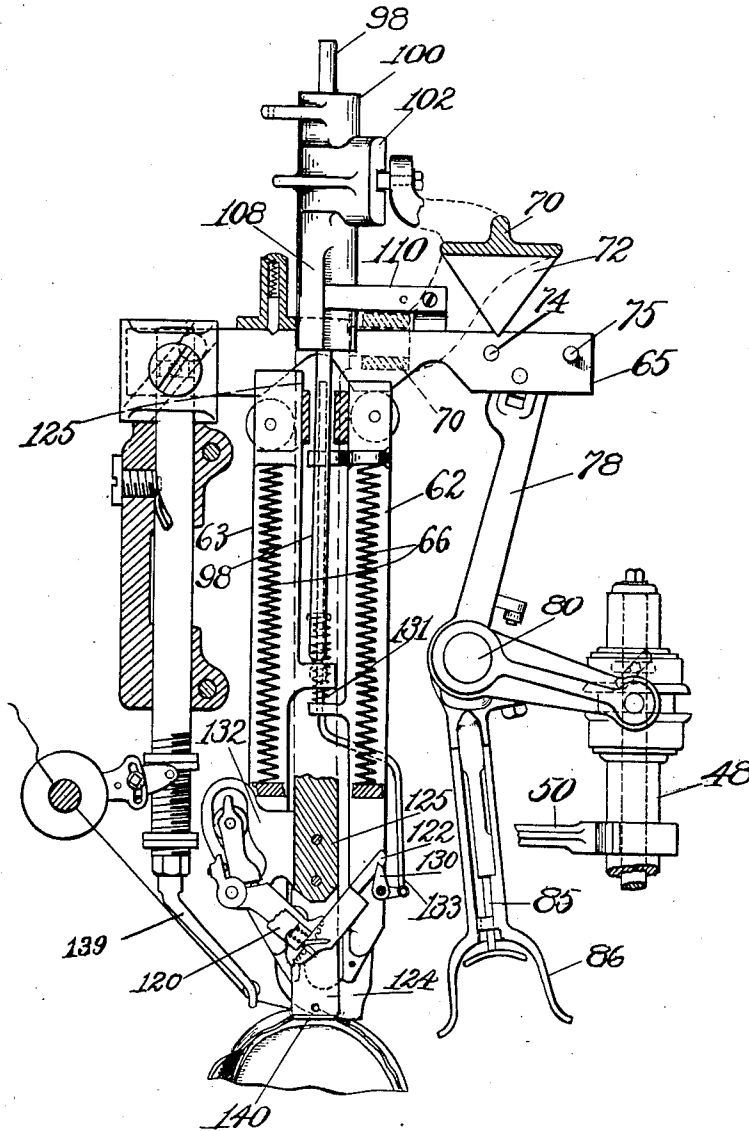


Fig. 10.

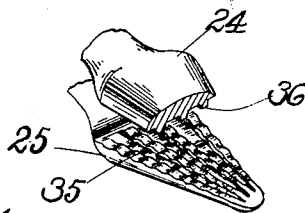


Fig. 11.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR USE IN THE MANUFACTURE OF BOOTS AND SHOES.

1,060,710.

Specification of Letters Patent.

Patented May 6, 1913.

Application filed December 21, 1908. Serial No. 468,541.

To all whom it may concern:

Be it known that I, ARTHUR L. RUSSELL, a citizen of the United States, residing at Hyde Park, in the county of Norfolk and State of Massachusetts, have invented certain Improvements in Machines for Use in the Manufacture of Boots and Shoes, 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 of the class employing grippers for pulling the upper and laying it over a last and, for some classes of work, employing wipers to press the upper into position to be secured by a binder of wire.

The invention is illustrated as applied to a machine of the type shown in United States Letters Patent No. 584,744, and has for one object to improve the mechanism for actuating the grippers. At the toe and sometimes at other parts of the shoe the grippers are required to plait or fold the marginal portion of the upper upon the shoe bottom to take care of the fullness which is incident to bending the upper inwardly over the convex edge of the last bottom.

An important feature of this invention consists in actuating the grippers for the purpose of plaiting the upper about an axis that extends in the general direction of the strain upon the upper to form the plait or fold, and also about another axis at an angle to the first one to lay the fold. As herein shown the grippers are turned or rotated while overdrawing the upper about an axis that extends parallel with or at an oblique angle to the face of the shoe bottom. This forms in the stock the plait or fold. Preferably while this fold is being formed the grippers receive a turning or swinging movement about a different axis which may extend substantially perpendicular to the shoe bottom and lays or locates the fold upon the shoe bottom in suitable angular relation to the edge of the last. The first mentioned movement may take place about an axis that lies in or parallel with the gripping faces of the jaws of the grippers and extends in the general direction of the strain under which the upper is being held. The second movement may advantageously take place about

an axis that extends in the general direction of the usual updrawing movement of the grippers which is approximately perpendicular to the last bottom and that axis should for the best results be so located with relation to the edge of the last and the end of the gripper jaws that the fold or plait formed will not extend as a pucker or wrinkle to or beyond the edge of the shoe bottom and show after the welt or the sole is applied to the shoe.

In accordance with a preferred arrangement the grippers comprise tapered jaws which are narrow at the outer ends so that when they are rotated about the oblique axis as proposed they will form a plait that tapers toward the edge of the shoe bottom and is widest at its inner end. This provision of tapering gripper jaws with means for rotating them to form a tapered plait is a valuable feature of this invention. Preferably also the mechanism for swinging the grippers about the perpendicular axis and the mechanism for rotating the grippers about the oblique axis will be relatively arranged and timed to insure that the jaws in their rotation do not exert strains tending to pull out the plait previously formed. To this end said mechanism may be arranged to permit the rear edge of the gripper jaws, that is the edge next to the portion of upper last plaited and secured, to remain in substantially the same vertical plane during the rotation of the jaws. By reason of this arrangement the plait or fold is or may be formed mainly by drawing inwardly and backwardly the stock pulled by the grippers and the stock in advance of the gripping point without danger of disarranging or undoing the plaits previously formed. This arrangement has also the positive advantage that by pulling inwardly and backwardly the upper in advance of the grippers said advance portions of the upper are pulled over and conformed to the edge of the last and the scope or range of action of the grippers is widened so that fewer pulls are required to last a given portion of a shoe. A similar advantageous result may be obtained by rotating the grippers about an axis located at the rear edges of their gripping faces. The rotation and the swinging of the grippers will preferably be yieldingly effected. By this means each of said move-

ments will be caused to proceed only so far as is needful for taking up the fullness of the stock and snugly making and laying the fold or plait without straining or tearing the upper.

