(No Model.) 3 Sheets—Sheet 1.

A. F. PRESTON.

LASTING MACHINE.

No. 395,629. Patented Jan. 1, 1889.

Fig. 1.

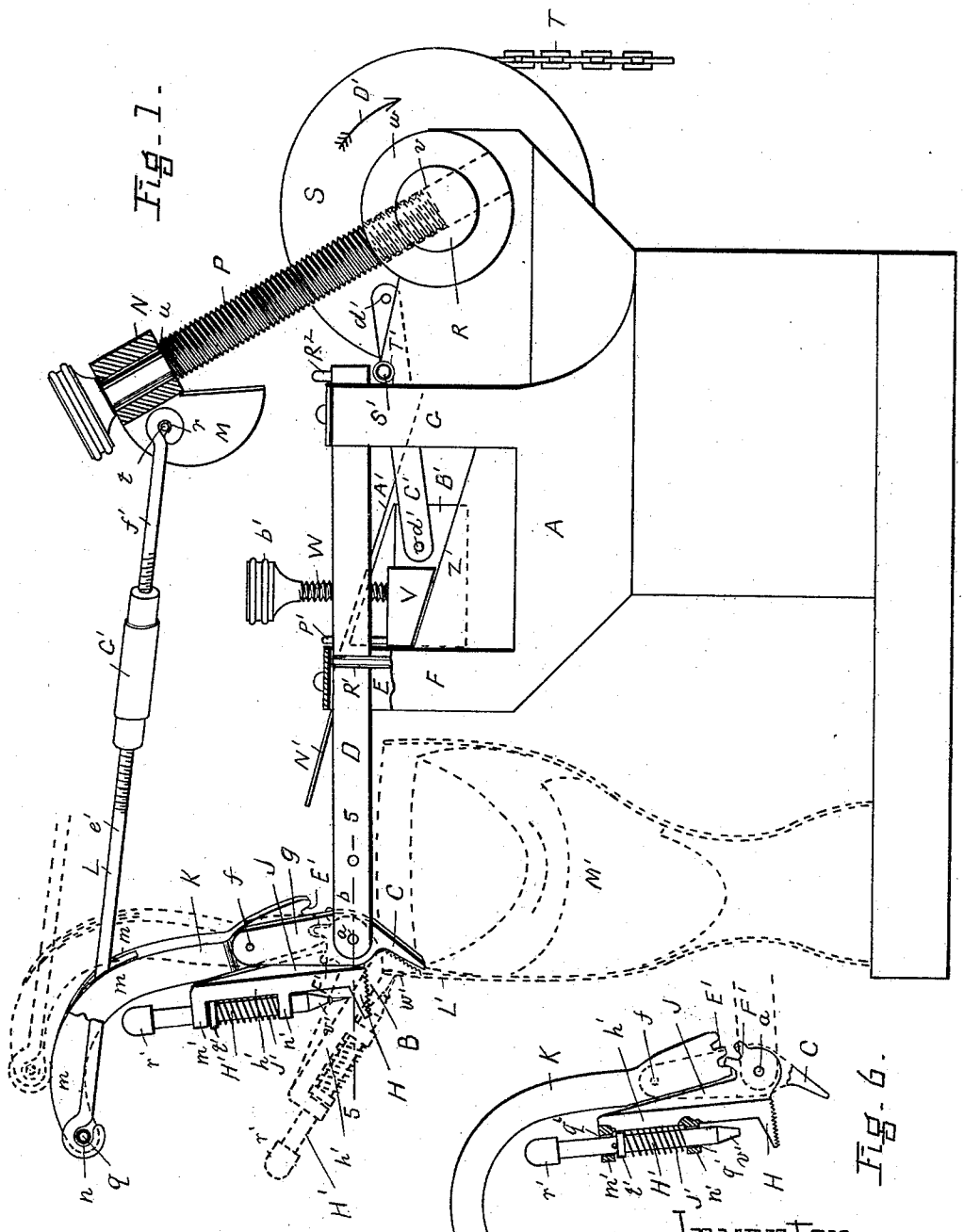
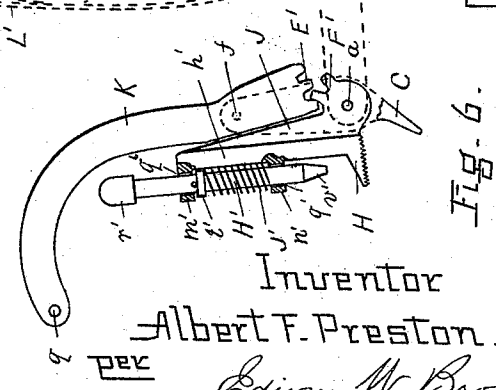


Fig. 6.



