

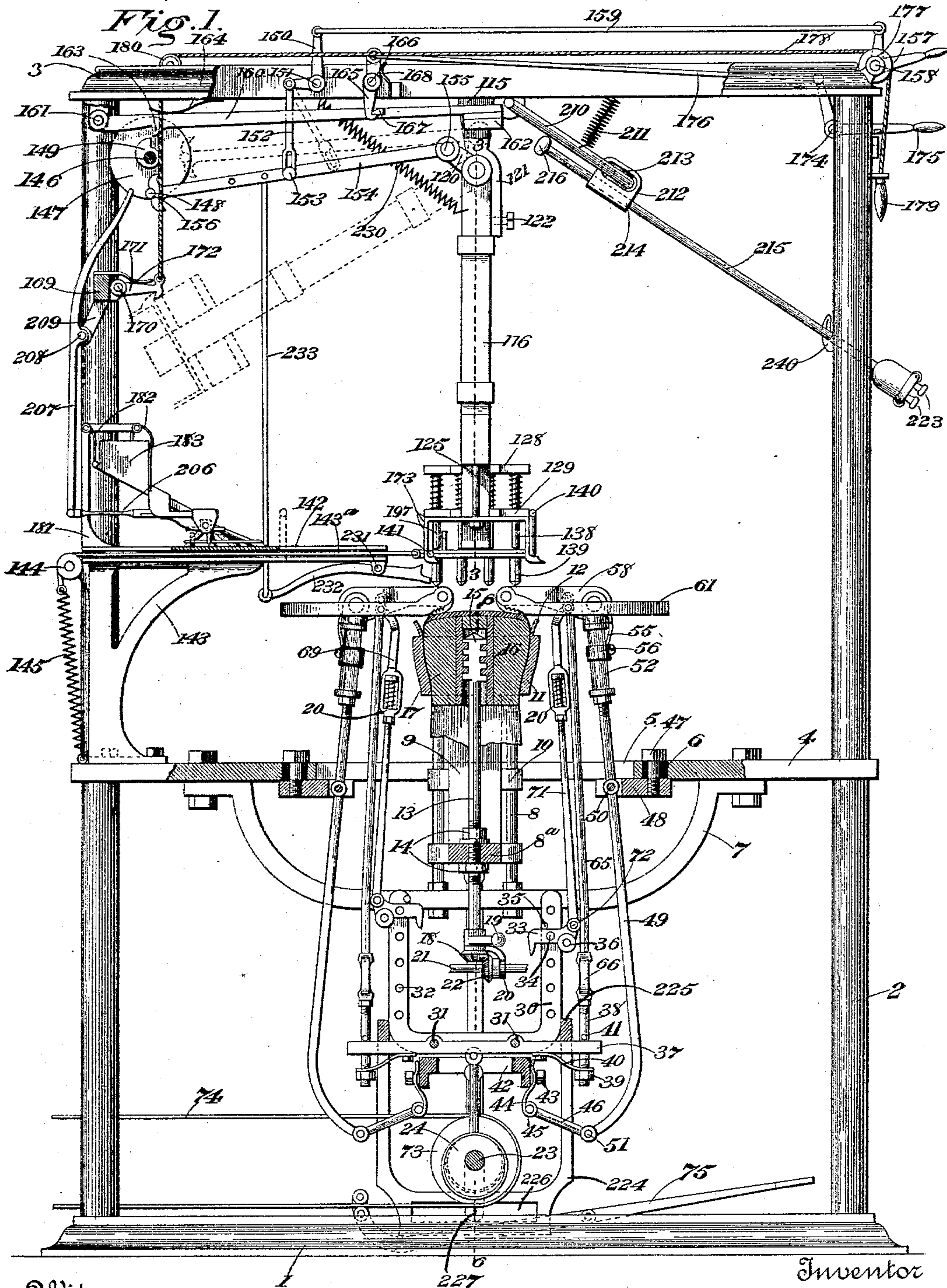
(No Model.)

6 Sheets—Sheet 1.

J. M. HOLLADAY.
LASTING MACHINE.

No. 561,887.

Patented June 9, 1896.



Witnesses

M. C. Fowler
W. J. S. Duval

Inventor

John M. Holladay

by

M. J. Duval
Attorney

(No Model.)

6 Sheets—Sheet 2.

J. M. HOLLADAY.
LASTING MACHINE.

No. 561,887.

Patented June 9, 1896.

Fig. 2.

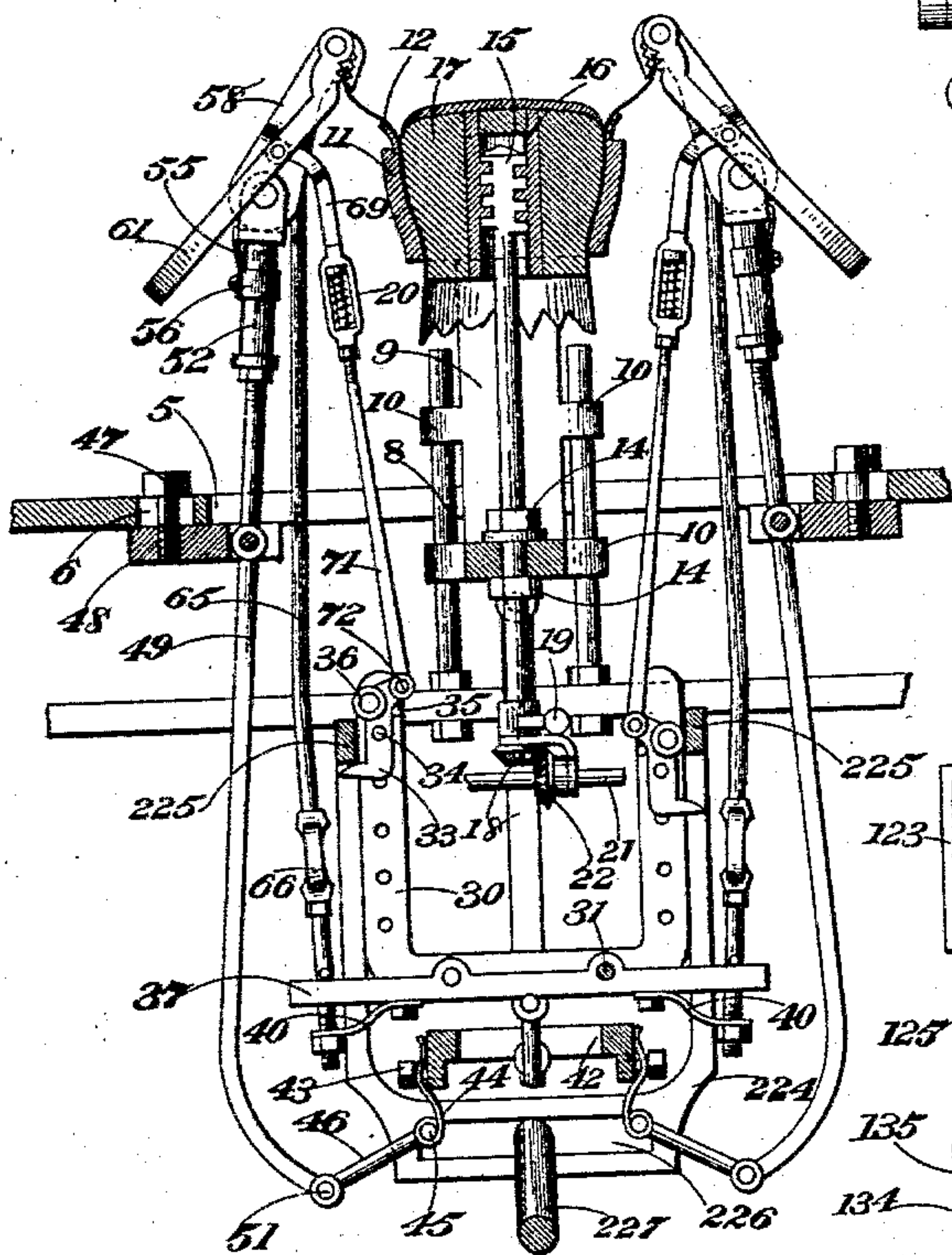


Fig. 3.

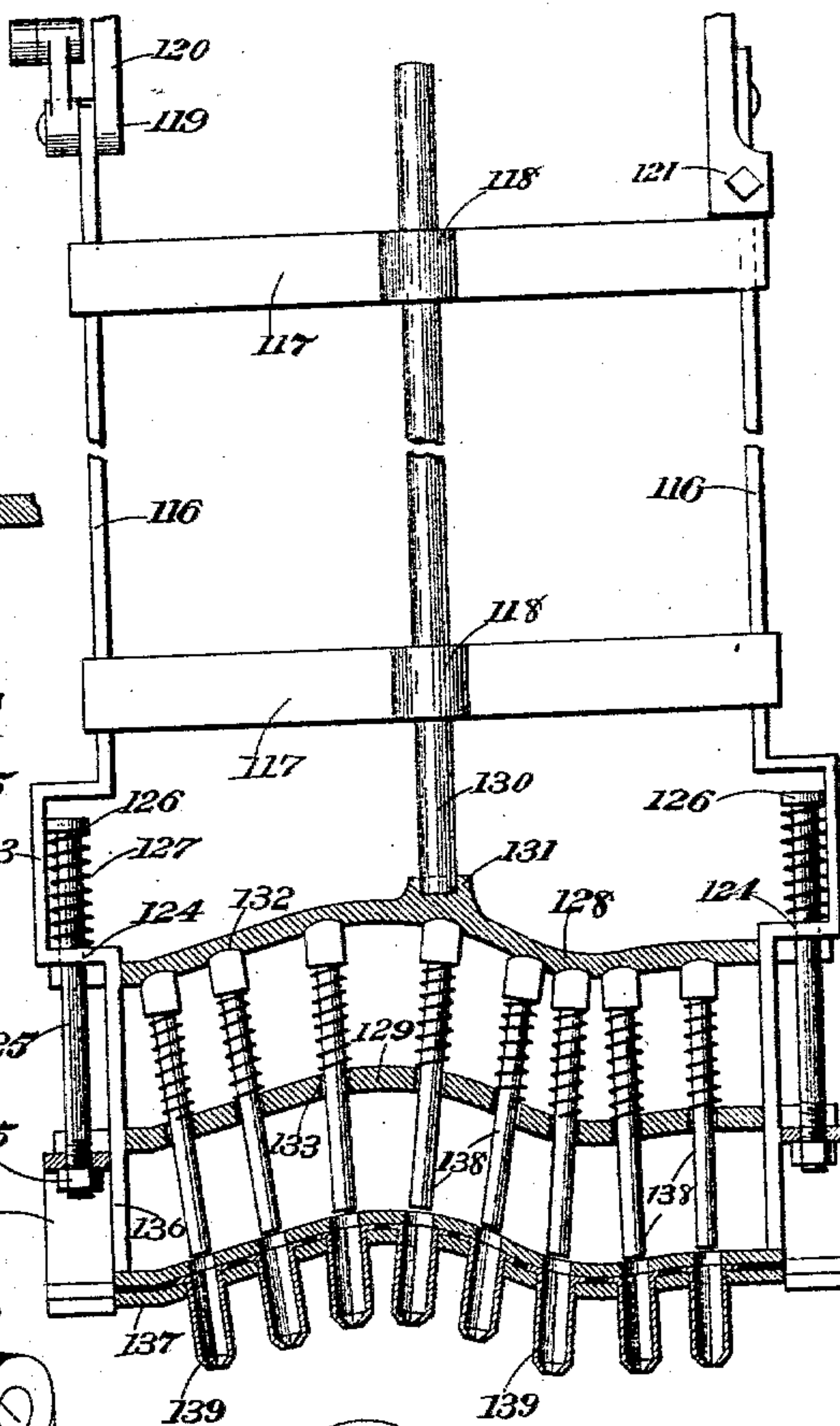
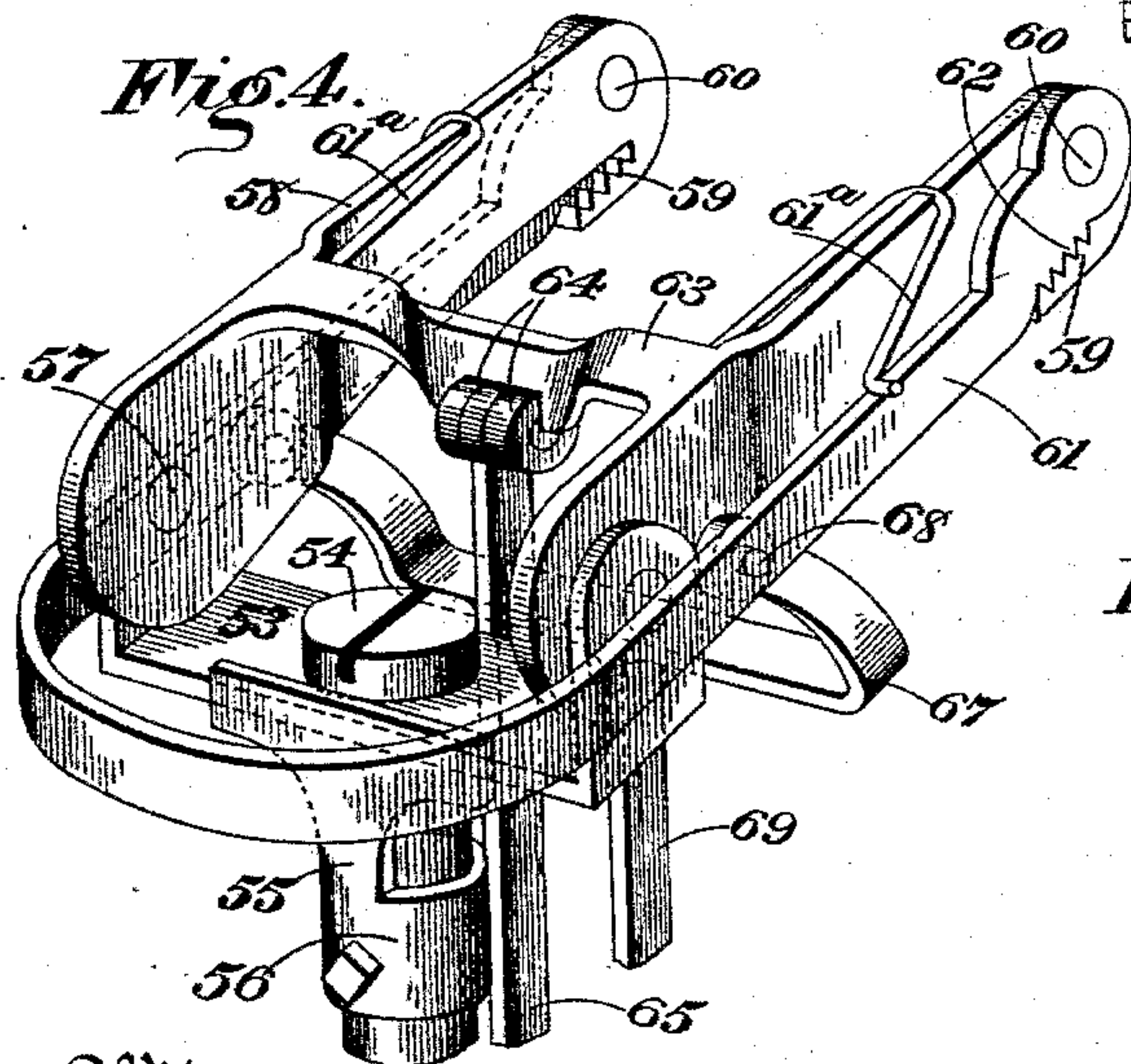