The formation of the gripping faces of the jaws for increasing their holding power is a novel feature of this invention. These jaws are so formed that the stock cannot move between them in the direction to pull out without automatically tightening the bite of the jaws upon the stock. To this end the jaws are formed to pull or gather in the stock widthwise between the gripping faces if the stock begins to slip toward the point of the jaws. This is effected by providing one or both of the jaws with converging faces or walls between which the stock is gathered widthwise if it slips downward between the jaws. As shown one jaw has converging grooves formed by converging side walls and tapering in depth toward the point of the jaw so that stock is crowded together if it moves toward the point of the jaw. The other jaw is shown as having similarly formed ribs which crowd into the upper portions of the grooves a greater quantity of stock than the lower portions of the grooves will hold. The grooves and the ribs may have interlocking teeth to assist in holding the upper and the converging edges of the gripping faces of the jaws may form gripping ribs between which the stock is laterally gathered in or fullled up if it begins to slip. With the described construction the grip on the stock is automatically tightened as the stock slips so that the slipping cannot progress far enough to do any harm before it is automatically checked. This permits the grippers to be held closed by the application of less force than has heretofore been required.

The invention is shown for the purpose of explanation as applied to the machine illustrated in said Letters Patent No. 584,744 wherein are employed grippers having shanks extending substantially perpendicular to the plane of the shoe bottom when the shoe is in position to be lasted and mechanism operatively connected with the shanks for turning or swinging the grippers jaws about the longitudinal axis of said shanks and also moving the grippers laterally. I have in this illustrated embodiment of the invention retained the said mechanism and its connections for swinging the grippers about the perpendicular axis and have replaced the connections for giving lateral movements to the grippers with connections extending to the jaws for rotating them in or with relation to their shanks or carriers. The jaws are supported in their shanks for rotation about an axis which lies in a plane between their gripping faces which are disposed obliquely to the shoe bottom. The

connection between said actuating mechanism and the jaws for rotating them may comprise means which can be adjusted during the operation of the machine for varying the extent of the rotatory movement imparted to the jaws according as the fullness to be plaited varies at different portions of the toe or other part of the shoe being lasted. In a modified construction the gripper jaws are formed with their rear edges in substantially the oblique axis about which they are rotated. When jaws of this form are employed the turning movement about the vertical axis may be omitted for the jaws obviously have no tendency to displace or pull out, during the formation of the plait, the upper just previously lasted and they do lay the plait being formed.

Lasting machines of the type herein shown that are adapted for making welt and turn shoes usually employ a wiper or presser which, following the grippers as they pull and plait the upper over the last bottom, presses or wipes the upper inwardly and snugly down upon the innersole and holds it while it is secured by a continuous binder or an individual fastening. A good form of wiper comprises a swinging plate the rear end of which rests continuously upon the shoe bottom behind the grippers or on a portion of upper already overworked while its acting edge extends across the path of the grippers to a point in advance of them. The advance end of the wiper is reciprocated, being drawn back to permit the grippers to pull the upper between it and the last, and then swinging inwardly to wipe the upper with a shearing action over the edge of the last. The heel end of the wiper is preferably pivoted back from its acting edge so that the entire acting edge receives a movement backwardly and inwardly over the shoe bottom and assists materially not only in working the upper inwardly over the last but also in disposing of the fullness at the toe or other convex edge of the last. It is customary to employ the wiper only when plaiting the upper and to retract it to an inoperative position and disconnect it from its actuating means when the plaiting movements of the grippers are discontinued and they receive only their updrawing and overdrawing movements for overworking the upper on portions of the shoe which do not require plaiting.

In machines as heretofore generally used the mechanism for imparting the plaiting movements to the grippers and the means for projecting the wiper or presser have been operatively connected so that both were rendered operative together, and consequently neither the wiper nor the plaiting movements of the grippers could be employed separately. It would sometimes however be advantageous to use the plaiting movements alone

as, for example, at the sharp corner found in some shoes at the junction of the ball and the shank at the inner side of the shoe and it would sometimes be desirable to use the
 5 pressers or wiper, particularly the swinging wiper above described, without giving to the grippers their turning or plaiting movements as, for example, at the slightly convex sides of the last adjacent to the more convex toe
 10 curve. An important feature of this invention consists in novel means for controlling the operation of the wiper and the grippers whereby either the wiper or the plaiting movements of the grippers may be employed separately or both together. The usual knee
 15 lever of the machine has connection with one of said parts and a second operating device is arranged, preferably within the knee yoke of said lever, to be actuated either independ-
 20 ently of said lever or simultaneously therewith at the will of the operator. The second operating device may conveniently be a push bar acting against a return spring and ar-
 25 rangd to have a slight lateral movement to permit engagement of a projection thereon with a locking shoulder to retain it in ad-
 justed position.