Witnesses.
Percy Bryant.
C. E. Nichols.

Inventor
Albert F. Preston.
per Edwin W. Brown.
Attorney.

(No Model.) 3 Sheets—Sheet 2.

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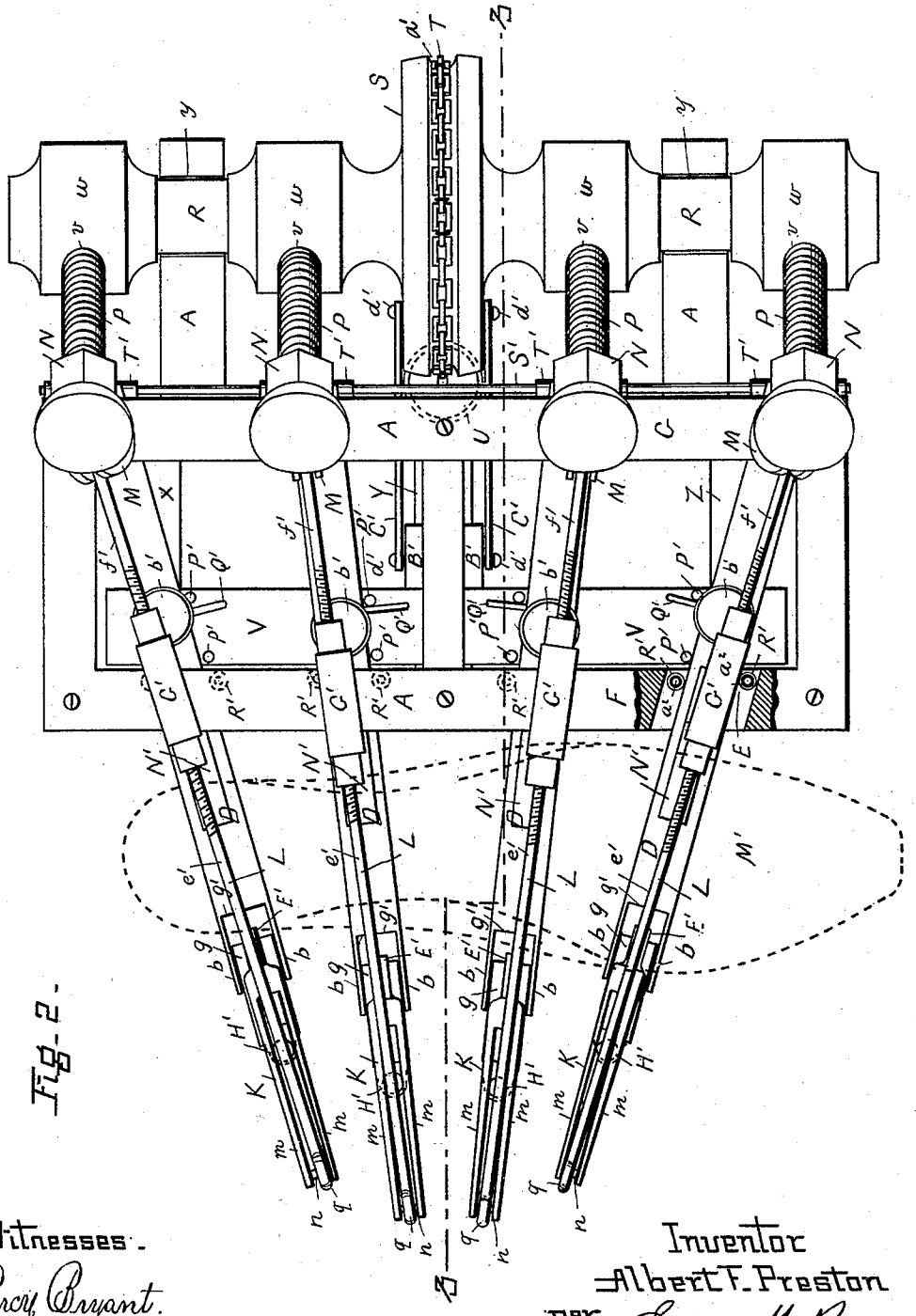

Fig. 2.