Fig. 4.



(No Model.)

6 Sheets—Sheet 3.

J. M. HOLLADAY.
LASTING MACHINE.

No. 561,887.

Patented June 9, 1896.

Fig. 6.

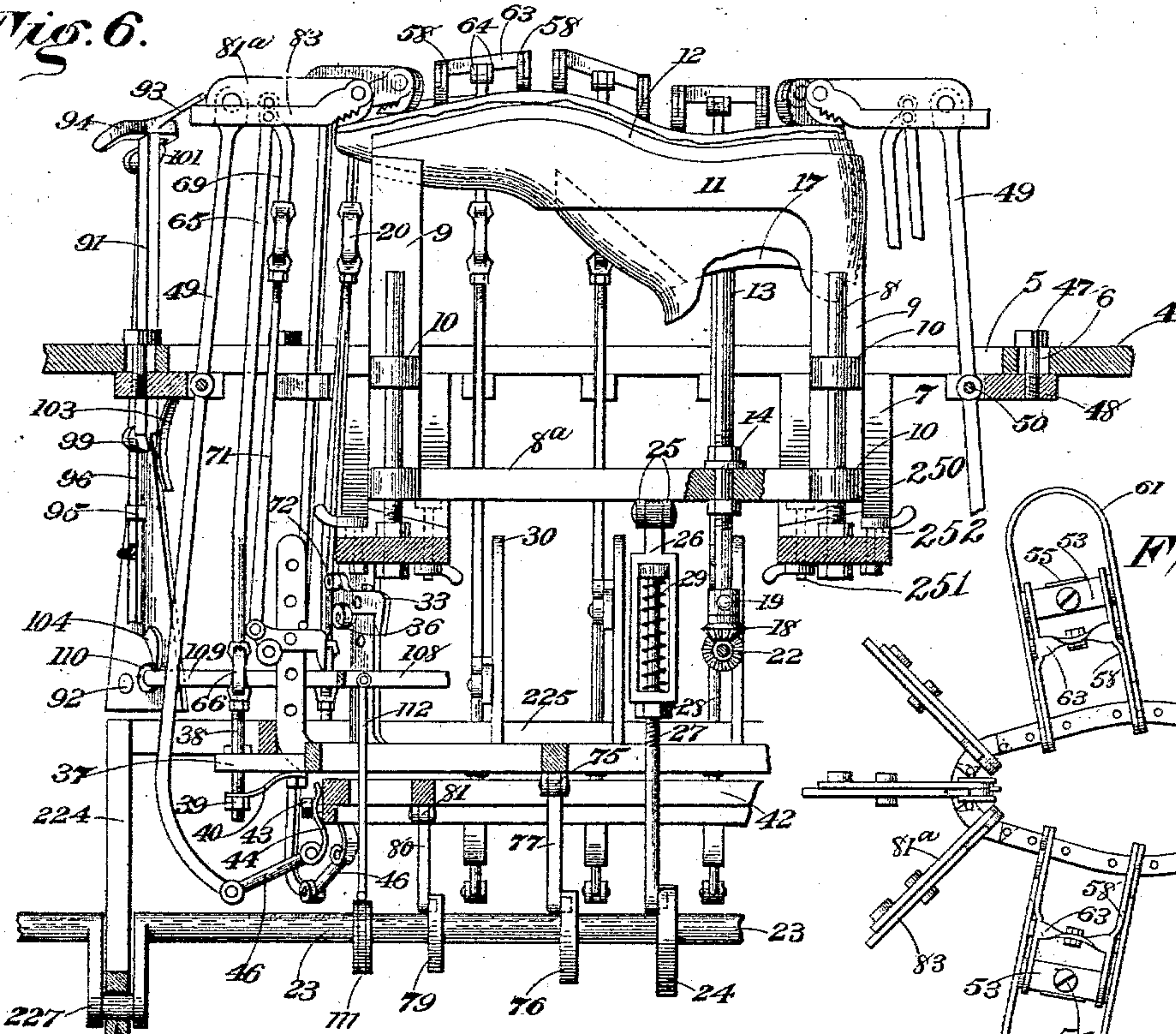


Fig. 7.

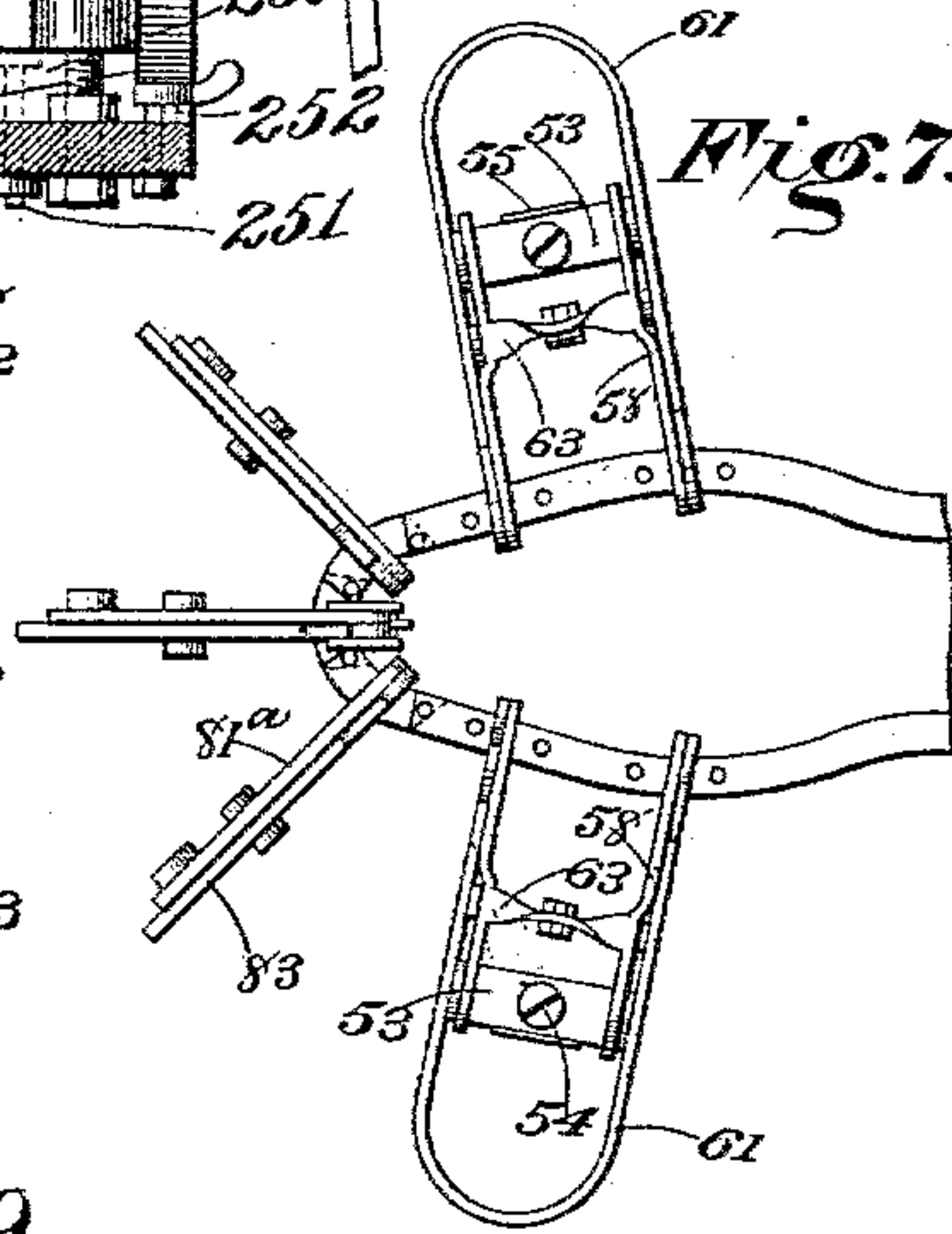


Fig. 9.