As herein shown the push bar is connected with the wiper controlling mechanism and
 30 the knee lever is connected with the plaiting mechanism. This controlling mechanism includes a cam slide which is a plate having inclined or wedge shaped acting faces that engage rolls on the rear ends of the wiper
 35 slides. Movement of the cam slide in one direction forces the wiper slides forwardly against the tension of their return springs while reverse movement dislodges the rolls
 40 from seats in the slide and permits the wiper slides to retract. The springs require to be fairly stiff so that considerable force is needed for moving the controlling slide, and
 45 this has heretofore put an appreciable load upon the shifting device. In accordance with a further feature of this invention
 50 means is provided which is adapted to be set by the shifting device, herein shown as the push bar, in the path of a power driven part by which the actuation of the cam slide is
 55 effected to render the wipers operative or inoperative. This power driven part may take the form of an intermittently reciprocated wedge having two inclined sides into the path of one or the other side of which a
 60 member shifted by the push bar may be positioned for causing the endwise movement of the wiper controlling cam slide. In one construction embodying this feature of the in-
 65 vention the member so shifted by the push bar is a swinging arm having a lost motion connection with the cam slide and a wedge shaped end capable of being positioned by the push bar at one side or the other of the
 latter to swing it further and, the lost motion

having been exhausted, therethrough to move the controlling slide. In a second construction embodying this feature of the invention according to which a device is set and the machine effects the movement of the con-
 70 trolling slide a stud on the slide may be set by the shifting device at the same time that a stud on the other side of the wedge is with-
 75 drawn. At the next advance of the wedge it will act through the projected stud to move the controlling slide in the desired direction. By simultaneously moving the two studs in
 80 opposite directions the depressed one may be arranged to stand adjacent to, but below, the point of the wedge after the slide has been moved so that when it is next raised it will
 85 be in a position to be actuated by its side of the wedge. This arrangement relieves the operator of the laborious part of the operation heretofore required for shifting the
 wiper controlling slide. The wedge for shifting this slide may be carried by one of the moving parts already present in the machine.

In accordance with another feature of this invention novel means is provided for actu-
 90 ating the wiper while it is in operative position and for connecting and disconnecting it and its actuator in time relation with its movement toward and from operative po-
 95 sition. To this end a plunger connected with the movable wiper carrying bar supports a latch which is arranged for interlocking en-
 100 gagement with a moving part which may conveniently be the same part by which the controlling slide is actuated. The latch is carried by a rotatable sleeve for movement
 105 laterally into and out of interlocking engagement with its actuator and the wiper controlling slide has an arm to engage the sleeve when the slide is moved in one direc-
 110 tion and turn the latch away from the actuator while a spring moves the latch into engagement with the actuator when the slide is reversely moved. Any other suitable mech-
 115 anism may be adopted to embody this feature of this invention.

It is customary to employ a binding wire instead of tacks to secure the upper in lasted position about the toe portion of the upper
 115 when the wiper is used and in accordance with another feature of this invention means is provided by which the tack delivering means is rendered inoperative when the
 120 wiper is rendered operative and vice versa. The means herein shown includes a connection formed by a rod and the non-reciprocating or stationary wiper carrying bar between the wiper controlling slide and the
 125 yieldingly actuated tack separator whereby when the wiper is advanced into operative position the separator is locked. When the wiper carrying bars are retracted the separator is unlocked. The illustrated arrange-
 ment for controlling the delivery of tacks has

the good characteristic that a tack is driven during the first complete cycle of the machine's operation after the wiper is retracted and the separator unlocked. The described combinations have the advantage that the settling of a single part which requires little force to shift renders operative power driven means which effects the several shiftings incident to the employment of the wipers and the binding of the lasted upper by wire, and the resetting of the same part effects the reverse shiftings for discontinuing the use of the wipers and resuming the use of tacks to fasten the upper. The illustrated construction has the further advantage that a single actuator, which may be the lever already present in the machine for moving the tack carrier, is used for operating several parts so that the construction of the machine is simplified rather than complicated. The use of separate knee operated devices both arranged in the position in which machine operators are accustomed to use a knee lever is convenient and leaves the two hands of the operator free for use in presenting the shoe to the machine.

A further feature of this invention consists in novel means for forcing or creasing the upper material into the angle between the feather and the lip or shoulder of the innersole. As herein shown a member is mounted on the tack carrier in position to be driven downwardly and outwardly by the tack driver bar to punch into the angle the stock which usually bridges over the angle from the wiper to the top of the shoulder. The operators have heretofore been expected to hold the shoe laterally and vertically against the advancing wiper with sufficient force to cause the wiper to push the stock horizontally into the angle. In practice this requires the exertion of more strength on the part of the operator than he is willing to expend continuously throughout a day's work, particularly about the toe portion of the shoe where the upper materials are thick and difficult to bend into the angle. As a result the upper is not, in many shoes, forced as well into the angle by the laster as it should be and an additional burden is put upon the welter to draw the upper into the angle by the sewing thread. It has been proposed to provide a lasting machine with a vertically movable tack block which was driven downwardly upon the shoe bottom by the driver bar. The area of contact of the driven block, extending from the edge of the shoe inwardly to the end of the block, distributed the blow over a large surface. The present invention contemplates, as distinguished from that, a blade or creasing tool that shall have a narrow area of contact located over and immediately adjacent to the angle at the front of the tack block and wiper and of sufficient

thickness to prevent cutting or otherwise injuring the shoe stock. This blade will preferably be guided to move somewhat outwardly toward the shoulder as well as downwardly and by reason of its direction of movement and its small striking face will not objectionably jar the shoe or the workman's hands while holding the shoe.

These and other features of the invention, including the novel details of construction shown and certain combinations of parts disclosed, will be fully explained in connection with the following description of an apparatus embodying the invention and will then be pointed out in the claims.

Figure 1 is a perspective view of those parts of a lasting machine of the type shown in said patent which are concerned with the present invention. Fig. 2 is a similar view showing modifications. Fig. 3 is a perspective view of the grippers on a larger scale than Figs. 1 and 2 and from the reverse side. Figs. 4, 5, 6 and 7 are detail views illustrating the plaiting operations as effected by the grippers of Figs. 1 and 2. Figs. 8 and 9 are details of certain mechanism which will be described. Fig. 10 is a plan. Fig. 11 shows the formation of the gripping faces of the gripper jaws.