Witnesses.
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(No Model.) 3 Sheets—Sheet 3.

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LASTING MACHINE.

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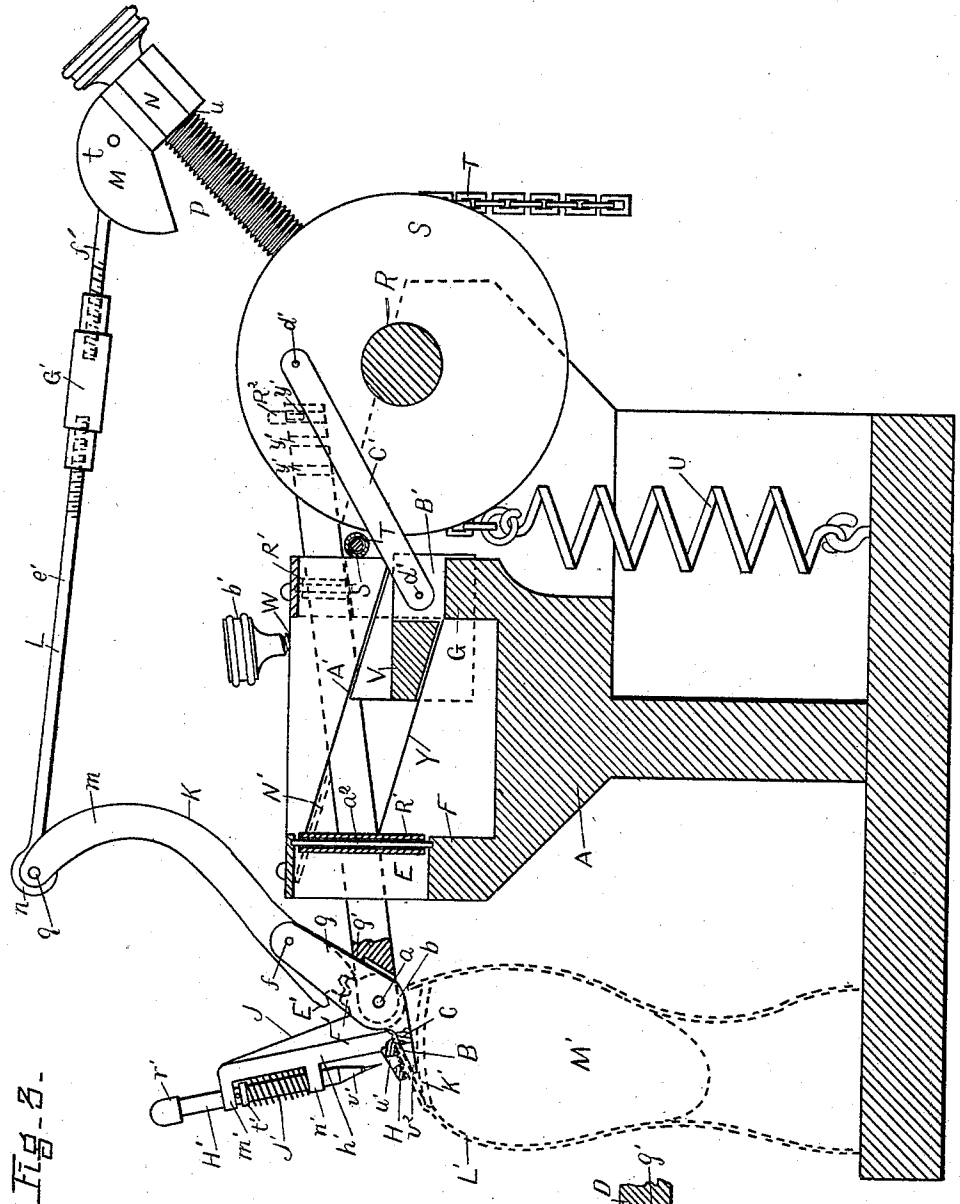

Fig. 3.

