

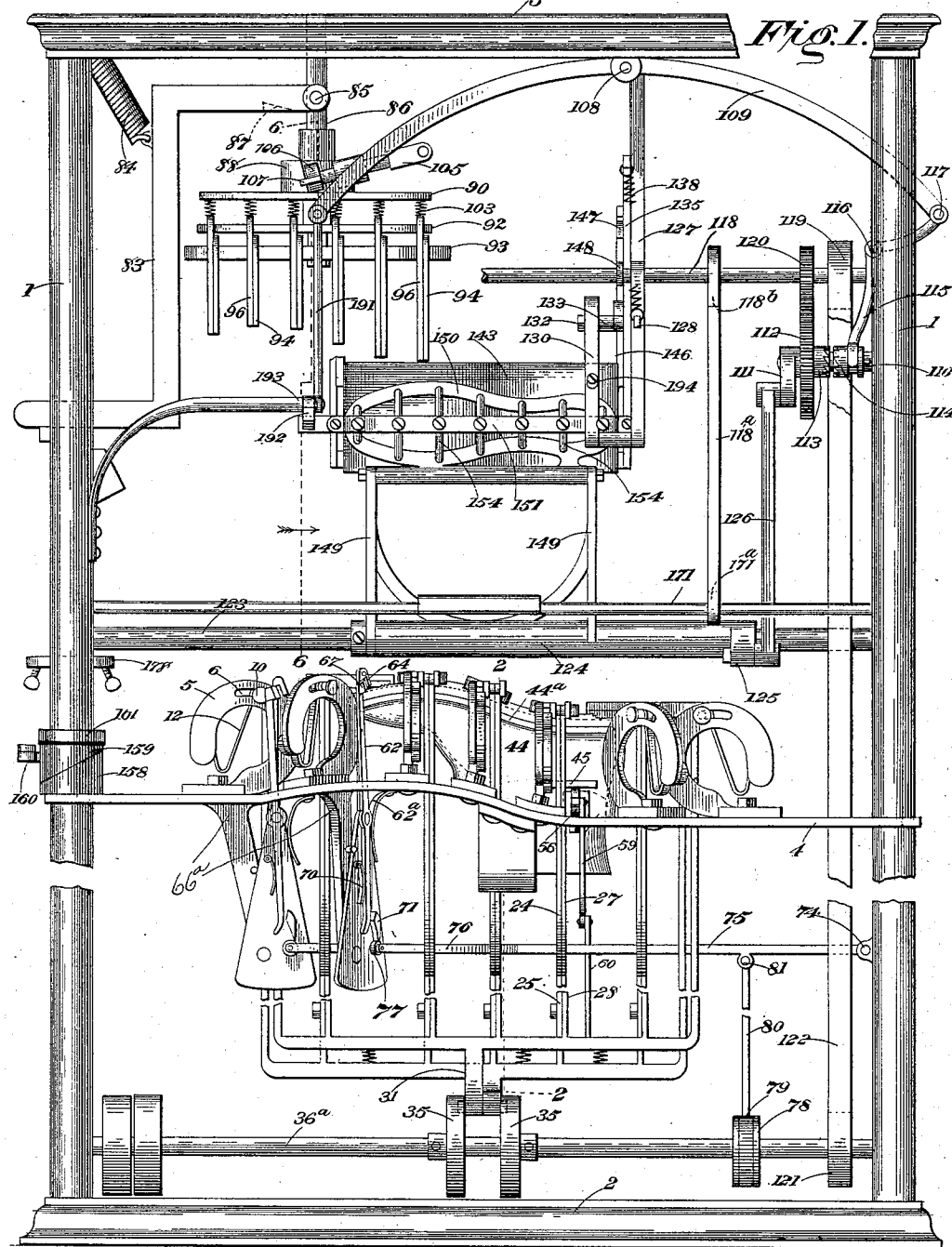
(No. Model.)

5 Sheets—Sheet 1.

J. M. HOLLADAY.
LASTING MACHINE.

No. 565,987.

Patented Aug. 18, 1896.