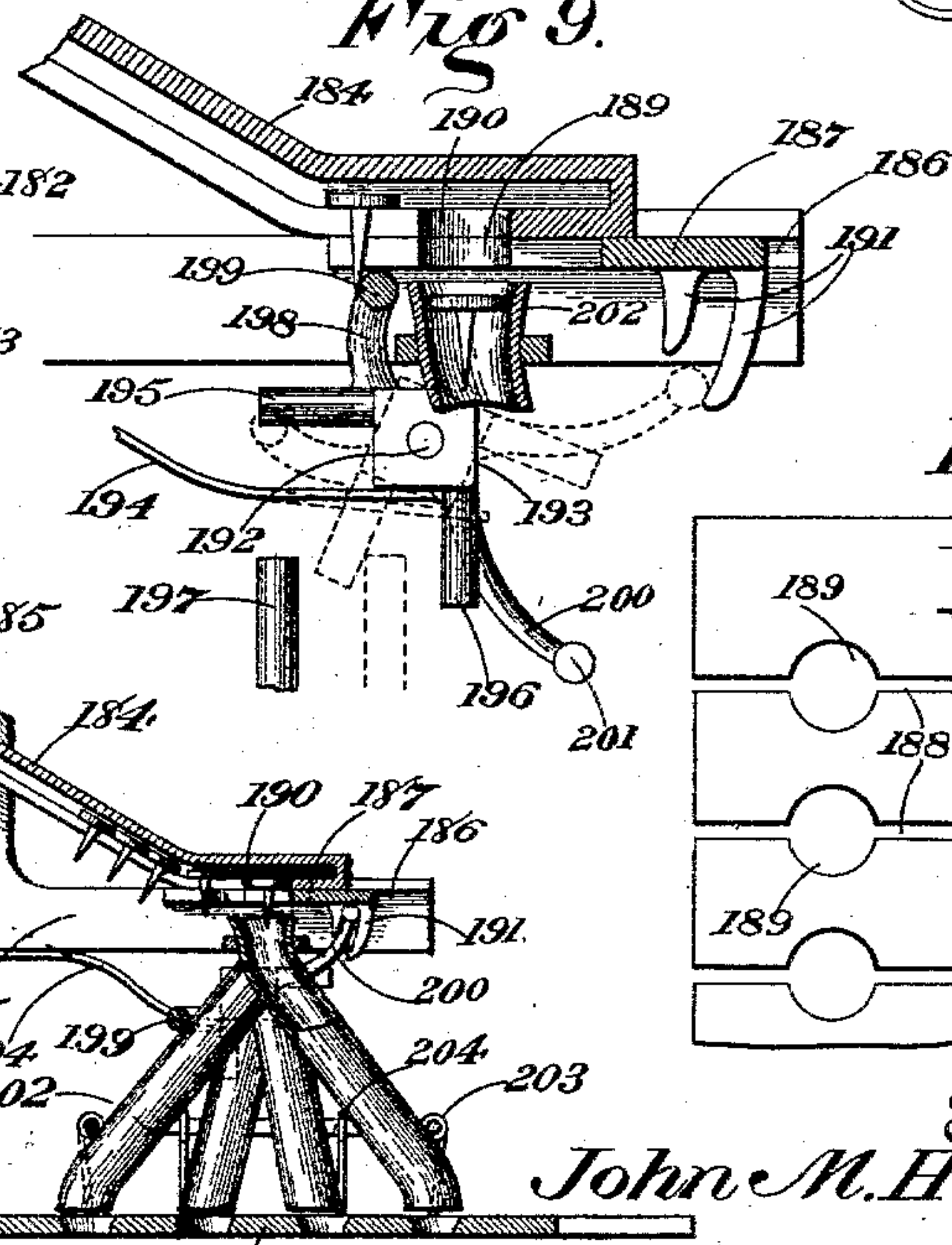


Fig. 9.^a

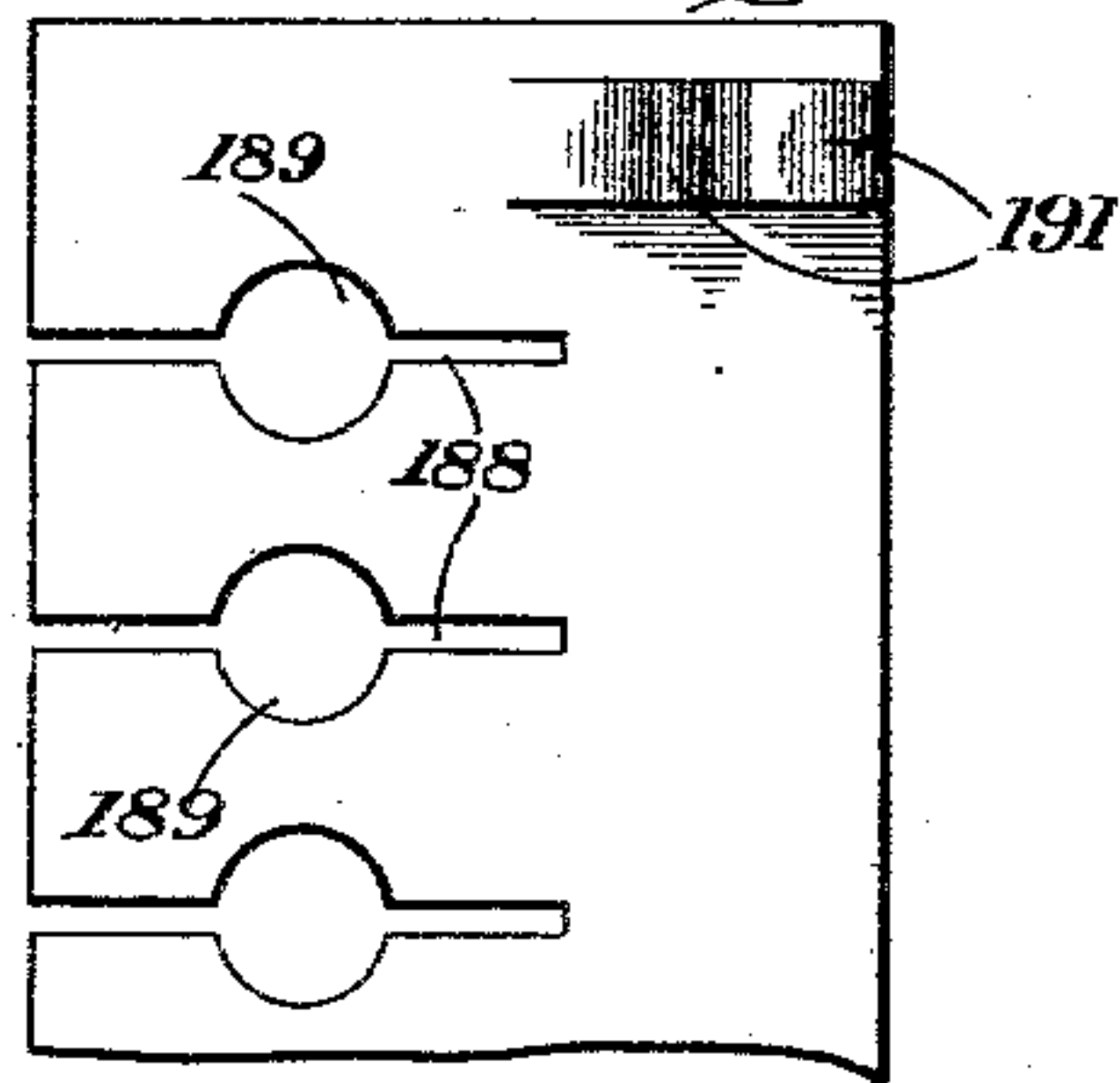
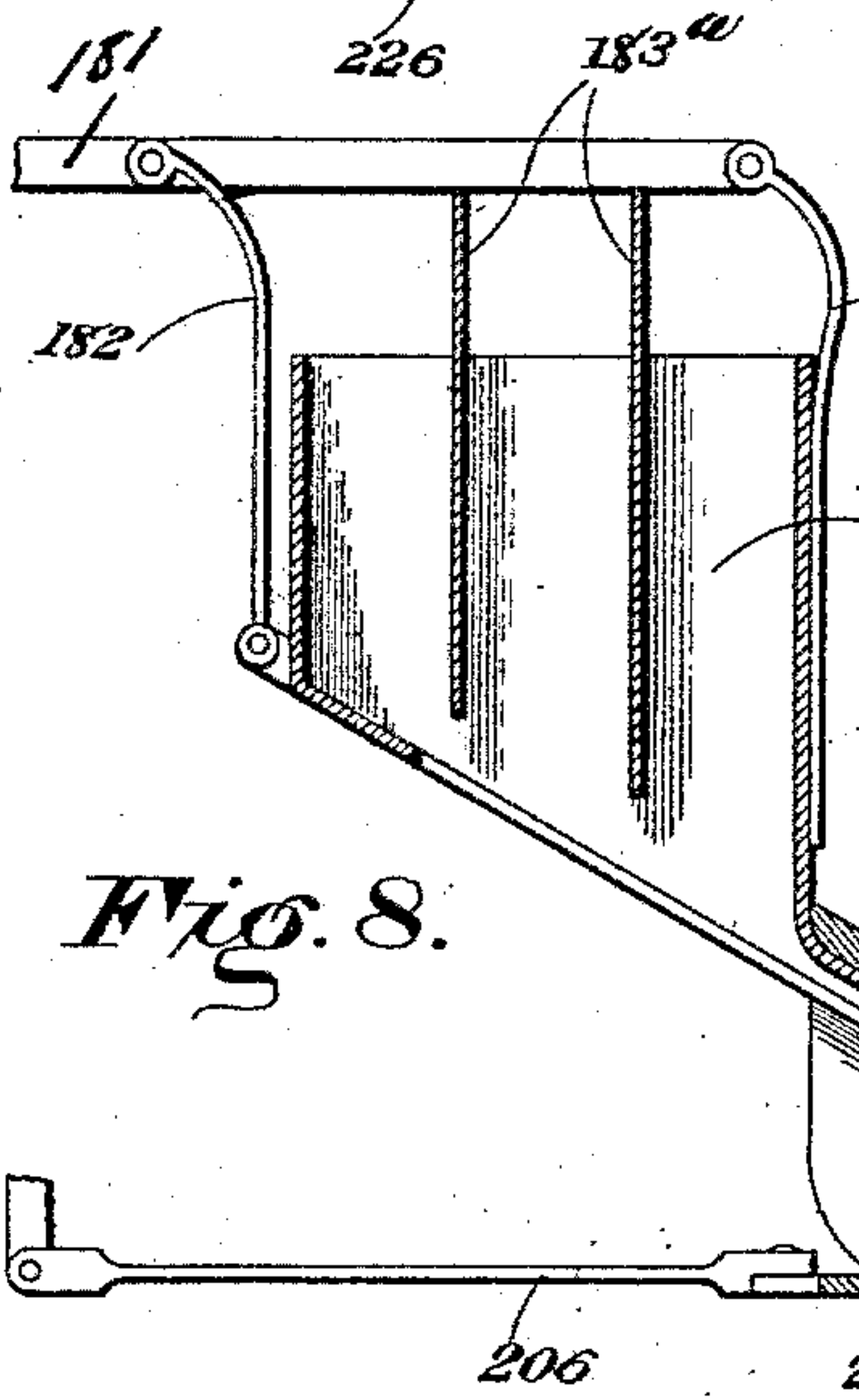


Fig. 8.



Witnesses

M. C. Fowler
W. J. Duwall

Inventor

John M. Holladay

by

253

W. J. Duwall Attorney

(No Model.)

J. M. HOLLADAY.
LASTING MACHINE.

8 Sheets—Sheet 4.

No. 561,887.

Patented June 9, 1896.

Fig. 14.

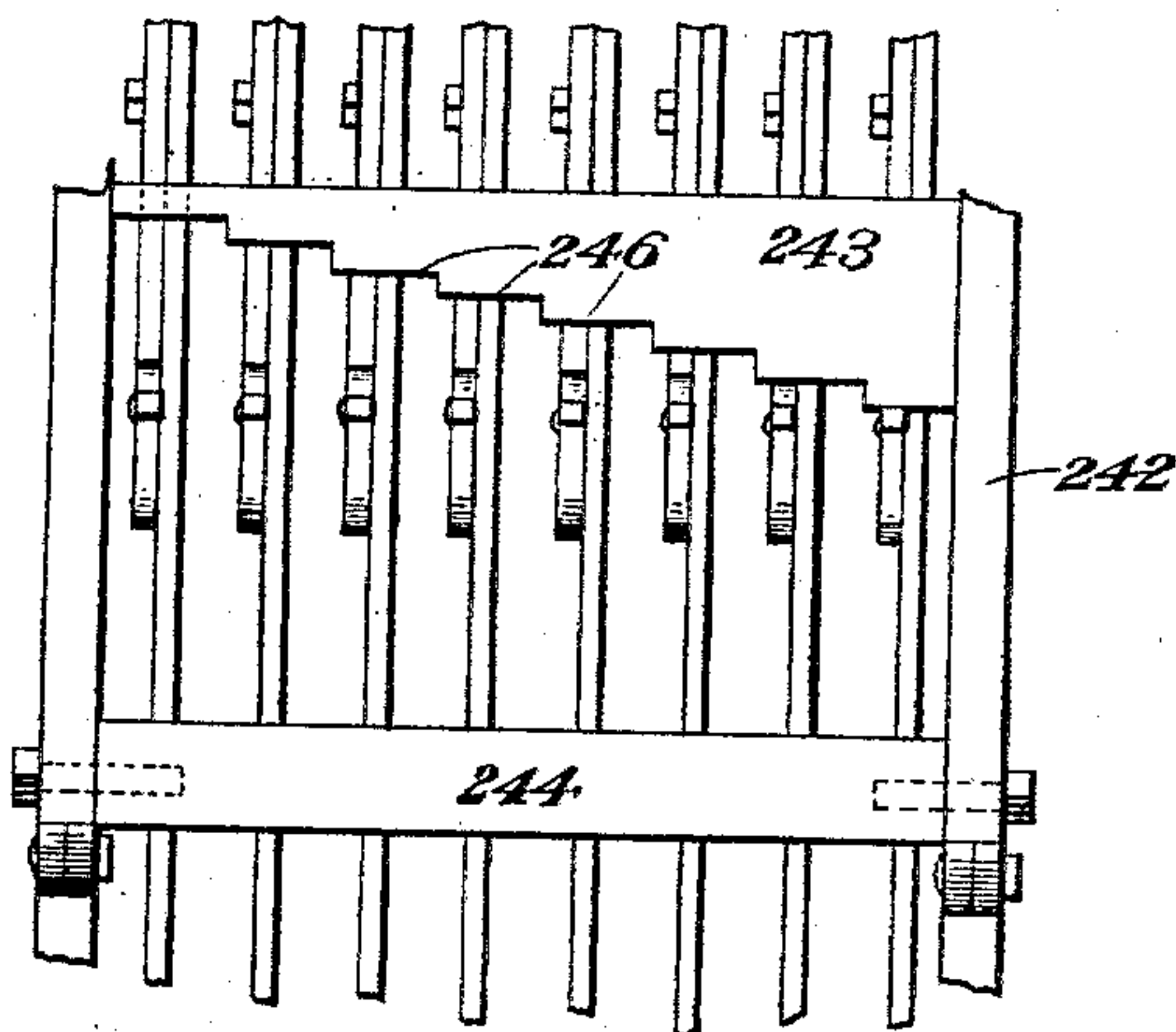


Fig. 13.

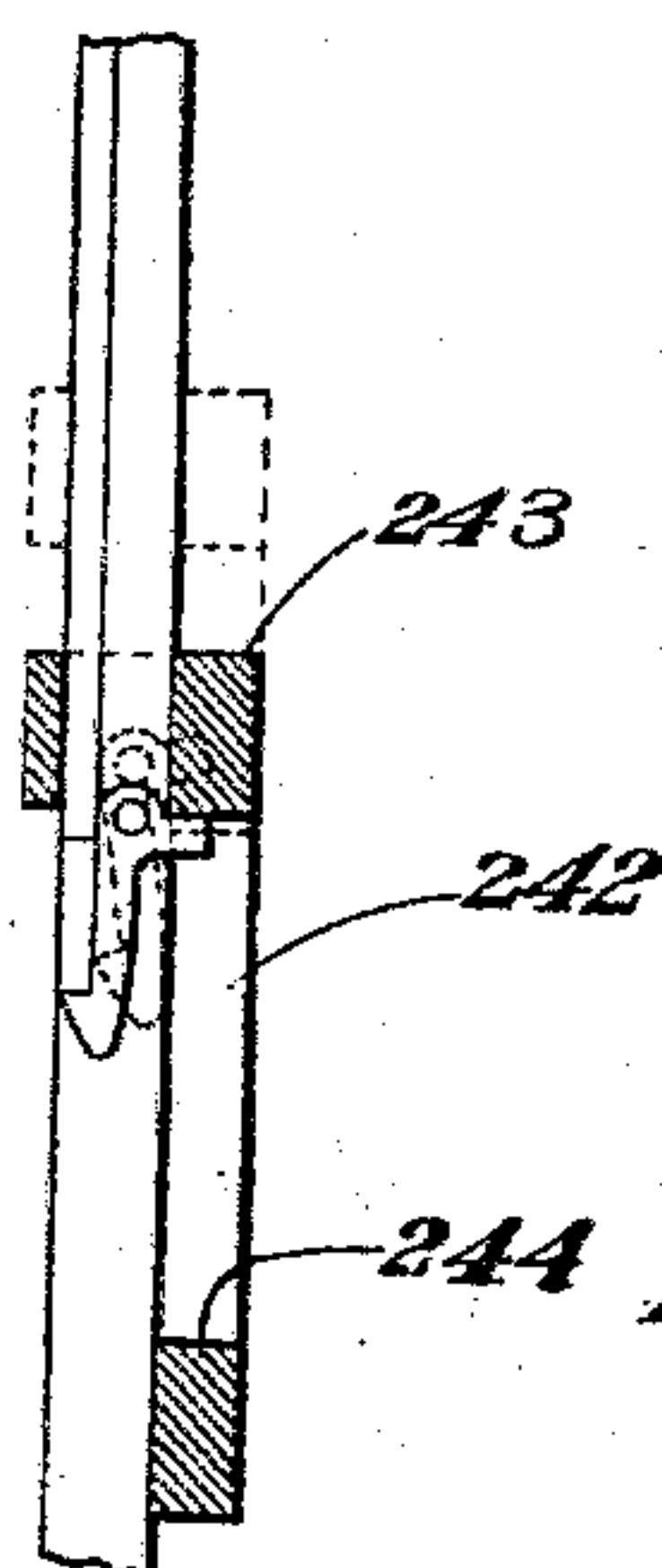


Fig. 12.