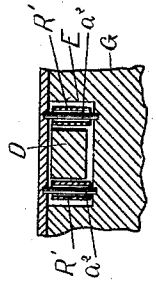

Fig. 4.

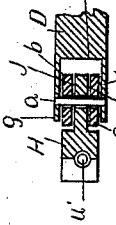

Fig. 5.

Witnesses.
Percy Bryant.
C. E. Nichols

Inventor
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per Edwin W. Brown.
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UNITED STATES PATENT OFFICE.

ALBERT F. PRESTON, OF LYNN, MASSACHUSETTS, ASSIGNOR TO THE PRESTON LASTING MACHINE COMPANY, OF PORTLAND, MAINE.

LASTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 395,629, dated January 1, 1889.

Application filed September 5, 1887. Serial No. 248,894. (No model.)

To all whom it may concern:

Be it known that I, ALBERT F. PRESTON, of Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Machines for Lasting Boots or Shoes, of which the following is a full, clear, and exact description.

This invention relates to a machine for lasting boots or shoes and to a machine in which a series of pairs of jaws or clamps is arranged substantially in a horizontal plane or in a plane corresponding to or substantially to the longitudinal contour of the bottom of the boot or shoe last and provided with means to close said jaws upon and firmly grasp and hold between them one side of the upper of a boot or shoe suitably held therefor at desired points at or about or along the edge and then move them all together, or at the same time, or substantially at the same time, to firmly pull and stretch the side of the upper up and over the edge and partly across the outer surface of the inner sole on the last, the series of jaws being arranged so that each pair of jaws will move and pull in a direction at right angles, or substantially at right angles, to that part of the edge of the inner sole over which and where each pair of jaws grasps and pulls upon the upper for the upper to then be secured to the inner sole, substantially as described, or in any suitable manner; and the invention also consists of certain construction and arrangement of parts in connection with one or more pairs of jaws or clamps arranged for operation on a side of an upper of a boot or shoe, all substantially as hereinafter fully described.

In the accompanying plate of drawings is illustrated a machine constructed and arranged for lasting an upper of a boot or shoe in accordance with this invention—

Figure 1 being a side elevation; Fig. 2, a plan view; Fig. 3, a vertical longitudinal section on line 3 3, Fig. 2; Fig. 4, a detail vertical section to be hereinafter referred to. Fig. 5 is a detail section on line 5 5, Fig. 1; and Fig. 6, a detail side view of a pair of jaws with parts connected therewith.

In the drawings, A represents a frame on which are supported and carried the operative parts of this invention.

B B represent pairs of jaws or clamps, each pair of which is secured by a pivot, *a*, between two arms, *b*, of and at the front end of a separate bar, D. Each of these bars D, supporting and carrying a pair of jaws, serves also as a means for giving the proper direction of the movement and pull of its respective pair of jaws upon the upper in the operation of the machine. They are square in cross-section and are disposed and arranged to move longitudinally back and forth, and in such movements each bar is guided laterally in grooves or guideways E in the two upright portions F and G of the frame A.

The upper jaw, H, is pivoted to said pivot *a* by a tongue, J, at its back side within a groove, *e*, in the jaw C, on which pivot *a* the two jaws C H respectively move or swing to and from each other and as one on the bar D.

Pivoted at *f* between two upper arms, *g*, of the lower jaw, C, is an arm or lever, K, which extends upward and forward in the form shown in side view in Figs. 1 and 3, and between the arms *m* of its upper end is secured by an eye, *n*, over a cross-pin, *q*, a rod, L, which extends back therefrom and is secured by an eye, *r*, on its other end over a pin, *t*, between two plates, M M, of a sleeve, N, adapted to swivel on the upper end, *u*, of an upwardly-projecting lever or arm, P, having a screw-thread on it, by which it is screwed into a screw-threaded socket, *v*, in a rim or flange, *w*, of a horizontal rock-shaft, R, adapted to turn in bearings *y* in the frame A. This rock-shaft R carries a pulley, S, in the groove *a'* of which is arranged a chain, T, connected by one end to a spiral spring, U, secured to the frame, and by its other end to any suitable treadle (not shown in the drawings) for operation of the same. Pressing down the treadle causes the rock-shaft R, through its chain and pulley, to turn to the right and against its spring U, and, raising the treadle, the spring acts to return the shaft R to its normal position.