Witnesses

M. Fowler
H. J. Duwall

Inventor

John M. Holladay
by *M. Duwall* Attorney

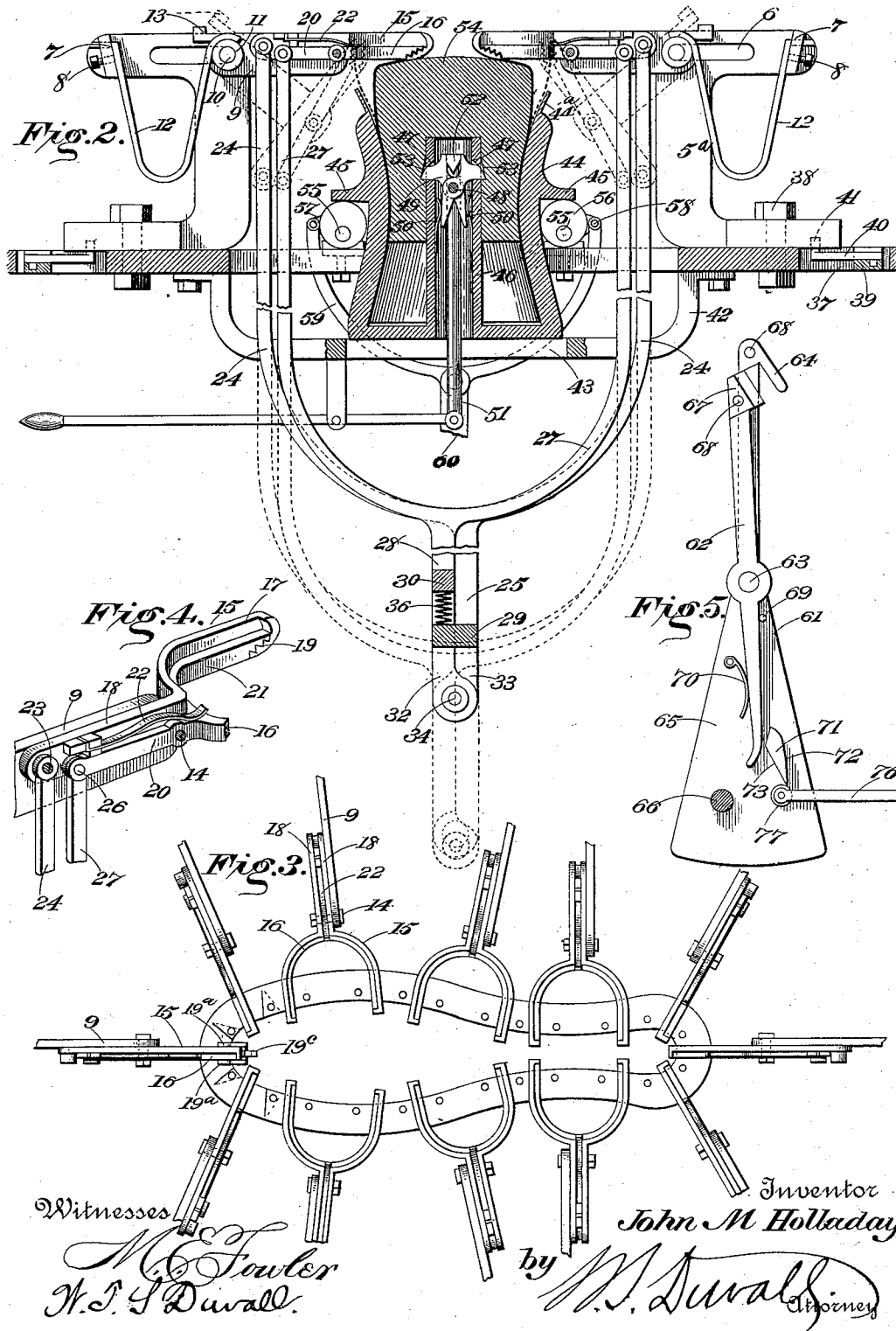
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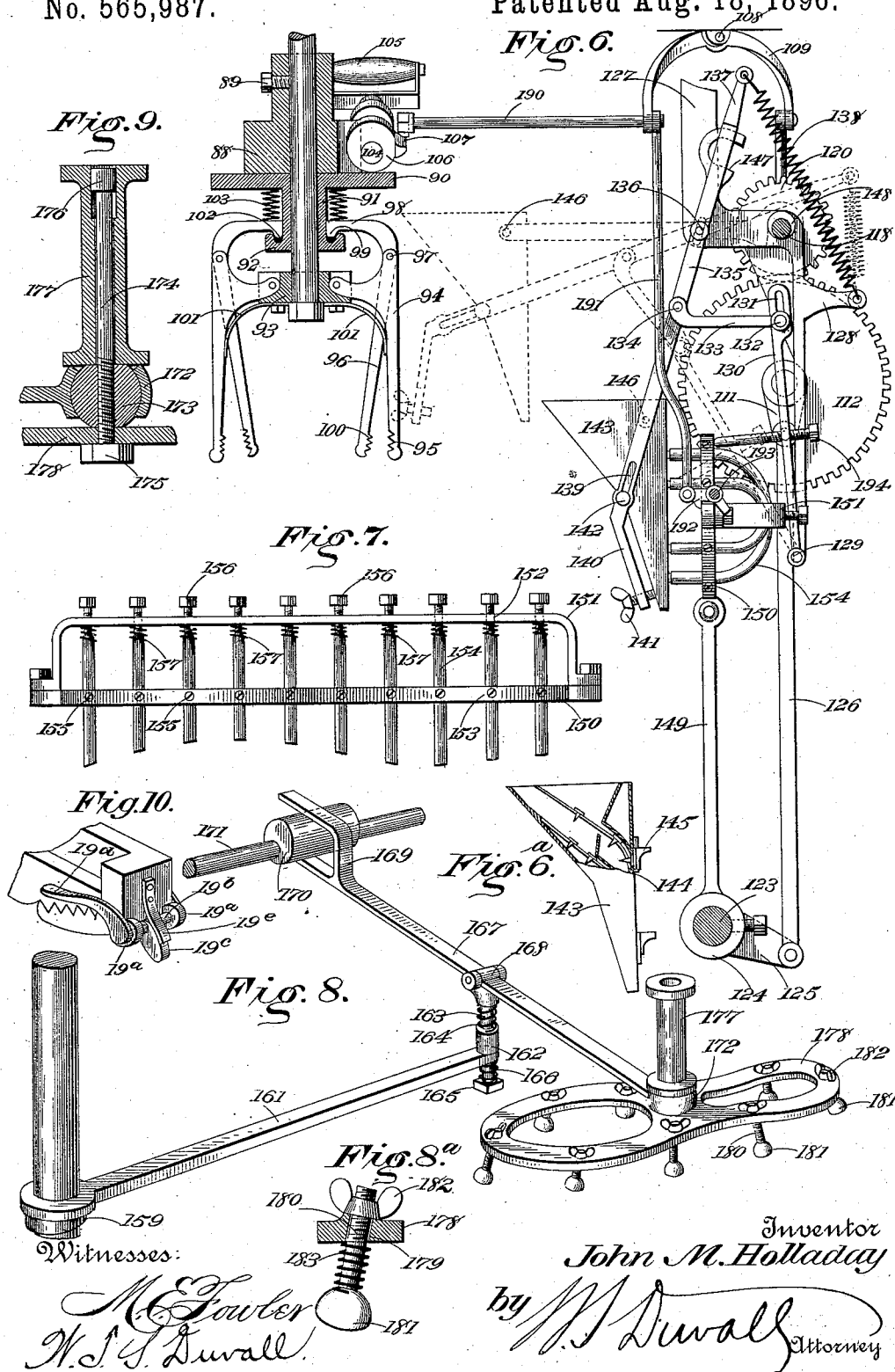
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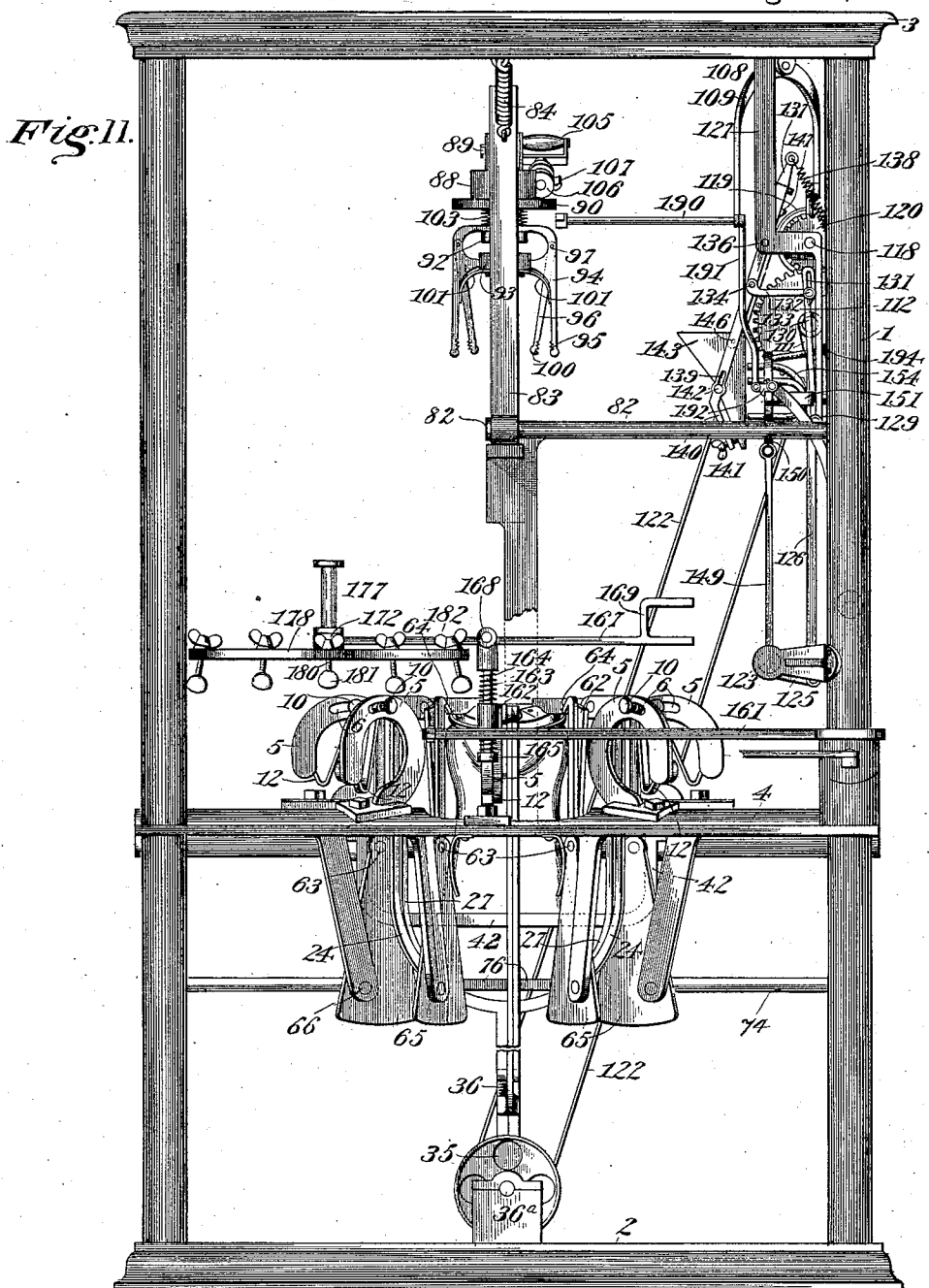
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5 Sheets—Sheet 4.