The driving shaft 2 supports cam blocks 3, 4 and 5 and also the usual tack driver actuating cam which is not shown herein. The block 3 has a groove in its front face from which the updraw lever 6 is actuated unyieldingly to lower the grippers to their gripping position and yieldingly to uplift them to pull the stock. The block 5 has an edge cam face from which is actuated a rockshaft 8 carrying a yielding plunger 9 to close the grippers which are opened by a spring 10 pressing upwardly upon a stud 11 which projects from the closing rod 12 within the gripper carrying bar 13 which has a ball head by which it is suspended from the updraw lever. The block 5 has also a cam face on its rear side for engaging a stud 15 on a rod 16 which has at its forward end a yoke connected with the grippers by which they are moved inwardly toward their gripping position in time relation with their descending movement from the cam block 3. The rod 16 is extended to the rear where it is engaged by a spring actuated arm 18 to force the grippers outwardly to draw the upper over the last bottom in time relation with the updrawing movement and to withdraw the gripper jaws from the plait while lasting the toe.

The gripper carrying bar 13 is outwardly deflected at its lower end and has a bearing extending obliquely downwardly and inwardly within which the grippers are rotatably mounted. The grippers comprise a shank or cylindrical block 20 held in the bearing by a flange at one end and an arm

22 at the other. The block has a split clamp in which is fixed the lower gripper jaw 24 while the other jaw 25 is guided through the block to which it is connected by links 26 while the end of its shank is located in the longitudinal axis of the block and has a ball and socket engagement with a lever 28. This lever is forked and is fulcrumed at its upper end to the bar 13 which has slots in its sides for guiding the cross head 30 of the closing rod 12. The ends of the cross head extend into cam slots 32 in the forks of the closing lever for actuating the lever to close jaw 25 upon jaw 24 or upon the stock between the jaws when the rod 12 is forced downwardly. The gripping faces of the jaws are preferably tapering from a broad head to a blunt point to facilitate the formation of plaits or folds in the upper as will be described and these faces may have the surface formation shown in Fig. 11 to enable them to hold the stock securely. This formation comprises in one jaw grooves 35 the side walls of which extend oblique to the direction of the pull to be exerted on the stock and converge toward the point of the jaw. The grooves may increase in depth from the point toward the head and preferably will be arranged at an angle to one another. The side grooves in the jaw 25 incline in opposite directions toward the point of the jaw and the raised faces between the grooves and at either side of the jaw are of substantially the same width throughout their length. The upper clamped against jaw 25 is compressed into the grooves and cannot slip toward the point of the jaw without being compressed laterally between the converging side walls of the grooves and, as the grooves diminish in depth toward the point the compression in the direction of the thickness of the stock is also increased if the stock slips outwardly in the grippers. The jaw 24 has ribs 36 which force the stock into the grooves. These ribs resemble in shape the grooves 35 in that they decrease in width and in height toward the point of the jaw, although preferably to a less extent so that they wedge or pinch the upper against the walls of the grooves if it begins to slip. The raised faces between the several ribs 36 on the one jaw and between the grooves 35 in the other impress themselves into the upper as the jaws close and thus direct the course of the stock if it slips, compelling it to gather in or full up between the lower portions of the jaws whereby the pressure upon the stock is increased and the slipping automatically checked. Teeth are formed on the raised faces between the grooves 35 and on the ribs 36 to assist in holding the stock.

The bearing in the carrier for the gripper block 20 extends oblique to the plane of the shoe bottom and in substantially the direc-

tion in which the upper extends from the edge of the last to the grippers in the over-drawing movement of the grippers. The arm 22 serves to rotate the grippers about this axis when plaiting of the upper is desired and to this end the arm is connected by the rod 40, elbow lever 42 and extensible rod 44 with a segment block 45 adapted to be adjusted off the center at either side of the rocker 46 which is fast on a sleeve 48 and is oscillated by a lever 50 receiving motion from a groove in the front face of the cam block 5. The segment block is set by a connection explained in United States Letters Patent No. 500,141 with a vertical manually shiftable rockshaft 80 hereinafter referred to. The rod 40 may include a yielding element 41, as shown in Fig. 1, through which the rotating movement of the grippers for the formation of plaits is yieldingly effected. The movement for forming plaits is illustrated in Figs. 4, 5, 6 and 7. In Fig. 1 there is shown means for also turning the grippers about an axis which is substantially perpendicular to the plane of the shoe bottom. This may be employed to swing the grippers laterally in laying the plait and cause them, while forming the plait, to take up stock mainly or wholly from that side which is in advance of the grippers. This has the advantage of extending the scope or range of action of the grippers, causing them to gather in the upper farther along the edge of the shoe, as shown in Fig. 7, so that the pulling points may be farther apart and fewer pulls required for lasting a shoe. Another advantage is that the previously formed plait is not pulled out or disturbed. The turning about the perpendicular axis may be effected by known mechanism including a connection from the segment block 45 to a lever 52 for reciprocating a rack bar 54 which engages teeth on the ball head of the gripper carrying bar 13. This connection may be made yielding by the spring 55 and the extent of the movement imparted may be varied by adjusting the fulcrum block 56 which is movable in the frame of the machine. Preferably the described turning of the grippers will take place in such time relation with the rotation of the jaws that the rear edge of the jaws will remain in substantially the same vertical plane during the formation of the fold and thus the last plait formed will remain undisturbed while the one being made is formed from stock pulled as indicated by the arrows in Fig. 7. Substantially the same result can be obtained, where plaiting in one direction only is required as in welt and turn shoes, by forming the grippers jaws as shown in Figs. 4 and 5 with the rear edges in the same vertical plane as the oblique axis of rotation is located. By so doing the parts 52, 54, 55 and 56 may be omitted as shown in Fig. 2 and the machine thus simplified. If the gripper

carrying bar 13 is to be turned by said parts as shown in Fig. 1 that bar is formed to turn in a separate block 58 which supports the elbow lever 42 and with which the overdraw rod 16 is connected.