Each bar D—in the present instance four in number—bears and rests by a vertical screw, W, which screws through it, having a head, *b'*, for operation thereof, when they are in their normal positions, (shown in Fig. 1,) upon a transverse bar, V, arranged below

them and between the two uprights F G of the frame. Turning the screws W in or out raises or lowers their respective bars and regulates their heights above the transverse bar V, and correspondingly the heights of their jaws C H and their relative position horizontally, as desired. This cross-bar V is arranged to move backward and forward between the two uprights F G, and in such movements it slides on longitudinally-inclined planes X Y Z, which incline backward, the center one, Y, having a correspondingly-inclined surface, A′, above it and the cross-bar, which prevents the cross-bar from rising from its inclined bearing-surfaces. At the middle portion, B′, of this cross-bar V it is connected by two pitman-rods, C′ C′, to the pulley S, one each side thereof, by pivots or screws d' in each end for moving the cross-bar V down its incline bearing-surfaces, and the place of attachment of these rods C′ to the pulley when the cross-bar V is forward is preferably substantially in or about, or a little above, the horizontal plane of the central axial line of the rock-shaft, so that as the pulley is turned in the direction of the arrow D′, Fig. 1, the cross-bar will be moved back and down its inclined bearings quite slowly in the first part of its movement, but increasing more and more rapidly as the pulley continues to turn.

The lower end of each arm or lever K, pivoted to the arm of the lower jaw, C, has a segment, E′, of a gear which engages with another segment, F′, of a gear on the tongue J of the upper jaw, H, so that as the arm or lever K is swung backward or forward on its pivot f it will, through the segmental gears E′ F′, swing the upper jaw on its pivot and respectively move it to or from its lower jaw, C.

Each connecting-rod L is made in two parts, e' f', connected together by an internal right and left screw-threaded sleeve, G′, adapted to screw onto the two contiguous ends of the portions e' f', so that turning the sleeve in one direction shortens and in the opposite direction lengthens the rod L.

In pulling the lever K back the lower jaw, C, is swung on its pivot upward, and when at a certain point substantially in a horizontal position, as shown in Fig. 3, its arms g abut against a shoulder, g', on its bar D, whereby any further upward swing of such jaw on its bar is prevented, and the lever K will then act upon the bar to pull it and its jaws backward.

The upwardly-extended arm h of the upper jaw, H, has two forward projections, m' n', having sockets q', through which projects and is adapted to move backward and forward or down and up therethrough a pin, H′, having a head, r', which pin H′ has a collar, t', secured to it between the two projections to abut against the upper projection, m', to limit the upward movement of the pin, the pin being held up by a spiral spring, J, bearing against the collar t' and the lower projection, n'.

The pin H′ is located above an opening, u', in the upper jaw, H, and its lower end, v', is pointed, as shown, and preferably magnetized, for the purpose of holding a tack when placed against the under side of its lower end, v', the point being downward, as shown in Figs. 1 and 3, in position to be driven into the upper and inner sole when the upper is fully drawn over the inner sole on the last, which is done by striking with a hammer upon the pin-head r', the opening u' in the upper jaw, H, and an open slot, v', in the lower jaw allowing the tack to pass through the jaws.

The pin H need not be magnetized; but in such case the tack will have to be placed in position by hand and then driven in by the pin or in any suitable manner; it is preferable, however, to magnetize the pin, as it saves time in handling the tacks and is more convenient.