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Witnesses;

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W. T. S. Duwall

Inventor,

John M. Holladay.

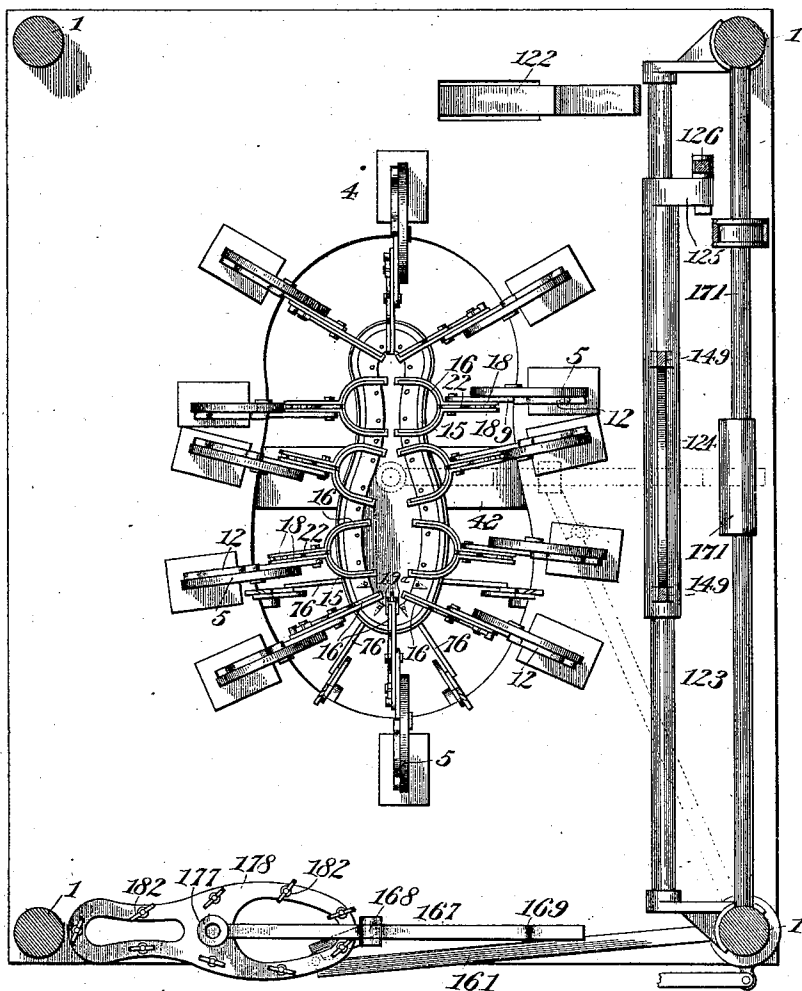
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J. M. HOLLADAY.
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Fig. 12.



Witnesses:

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UNITED STATES PATENT OFFICE.

JOHN M. HOLLADAY, OF HOLLADAY, VIRGINIA.

LASTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 565,987, dated August 18, 1896.

Application filed April 7, 1894. Serial No. 506,729. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. HOLLADAY, a citizen of the United States, residing at Holladay, in the county of Spotsylvania and State of Virginia, have invented certain new and useful Improvements in Lasting-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in shoe-lasting machines, the objects in view being to provide a machine of simple and economic construction, and which is adapted to last shoes in an efficient expeditious manner; to provide for an automatic picking up of the leather and insertion of the same in the grippers; for a straining of the leather by the grippers over the last; for an application of the tacks or nails to the leather and last; for a gathering of the leather at the toe, and for a subsequent hammering of the tacks and leather, the whole being successively accomplished by mechanical means.

Other objects and advantages of the invention will appear in the following description, and the novel features thereof will be particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a rear elevation of the complete machine, the last being shown in position and the grippers in the position they occupy when straining the leather over the same. Fig. 2 is a vertical sectional view on the line 2 2 of Fig. 1, the parts being in the same position. Fig. 3 is a plan view of Fig. 2, the outer ends of the grippers being broken away. Fig. 4 is a detail of a portion of one of the double grippers employed at the sides of the last. Fig. 5 is a detail in elevation of the splitter or cutter employed at the toe and in connection with the toe-grips. Fig. 6 is a sectional view on the line 6 6 of Fig. 1, illustrating the pick-up and tack-applying mechanisms. Fig. 6^a is a partial section and side elevation of the tack-receiving hopper. Fig. 7 is a top plan view in detail of the tack-applying magnets. Fig. 8 is a detail in perspective of the hammer mechanism. Fig. 8^a is a sectional view in detail through the head of said mechanism, illustrating

one of the hammers in elevation. Fig. 9 is a vertical longitudinal sectional view of the handle of the hammer mechanism. Fig. 10 is a detail in perspective of one of the grippers. Fig. 11 is an elevation of the machine. Fig. 12 is a horizontal section of the same above the table.

Like numerals of reference indicate like parts in all the figures of the drawings.

Before detailing the construction of this machine I deem it proper to state that the framework and other details of construction to be described are such as are employed merely for illustrating the principle of my invention, and I deem myself at liberty under my patent to change such details and make such other minor alterations as come properly within the skill of the mechanic without departing from the spirit of my invention or sacrificing any of the advantages that will hereinafter appear.

In the present instance I employ four posts 1, arranged, preferably, in the form of a rectangle, the same being supported at their lower ends upon a base or sill 2, and supporting at their upper ends a crown-piece 3. These posts, it will be understood, are secured together by suitable bolts, tie-bars, and other auxiliary devices in any manner desired and not necessary here to state. The posts support a table 4, at the center of which is located the usual opening for the accommodation of the last and head of the machine.

Arranged around the opening in the table and bolted at their bases thereupon is a series of standards 5, Fig. 1, or 5^a, Fig. 2, the latter being slightly altered in shape, the same having at their upper ends elongated horizontal slots 6, and in rear of the same lateral flanges or shoulders 7, through which set-screws 8 are passed.

Applied to the side of each standard 5 is a movable plate 9, and through the same at their rear ends and entering the slots 6 of said standards are transverse pins 10, having movement in the slots 6. These pins 10 are provided with antifriction-rollers 11, and interposed between said rollers and the flanges or shoulders 7 of the standards 5 are in the present instance bell-shaped springs 12. The plates 9 are provided upon their upper sides

at their rear ends with lateral flanges 13, (see dotted lines, Fig. 2,) which limit the upward movement of the inner ends of the plates.

To the inner end of each plate 9 there is intermediately pivoted, by means of bolts 14, the two members 15 and 16 of the grippers. Those grippers at the sides of the last are preferably arranged in pairs, or what I shall term "twin grippers," while those at the toe and heel, for reasons hereinafter obvious, are "single grippers." Each, however, has a construction common to the other, so that similar numerals may be employed for designating similar parts. The twin gripper, as its name implies, employs two members 15 in the construction shown, so that the jaws 17 thereof diverge, but it will be obvious that these jaws may be mounted upon a single shank 18. In the present instance, however, I have shown two shanks, one for each jaw. The outer ends of the jaws are inwardly flanged, said flanges being curved downward and rearward and toothed, as indicated at 19.

Upon the same pin 14 as the members 15 are pivoted are in the present instance intermediately pivoted the members 16. Each member 16 consists of a rear shank portion 20 and a divergent jaw portion 21, designed to fit down upon the jaw 19, and is toothed to correspond therewith. A flat spring 22 is secured to the shank 18 of the member 15, and at its inner or free end bears upon the member 16 in advance of the pivot-pin 14, said spring having a tendency to close the jaws 21 upon the jaws 19. The shank 18 of each opposite member 15 is, by means of a transverse pin 23, pivotally connected to the upper branch of a bail 24, each of the bails 24 having formed at its lower end a shank 25.