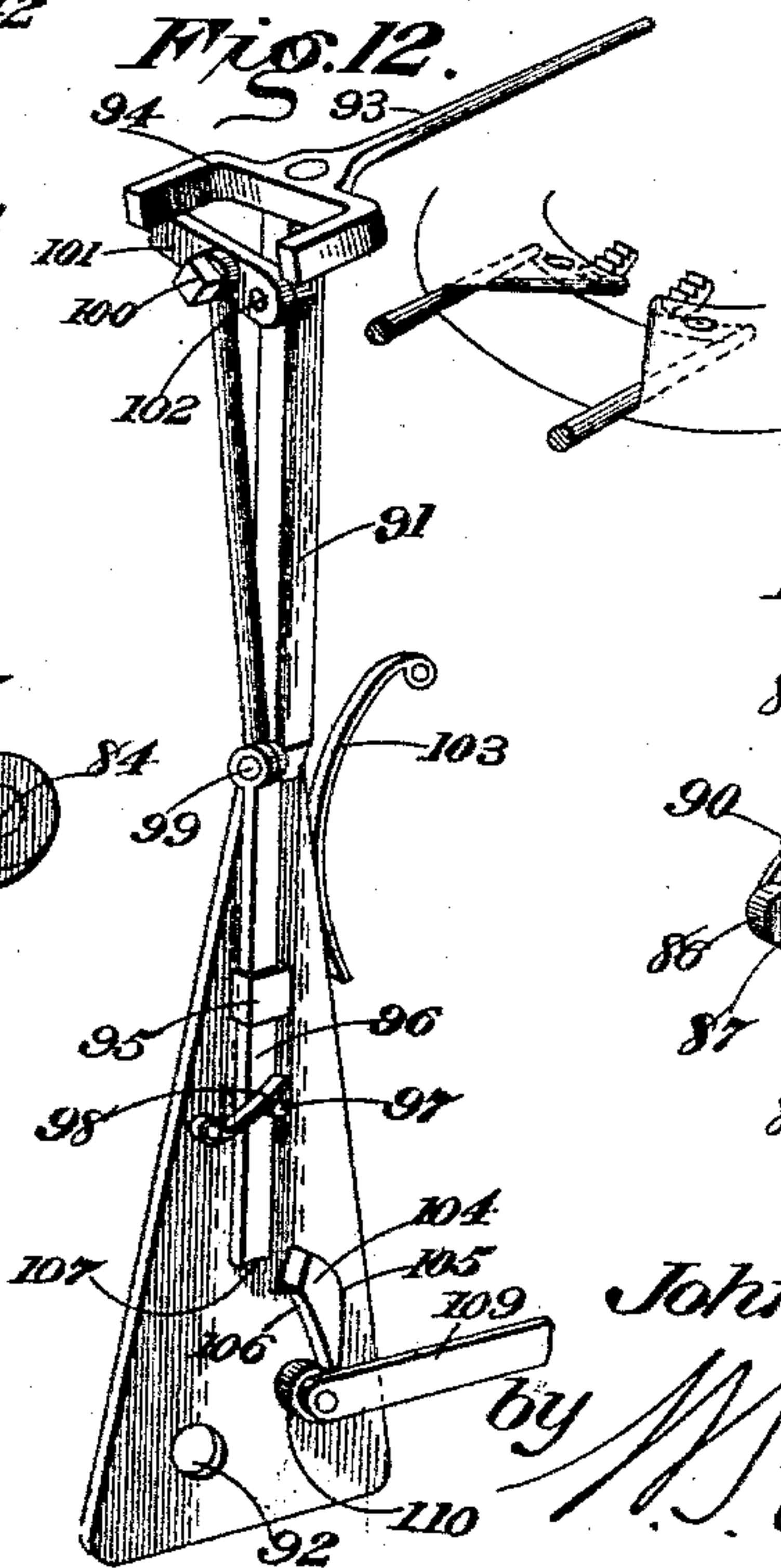


Fig. 10.

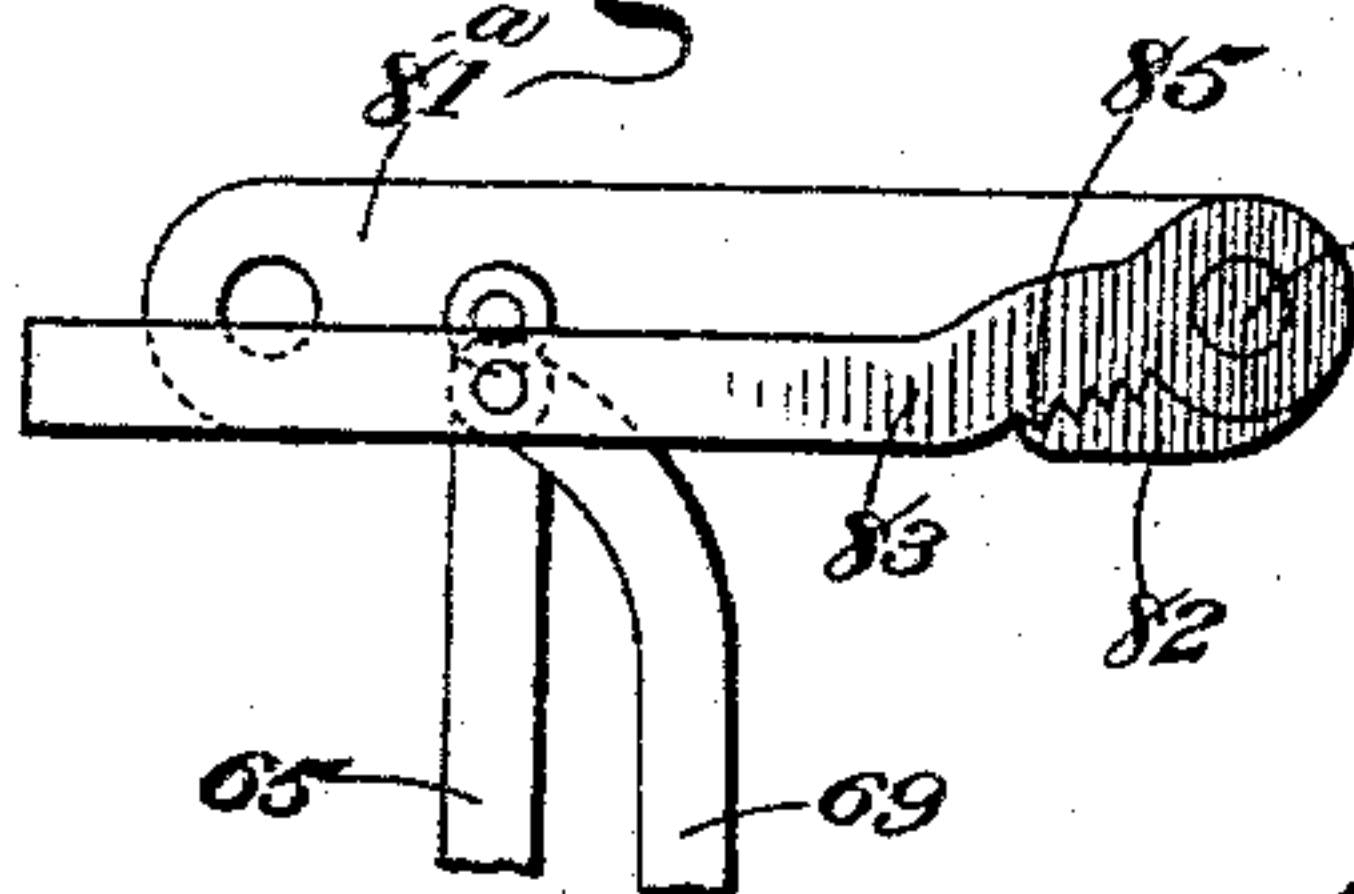
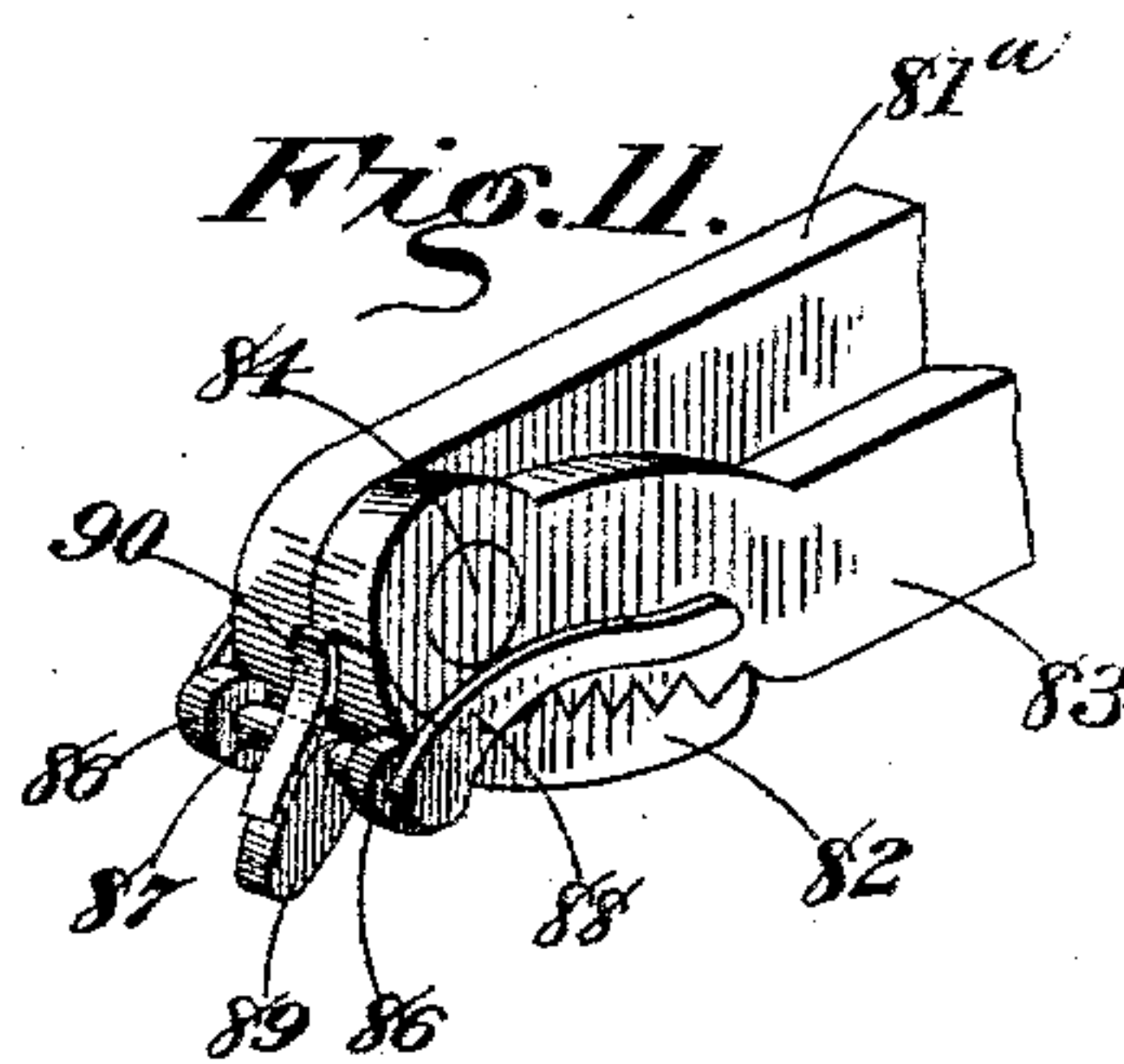


Fig. 11.



Witnesses
M. C. Fowler
W. J. S. Duvall

Inventor
John M. Holladay

by *M. Duvall*
Attorney

(No Model.)