The wiper which assists the grippers in laying the upper over the last bottom into position to be secured is shown as a swinging plate 60 fulcrumed at one end to a carrier 62 and pivoted at the other end to a slide 63 adapted to be reciprocated to swing the wiper forward and back over the upper in time relation with the gripper actuating means. This wiper is used only in lasting the toe of the shoe and at other times should occupy a retracted position to permit proper presentation of the heel and side of the shoe. The position of this wiper is controlled by a cam slide 65 arranged to move endwise and having oblique walled notches which when they are opposite the members 62, 63 permit the springs 66 to retract the wiper. Seats between the notches maintain the wiper in its advanced position when the cam slide has been moved to cause the oblique walls to wedge the members 62, 63 forwardly against the tension of the springs 66. For thus shifting the cam slide 65 a lever 70, fulcrumed adjustably at 71 and operated from a groove in the edge of cam block 4, is provided with a wedge 72 having oppositely inclined side faces and means connected with the cam slide 65 is arranged to be set by the operator in position to cause the power driven lever to do the work of shifting the slide. In Fig. 1 the slide 65 guides two pins 74, 75 connected to opposite sides of a rock-shaft 76 supported in an arm 78 which is sustained by the vertical shaft 80. The rock-shaft 76 has an arm connected by a rod 82 with a lever 84 fulcrumed on the vertical shaft 80 and adapted to be actuated by a push bar 85 which is guided in the knee lever or arm 86 carried by the shaft 80. The push bar and the arm 86 have coöperating shoulders and the bar is arranged to have enough lateral movement to permit it to be readily engaged with and disengaged from the shoulder on the arm.

A spring 88 is arranged to move the push bar out and to thrust the pin 74 upwardly into the path of the left hand side of the wedge 72 and simultaneously to withdraw the pin 75 below the path of the wedge. When this has been done the wedge in its next forward stroke acts through the pin 74 to move the cam slide 65 toward the left, placing the notches therein back of the wiper carrying member 62, 63 and permitting those parts to be retracted by their springs 66. Inward movement of the push bar reversely sets the several parts causing the pins 75 to be placed in the path of the right hand face of the wedge and the latter to advance the wiper and compress springs 66. A move-

ment of the push bar to the right after it has been pressed inwardly causes it to lock against shoulder on the arm 86 so that the wiper remains in its operative position until the bar is unlocked. In Fig. 2 a modified construction is shown in which the wedge 72 coöperates with another wedge 90 on an arm 91 extending from a sleeve 92 having in another arm 93 a V shaped notch either wall of which can be engaged by the push bar which has a spring to retract it. The arm 91 has stop screws 94, 95 located to engage a swinging bar 96 connected to the cam slide 65 for moving that slide. The swinging bar 96 in Fig. 2 is also connected by a link 97 with a plunger 98 actuated through a lever 99 by a cam face formed on the rear side of the cam block 3. The link 97 puts the plunger into engagement with a shoulder on the wiper actuating slide 63 to cause the wiper to be moved while it occupies its operative position and said link withdraws the plunger from the shoulder to leave the wiper at rest when the wiper is retracted. It will be observed that in both of the constructions the wiper controlling devices are set by an easily operated means but the actual work of shifting the wiper is done by the machine and the wiper can be rendered operative or inoperative independently of the plaiting mechanism which is started and stopped by turning the vertical rock shaft 80. In the construction shown in Fig. 1 a simplification is effected in the means for actuating the plunger 98 by which the wiper is reciprocated. Herein the plunger is permanently connected by a ball to the wiper side 63 and has a collar 100 fast thereon with an arm 102 having a slot 104 by which it is adapted to have operative engagement with a stud 106 on the lever 70 before mentioned. A spring 105 holds the parts in the operative position shown and a projection 108 on the collar is adapted to be engaged by an arm 110 on the wiper controlling cam slide 65 to turn the collar and disengage the slotted arm 102 from the lever 70 when said cam slide is shifted to render the wiper inoperative. The stud 105 can be adjusted in a slot in the lever 70 to vary the stroke of the wiper independently of the stroke of the lever.

For fastening the upper tacks are employed at the sides and heel of the shoe and are fed from a raceway 120 by a separator 122 to a tack carrying block 124 secured to the front end of a slide 125 attached at its rear end to the lever 70. A driver 126 on a bar 128 actuated from the driver cam not shown on the shaft 2 is timed to punch the tack from the tack block into the shoe when the block is in its advanced position after which the block retracts to receive another tack from the separator. The use of tacks should be discontinued while the toe is being

lasted and secured by wire, and for this purpose a latch 130 is suspended beside the separator in position to engage it at one end of its stroke and hold it from the return movement which is normally effected yieldingly by the cam 132 on the slide 125. A rod 133 extends from the latch 130 into the path of the cam slide 65 and is normally pressed backwardly by a spring 131 to hold the latch in engagement with the separator while the wiper is in use. When the cam slide 65 is moved to the left in Fig. 10 to permit the wipers to be retracted for the lasting of the sides and heel of the shoe the inclined face of one of the cam slide notches engages the rod 133 and forces it forwardly to disengage the latch from the separator and permit the feeding of tacks to be resumed. It will be noted that the setting of a single part, which may be the easily moved push bar 85, causes the continuously moving lever 70 with its wedge 72 to position the wiper, connect it with its actuator and stop the feeding of tacks all of which manipulations need to take place at the same time. Release of the push bar from its shoulder on the knee lever 86 causes reverse manipulation of the same parts to be effected by the power driven lever 70. The cam slide 65 is connected by a pin and oblique slot with the wire guide 139 as shown in Fig. 10 to advance and turn the guide from and toward operative position and through the wire guide to apply and release the tension on the wire, as for example, by the mechanism shown for those purposes in United States Patent 1,005,929, granted Oct. 17, 1911. This connection insures that these manipulations of the wiring devices will also be effected by the power driven lever 70 when the push bar is set. These manipulations can be made quite independently of the shifting of the knee lever to start and stop the plaiting movements of the grippers, although the latter shifting can, if desired, be effected at the same time by reason of the arrangement of the push bar within the knee lever 86.