The outer ends of the shank 20 of the members 16 are, by means of pins 26, connected to the upper ends of similar U-shaped bails 27, which, like the bails 24, are provided at their lower sides with shanks 28, and the two shanks 25 and 28 are at their lower ends connected rigidly to their bars 29 and 30, respectively, the former bar being below the latter and having an opening in its edge, as at 31, through which depends a lug 32, formed on the under side of the bar 30. The bar 29 has a companion lug 33, and the two are provided with lateral trunnions or pins 34, which, as shown in Fig. 1, engage grooves formed in cam-disks 35, arranged upon a power-shaft 36. Between the two bars 29 and 30 coiled springs 36 are interposed, and these may be relied upon for closing the members of the jaws, and in that case the springs 22 might be omitted, though I deem it best to employ them.

The table 4 of the machine, as best shown in Fig. 2, is provided with a series of radial slots 37, the same being arranged in rear and under the flanges or feet of the bases 5. These bases are preferably pivotally bolted, as at 38, to the table, and arranged in the slots 37 are movable blocks 39. Let into each block is a

spring-arm 40, the inner ends of which are upwardly disposed, as at 41, and engaged with the under sides of the bases of the standards 5, beyond their pivot-bolts 38. The tendency of these springs 40 is to maintain the standards in proper radial alinement with relation to the last, and it is intended that the standards be bolted pivotally to position, so as to have a slight swiveling movement, in order to yield and to be returned by the springs after pressure is removed therefrom. In adjusting the standards it will be seen that the blocks will slide in the slots, and therefore offer no obstruction to such adjustment.

Arranged under the opening in the table, and bolted to or made integral therewith, is a U-shaped yoke-plate 42, the same having a central opening 43 below and corresponding with that of the table. Arranged in the openings in the table and the yoke-plate is the last-supporting saddle 44, the same approximating interiorly the exterior outline of a last, and being provided upon its interior with a horizontal flange 45. From the base of the saddle, and within the same, there rises a tubular standard 46, the same having adjacent to its upper end, and formed at diametrically opposite sides, openings 47. A short stub-shaft 48 is located in the tubular standard below the plane of the openings, and pivotally mounted upon this shaft are the opposite dogs or catches 49, whose engaging ends are designed to extend through the openings 47. Light springs 50 are interposed between the outer edges of the lower portions of the dogs and the wall of the tubular standard, the tendency of the springs being to contract the upper or engaging ends of the dogs and withdraw them from the openings 47 in the standard.

A rod 51 projects upwardly through the standard to one side of the dogs, and is provided with a laterally-beveled or V-shaped liberating cam-finger 52, which takes between the inner edges or faces of the upper ends of the dogs, and when in position, as shown in Fig. 2, supports the dogs against the tendency of the springs 50 and causes their outer or engaging ends to pass through the openings 47 of the tubular standard, and hence engage with recesses 53, which are formed in the last 54. The last, it will be seen, has a tubular recess to receive the tubular standard, and the offsets or recesses 53 are formed in the wall of this recess. By elevating the rod 51 it will be seen that the springs 50 will cause the dogs to contract in a manner obvious, thus disengaging their outer ends from the recesses 53 of the last and permitting a removal of the latter. Any means may be provided for raising and lowering the rod 51 for the purpose of locking and unlocking the last.

At opposite sides of the saddle 44 horizontal shafts 55 are journaled in their ends upon suitable bearings formed on the table, or it may be on the yoke, and arranged upon these

shafts eccentrically and adapted for rotation are cam-rollers 56, whose surfaces take under the flanges 45. Arms 57 extend outward from the rollers 56, and they are connected pivotally, as at 58, to the upper ends of a bail 59, that extends under the saddle 44 and has connected therewith a vertical operating-rod 60. Said rod may be operated by hand or foot or other means.

In Fig. 5 I have illustrated in detail a form of cutter that may be employed in connection with my machine, and is preferably located between the single grips at the toe of the last. Of course they may be located at the heel or any other point where a cut is desired, but I have illustrated them in Fig. 1 as located at the toe.

Referring to Fig. 5 more particularly, it will be seen that each cutter consists of a main and auxiliary member 61 and 62, the same being arranged side by side and pivotally connected by a pin 63. The main member at its upper end is provided with an angularly-disposed bill or blade 64, and at its lower end, below its pivot 63, is diverged to form a widened fin portion 65, which is pivotally mounted upon a suitable journal 66, supported by hangers 66^a. The auxiliary member 62 is provided at its upper end with a beveled blade 67, which is designed to operate against the blade 64 of the main member 62. The blades, it will be seen, are preferably made independent of the members and are held in position by means of pins or screws 68, so that when impaired from use they may be replaced or sharpened. A small stop-pin 69 is located on the main member 62 below its point of pivot 63 and limits the separation of the blades. A light return-spring 70 bears against the opposite side of the member 62 and has a tendency to separate the blades so that they are normally maintained open. A cam-block 71, having a general V shape, is arranged upon the lower portion or fin 65 of the main member immediately in advance of the lower end of the auxiliary member, and the same has an inner curved face 72 and a rear inclined face 73.

Pivotally supported upon a rod arranged in opposite bearings 74, secured to the posts 1, is a vibratory rod or arm 75, the same having its outer or free end forked, producing the branches 76, each of which extends to the side of the fin 65 of a cutter, and is provided at its extremity with a cam-roller 77, designed to operate against the several faces of the cam-block 71 to cause the operation of the cutter in the manner to be described. Arranged upon the shaft 36^a is a grooved cam-disk 78, and resting thereupon is the lower forked end 79 of a connecting-rod 80, whose upper end is pivoted at 81 to the vibratory lever 75, so that as the shaft 36 revolves the lever 75 is vibrated or raised and lowered through the medium of the connecting-rod 80.

It will be obvious that the blades may be so arranged in the knives with relation to each

other as to produce a V-shaped cut or hole, removing a portion of the stock at each operation, as may be preferred.

Pivotally mounted on a horizontal shaft 82, arranged above and at one side of the last, is a Z-shaped angular arm 83, which is normally maintained supported by means of a coiled spring 84. A pin 85 is arranged in the free end of the arm 83, and loosely connected to said arm by means of the pin is a bar 86, which may be tilted so as to abut against a stop 87, so that when the arm 83 is lowered the bar 86 will be in proper position with relation to the bottom of the last. A head-block 88 is arranged upon the arm 86 and is adjustable thereon by means of a set-screw 89, that passes therethrough and binds upon the bar. Below the head-block 88 and mounted loosely upon the bar 86 is the head-plate 90, the same having a central depending tubular hub 91, provided at its lower end with an annular flange 92, whose upper side is grooved. Below the head-plate 90 and its tubular hub a block 93 is secured to the bar 86, and the same is at intervals notched to receive the inner branches of a series of bell-cranked levers 94, whose lower ends at their inner sides are serrated to form jaws 95. Pivoted to the outer upper branches of these bell-cranked levers 94 are levers 96, the pivots 97 being at an intermediate point of the levers 96 and the upper ends of the latter being inwardly disposed, forming branches 98, whose inner ends have lugs 99, that fit in the groove formed in the flange 92. The lower ends of the levers 96 are at their outer sides toothed to form jaws 100 to correspond with the jaws 95, and the two jaws are normally maintained open by means of curved springs 101. Interposed between the under sides of the lugs 99 and the bottom of the groove formed in the flange 92 are cushions 102, preferably of rubber. Coiled springs 103 are also preferably interposed between the upper sides of the branches 98 and the under side of the head-plate 90. Journaled at one side of the head-block 88 is an inclined shaft 104, the same being provided at one end with a handle or grip 105 and at its opposite end with an eccentric disk 106, having at one side a trip-stud 107.