The operation of the machine is substantially as follows: With the machine in the position shown in Figs. 1 and 2, and with an inner sole, K′, and an upper, L′, placed upon the last M′ in the proper manner, as shown in dotted lines in Figs. 1, 2, and 3, the upper being tacked to the last at the heel and toe and its edge w' at the side being placed in and between jaws C and H of each pair of jaws, which should preferably all be adjusted so as to be in the same horizontal plane, or substantially so, the treadle is operated, which turns the shaft R, and with it the pulley S, to the right, carrying and swinging over with it the levers P, which, through their connecting-rods L, pull back the levers K of the jaws, each of which levers as it moves back causes its upper jaw, H, by its gear-connection to swing on its pivot and to move down to and close upon its other jaw, C, as shown in dotted lines in Fig. 1, and grasp and hold between the two jaws the edge of the upper placed between them. At the same time the cross-bar V has moved back slowly and down its inclined plane sufficient to allow the front ends of the bars D to fall and rest upon the inner sole, and the arms K of each pair of jaws also moved back sufficiently to abut against their respective shoulders g' on their bars D. In the continued movement of the shaft and connecting-levers the bars D will be all pulled and moved back as far as the machine or the stretch of the upper over the inner sole will allow or as desired, the cross-bar also having moved down its incline planes and away from the bars, which then, not resting thereon, are free, so that the jaws at the end of their pull upon the upper will lay and bear closely upon the inner sole and hold the edge of the upper which has been pulled over the edge of the inner sole down close upon the inner sole on the last, as shown in Fig. 3, when the tacks which had previously been placed in position on the pins H′ are driven by striking upon the heads of the pins H′ down through the upper and inner sole, which secures the upper and lasts it to the inner sole. The treadle is now allowed to rise,

when the spring U causes by its tension the shaft and pulley to turn backward or in the reverse direction, which moves all the parts back into their normal positions, as shown in Figs. 1 and 2, when the last is removed from the machine and the boot removed therefrom, another placed thereon, the last placed in position, and the upper lasted as before, and so on.

P′ P′ are pins secured in the upper side of the cross-bar V and arranged in position to abut against projecting side pins, Q′, of the guide-bars D, so as to insure that their height-regulating screws W will always be over the cross-bar V to rest thereon at the proper time.

The back end of each guide-bar D has a longitudinal series of vertical sockets, y', in which is adapted to fit a pin, R^3, so that movement of the bar forward after lasting the shoe will be stopped by the pin R^3 striking or abutting against the upright G for the lower jaw-lever, K, to operate on the upper jaw to raise and open it from the lower jaw, as shown in Fig. 1, in proper position for the jaws to receive and properly grasp and operate on the upper, such forward movement being regulated by changing the pin R^3 from one socket to another, as desired.

N′ is a flat metal spring secured on the top of each bar D, its free end projecting upward and arranged to bear against the upper side of the groove E in the upright F, in which the bar slides when the bars are pulled back, so that then the spring will cause the bar to hold its jaws firmly down upon the inner sole on the last in order to bring the edge of the upper down close upon the inner sole for the better lasting of the upper.

In the uprights F and G at each side of each bar D are friction-rollers R′ on vertical pins a^2, secured in the frame, as shown in section in Fig. 3 as to the upright F and in detail vertical section in Fig. 4 as to upright G, by which the friction on the bars is reduced in moving back and forth through the grooves. On the back side of upright G is a horizontal wire, S′, extending across and secured to the frame, having at each groove E a loose sleeve, T′, on which the bars D run, and by which the friction is still more reduced.

The grooves E for the several jaw guide-bars D are arranged so that the bars will run in diverging lines, substantially as shown, for the proper pull of the jaws upon the upper, as these guide-bars are principally for the purpose of giving direction to the pull upon the upper by their respective jaws when the machine is operated in order to insure that such pull upon the upper will be in a direction at right angles to the edge of the inner sole where its respective jaws grasp the edge of the upper.

The bars D and their jaws are so arranged in connection with the transverse bar V that when the transverse bar is forward it raises up the bars from the inner sole on the last, so that the jaws will turn down over the side of the last to project downward in position to conveniently receive between them the vertical edge of the upper of the boot or shoe when placed on the last, as shown in Fig. 1. With the transverse bar moved back and down its inclined guiding-surfaces, and thus down from said bars D, and leaving them free to rest horizontally on the inner sole on the last, the action of the jaws upon the upper will pull it close to and over the edge and upper surface of the inner sole, as shown in Fig. 3.

Although only four bars and their respective jaws and connecting parts are shown in the drawings, it is obvious more may be used, and, if so, such bars should be arranged to pull in the manner or direction as before described.

If either pair of jaws does not pull or stretch the upper over far enough on the inner sole, turn the lever P out of its socket Q to increase the distance of the point where the rod L is connected thereto from the axial line of the shaft, which will correspondingly increase its leverage or length of its movement and give more pull or stretch on the upper by its respective jaws, and if either jaw pulls too much turn the lever P in the reverse direction, which will shorten its leverage or length of its movement and relieve or lessen such pull.