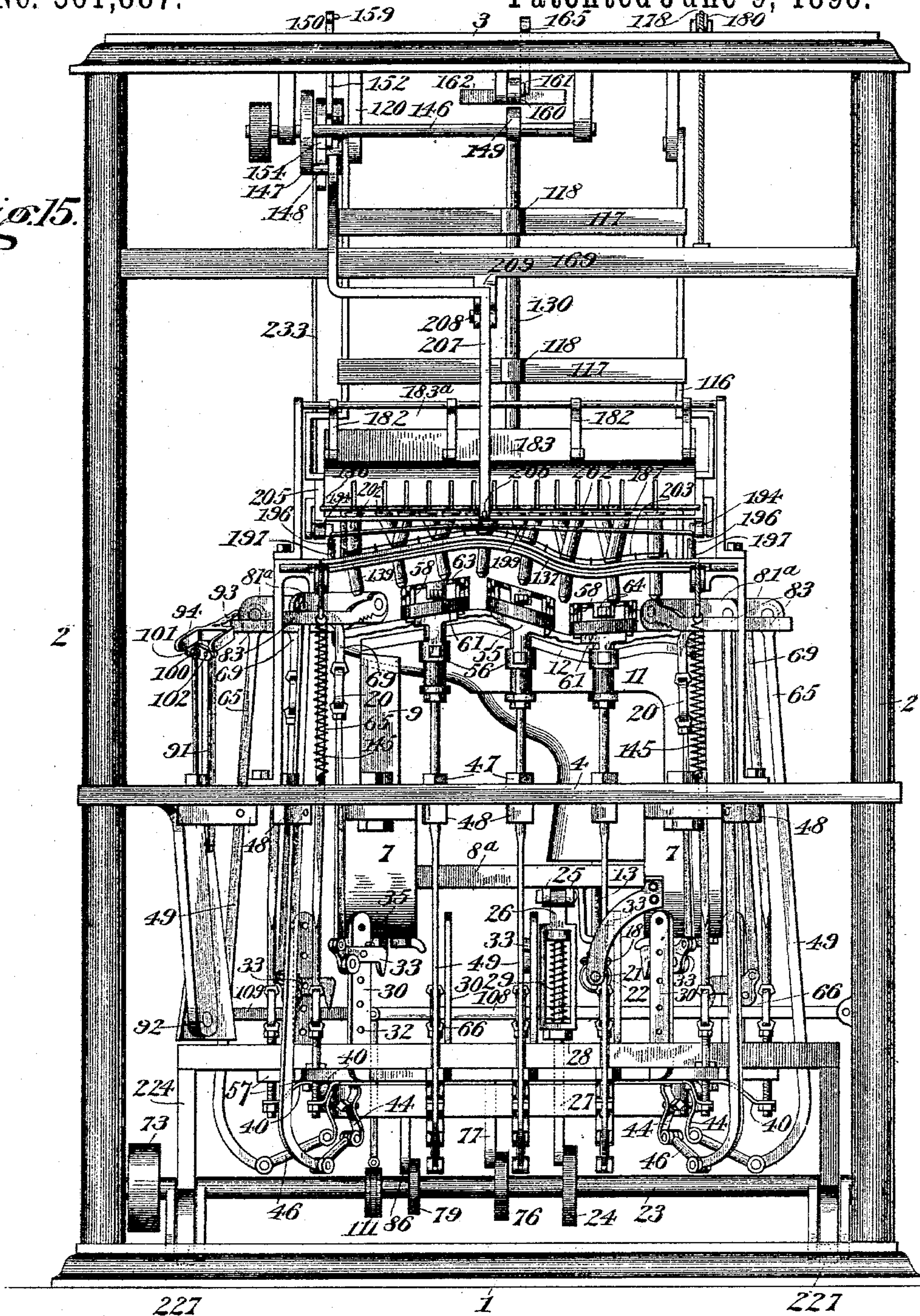
6 Sheets—Sheet 5.

J. M. HOLLADAY.
LASTING MACHINE.

No. 561,887.

Patented June 9, 1896.

Fig. 15.



Witnessed:

T. J. Keating
J. A. Saul

Inventor,
John M. Holladay,

by M. J. Duval atty.

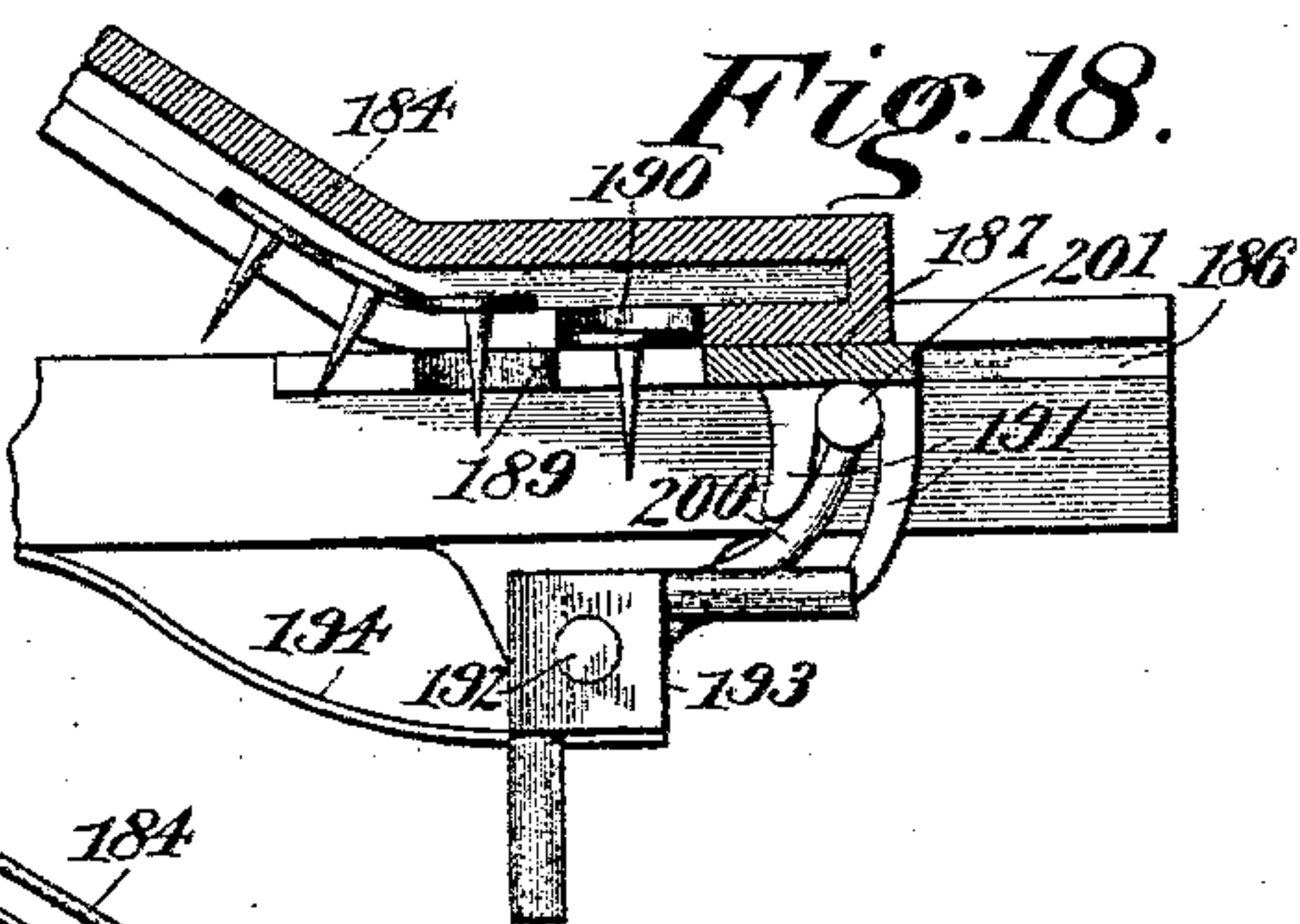
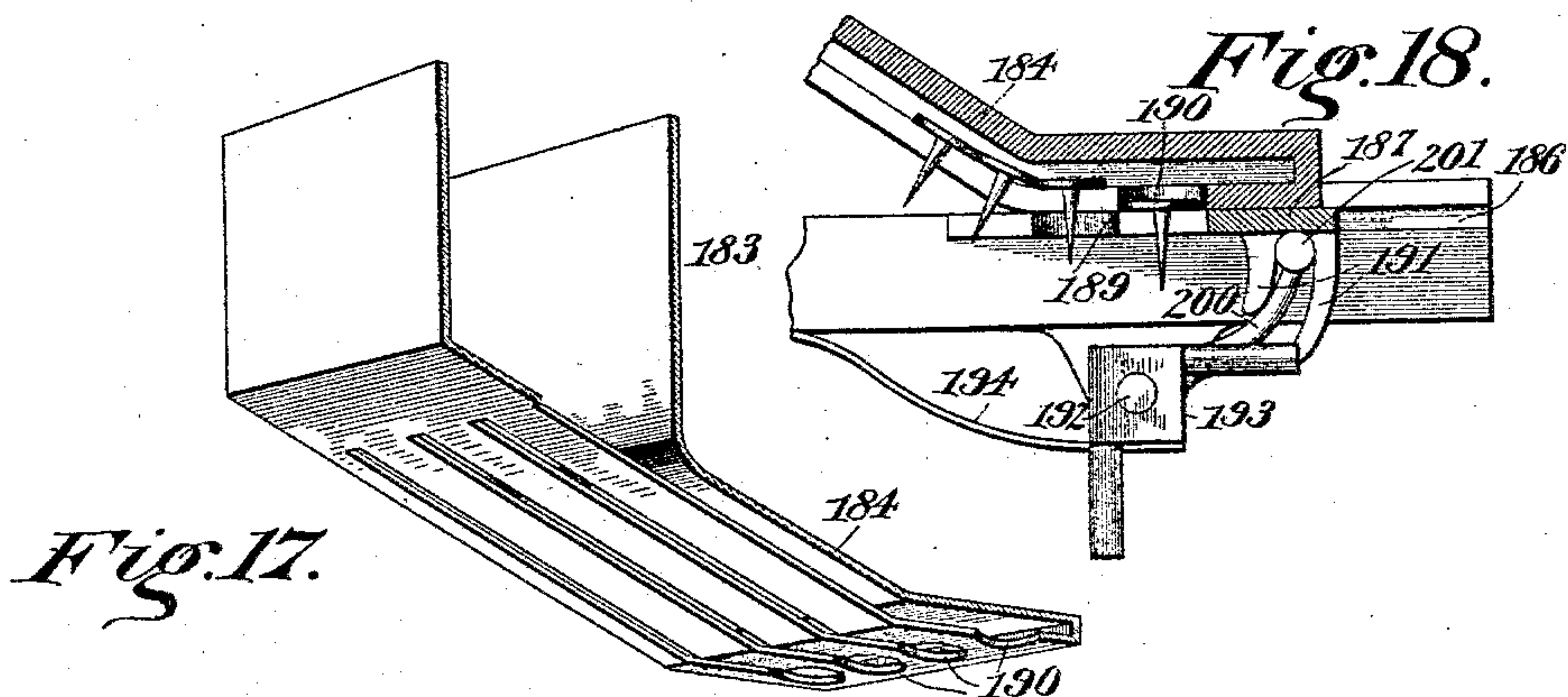
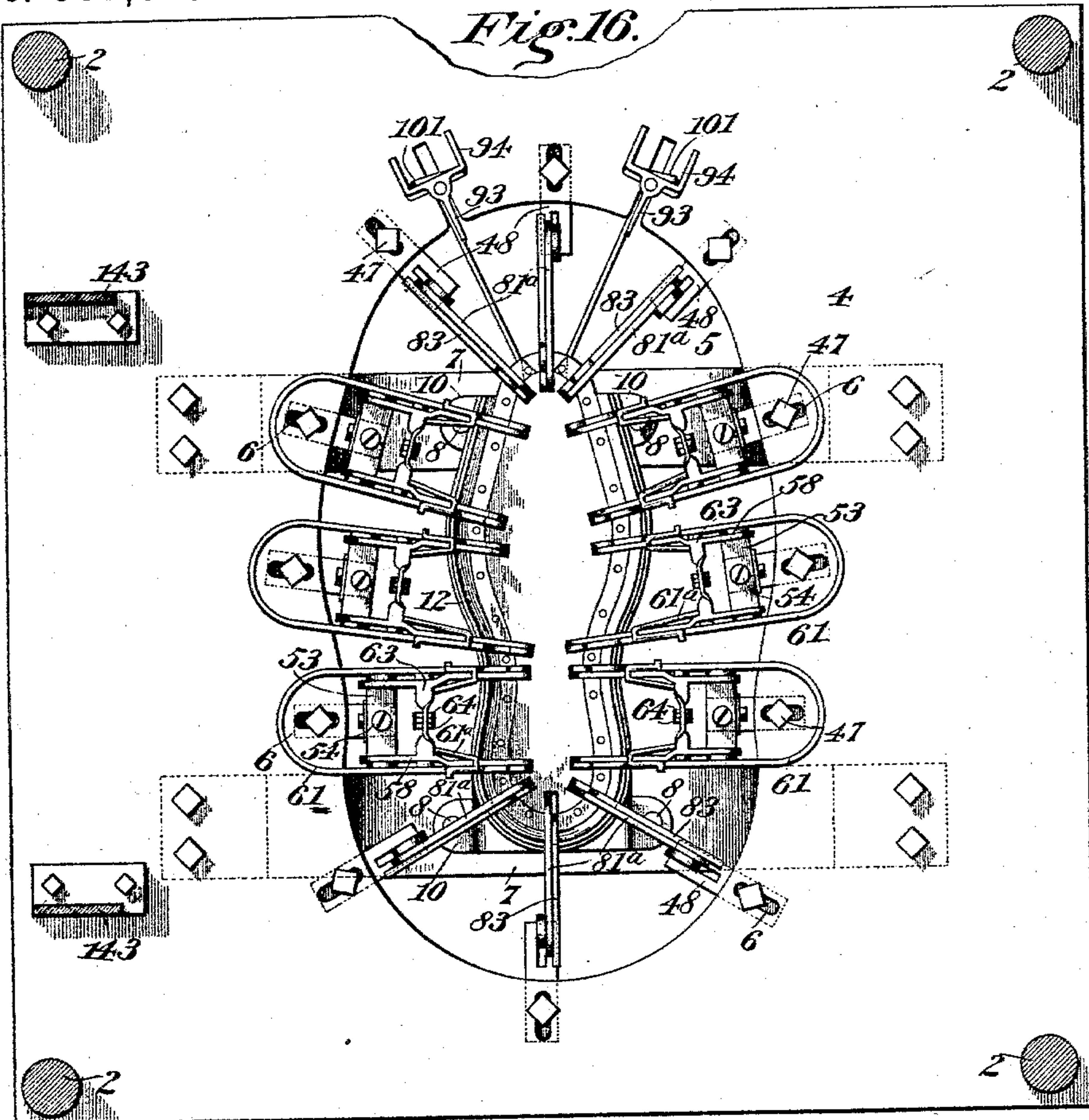
(No Model.)