Pivotally supported at 108 from the crown of the framework is a curved or bow-shaped lever 109, and below this lever there is journaled in the side of the framework opposite which the arm 83 is located a stub-shaft 110. This stub-shaft is provided at its outer end with a crank 111 and with a loose spur-gear 112, having at its innerside or hub one member of a clutch 113. The remaining member 114 of the clutch is splined on the stub-shaft and is annularly grooved to receive the lower bifurcated end of a bell-cranked lever 115, which is fulcrumed at 116 and pivoted at 117 at its opposite end to the outer end of the bowed lever 109. A counter-shaft 118 is arranged above the stub-shaft 110, and car-

ries a pulley 119 and a spur-gear 120, the latter being engaged by the loose spur-gear 112 of the stub-shaft 110. A pulley 121 is arranged on the shaft 36^a, and is connected
5 with the pulley 119 by a belt 122.

Below the stub-shaft 110 is a rod 123 arranged in the framework, and upon the rod there is loosely arranged a sleeve 124, which is provided at one end with an arm 125, which
10 is connected pivotally to the lower end of a pitman-rod 126, whose upper end is similarly connected to the crank 111 of the aforesaid shaft 110. A pair of angular hangers 127 form bearings for the counter-shaft 118,
15 said hangers being provided at their rear sides with horizontal projecting arms 128, the lower ends of the hangers having hinged thereto at 129 arms 130, whose upper ends are slotted, as at 131. Adjustably arranged
20 in the slots 131 are pivot-bolts 132, which pivotally connect thereto links 133. The links are pivotally connected at their outer ends at 134 to the opposite terminals of an inverted-U-shaped frame 135 at intermediate
25 points, and above said points the two terminals of the frame are pivotally connected to the hangers 127, as indicated at 136. The upper end of this U-shaped frame is provided with an extension-arm 137, and the same is
30 connected to the arm 128, with which one of the hangers is provided, by means of a retracting coiled spring 138. The lower ends or terminals of the U-shaped frame 135 are
35 slotted at 139, and finally are angularly disposed at 140. In these ends adjusting-screws 141 are mounted. Located in the slots 139 are the opposite ends of a headed rod 142, so that a loose connection is formed between the terminals of the U-shaped frame 135 and
40 the hopper.

The hopper 143, it will be understood, is interiorly divided, so as to form a series of tracks for the travel of the tacks, as indicated in Fig. 6^a, and its face is provided with
45 openings at the lower end of each track, as indicated at 144. Over each opening 144 gravity-gates 145 are located, said gates, when not otherwise influenced, closing the openings. A pair of levers 146 are pivoted to the
50 opposite sides of the hopper, as best shown by dotted lines in Fig. 6, and at their inner ends are provided with recesses 147, that loosely engage over eccentrics 148, arranged on the counter-shaft 118, and located at one
55 side of the spur-gear 120.

Arranged upon the sleeve 124, at an angle with the arm 125, is a pair of arms 149. Rigidly secured in any suitable manner to the arms 149 is the tacking-plate 150. This
60 plate has the general contour of the bottom of the last and is provided with a longitudinally-disposed bridge 151, having a series of holes 152, which correspond with pairs of holes 153, formed in the opposite sides of the
65 plate 150. Having their terminals passed through the holes 153 of the plate is a series of inverted-U-shaped or horseshoe-shaped

hammers 154, which are rigidly held in position by means of screws 155, which extend through the sides of the plate and bear against
70 the terminals of the hammers. The upper end of each hammer is provided with a threaded shank 156, and between the bridge-piece 151 and the upper ends of the hammers coiled springs 157 are located, the same being
75 designed to cushion the hammers in case of any abnormal shock. The hammers 154 are of various lengths, so that their ends will all contact with the bottom of the last, when the hammer is lowered upon the same, in a
80 manner hereinafter described. When elevated, the position of the hammers is such as to bring their ends at the terminals of the feed-slots in the gripper, and it is my design to employ magnets for the hammers. 85

Arranged on one of the posts 1, or it may be an independent standard at the side of the machine, is a cam 158, the same being fixed, and above the same there is swiveled on the same post or independent standard, as the
90 case may be, a corresponding cam-collar 159, having a handle 160 at one side. From this upper cam there projects an arm 161, at whose outer end there is arranged a sleeve 162, in which loosely fits for reciprocation a stud 163,
95 having a shoulder at its upper end, between which and the upper end of the socket a coiled spring 164 is located. The stud 163 projects below the sleeve 162 and is provided at its lower end with a stop-nut 165, between
100 which and the bottom of the sleeve a spring 166 or rubber cushion may be arranged.

167 represents a hammer-arm, the same being hingedly connected at 168 to the upper
105 end of the stud 163. The outer end of the hammer-arm 167 is forked or bifurcated at 169, and the same loosely embraces a cam-shaped boss 170, which is arranged upon and revolves with a shaft 171, and which may be
110 revolved in any desired manner, and which, in the present instance, is operated by a belt 118^a, which passes over and connects two pulleys 171^a and 118^b, located on the shafts 171 and 118, respectively. The inner end of the hammer-arm 167 is provided with a portion
115 of a spherical socket 172, which loosely fits over a sphere 173, which is axially perforated. A plunger-rod 174 extends through the sphere, is threaded at its lower end to receive a nut 175, and terminates at its upper
120 end in an enlarged head 176. Arranged on this plunger and bored to loosely receive the same is a handle or grip 177, the upper portion of the bore being enlarged to receive the head 176. Secured rigidly to the lower portion
125 of the plunger 174 is the hammer-plate 178, the same being provided at intervals with perforations 179, as best shown in Fig. 8^a, said perforations being inclined, preferably, and each having loosely arranged therein
130 the shank portion 180, at whose lower end a hammer-head 181 is produced. The shank 180 is threaded and receives an adjusting-nut 182, and a coiled spring 183 is arranged upon

the shank between the hammer-head 181 and the hammer-plate 178.

The last is placed in the leather, the stiffener is put in position, and the whole mounted in the saddle, after which the rod 51 is drawn down so as to actuate the dogs 49 and engage the last, so that the latter is locked securely in the saddle. When this operation takes place, the grippers are in the positions shown by dotted lines in Fig. 2 of the drawings, that is, the jaws are open above the edge of the leather, it being understood that this operation upon the part of the jaws is caused by means of the cams 35. The leather is held directly below the jaws by means of guide-flanges 44^a, with which the upper edge of the saddle is provided, so that it simply requires a lifting of the leather in order to bring the same between the jaws of the several grips. The saddle, last, and the parts carried thereby and connecting the same, it will be understood, are in their raised positions at this stage, and subsequently the cams 56 are caused to rotate through the medium of their connecting-bail 59, that is suitably connected so as to raise the saddle and last until the leather is in the position shown by dotted lines in Fig. 2 of the drawings.

Previous to the raising of the saddle the arm 83, carrying the pick-up mechanism, is swung down by the attendant, who grasps the handle 105 and moves the arm against the tension of the spring 84. When the pick-up mechanism has reached a point above the last and is in its lowest position, the jaws 95 and 100 will straddle the edge of the leather, and they are in position to clamp upon the same at intervals. In order to operate the jaws, the attendant now turns the handle 105, thus operating the shaft 104, upon which it is mounted, and causes the cam 106 to depress the head 90, forcing the latter down so as to cause the jaws 100, at their lower ends, to swing outward against the jaws 95, thus tightly gripping the leather. It is at this point that the operation described of raising the last takes place, and with it moves upward the pick-up, so that the leather is carried to the series of grippers. As soon as the pick-up has presented the leather to the grips the cams 35, operating said grips, serve first to close the jaws 21 against the jaws 19, so as to grasp the leather, after which the companion cam operates through the medium of the bail 24 to elevate the entire grip at its outer end and bring it to the position shown in full lines in Figs. 12 and 3.