In lieu of regulating the length of the levers or arms P by screwing them in or out of the shaft R, they can be secured permanently in the shaft and the sleeve N secured to each lever in such manner that it can be moved up and down on said lever, and thus regulate its action upon the levers K, connected to the jaws, and their guide-bar or the levers P can be regulated in any suitable manner.

The connecting-rods L between the levers K and arms or levers P are arranged for the adjustment of their length more particularly, so that the machine can be adapted to different widths of lasts. For instance, for a narrow last they would be shortened, and for a wide last lengthened, and for lasts between the two extremes adjusted accordingly.

Any suitable jaws for grasping and holding the upper can be used and operated in any suitable manner for such purpose; but such as are described and the manner of operating the same are practical and satisfactory in their operation and results.

The various parts are preferably made of metal, or can be of any suitable material and constructed in any suitable manner.

The last can be arranged to be removed and placed in position in any suitable manner, but, not being a part of this invention, this is not shown or described.

The plate M of the sleeve N, to which the rod L is attached, serves to steady the connection of the two, preventing lateral play of the same.

This machine lasts only one side of the boot at a time, the jaws and their guiding bars and grooves being arranged more par-

ticularly for one side of the boot, and to last the other side the last, with the boot thereon, is reversed, so as to place the other side of the boot or shoe in position to be operated on, and in such case to preserve the line or direction of pull of the jaws upon the upper required in this invention a machine should be used in which the guiding bars and grooves for the jaws are changed or arranged to suit the change of direction in which the edge of the inner sole runs, as turning the boot around to last the other side would more or less change such direction, it being different at the ball and toe from what it is at or near the heel; but otherwise the parts would substantially remain and operate in the same manner.

Having thus described my invention, what I claim is—

1. In a lasting-machine, the combination, with two jaws pivoted to a bar, D, arranged to move backward and forward in suitable guideways and provided with a shoulder, y', of a lever pivoted to one and arranged to engage with the other of said jaws and connected to means for operation thereof.

2. In a lasting-machine, the combination, with a series of bars, D, arranged to move backward and forward in suitable guideways, each bar carrying two jaws adapted to grasp and hold the upper of a boot or shoe between them, of a transverse bar, V, arranged to move backward and forward on inclined guideways, and on which transverse bar the bars D are adapted to rest and bear, and said bars D and V being connected to suitable mechanism for operation thereof, for the purpose specified.

3. In a lasting-machine, the combination, with a series of bars, D, provided with regulating-screws W, arranged to move backward and forward in suitable guideways, and each bar carrying two jaws, of a transverse bar, V, arranged to move backward and forward on inclined guideways, and on which transverse bar are adapted to rest and bear the bars D by said regulating-screws, substantially as and for the purpose specified.

4. In a lasting-machine, the combination, with a bar, D, carrying two jaws, C H, and arranged to move backward and forward in suitable guideways in a frame, and provided with a series of holes or sockets, y', of a pin, R^2, adapted to fit said socket to abut against said frame to limit the forward movement of the said bar.

5. In a lasting-machine, the combination, with a series of bars, D, arranged to move backward and forward in suitable guideways, each bar carrying two jaws, and a lever, K, pivoted to one and arranged to engage with the other of said jaws, of an arm or lever, P, adjustably secured to a rock-shaft and connected to said lever K, for the purpose specified.

6. In a lasting-machine, the combination, with a series of bars, D, arranged to move backward and forward in suitable guideways, each bar carrying two jaws, and a lever, K, pivoted to one and arranged to engage with the other of said jaws, of an arm or lever, P, adjustably secured to a rock-shaft and connected to said lever K by a rod, L, formed of two parts and connected at their contiguous ends by a sleeve provided with a right and left screw-thread, for the purpose specified.

7. In a lasting-machine, the combination, with a series of bars, D, arranged to move backward and forward in suitable guideways, each bar carrying two jaws, and a lever, K, pivoted to one and arranged to engage with the other of said jaws, of an arm or lever, P, adapted to screw into a rock-shaft and provided with a swiveling sleeve, N, connected to said lever K by a rod, L, formed of two parts connected together by a right and left screw-thread.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ALBERT F. PRESTON.

Witnesses:
EDWIN W. BROWN,
PERCY BRYANT.