6 Sheets—Sheet 6.

J. M. HOLLADAY.
LASTING MACHINE.

No. 561,887.

Patented June 9, 1896.



Witnesses

T. J. Keating.
J. A. Saul.

Inventor,

John M. Holladay.

by *M. Duval* Attorney

UNITED STATES PATENT OFFICE.

JOHN M. HOLLADAY, OF HOLLADAY, VIRGINIA.

LASTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 561,887, dated June 9, 1896.

Application filed April 14, 1894. Serial No. 507,581. (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 Spottsylvania 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 lasting-machines, the objects in view being to provide a machine wherein the lasting operation may be conveniently, expeditiously, and successfully carried on, and which is adapted to apply the tacks and subsequently hammer the leather all in one continuous operation, the parts being of simple construction and operated by mechanism forming a part of the machine.

Various 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 an elevation and partial section of the complete machine, the same being constructed in accordance with my invention. Fig. 2 is a sectional view similar to Fig. 1 of the lower portion of the machine, the grippers being shown in their raised and open position. Fig. 3 is a sectional view on the line 3 3 of Fig. 1. Fig. 4 is a detail in perspective of one of the twin grippers. Fig. 5 is a vertical longitudinal sectional view of the hammer and adjacent parts. Fig. 6 is a sectional view of the lower portion of Fig. 1 at a right angle to the same. Fig. 7 is a top plan view of a portion of the last, showing the arrangement of the grippers at the sides and toe. Fig. 8 is a longitudinal sectional view in detail of the hopper and tack-distributor mechanism. Fig. 9 is an enlarged detail view of the feed. Fig. 9^a is a bottom plan view of the gate forming a part of the feed. Fig. 10 is a detail in elevation of one of the single grippers. Fig. 11 is a perspective view of one end of the same enlarged. Fig. 12 is a detail in perspective of one of the folders or crimpers. Fig. 13 is a transverse sectional view illustrating a modified arrangement for operating the grippers. Fig. 14 is an elevation of the latter.

Fig. 15 is a side elevation of the entire machine. Fig. 16 is a sectional plan view on the line 16 16. Fig. 17 is a detail of the hopper. Fig. 18 is an enlarged detail sectional view through the lower end of the raceway and slides.

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

Before proceeding with a detailed description of the mechanism preferred in the construction of my invention I deem it proper to state that I do not wish to be understood as limiting the invention to such details as I will hereinafter describe, but hold that I may make such variations therein as are within the skill of the mechanic and interchanging various mechanisms of the present invention with those illustrated in a companion case pending herewith.

In the drawings, 1 designates the base of the machine, which is preferably rectangular and supports the posts 2, upon which is arranged the crown-piece 3, the whole being bolted and braced in any desired manner to lend rigidity.

Supported by the posts 2 is the table 4, the same having at its center the usual opening 5, around which are arranged a series of radial slots 6. Rigidly secured to the table, or it may be formed integral therewith, are the subjacent yoke-bars 7, which span the opening in said table. These yoke-bars 7 are spaced apart and support the jack, as will appear.

Rising from each of the yoke-bars 7 is a pair of cylindrical guide-rods 8, the same having their lower ends nipped above and below the yoke-bars, and the upper ends of these guide-rods project through the opening 5 in the table and above the same. A plate 8^a is arranged between the pairs of yoke-bars, and from the ends of the plate rise the standards 9. The standards 9 and the plate 8^a have sleeves 10, which embrace and slide upon the guide-rods 8. The upper ends of the standards support the front and rear ends of the hollow last-receiving saddle 11, the saddle being formed as a part of the standards or secured thereto as may be desired. The saddle is provided at its upper edge with a flared flange or guide 12. It will be seen that the saddle may be removed and those of other

forms and sizes substituted in an expeditious manner.

Extending through a perforation formed centrally in the plate 8^a is the jack-supporting rod 13, the same being secured rigidly to the plate 8^a by means of upper and lower clamping-nuts 14. The upper end of this rod is provided with an interrupted screw 15 at its upper end, and the same receives a female screw 16 of a similar kind which is arranged in the last 17. The lower end of the rod 13 is provided with a small miter-gear 18, or it may have a handle 19, and it also supports a bearing 20, in which a transverse shaft 21, operated by any suitable motor, may be journaled. A similar miter-gear 22 is arranged on the shaft 21 to impart motion from the latter shaft to the jack-supporting rod 13. It will be understood that the last is locked upon the rod by giving the rod a one-fourth revolution, so as to throw the threads of the rod and those of the last at right angles.

Journaled in suitable bearings in the lower portion of the frame is a transverse power-shaft 23, and the same carries a grooved cam 24. The under side of the plate 8^a has ears 25, and pivotally arranged in said ears is the upper end of a turnbuckle 26. Threaded in the turnbuckle is a pitman-rod 27, the same having an adjusting-nut 28 and an upper head, between which and the lower end of the buckle a coiled spring 29 is arranged. The lower end of the pitman-rod is provided with a lateral pin that engages with the groove of the cam 24, so that by the rotations of the shaft 23 it will be obvious that the jack may be raised and lowered, the former operation being positive and the latter yielding.

Located between the yoke-bars 7 are the series of U-shaped bails 30, the same being connected by means of transverse tie-rods 31. The terminals of these bails are provided with perforations 32, and arranged upon each terminal is a bell-cranked latch 33. Above each bell-cranked latch and at the inner side of its pivot 34 stop-pins 35 are located, and at their outer angles each latch carries an antifric-tion-roller 36. The latches as a whole are arranged in the present instance one upon each terminal, though it will be obvious that inas-much as they all occupy different positions more than one latch may be arranged upon each terminal, as desired.

Supported by the tie-rods 31 are cross-bars 37, the ends of which project beyond the bails 30, and they are perforated to receive bolts 38, whose lower ends have adjusting-nuts 39, and between them and the under sides of the cross-bars springs 40 are arranged, so as to normally draw the bails downward, such movement being limited by means of stop-pins 41, arranged in the bolts 38 above the cross-bars 37. Arranged under the latch-frame thus described is a rectangular frame 42, and at its opposite sides and ends opposite each of the bolts 38 there are secured by means of bolts 43 spring-arms 44, in whose

lower ends bearings 45 are formed for the accommodation of links 46.

Adjusting-bolts 47 are arranged in the radial slots 6 of the table, and at their lower ends are connected to movable fulcrum-blocks 48. Levers 49 are between their ends fulcrumed to the inner ends of the blocks 48, as indicated at 50, and have their lower ends curved and pivoted at 51 to the lower ends of the links 46. The levers extend above the table through the opening 5 thereof, and each receives and has threaded thereon a socket 52. Supported on the upper end of each socket 52 is a U-shaped yoke-plate 53, the outer ends of which are upturned to form bearing-ears. The yoke-plate is centrally perforated, and a screw 54 passes downwardly through the same into the upper end of the socket 52. Thus it will be seen that the yoke-plate is swiveled upon the socket; but it is normally maintained in position by means of a T-shaped spring 55, that is secured to a sleeve 56 or formed as a part thereof and which is located on the socket. By changing the location of the sleeve upon the socket it will be obvious that in that manner the normal position of the yoke-plate may be changed.

I prefer to employ at the opposite sides of the last what I term "twin grippers," and at the toe and heel what I term "single grippers." They are both preferably, however, of similar construction, with the exception that those at the sides consist of two grippers designed to simultaneously operate.

Referring more particularly to Fig. 4, wherein I have illustrated a twin gripper, it will be seen that I pivot at 57 upon each of the ears of the yoke-plate 53 one member 58 of the gripper, the two members extending forward and having their front ends laterally disposed and curved at their lower edges to produce the gripping-jaws 59. Above these jaws and to the inner ends of the members 58 I pivot at 60 the terminals of a U-shaped gripping member 61, and in rear of the pivots form the upper jaws 62. V-shaped springs 61^a are seated in notches formed in the upper sides of the members 58, the inner terminals of the members resting under the bar 63 and the outer terminals upon the outer jaws 62 to depress the latter against the jaws 59. The members 58 are connected by a transverse bar 63, which may be formed integral with the members or connected by a transverse rod as preferred.

Loosely connected at 64 to the transverse bars 63 and at their lower ends to the upper ends of the bolts 38 are rods 65, the lower ends of which are provided with turnbuckles 66, which are therefore adjustable upon the bolts 38. These turnbuckles are also provided with springs whereby the strain upon the rods is yielding.

U-shaped yokes 67 have their terminals pivoted at 68 to the terminals 61 of the upper jaws of the grippers, and shanks 69 depend from these yokes 68 and are by means of

yielding turnbuckles 20 connected to rods 71, which are pivotally connected at their lower ends each to the outer end of one of the latches 33, as indicated at 72.

5 The power-shaft 23 may receive its motion in any suitable manner, and in the present instance is provided with a pulley 73, over which a belt 74 runs, the same leading from any suitable motor. The belt may be provided with a desired belt-tightener 75 if preferred. A cam 76 is arranged upon the shaft 23, and in the same is engaged the lower end of a rod 77, whose upper end is loosely pivoted at 75 in ears formed on the under side 15 of the bail-frame 30, whereby motion will be given to said bail-frame. A similar cam 79 is also arranged on the shaft 23 and engages the lower end of a rod 80, whose upper end is pivotally connected at 81 to the under side 20 of the frame 42.

In Figs. 10 and 11 I have illustrated what I term the "single gripper," and its construction is very similar to the twin gripper, as before stated. In the single gripper the member 81^a is pivoted between the ears of the yoke-plate 53 and embraced by the same, and at its outer end upon its under side is laterally bent or extended to form the jaw 82. The companion member 83 is pivoted at 84 to 30 the outer end of the upper member 81^a above the jaw and in advance of the same, and has its under side in rear of its pivot shaped to produce the companion jaw 85. The same rods 69 and 65 are employed for operating 35 these members.

The ends of the grippers may be plain; but I prefer, as shown, to provide the same with pairs of transversely-opposite bearing-lugs 86 and to arrange in each pair of lugs a rock-shaft 87, whose extremities project beyond the lugs and are provided with curved rock-arms 88 and with an intermediate arm 89. A curved spring 90 is secured to the end of the gripper and normally depresses the central arm 89, 45 and hence elevates the arms 88.

Between the toe or heel grippers, or it may be between both sets, I locate pairs of folders. In fact, these folders may be located anywhere opposite a curve in the last or where 50 folding of the leather will be required to take up stock. Previous to describing these folders I would state that I prefer to employ the folders in lieu of cutters.

Referring to Fig. 12, wherein I have illustrated in detail a folder, it will be seen that the same consists of a lever 91, whose lower end is widened or provided with an outward extension or web, and the same is pivotally mounted upon a suitable bearing-pin 92. The 60 upper end of the lever 91 is provided with a finger 93, the rear portion of which is bifurcated at 94, one wall of which has a cam-face. The lever is further provided at one side with a keeper 95, and arranged for sliding in said 65 keeper is a rod 96. A pin 97 projects from the rod below the keeper, and a spring 98 is secured to the lever and bears upon the pin

to normally depress the rod. The rod may be jointed, if preferred, the members or sections being pivotally connected at 99. The upper 70 end of the rod is pivoted at 100 to a cam-lever 101, which at its free end operates upon the cam-face of the finger, so as to oscillate the same, the inner end of the cam-lever being pivoted at 102 to the lever 91. Springs 103 75 are arranged at the inner side and bear against the lever 91 above its pivot 92, so as to normally throw said lever and the parts carried thereby outward away from the last. The lower widened portion of the lever 91 in advance of its pivot is provided with a cam-block 104, the same having an inner curved surface 105 and an outer inclined surface 106, the latter being just below and in advance of the lower end of the rod 96, which, as shown, 85 is preferably hollowed or recessed at 107. An operating-lever 108 is provided with branches 109, corresponding with the number of levers 91, and each branch 109 is provided with a loose antifriction-roller 110, which is arranged 90 at the sides of the levers 91 and designed to operate upon the cam-surfaces 105 and 106 of the cam 104 and against the under side or lower end of the rod 94. The lever 108 may be vibrated in any suitable manner, but in 95 the present instance is vibrated through the medium of an eccentric disk 111, arranged on the shaft 23, and connected thereto by means of an intermediate rod 112, whose upper end is pivoted to the lever 108. 100

Supported in a pair of bearings 115 above the last is a pair of hangers 116, the same being pivotally connected to the bearings and connected by a transverse bar 117, having a central opening 118. The pivot 119, that 105 serves to connect one of said hangers to its bearing-bracket, is provided with a crank 120. The opposite bracket has a stub-flange 121, in which is arranged an adjustable stub-screw 122 to limit the downward movement of the 110 aforesaid hangers 116, so that they cannot pass beyond the vertical. A second bar 117 connects the hangers 116 and is provided with a guide-opening 118. The hangers are below the bar 117 and above their ends provided with 115 outwardly-disposed offsets 123, the lower portions of the same being perforated at 124. Arranged in these perforations are vertical bolts or rods 125, whose upper ends are headed at 126, and between said heads and the lower 120 sides of the offsets coiled elevating-springs 127 are arranged on the bolts or heads. Upper and lower plates 128 and 129 respectively are notched at their ends, so as to be arranged over the lower portions of the hangers below 125 the offsets, and may be removed therefrom by elevating them to points coincident with the offsets and thus laterally displacing them. The plates 128 and 129 are curved so as to conform to the general contour of the bottom 130 of the last, and the upper plate 128 has secured to its upper side a plunger-rod 130. The rod extends through the guide-openings 118 of the bars 117 and at its lower end rests loosely

in a cavity 131, with which the upper side of the plate 128 is provided. A series of sockets 132 are arranged upon the under side of the plate 128, and coincident openings 133 are formed in the plate 129.