Between the time that the grips leave their lowermost positions to assume their highest position the lever 75 has been slightly elevated, so that the several branches 76 thereof have caused their cam-rollers to operate against the rear inclined faces of the cams 71, formed on the fins 65 of the cutters, and by reason of the depression of the cams and the point of pivot of the cutters the cutters, as a whole, are swung inward between those

grips at the toe and heel or other points that they may be employed. This inward movement of the cutters places the bills or stationary blades 64 in position to receive the leather. The antifriction-rollers 77, continuing up the incline of the cam, next come in contact with the tail end of the auxiliary member 62 of the cutter, forcing the latter outward against the tension of the spring 70 and causing its blade 67 to swing inward and thus cut the leather. By the time the cut is made the rollers will have reached the upper ends of the cams, at which point it will be seen that the cutters are released and are incidentally thrown outward away from the last by means of return-springs 62^a. (See Fig. 1 of the drawings.) It is at this point that the grippers begin their inward movement so as to stretch the leather as cut tightly over the last, and it is here also, or rather in such instance, that the fingers 19^a, located upon the inner ends of certain grippers, serve their useful function. As the grippers move inward over the last the arms 19^c of the rock-shafts 19^b are caused to raise against the springs 19^e, thus causing the curved fingers 19^a to lower and bear against the leather, holding the cut portions snugly upon the last during the driving of the tack.

The springs 12, it will be seen, serve to yieldingly press the grippers inward, the latter being free to move in the slots 6, so that all inequalities in the last, either in size or shape or stretch of leather, are compensated for and a snug fit of the leather over the last results. The retraction of the pick-up by its spring causes the lug 107, carried thereby, to contact with a trip-arm 190, that extends from one end of the bow-shaped lever 109, and thus rock the same. Such rocking motion upon the part of the lever 109 serves to raise a connecting-rod 191, whose lower end is pivoted to one end of a latch 192. The latch is pivoted at an intermediate point, as at 193, and when thus rocked its shoulder is disengaged from the hammer-plate 178, before mentioned, and which it engages normally and supports when not otherwise influenced, as shown in Fig. 6. Such disengagement of the latch at this time releases the hammer, and it will be seen that when the hammer is released the latch has made at least a quarter of a rotation, so that its upper end is back of a perpendicular line, and consequently the rod 191 is elevated, the bowed lever 109 is tilted, and the clutch mechanism operated by said bowed lever and indicated at 113 and 114 is in engagement, so that also the gears 112 and 120 rotate, as does also the shaft 118. Through the medium of the crank 111 it will be seen that the tacker will be swung downward, the sleeve 124 rotating upon the rod 123. When the tacker is raised, it will be seen that it locks the hopper in its lowest position, as shown by full lines in Fig. 6, in that it abuts against the end of an adjusting screw or rod 194, that is passed through the arm 130, thus pressing

the latter backward against the tension of the spring 138. The instant, however, that the tacker starts downward the mechanism supporting the hopper, being released from pressure of the tacker, swings the hopper quickly outward, so that the parts assume, by reason of the spring 138, the position shown by dotted lines in Fig. 6. The hammers of the tacker, it will be seen, each carry a tack by its head, and the points of the latter are forced into the leather and last at one stroke of the mechanism. When the tacker is raised, the plate 150, coming into contact with the tail end of the latch 192, swings the lower end to the rear and the upper end forward, so that its shoulder 192 engages over the tacker-plate and relocks the same in position. Such movement upon the part of the latch disengages the clutch mechanism and arrests the motion. Such movement upon the part of the tacker-plate causes it to abut against the rod or screw 194, thus returning the hopper-supporting device to the position shown in full lines in Fig. 6.

When the parts are in the position shown by dotted lines in Fig. 6, the recessed end of the bar 146 engages with the cam 148, so that during the process of tacking the tacks within the hopper are being agitated by the vibrations of the hopper and thus caused to move down the guide or slots therein, to be subsequently attracted by the tacker when the tacker and hopper have assumed their relative positions, as shown in full lines in Fig. 6. As soon, however, as the parts have resumed their position, as shown in full lines in Fig. 6, the jarring of the hopper ceases by reason of the disconnection of the bar 146 with the cam.

If, when the pick-up is elevated by its spring 84, the operator should for any reason not desire to immediately and successively apply the tacks, but, for instance, to inspect the work, he may do so by simply giving the handle 105 a slight rotation, so as to throw the lug 107 out of the path of the liberating-rod 190 until the lug has passed by said rod. Subsequently, however, when he desires to apply the tacks he may perform the function of the lug by hand, that is, simply raise the rod 190 by hand and cause the same operation as has been described.

Having applied the tacks and the grippers having released their hold upon the leather by reason of the action of the cams and returned to their former positions it is desirable that the leather should be subjected to a pounding or hammering, and it is at this point of the operation that the hammer disclosed in Fig. 8 is swung from its folded position within the frame to a point above the last.

In operating the hammer the handle is grasped by the hand of the operator and held stationary so far as vertical movement is concerned, and the hammer as a whole may be

moved over the shoe, so that the hammer-heads will contact at all points of the leather and all portions of the latter be thus subjected to their action. The cam 170, arranged on the shaft 171, will, as will be obvious, serve to vibrate the lever 167, attached to the hammer-plate, and thus the hammer-heads brought in contact with the leather. The springs interposed between the hammer-heads and the plate that carries the same will serve to cushion the blows of the hammer, so as to prevent injury to them and permit of rapid work.

The springs 12, when the grippers release their hold upon the leather, serve to throw the same forward or inward, so as to disengage the lower jaws of the grippers from under the leather and permit the grippers to retract and fall to the first position.

Having described my invention, what I claim is—

1. In a lasting-machine the combination with a table and a last-support, of grippers arranged around the support, means for raising, closing, and moving said grippers inwardly over the support, and for yieldingly holding them in the last-mentioned position, substantially as specified.

2. In a lasting-machine the combination with a table and a last-support, of a series of standards pivoted thereon, grippers mounted on the standards, means for opening and closing the grippers, and for sliding the same inward upon the standards and over the last-support, substantially as specified.

3. In a lasting-machine the combination with a table and a last-support, of a series of grippers, swiveled supports for the grippers, means for normally maintaining the supports in radial alinement with the last-support, and for opening and closing the grippers, substantially as specified.

4. In a lasting-machine the combination with a table and a last-support, of a series of standards swiveled around the support upon the table, grippers carried by the standards, means for opening and closing the grippers, and springs for yieldingly maintaining the standards in radial alinement with the last-support, substantially as specified.

5. In a lasting-machine, the combination with the table and last-support, of means for raising and lowering said support, normally open grippers arranged around the support in position to receive the edge of the upper as the last-support is raised, and means for closing the grippers to grip the upper subsequent to such raising of the support and previous to a lowering of the same, substantially as specified.

6. In a lasting-machine, the combination with a table, a last-support, and swiveled standards, of twin grippers arranged at the sides of the support on the standards, single grippers arranged at the toe and heel of the

support, and means for opening and closing the twin and single grippers, substantially as specified.

7. In a lasting-machine the combination with the table, the last-support, and swiveled standards of twin grippers arranged at opposite sides of the last-support on the standards, single grippers arranged at the toe and heel of the support, and means for simultaneously opening and closing the two sets of grippers, substantially as specified.

8. In a lasting-machine the combination with the table and last-support, of standards arranged around the last-support, plates pivoted to the standards, gripper-jaws carried by the plates, and means for raising and lowering the plates, and opening and closing the gripper-jaws, substantially as specified.

9. In a lasting-machine the combination with a table, a last-support, standards arranged around the support, plates pivotally and slidably mounted upon the standards, gripper-jaws pivoted at the inner ends of the plates, means for pressing the plates yieldingly inward, and means for raising and lowering the plates and jaws, and for closing the latter, substantially as specified.

10. In a lasting-machine the combination with a table, a last-support, radial slots formed in the table, blocks arranged in the slots and adapted for movement, springs arranged in the blocks and having their inner ends upwardly bent, of gripper-carrying standards pivotally bolted to the table, and having their lower free ends arranged over the slots, and engaged by the inner ends of the springs, substantially as specified.

11. In a lasting-machine the combination with a table and a last-support, of standards arranged upon the table around the support, grippers comprising pivoted members supported by the standards, one member of each gripper having its inner end laterally bent to form a curved jaw over the end of the remaining member, and the remaining member serrated to engage said jaw, and a spring for closing said remaining member upon the first-mentioned member, substantially as specified.