The tack block supports a creasing tool 140 which it carries forward with each advance movement to set into operative position for pressing or punching the upper downwardly and inwardly into the angle between the lip and feather of the innersole over which it tends to bridge if it is stiff or thick. The tool is mounted to slide on the front end of the tack block and is held up by springs 142. The driver has an abutment 144 secured by a clamp 145 and arranged to strike the tool and cause it to crease the upper into the angle in front of the tack block at each descent of the driver. The abutment may be a shiftable plate adapted to be readily turned into an

inoperative position and held in either position by a spring pressed pin 146. This permits the creasing tool to be used at the toe and rendered inoperative at the sides or on any shoes where it is not needed. It will be observed that the tool has a thin work engaging face of small area so that, without a heavy blow and consequent jarring of the shoe, it may be driven down upon the bridging upper with sufficient force to crease the upper into the angle of the innersole in position to be sewed to the lip of the innersole. The direction of its movement is obliquely outward from the machine so that it drives the upper into the angle. The tool also forms a crease or seat for the binding wire and insures a more secure holding by the wire than can be obtained if the upper bridges across the angle.

The operation of the lasting machine as a whole may be substantially the same as that of the machine of said prior patent 584,744 and the purpose of the new mechanisms has been sufficiently explained in connection with the description of the construction and arrangement thereof.

Certain features of the herein described invention are not claimed in this application but are claimed in a divisional application, Serial Number 565,225, filed June 6, 1910, and in a companion application Ser. No. 491,490, filed April 22, 1909.

I claim as new and desire to secure by Letters Patent of the United States:

1. In a shoe lasting machine, the combination with grippers, and mechanism adapted to be rendered operative or inoperative to impart plaiting movements to the grippers, of a wiper and mechanism adapted to be rendered operative or inoperative to actuate the wiper, a knee lever and connections therefrom to the gripper mechanism, a knee push bar and connections therefrom to the wiper mechanism.

2. In a shoe lasting machine, the combination with grippers, and mechanism adapted to be rendered operative or inoperative to impart plaiting movements to the grippers, of a wiper and mechanism adapted to be rendered operative or inoperative to actuate the wiper, and devices arranged in proximity to be engaged by the leg of the operator and to be actuated together or separately for controlling the movements of said two mechanisms while the machine continues to operate upon the shoe held by the two hands of the workman.

3. In a shoe lasting machine, the combination with grippers, and mechanism adapted to be rendered operative or inoperative to impart plaiting movements to the grippers, of a wiper, and devices including two parts to which force is to be directly applied by the operator and which are or

ranged in proximity to each other to permit them to be engaged by the same limb of the operator either together or separately for controlling the movements of the grippers and the position of the wiper.

4. In a shoe lasting machine, the combination with grippers, and mechanism adapted to be rendered operative or inoperative to impart plaiting movements to the grippers, of a wiper, and devices arranged to be actuated together or each separately for controlling the movements of the grippers and the position of the wiper, said grippers controlling device having provision for independent adjustment to vary the movement of the grippers while the machine is running.

5. A shoe lasting machine having in combination, a wiper adapted to be shifted from and toward operative position, an actuator, and means adapted to be manually set with relation to the actuator for causing the actuator to effect the shifting of the wiper.

6. A shoe lasting machine having in combination, means adapted to be rendered operative for working an upper over a last, an actuator therefor, and a device arranged to be set by the operator in the path of the actuator for causing the actuator automatically to render the overworking means operative or inoperative.

7. A shoe lasting machine having in combination, a wiper, means for positioning the wiper in an advanced operative position or in a retracted inoperative position, an actuator and means controlled by the operator and including a device connected with the positioning means and adapted to be set with relation to the actuator for causing the latter to advance or retract the wiper.

8. A shoe lasting machine having in combination, an operating tool, a positioning slide therefor, an actuator, and setting means including devices adapted to be set in different relations to the actuator for causing the slide to be moved in one or the other direction.

9. A shoe lasting machine having in combination, an operating tool, a positioning means therefor, an actuator for the positioning means including oppositely inclined working faces, and connected pins arranged to be simultaneously moved in opposite directions for alternately positioning them with relation to the inclined faces of the actuator to determine the position to which the tool shall be moved.

10. A shoe lasting machine having in combination, a wiper and setting means for causing the machine to position the wiper in operative or inoperative position.

11. A shoe lasting machine having in combination, wiring devices and setting means

for causing the machine to position the wiring devices in operative or inoperative position.

12. A shoe lasting machine having in combination, a wiper, driving means therefor, and setting means arranged to cause the machine to position the wiper and make or break operative connections with the driving means.

13. A shoe lasting machine having in combination, an operating tool, driving means therefor, said parts having connecting devices adapted to be rendered operative or inoperative and means adapted to be set by the machine operator to cause the tool to be shifted by the driving means from or toward operative position and to adjust the connecting devices in accordance with the shifting of the tool.

14. A shoe lasting machine having in combination, a wiper, a plunger permanently connected with the wiper, and driving means for the plunger including a swinging arm adapted to be moved into and out of operative engagement with the driving means.

15. A shoe lasting machine having in combination, a wiper adapted to be shifted from and toward operative position and to be actuated only when in operative position and means arranged to cause the shifting to take place and the actuation to commence in predetermined time relation.

16. A shoe lasting machine having in combination means for fastening an upper by means of tacks, including a raceway and a separator for the tacks in the raceway; a wiper; and means connected with the separator and the wiper for rendering one operative when the other is inoperative.