Angle-plates 134 are secured to the lower ends of the bolts 125 below the ends of the plate 129, and nuts 135 are arranged on the lower ends of the bolts, so as to support said angle-plates and permit of proper adjustment of the same. The extremities of the plates 134 are depressed, and they support the lower plates 136 and 137. The plates 136 and 137 are provided with perforations which aline radially with the perforations 133 and the sockets 132, and through these perforations and in the sockets are seated the plungers or hammer-rods 138.

Semicylindrical tubular tack-holders or fingers 139 are arranged in the openings in the lowest plate 137 and in pairs, the upper ends of said fingers being headed or flanged and clamped between the plates 136 and 137, or any other means may be provided for arranging these tack-holders in position. The lower ends of the holders 139 are converged so as to support a tack, point downward, in a position that the head thereof can be struck by a descending plunger, and thus the tack forced through the holders, the parts thereof yielding to the pressure. The plates 136 and 137 are provided at one side with a vertical bail 140 and at the opposite side with lateral pins 141. A horizontal guide 142 is supported upon a bracket 143 in horizontal alinement with the plates 136 and 137 and in a tangential line with the circle described by the lower ends of the angle-plates 134 as they swing upon the pivots 119. A strap or cord 143^a is arranged in the guide 142, passes over a pulley 144 at the rear of the bracket 143, and is by means of a coiled spring 145 secured to a fixed point of the framework, the tendency of the spring being to retract the tack-holding plate when the same is liberated from its connection with the angle-plates 134.

Arranged upon a shaft 146 in the upper end of the framework is a disk 147, the same having a pin 148 extending from one face. Upon the same shaft a cam 149 is located, the same being designed to revolve with the shaft and the disk. A bell-cranked lever 150 is pivoted at 151 in the crown-piece 3 of the frame, and a slotted link 152 hangs loosely from the lower branch of the bell-crank and engages with a stud 153, which is arranged on a push-bar 154, that is loosely pivoted at 155 to the free end of the crank 120, that is located on the end of the pivot 119, as before stated. The outer end of the push-bar 154 is provided with a recessed head 156. A bell-cranked lever 157 is fulcrumed on the opposite end of the machine, one branch of the bell-crank being shaped to form a handle 158, being designed to be grasped and operated by hand, and the opposite branch is connected to the bell-crank 150 by means of an intermediate connecting-

rod 159. A hammer-lever 160 is fulcrumed at its outer end at 161 and at its inner end is provided with a head 162, which is directly above the upper end of the plunger-rod 130. The hammer-lever is provided upon its under side in the path of the cam 149 with an inclined shoulder 163, so that as the cam revolves it acts upon the shoulder to raise the lever against the tension of a spring 164, which is interposed between the upper side of the lever and the crown portion 3 of the framework. A latch 165 is pivoted at an intermediate point at 166 to the crown-piece of the framework, and its lower end is adapted to engage with a lug 167, with which the lever 160 is provided, and is normally pressed into position for such engagement by means of a small light spring 168.

In the side of the framework in a bearing 169 there is pivoted at 170 a latch 171, whose inner end is normally depressed by a light spring 172, so as to engage with a catch-lug 173, with which one of the angle-plates 134 of the tacker mechanism is provided. This tacker mechanism may be swung up upon its pivots 119 and locked by means of the latch 171 out of position. At that side of the framework opposite which the latch 171 is fulcrumed I fulcrum a bell-crank or other operating lever 174, one end of which may be provided with a handle 175 and the other end of which is connected by means of a rod 176 to the upper end of the latch 165. Above the bell-crank 174 a pulley 177 is journaled in suitable bearings, and a pull-rope 178 passes over the pulley and is provided at its lower end with a handhold or pull 179. Beyond the pulley the rope passes over a guide-pulley 180, located above the inner end of the latch 171. It depends from said pulley and is connected to the inner end of the latch 171.

An inverted-L-shaped standard 181 is supported above the guides 142, and a pair of spring-hangers 182 depends from the standards and supports in a vibratory or yielding manner a tack-hopper 183. Agitating fingers or rods 183^a are located in the hopper for the purpose of aiding in the feed of the tacks, as hereinafter described. The construction of this hopper is best illustrated by Figs. 8, 9, and 9^a of the drawings. The bottom of the tack-hopper is inclined and is provided with a discharge chute or spout 184, the under side of which is slotted, forming a continuation of a similar slot formed in the hopper, and through this slot extend the shanks of the tacks, the heads resting in the chute. A U-shaped frame 185 straddles the spout and has its lower horizontal portions provided with ways 186, in which is arranged for horizontal movement the gate 187. The gate is provided with slots 188, (see Fig. 9^a,) and at the center of each slot a circular opening 189 sufficiently large to permit of the passage of the tack and corresponding with a similar opening 190, formed in the slot of the chute. The gate is provided upon its under side with a pair of

fingers 191. Below the gate upon a short stub-shaft 192 is arranged an angular cam 193, the same being located at opposite sides of the frame 185. Flat springs 194 are secured to the frame 185 and bear against the faces of the angular cam, so as to arrest the movement of the shafts 192 and hold them yieldingly at any desired point of rotation. The shafts are rock-shafts in their nature, and from the same and disposed at right angles to each other are rock-arms 195 and 196, said rock-arms being designed to extend into the path of the trip-pin 197, located on the tack-carrying plates 136 and 137. From the arms 195 extend branches 198, the same being connected by a cross bar or wire 199, which extends across the under side of and below the slots in the chute and gate. The opposite arm 196 is provided with a branch 200, and the two branches are connected by a cross-bar 201, designed to engage between the fingers 191 before mentioned as being located upon the underside of the gate. Between the two stub-shafts 192 and below the several slots of the chute I arrange a series of tack-tubes 202, the upper ends being loosely supported below the openings 189 of the gate and flared, so as to readily receive tacks from said openings, as those in the gate register with those in the chute. The lower ends of the tubes 202 lead to the upper ends of the tack-holding tubes 139, above which said tubes terminate when the tack-plate is in a retracted position. The lower ends of the tubes are pivoted at 203 to a surrounding ring 204, so that said lower ends are always in a position to discharge tacks into the holders, and yet at their upper ends the tubes are capable of slight vibrations to induce the tacks to feed therethrough.

A shaker-frame 205 embraces the upper ends of the tack-tubes and is connected by means of a pitman 206 to a trip-lever 207, that is fulcrumed at 208 in suitable bearings 209 and at its upper end extends into the path of the pin 148, so that as the pin revolves it contacts with and trips the lever 207, causing it to vibrate, and through the medium of the pitman 206 cause a vibration of the tack-hopper 183 and incidentally a vibration of the upper ends of the tack-tubes.

In a pair of bearings located at one side of the bearings 115 is supported loosely a U-shaped swinging frame 210, the same being normally supported by a spring 211. Arranged upon the lower transverse portion of this frame is a block 212, provided with a transverse opening in which is journaled a grooved roller or pulley 213, designed to travel upon the transverse portion of the frame. The block is provided with a vertical opening 214, in which is arranged a hammer-rod 215, which at its upper end is provided with a head 216, designed to be brought under the hammer 162 when the frame 210 is lowered to a vertical position. As best shown in Fig. 5, the rod 215 is secured rigidly in a bell-shaped

socket 216, the same having its lower edge or periphery provided at intervals with antifric-tion-rollers 217. A head-block 218 is arranged within the bell-shaped socket and is supported therein by means of bolts 219. Interposed between the block and the upper end of the bell-shaped socket is a coiled spring 220. The block is at intervals provided with recesses and arranged in each is the upper end of a bell-cranked hammer-lever 221, the inner branches of which project above the face of the block and receive the lower end of the spring. The lower ends of these bell-cranked levers are provided with cam-surfaces 222 and at their extremities below the bell-shaped socket with hammer-heads 223.

A pair of U-shaped frames 224 are arranged at opposite sides of and embrace the bails 30, and the upper ends of these U-frames are connected by transverse trip-bars 225. The opposite U frames are provided at their lower ends with horizontal slots 226, and each engages with cranked portions 227 with which the power-shaft 23 is provided.

Referring to Fig. 2, I have shown the parts in the position they occupy after the last and leather are in position and the edge of the leather arranged between the jaws of the grippers, but ungripped, it being understood that the leather has been introduced between the jaws of the several grippers by hand or by any mechanical means.

Motion being imparted to the shaft 23, the cranks 227 serve to depress the lower frames 224, they being in the position shown in Fig. 2 of the drawings. When in this position, it will be seen that the latches have been rotated on their pivots, so that what would otherwise be their inner ends are projected into the paths of the trip-bars. As the trip-bars descend they successively act upon the latches, serving to partially rotate the same and swing their inner ends to a point beyond the vertical, and in so doing draw upon the rods 71, giving the first motion to the grippers, which is to close the jaws thereof and grip the leather. In this manner it will be seen that the entire series of grips are closed on the leather. A further descent of the trip-bars brings them simultaneously in contact with the ends of the cross-bars 37, thus depressing the latter and through them drawing downwardly upon the rods 65. This drawing down of the rods 65 causes the grippers to swing inward, carrying with them the edges of the stock or leather over the last. Just before the grippers swing downward at their inner ends to lay the leather over the last the jack, through the medium of the cam 24 and rod 27, begins to lower, the cams being so timed as to cause such an operation. When the jack carrying the last has lowered and the grippers have begun to swing inward, the cam 79 begins to draw down upon the frame 42, and in so doing, through the medium of the spring-arms 44 and the links 46, spreads the lower ends of the levers 49, and hence

contracts or draws inward the upper ends of said levers and the grippers, thus tightly drawing the leather over the last. This inward movement of the grippers is permissible by reason of the spring joints or connections with which the rods 71 are provided, and is furthermore aided or permitted by the presence of the spring-arms 44. As the grippers descend to draw the leather over the last the vibratory lever 108 operates and the anti-friction-rollers 110 at the branches of said lever ascend the cam-surfaces 106 of the cam-blocks 104 of the levers 91, and being in advance of the pivots of said levers draw the latter at their inner ends forward, so that the fingers 93 thereof take over the leather under the grippers. The continued movement of the rollers 110 causes them to contact with the lower end of the rod 94, and hence raises the same against the spring 98, and causes the cam-lever 101 to elevate, and operating against one of the bifurcations 94 causes the finger 93 to vibrate, so that the two fingers of the two levers 91 will spread, drawing the surplus of leather tightly under the grippers, effecting a fold or crimp. When this has been done, the rollers pass over the upper ends of the cams. The shape of the cam that operates the lever 109 is such that the parts remain in this position until the tacks are driven into the leather and only let go and withdraw at the same time that the grippers do, the fingers being withdrawn by means of the return-springs 103 when the levers are released from engagement by the anti-friction-rollers 110. Leaving this point of the operation, we next turn to the tacking mechanism, it being understood that the tack-holders 139 are occupied by tacks deposited in position therein through the medium of the tubes heretofore described. To set this tack mechanism in operation, the pull 179 is operated and through the medium of the rope or cord 178 the latch 171 is retracted, so as to permit the tack-drivers to fall to a vertical position over the last, the fall being cushioned by means of a coiled spring 230. As the tack-drivers fall the angle-plates 134 engage with the bail 140 and pins 141, thus withdrawing the tack-carrying plate or carriage from its ways 142 and suspending it over the last against the tension of the spring 145. In order to lock the tack mechanism at this point in position for operation, I prefer to pivot at 231 a latch-lever 232, whose inner end engages with the angle-plate of the tack mechanism and whose outer end is connected by a rod 233 with the push-bar 154. The lever 154 is now at its lowest position—that is, in the path of the pin 156. The operator now draws down upon the bell-cranked lever 174 and through the medium of its rod 175 withdraws the latch 165 from its engagement with the lug 167 on the hammer-lever 160, and the shaft 146 being in motion the cam 149 will be caused to operate against the shoulder 163 of the hammer-lever and thus raise said lever to subsequently re-

lease the same and permit it to fall by reason of its weight and also under the pressure of the spring 164. This raising and lowering of the hammer-lever causes the same to impart a blow to the upper end of the plunger 130 of the tack mechanism, which blow may be repeated, if desired. The blow imparted causes the plunger to descend through the tack-holders and the corresponding openings in the plate, thus forcing the tacks through the holders into the leather and last. After the blow or blows have been struck the lever 157 is drawn down by hand and through the medium of its rod 159 oscillates the bell-cranked lever 150, which raises, through the link 102, the push-bar 154 and brings it in the path of the pin 148. This raising of the push-bar 154 also through the medium of the connecting-rod 233 raises the outer end of the latch-lever 232 and lowers the inner end thereof, as shown in Fig. 1, thus liberating the tacking mechanism and permitting the push-bar operated by the pin to cause a partial rotation of the crank 120, and hence an elevation of the tacking mechanism to a point where it is locked by the latch 171, as shown by dotted lines in Fig. 1. As the tacking mechanism ascends to its point of engaging support the tack-carrying plate, together with its holders, passes into the ways 142, so that the tacking mechanism separates from the tack-holder plate and the latter is retracted by the spring 145 to a position to receive a new charge of tacks.