12. In a lasting-machine the combination with a table, a last-support, and a series of standards arranged around the same, of pivoted grippers carried by the standards, U-shaped bails pivotally connected at their ends to the members of the grippers, and means for raising and lowering the bails, and opening and closing the grippers, substantially as specified.

13. In a lasting-machine the combination with the table, the last-support and the standards arranged around the latter, of pivoted grippers arranged upon the standards, U-shaped bails connecting the grippers in opposite pairs, a lower shaft, a cam carried thereby, and connections between the bails and cam, substantially as specified.

14. In a lasting-machine the combination with the table and the last-support, of the op-

posite standards arranged upon the table and provided with horizontal slots in their upper ends, plates arranged at the sides of the standards, bolts passing through the plates and slots, gripper members pivoted to the inner ends of the plates, springs for normally closing said members, springs for normally pressing the plates inward, and sets of bails pivoted to the inner ends of the members, and means for successively operating said sets, substantially as specified.

15. In a lasting-machine the combination with a table having an opening and the grippers, of a hollow last-receiving saddle arranged in the opening of the table, a flange surrounding said saddle, cams arranged under the flange, and means for rotating the cams, substantially as specified.

16. In a lasting-machine the combination with the table having an opening and the grippers arranged around the latter, of a hollow saddle for receiving the last, the same being provided with a horizontal flange, shafts arranged under the flange, cams carried by the shafts, arms extending from the cams, a bail pivotally connected to the arms, and means for raising and lowering the bail, substantially as specified.

17. In a lasting-machine the combination with the table having an opening, a hollow last-receiving saddle arranged in the opening and provided at its upper edge with a guide-flange 44^a, means for raising and lowering the saddle, standards arranged around the opening, and grippers arranged upon the standards, substantially as specified.

18. In a lasting-machine the combination with the table having an opening, the standards, and the grippers carried by the standards, of a hollow saddle for receiving the last, a support for said saddle, a tubular standard arranged within the saddle and adapted to fit the opening in the last, catches arranged in the tubular standard, and means for opening and closing the catches and projecting the latter through perforations formed in the tubular standard, substantially as specified.

19. In a lasting-machine the combination with the table having an opening, the saddle supported in the opening, the grippers arranged around the saddle, of the tubular standard arranged within the saddle and provided with diametrically opposite openings near its upper end, a short shaft arranged in the tubular standard, catches arranged pivotally on said shaft, springs for normally pressing the lower ends of the catches inward, a vertical movable rod arranged in the tubular standard at one side of the catches, and a cam-finger 52 extending laterally from the rod between the upper ends of the catches, substantially as specified.

20. In a lasting-machine the combination with a table having an opening, the gripper-carrying standards arranged around the opening, the yoke-plate 42 arranged under the opening and connected to the table, the hol-

low last-receiving saddle arranged upon the yoke-plate, last-locking devices carried by the saddle, and means for raising and lowering said saddle, substantially as specified.

5 21. In a lasting-machine the combination with the table, the last-support arranged thereon, and the grippers surrounding the support, of cutters arranged between certain of the grippers, and means for operating the
10 cutters to slit the leather between the grippers, substantially as specified.

22. In a lasting-machine the combination with a table, a last-support and grippers arranged around the latter, of a series of cutters arranged between certain of the grippers,
15 and means for successively operating the cutters and grippers, substantially as specified.

23. In a lasting-machine the combination with a table, a last-support and a series of grippers, of a series of cutters arranged pivotally between certain of the grippers, and means for swinging the cutters inward to engage the stock operating the cutters to slit the same, and for returning said cutters, substantially
25 as specified.

24. In a lasting-machine the combination with the table, the last-support, and grippers, of the herein-described cutters, the same consisting of the main and auxiliary members 61
30 and 62 pivoted at 63, the first member having the angular jaw 64 and the fin 65, the cam 71 having the faces 72 and 73 arranged on the fin in front of the pivot, and the stop 69, and the second or auxiliary member extending in
35 rear of the cam and having the cutting jaw or blade 67, the spring 70 for normally opening the blade, the vibratory rod 75, means for operating the same, the forks 76 at the end of the rod, and the loose rollers 77 at the
40 ends of the forks for engaging the cams, the whole operating as described, substantially as specified.

25. In a lasting-machine the combination with the table, a vertical movable last-support
45 and a series of grippers arranged around the same, of means for raising and lowering the support, a movable pick-up device adapted to be brought over the last-support, and stock-gripping devices carried by said pick-up device and adapted to present the stock to the
50 jaws of the grippers upon the table, substantially as specified.

26. In a lasting-machine the combination with the table, the last-support, means for
55 raising and lowering the latter and grippers arranged therearound, of a swinging arm, means for normally elevating the same, and a leather-gripping device carried by said arm adapted to engage the leather and raise the
60 same to the grippers when the last-support is raised, substantially as specified.

27. In a lasting-machine the combination with the table, the last-support, means for
65 raising and lowering the same, and the grippers arranged therearound, of an arm pivotally supported at one side of and above the table, and adapted to swing over the support,

a standard pivotally connected to the free end of the arm, means for raising and lowering the arm, a sliding head mounted for
70 movement on the arm, a fixed head below the sliding head, pivoted gripper members connected respectively to the sliding and fixed heads, springs for normally opening the grippers, and devices for compressing the sliding
75 head, substantially as specified.

28. In a lasting-machine the combination with the table, the vertical movable last-support and the grippers arranged therearound, of the pivoted arm 83, the spring 84 for normally elevating the same, the standard 86
80 pivoted to the free end of the arm, the stop-block 88 rigidly arranged upon the rod, the shaft journaled in the stop-block and having a handle at one end and a binding-cam at the
85 other, the movable head arranged upon the shaft below the cam and adapted to be operated upon thereby and having a central depending flanged hub, the fixed head at the lower end of the shaft, the bell-cranked gripping
90 members 94 pivoted to the fixed head, the springs for pressing the same outward, the curved gripping members 96 pivoted at 97 to the bell-cranked members and having at their inner ends the lugs 99 engaging the
95 groove in the flanged hub, and the springs interposed between the upper ends of the members 96 and the under side of the movable head 90, substantially as specified.

29. In a lasting-machine the combination
100 with the table, the vertical movable last-support and the grippers arranged therearound, of the pivoted arm 83, the spring 84 for normally elevating the same, the standard 86
105 pivoted to the free end of the arm, the stop-block 88 rigidly arranged upon the rod, the shaft journaled in the stop-block and having a handle at one end and a binding-cam at the other, the movable head arranged upon the shaft below the cam and adapted to be operated
110 upon thereby and having a central depending flanged hub, the fixed head at the lower end of the shaft, the bell-cranked gripping members 94 pivoted to the fixed head, the springs for pressing the same outward,
115 the curved gripping members 96 pivoted at 97 to the bell-cranked members and having at their inner ends the lugs 99 engaging the groove in the flanged hub, and the springs interposed between the upper ends of the
120 members 96 and the under side of the movable head 90, and the cushions 102 arranged in the groove of the flanged hub under the ends of the members 96, substantially as specified.

30. In a lasting-machine the combination with the table and last-support, of a lever supported at one side of the machine, a hammer-plate at the inner end of the lever, a fork at the outer end, and a shaft having an eccentric boss arranged in the fork and adapted to
130 vibrate the lever, substantially as specified.

31. In a lasting-machine the combination with the table and the last-support, of an arm,

means for vibrating the same, a plate at the inner end of the arm provided with perforations, shanks arranged in the perforations, thumb-nuts on the upper ends of the shanks, hammer-heads at the lower ends of the shanks, and coiled springs between the hammer heads and plate, substantially as specified.