17. A shoe lasting machine having in combination, means for fastening an upper by means of tacks, and a wiper adapted to be used alternatively, driving means, and means adapted to be set by the workman for causing the driving means to stop the tacking and start the wiper.

18. A shoe lasting machine having in combination means for fastening an upper by means of tacks, and a wiper adapted to be used alternatively, driving means, and means adapted to be set by the workman for causing the driving means to stop the delivery of tacks and, in predetermined time relation, to render the wiper operative.

19. A shoe lasting machine, having in combination means for fastening an upper by means of tacks, including a raceway and a separator for the tacks in the raceway; a wiper adapted to be shifted from and toward operative position; and a connection between the wiper and the separator to control the operation of the latter from the former.

20. A shoe lasting machine having in combination means for working an upper over the feather and against the lip of a welt innersole, a creasing tool arranged to be set into operative position over the angle between the feather and the lip during each overworking operation, and means for actuating the tool downwardly after it is set.
21. A shoe lasting machine having in combination a creasing tool, a carrier therefor, means for actuating the carrier to reciprocate the tool over the shoe bottom and place it over the angle between the feather and lip of the shoe innersole, and means for reciprocating the tool in the carrier to crease the upper into the angle while it is over the shoe bottom.
22. A shoe lasting machine having in combination a tack carrier, a driver, a creasing tool independent of the tack carrier and mounted thereon, and an abutment on the driver for actuating the creasing tool to crease the upper in advance of the carrier.
23. A shoe lasting machine having in combination a wiper, a creaser, means for actuating the wiper to press the upper inwardly from the edge of the shoe bottom and means for actuating the creaser to force the upper downwardly in front of the wiper into the angle between the feather of the innersole and the lip or shoulder thereof.
24. A shoe lasting machine having in combination a wiper, a creaser, means for actuating the wiper, and means for actuating the creaser to crease the upper in front of the wiper.
25. A shoe lasting machine having in combination a wiper, a creaser, means for actuating the wiper inwardly and means for actuating the creaser downwardly in front of the wiper.
26. A shoe lasting machine having in combination a creasing tool to punch the upper downwardly into the angle between the feather and the lip of the innersole and means adapted to be rendered operative or inoperative to actuate the tool.
27. A shoe lasting machine having in combination means for working an upper over a last including a reciprocating block adapted to carry tacks, a tack driver, a creasing tool mounted on the block having a thin work-engaging face to punch the upper into the angle of a welt shoe innersole and an abutment carried by the driver and adapted to be rendered operative or inoperative to actuate the tool.
28. A shoe making machine having in combination means for forcing the upper inwardly over the edge of a last bottom, and means for forcing downwardly upon the last bottom the upper in front of the first mentioned means.
29. A shoe lasting machine having in combination a wiper, actuating mechanism therefor and means for automatically connecting or disconnecting the wiper and its actuating mechanism at times determined by the operator.
30. A shoe lasting machine having, in combination, an operating tool movable from and toward working position over the shoe bottom, said machine having provision for maintaining the tool in its working position continuously during repeated cycles of the machine, automatic means for so moving the tool to its working position, means adapted to be set by the operator for rendering said automatic means operative to shift the tool, and means for actuating the tool while in its working position to perform its function on the shoe.
31. In a lasting machine the combination with the reciprocatory wiper 63 and its operating plunger 98, of the lever 70 fulcrumed at 71, the cam 4 for actuating said lever, the latch 100, 102, 104 adapted for movement into and out of operative engagement with the lever, and means adapted to be set by the operator in position to cause the lever to effect the movement of the connecting member into or out of engagement with the lever.
32. In a lasting machine the combination with the reciprocatory wiper 63 and its operating plunger 98, of the lever 70 fulcrumed at 71, the cam 4 for actuating said lever, the latch 100, 102, 104 adapted for movement into and out of operative engagement with the lever, and manually controlled means for effecting such movement.
33. In a lasting machine the combination with the reciprocatory wiper 63 and its operating plunger 98, of the lever 70 fulcrumed adjustably at 71 and connected to the tack block operating slide 125, the cam 4 for actuating the lever, and a connection between the lever and the wiper operating plunger capable of adjustment to vary the length of stroke imparted to the wiper relatively to the stroke imparted by the lever to the tack block.
34. In a lasting machine the combination with the reciprocatory wiper 63 and its operating plunger 98, of the lever 70 fulcrumed at 71, the cam 4 for actuating said lever, and a connection between said lever and the plunger adapted for adjustment to vary the stroke of the plunger and wiper relatively to the stroke of the lever.
35. A lasting machine having grippers and mechanism for causing them to grip an upper and pull it over a last, combined with means for turning the grippers about an axis substantially perpendicular to the last bottom and means for also turning the grippers about another axis at an angle to the first mentioned axis.
36. A lasting machine having grippers and mechanism for causing them to grip an

upper and pull it over a last, combined with means for turning the grippers about an axis oblique to the last bottom and means for turning the grippers about an axis substantially perpendicular to the last bottom.

37. A lasting machine having grippers and mechanism for causing them to grip an upper, combined with means for relatively actuating the grippers and the last to updraw and overdraw the upper, and mechanism for turning the grippers about axes extending in the general direction of the updrawing and the overdrawing movements.

38. A lasting machine having grippers and mechanism for causing them to grip an upper, combined with means for relatively actuating the grippers and the last to updraw and overdraw the upper and connected mechanism for turning the grippers simultaneously about two axes extending in the general directions of the updrawing and overdrawing movements.

39. A lasting machine having grippers with gripping faces extending oblique to the plane of the last bottom and mechanism for causing them to grip an upper, combined with means for relatively actuating the grippers and the last to updraw and overdraw the upper, means for swinging the grippers about an axis extending substantially perpendicular to the last bottom and means for causing the grippers to rotate about an axis extending at an angle to the first axis.

40. In a lasting machine, means for resting a last, grippers having cooperating jaws with gripping faces extending oblique to the last bottom, means for turning the grippers about an axis extending from at or adjacent to the point of the jaws substantially perpendicularly with relation to the last bottom and means for rotating the grippers about an axis located in or parallel with the gripping faces of the jaws.

41. In a shoe lasting machine, the combination with grippers adapted to operate successively on adjacent portions of the upper along the shoe edge; of actuating mechanism including means for rotating the gripper jaws and having provision for maintaining the rear edge of the gripping faces, with respect to their direction of progression along the shoe edge, in substantially the same relation to the axis of rotation during the rotary movement.

42. In a shoe lasting machine, the combination with grippers, of grippers actuating mechanism including means for rotating the gripper jaws about an axis extending obliquely with relation to the shoe bottom, and means for swinging the grippers rearwardly during said rotary movement.

43. In a shoe lasting machine, the combination with grippers, of grippers actuating mechanism including means for rotating

the gripper jaws about an axis extending obliquely with relation to the shoe bottom, and located substantially in the vertical plane of the rear edge of the gripper jaws.

44. In a shoe lasting machine, the combination with grippers, of grippers actuating mechanism including means for rotating the gripper jaws about an axis extending obliquely with relation to the shoe bottom, said parts being constructed and arranged to maintain the rear edges of the jaws in substantially the same vertical plane during the said rotary movement.

45. In a shoe lasting machine, the combination with grippers, of grippers actuating mechanism including means for overdrawing the upper and means for rotating the gripper jaws about an axis extending in the general direction of the overdrawing movement and constructed and arranged to form a plait by drawing the upper from the front side of the jaws without necessarily straining the upper on the rear side of the jaws.

46. A machine of the class described having, in combination, means to assist in determining the plane of the shoe bottom; grippers to seize and stretch the upper and to form from the seized portion of stock a tapering plait, comprising jaws each of which has straight sides which converge from a broad head at the upper end of its gripping face to a blunt point substantially as described, and having shanks by which the jaws are rotated about an axis extending between the gripping faces of the jaws and at an oblique angle to the plane of the shoe bottom and means to rotate the jaws about the specified axis.

47. In a step-by-step lasting machine, the combination with grippers comprising jaws having gripping faces that taper in width toward their outer ends, of means for imparting plait forming movements to the jaws by rotation of the jaws about an axis located substantially in the rear edges of the jaws.

48. In a shoe lasting machine, the combination with grippers comprising jaws that taper in width toward their outer ends, of means for turning the grippers about an axis substantially perpendicular to the shoe bottom and means for turning the grippers about an axis at an angle to the first mentioned axis.

49. In a shoe lasting machine, the combination with grippers, an actuator, yielding connections between the actuator and the grippers for turning them about an axis substantially perpendicular to the shoe bottom and yielding connections from the actuator for turning the grippers about a different axis.

50. In a shoe lasting machine, the combination with grippers, of grippers actuating mechanism including means for rotating

nation with grippers, of independently yielding means for turning the grippers about two axes extending through or adjacent to the gripper jaws.

5 51. In a shoe lasting machine, the combination with grippers, of mechanism for turning the grippers about an axis substantially perpendicular to the shoe bottom, mechanism for turning the grippers about
10 an axis oblique to the shoe bottom, and means for relatively adjusting the extent of said two turning movements.

52. A shoe lasting machine, comprising grippers having gripping faces the sides of
15 which diverge on straight lines backwardly from a narrow free end, said grippers being mounted for rotation about an axis parallel with and substantially in the plane of the gripping faces of the jaws, said axis
20 extending at an angle which is oblique to the plane of the shoe bottom.

53. A shoe lasting machine, comprising grippers having gripping faces the sides of which diverge on straight lines backwardly
25 from a narrow free end, said grippers being mounted for rotation about an axis parallel with and substantially in the plane of the gripping faces of the jaws, said axis extending at an angle which is oblique to
30 the plane of the shoe bottom, and means for moving the grippers in the general direction of the axis of the grippers to overdraw the shoe upper.

54. A shoe lasting machine having, in
35 combination, taper jawed grippers, means for rotating the grippers about an axis parallel with the gripping faces of the jaws and passing between them, a sole rest, and a reciprocating wiper, said rest and wiper
40 serving to position the shoe bottom substantially horizontally and said grippers axis being at an oblique angle to the plane of the shoe bottom.

55. An apparatus of the class described
45 comprising gripper jaws and shanks by which the jaws are actuated, said jaws having one edge lying substantially in the longitudinal axis of the shanks.

56. An apparatus of the class described comprising gripper jaws and shanks by
50 which the jaws are actuated, said jaws having substantially triangular gripping faces, one lateral edge of which is substantially parallel with, and is located laterally adjacent to, the longitudinal axis of the shanks,
55 and the other lateral edge of which jaws is oblique to and farther removed from said axis.

57. An apparatus of the class described comprising gripper jaws and shanks by
60 which the jaws are actuated, said jaws having one lateral edge located substantially in the longitudinal axis of the shank and the other lateral edge extending obliquely from near the point of the jaws backwardly and
65 outwardly away from the first mentioned edge to form a tapering gripping face.

58. In an apparatus of the class described, grippers comprising shanks which are adapted for rotation on their longitudinal
70 axis and gripping jaws located on one side only of said axis of rotation and tapering in width from a broad head to a narrow blunt end, substantially as described.

59. In an apparatus of the class described,
75 grippers which comprise gripping faces having straight sides that diverge from the ends backwardly to an increased width at the heels thereof and shanks which are formed to permit rotary movement about
80 an axis that extends along the plane of the gripping faces when the jaws are closed.

60. In an apparatus of the class described, grippers which comprise jaws that are adapted for rotation to form plaits and that
85 are formed to present a portion which is of substantially the shape of a portion of a cone and about which the stock is wrapped in forming a tapering plait.

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

ARTHUR L. RUSSELL.

Witnesses:

FREDERICK L. EDMONDS,
ELIZABETH C. COUPE.