32. In a lasting-machine the combination with a table and last-support, of a vibratory lever, means for operating the same, a portion of a spherical socket at the inner end of the lever, a ball arranged within the socket and having a radial opening, a rod arranged in the opening, a loose handle arranged upon the rod, and a hammer-carrying plate secured to the lower end of the rod, substantially as specified.

33. In a lasting-machine the combination with a table, a last-support, a standard, an arm swiveled on the standard and terminating at its outer end in a sleeve a stud arranged within the sleeve, a spring interposed between the upper end of the sleeve and a shoulder on the stud, a lever pivoted upon the upper end of the stud, means for vibrating the lever, and a hammer-carrying plate provided with a handle arranged at the inner end of the lever, substantially as specified.

34. In a lasting-machine the combination with a table, a last-support, an arm swiveled on the standard at one side of the support, and having a sleeve at its outer end, a stud passing loosely through the sleeve and projecting below the same, an adjusting-nut on the lower end of the stud, springs above and below the sleeve, a lever fulcrumed at an intermediate point upon the stud, means for vibrating the lever, a loose socket connection at the end of the lever, a rod extending there-through, a bored handle loosely arranged on the rod, and a hammer-carrying plate secured to the lower end of the rod, substantially as specified.

35. In a lasting-machine the combination with a table, a last-support and grippers, of a swinging hopper, a swinging tacker adapted to abut thereagainst, means for raising and lowering the hopper and the tacker, the latter to contact with the last arranged upon the same, substantially as specified.

36. In a lasting-machine the combination with a table, a last-support and the grippers, of a swinging hopper, means for raising and lowering the same, guides arranged in the hopper and terminating in outlets, a tacker-plate, a gang of magnets carried thereby, means for raising and lowering the plate and the magnets from points opposite the openings in the hopper to and from the last-support, substantially as specified.

37. In a lasting-machine the combination with the table, the last-support and grippers, of a hopper, means for raising and lowering the same, tack-applying devices, means for raising and lowering the same to and from

the last, and means for vibrating the hopper when raised, substantially as specified.

38. In a lasting-machine the combination with the table, the last-support and the grippers, of a plate, means for swinging the same over the last-support, hammers carried by the plate, hangers arranged above the plate, levers pivoted to the lower ends of the hammers, links pivotally and loosely connected to the upper ends of the levers, a frame pivoted at an intermediate point to the ends of the links and above the same to the hangers, a hopper supported in the lower end of the frame, a spring for normally elevating the frame to a horizontal position, means for locking the hammer-carrying plate in its elevated position and for limiting the same, and devices arranged on the levers in the path of the hammer-carrying plate, substantially as specified.

39. In a lasting-machine the combination with the table, the last-support, the grippers and the framework, of hangers depending from the framework at one side of and above the support, a frame pivoted to the hangers, a hopper arranged in the frame, levers pivoted at the lower ends of the hangers and slotted at their upper ends, links pivotally mounted in the slots and at their outer ends pivotally connected to the frame, adjusting-screws extending through the links, a plate arranged between the screws and hopper, hammers carried by the plate, a bell-cranked latch pivoted in the path of the plate, a rod for operating the latch, a swiveled lever arranged above the hopper and connected to the rod, a rotatable shaft, a gear thereon, eccentrics arranged on the shaft, links recessed to receive the eccentrics and pivotally connected to the hopper, a bell-cranked lever pivoted in the framework and connected to the swiveled lever, a stub-shaft below the same, a clutch member engaged by the bell-cranked lever and splined on the stub-shaft, a gear loosely arranged on the stub-shaft and having at one side of its hub a clutch member and at the opposite side a crank, a lower counter-shaft, a sleeve rotatably arranged thereon, arms extending from the sleeve, and a pitman-rod between the same and the crank, substantially as specified.

40. In a lasting-machine the combination with the table, the last-support, the grippers and the framework, of hangers depending from the framework at one side of and above the support, a frame pivoted to the hangers, a hopper arranged in the frame, levers pivoted at the lower ends of the hangers and slotted at their upper ends, links pivotally mounted in the slots and at their outer ends pivotally connected to the frame, adjusting-screws extending through the links, a plate arranged between the screws and hopper, hammers carried by the plate, a bell-cranked latch pivoted in the path of the plate, a rod for operating the latch, a swiveled lever ar-

1arged above the hopper and connected to
to the rod, a rotatable shaft, a gear thereon, ec-
centrics arranged on the shaft, links recessed
to receive the eccentrics and pivotally con-
5 nected to the hopper, a bell-cranked lever
pivoted in the framework and connected to
the swiveled lever, a stub-shaft below the
same, a clutch member engaged by the bell-
cranked lever and splined on the stub-shaft,
10 a gear loosely arranged on the stub-shaft and
having at one side of its hub a clutch mem-
ber and at the opposite side a crank, a lower
counter-shaft, a sleeve rotatably arranged
thereon, arms extending from the sleeve, and
15 a pitman-rod between the same and the crank,
an arm at the opposite side of the frame, a
spring for normally raising the arm, pick-up
devices carried by the arm, a shaft having a
handle located above the pick-up devices, a
20 disk for operating the pick-up devices, a trip-
lug carried by the disk, and a trip-rod ex-
tending from the end of the swiveled lever
and adapted to be struck by the lug, substan-
tially as specified.

41. In a lasting-machine the combination with a last-support, of a movable hopper having a series of inclined guides terminating in openings, gravity-gates arranged over the openings and means for raising and lowering the hopper, of a series of U-shaped hammers, a plate for supporting the same, and means for raising and lowering the plate, substantially as specified.

42. In a lasting-machine the hammer-plate
35 150 having the yoke 151 arranged thereon,
and pairs of opposite openings corresponding
with openings in the yoke, the U-shaped ham-
mers having their terminals passed through
the openings in the plate, and provided at
40 their upper ends with shanks passing through
the openings in the yoke, and above the same
having heads, and coiled springs interposed
between the yoke and hammers, substantially
as specified.

45 43. In a lasting-machine the combination
with the table, last-supports and grippers, of
a cam-collar fixedly mounted at one side of
the table, a cam-collar loosely mounted over
the fixed cam-collar, a handle for operating
50 the loose collar, and a hammer mechanism
carried by the loose collar, substantially as
specified.

44. In a lasting-machine the combination with the table, last-support and grippers car-

ried by the table, of means for raising and 55
lowering the support, a pick-up mechanism
arranged at one side of the table, means for
normally elevating the same out of position
for operation, a tack-applying hammer ar-
ranged at one side of the same, means for 60
supporting it normally out of position, and
means for liberating the same upon the ele-
vation of the pick-up mechanism, substan-
tially as specified.

45. In a lasting-machine the combination with the framework, the table, the last-support and the devices carried by the table, of a pick-up mechanism arranged at one side of the table and above the same, means for normally elevating the same out of operative position, a tack-applying mechanism, means for normally elevating the same out of operative position, and a hammer and means for normally elevating the latter out of operative position at the side of the table, substantially as specified.

46. In a last-ing-machine the combination with a table and a last-supporting jack, of an arm pivotally supported at one side of and above the table, means for swinging the arm over the jack, a standard pivotally connected to the free end of the arm, a sliding head mounted for movement on the arm, a fixed head below the sliding head, pivoted gripping members connected respectively to the sliding and fixed heads, springs for normally opening and closing the gripping members, and devices for compressing the sliding head, substantially as specified.

47. In a last- ing-machine, the combination 90
with a table a last-support, of grippers com-
posed of two members arranged side by side
and pivoted together between their ends one
of said members being bent at a right angle at
its front end and toward its companion mem- 95
ber, and then rearwardly and laterally under
said companion, forming a lower jaw for the
same to operate against, and means for open-
ing and closing and raising upwardly and
moving inwardly said jaws, substantially as 100
specified.

In testimony whereof I affix my signature
in presence of two witnesses.

JNO. M. HOLLADAY.

Witnesses:

JOHN W. GARDNER,
W. S. DUVALL.