Having completed the tacking operation, it now becomes necessary to disengage the grips and return them to the position they occupy in Fig. 2. This is done by the return movement of the trip-frame, during which time the trip-bars successively, in the present instance, operate upon the loose rollers 36, thus tilting the grips so that they assume the position shown in Fig. 2. Immediately after this opening of the grips to release the leather the spring-arms 44 exert their force to separate the lower ends of the levers 49, thus forcing said lower ends outwardly and the upper ends inwardly, disengaging the jaws of the grips from the leather. Having opened the grips, the bails 30 move upward, being operated by a cam and pitman 76 and 77, respectively, thus bringing the grips to the position shown in Fig. 2. It is at this point that the hammering operation takes place. The hammer-rod 215 is now disengaged from the hook 240, by which it is suspended when not in use at one side and above the last, so as to be out of the way of the operator, and when liberated it drops to a vertical position, the falling motion being eased by the spring 211. The length of the hammer-rod is such with relation to the distance between the face of the hammer and the last that the hammer-heads 223 will rest on the last or leather and the head of the hammer-rod be in close proximity to the head of the hammer 160. The vibrations of the hammer 160 cause the head of the same to operate

upon the head of the rod and thus force at intervals the bell-shaped socket down over the sides of the hammer-levers, and the latter being cam-shaped, as shown, are operated
 5 upon by the rollers 222, so that as the hammers are pressed down by the springs they are caused to contract or move inward over the leather, whereby not only a pounding takes place, but also an inward pinching is
 10 imparted to the leather, thus further aiding to draw the leather snugly over the last and give the same proper shape. It will be seen that the hammer is free to operate from toe to heel of the last, in that it is capable of
 15 moving back and forth upon the supporting-bail 210. In a word, I employ a universal traveling joint.

From the foregoing description, in connection with the accompanying drawings, it will
 20 be seen that I have provided in one simple machine a gripper mechanism for drawing the leather snugly over the last and imparting to the same the exact contour of the last; that I have provided a convenient means for
 25 operating the grippers; that I have provided for a distribution of the tacks to the tack-applying devices; for a suspension and liberation of such devices; for a driving of the tacks
 30 and for a subsequent pounding of the leather, and simultaneously therewith of a drawing of the jaws of the same together or toward each other.

In Figs. 13 and 14 I have illustrated how I may successively operate the grippers to close
 35 upon the leather by changing the mechanism from that shown, and I accomplish this not by an arrangement of the bell-cranked trips 33 at different points along the bail terminals 30, but simply reverse the order and arrange
 40 the trips all in a horizontal plane, and employ in the trip-frame 242 an upper arm 243 and a lower bar 244, the upper bar having its under side provided with a series of offsets or stubs 246, which successively contact with
 45 and operate the trips. This is an obvious change, and in fact is a mere reversal of the preferred construction shown. Interposed between the opposite ends of the yoke-plates 7 and those of the cross-piece 8^a are pairs of
 50 opposite wedge-shaped blocks 250, whose inclined faces oppose each other. The lower blocks of the pairs are adjustable by means of eccentrics 252, and the blocks are held in any of their adjusted positions by means of
 55 the binding-bolts 251, which connect the blocks composing each pair and are arranged in the slots provided for the purpose. By loosening the nuts on the bolts 251 and operating the cams or eccentrics 252 it will be ob-
 60 vious that slight and accurate adjustments may be obtained both at the toe or at the heel of the last.

In order to provide for an accurate feeding of the tacks to the tacker-plate, I prefer, as
 65 shown in Fig. 1, to locate in a stationary manner under the lower ends of the tack-distributing tubes and over the ways 142, in

which the tacker-plate moves, a perforated distributing-plate 253, the same having flared
 70 holes arranged therein to accord with the tack-receiving tubes 139 of the tacker-plate.

Having described my invention, what I claim is—

1. In a lasting-machine, a gripper consisting of the two members 81 and 83 arranged
 75 side by side and pivoted at their inner ends, the member 81 having its front lower edge laterally bent to form the jaw 82, and the member 83 having its lower edge in rear of its
 80 pivot shaped to form the jaw 85, and means for opening and closing the jaw, substantially as specified.

2. In a lasting-machine the combination with the framework, the table, and last-support, of the series of grippers arranged around
 85 the latter each consisting of the members 81 and 83 pivoted at their inner ends at 84, the member 81 having its front lower edge laterally bent and serrated to form the jaw 82, and the member 83 having its lower edge ser-
 90 rated in rear of its pivot to form the jaw 85, pivotal supports connected to the outer ends of the members 81, rods pivotally connected to the members 83, and means for lowering the pivotal supports, and raising the rods, 95 substantially as specified.

3. In a lasting-machine the combination with the framework, table, and last-support, of supports arranged around the opening in
 100 the table, studs swiveled in the supports, grippers pivoted to the studs, springs arranged on the supports and pressing against the studs, and means for opening the jaws of the grippers, substantially as specified.

4. In a lasting-machine the combination 105 with the framework, the table having the opening, and the last-supporting jack, of levers pivoted in the openings of the table, sockets arranged on the levers, yokes having studs on their under sides swiveled in the
 110 sockets, T-shaped springs arranged upon the sockets and bearing at their upper ends upon the yokes, grippers pivotally supported in the yokes, and means for opening and closing and raising and lowering the grippers, 115 substantially as specified.

5. In a lasting-machine the combination with the framework, the table having the opening, and the last-supporting jack, of levers arranged around the opening, sockets
 120 on the upper ends of the levers, yokes having lugs swiveled in the sockets, sleeves swiveled on the sockets, T-shaped springs secured to the sleeves and bearing on the yokes, grippers pivotally mounted in the yokes, and 125 means for raising and lowering the grippers, and opening the same, substantially as specified.

6. In a lasting-machine the combination with the framework, the table having the
 130 opening, the series of slots arranged in the table and radiating from the opening, the bolts arranged in the slots, the blocks carried by the bolts, the series of levers pivoted to

the blocks, spreading devices connected to the lower ends of the levers, grippers at the upper ends of the levers, of means for raising and lowering the grippers and for opening and closing the same, substantially as specified.

7. In a lasting-machine the combination with the framework, the table having the opening, the series of levers pivoted in the opening, grippers at the upper ends of the levers, means for raising and lowering the grippers and for opening and closing the same, of a movable frame above and between the lower ends of the levers and yielding spreading devices connecting said frame with the lower ends of the levers, substantially as specified.

8. In a lasting-machine the combination with the framework, the table having the opening, the last-supporting jack, of the levers pivoted around the opening, the grippers carried by the levers, the vertical movable frame 42, means for operating the same, the spring-arms 44, the links between the lower ends of the spring-arms and the lower ends of the levers, and means for opening and closing the grippers, substantially as specified.

9. In a lasting-machine the combination with the framework, the table having the opening, and the last-supporting jack, of the pivoted levers arranged around the jack, the sockets 52 arranged on the upper ends of the levers, the yokes 53 having studs 54 extending into the sockets and swiveled therein, the gripper members 58 pivoted to the studs, the connecting-bar 63 connecting said members, the rod connected to the bar 63, means for raising and lowering the rod, the companion U-shaped gripping members 61 pivoted at 60 to the member 58, said members having the jaws 59 and 62 arranged as shown, the yoke 67 pivoted to the U-shaped members, the rod connected to the yoke and means for vibrating the levers and operating the rods, substantially as specified.

10. In a lasting-machine the combination with the framework, the table having the opening, and the last-supporting jack, of the pivoted levers arranged around the jack, the sockets 52 arranged on the upper ends of the levers, the yokes 53 having studs 54 extending into the sockets and swiveled therein, the gripper members 58 pivoted to the studs, the connecting-bar 63 connecting said members, the rod connected to the bar 63, means for raising and lowering the rod, the companion U-shaped gripping members 61 pivoted at 60 to the member 58, said members having the jaws 59 and 62 arranged as shown, the yoke 67 pivoted to the U-shaped members, the rod connected to the yoke and means for vibrating the levers and operating the rods, the sleeves 56 arranged on the sockets, and the T-shaped springs 55 connected to the

sleeves and bearing on the yokes, substantially as specified.

11. In a lasting-machine the combination with the framework, the table having the opening, the last-supporting jack, the series of grippers supported about the jack, of mechanical means for successively closing the grippers and moving the same inward over the last, substantially as specified.

12. In a lasting-machine the combination with the framework, the table having the opening, the last-supporting jack, the series of grippers supported about the jack, of mechanical means for successively closing the grippers and moving the same inward over the last, and for simultaneously and subsequently opening the grippers and moving them away from the jack, substantially as specified.

13. In a lasting-machine the combination with the framework, the table having the opening, the series of levers arranged around the jack, the grippers arranged upon the upper ends of the levers, means for spreading and contracting the ends of the levers, vertical supports below the grippers, a series of bell-crank latches pivoted to the supports, connecting-rods between the gripper members and latches, and means for striking the latches and oscillating them upon their pivots, substantially as specified.

14. In a lasting-machine the combination with the framework, the table having the opening and the jack-support, of the series of levers arranged around the support, means for contracting and expanding said levers vertical supports below the grippers, bell-crank latches pivoted in the supports, yielding rods between the gripper members and the bell-crank latches, and devices for striking and tilting the said latches, substantially as specified.

15. In a lasting-machine the combination with the framework, the table having the opening, and the last-support, of the series of levers arranged around the support, the grippers arranged upon the upper ends of the levers, means for contracting and expanding the ends of the levers, a series of vertical supports arranged below the grippers, a series of bell-crank latches pivoted at different points upon the supports, connecting devices between the bell-crank latches and gripper members, and means for successively striking and tilting said latches, substantially as specified.

16. In a lasting-machine the combination with the framework, the table having the opening, the last-supporting jack arranged in the opening, of the series of levers fulcrumed around the last-support, means for contracting and spreading the lower ends of the levers, a series of vertical supports arranged below the grippers, bell-crank latches pivoted in said supports, connections between

the bell-crank latches and the gripper members, and devices for successively tilting the latches in one direction and for simultaneously returning them subsequently to their first position, substantially as specified.

17. In a lasting-machine the combination with the framework, the table, and the last-supporting jack, of the series of levers pivoted around the jack, grippers arranged on the upper ends of the levers, means for contracting and spreading the lower ends of the levers, transverse rods 31 arranged below the jack, U-shaped bails 30 arranged upon the rods and having perforations, cross-bars 37 mounted on the rods 31, bell-crank latches 33 pivoted upon the terminals of the bails, anti-friction-rollers arranged on the angles of the latches, rods between one set of gripper members and the bell-crank latches, rods between the second set of gripper members and the bars 37, the cross-bars 225 embracing the bails 30 and adapted to be raised and lowered for tilting the latches, and for subsequently striking the bars 37, substantially as specified.

18. In a lasting-machine the combination with the framework, the table having the opening, and the last-supporting jack arranged therein, of the series of levers pivoted around the jack, the gripper members carried by the levers, means for opening and closing the lower ends of the levers and yieldingly supporting the same, the cross-rods 31, the U-shaped bails 30 through which they pass, the bars 37 arranged on the cross-rods, the series of bell-crank latches 33 pivoted at various points on the terminals of the bails and having anti-friction-rollers 36 at their angles, the opposite frames 224 having the cross-bars 225 arranged to strike and tilt the latches, and the cross-bars 37, the slot in the frames 224, the transverse shaft 23 having cranks 227 engaging the slots, means for operating the shaft, and the rods between the bell-crank latches and bars 37 and the two sets of members of the grippers, substantially as specified.

19. In a lasting-machine the combination with the framework, the table having the opening, and the last-supporting jack, of the levers pivoted around the jack to the table, the spreading device at the lower ends of the levers, the rods 31 below the grippers, the bails 30 arranged on the rods, the cross-bars 37 arranged on the rods, the bolts 38 loosely mounted in the cross-bars and having nuts at their lower ends, the springs 40 between the nuts and cross-bars, the turnbuckles 66, the rods 35 between one set of members of the grippers and the buckles, the springs arranged on said rods, the bell-crank latches 33 pivoted to the bails and having anti-friction-rollers 36, the rods 71 pivoted to the outer ends of the bell-cranks and having upper headed ends, the turnbuckles 70 arranged on the rods 71, the springs between the heads of the rods and the bottoms of the turnbuckles,

the connecting-yokes between the upper ends of the turnbuckles and the remaining members of the grippers, the opposite frames 224 having the cross-bars 225 adapted to strike the bars 37 and the latches, and means for raising and lowering said frames 224, substantially as specified.

20. In a lasting-machine the combination with the framework, the table having the opening, the yoke-bars 7 below the opening and rigid with the table, the rods 8 extending up from the yoke-bars, the cross-piece between the bars, the standards 9 rising from the cross-piece, the sleeves carried by the cross-piece and the standards, the hollow saddle arranged in the upper ends of the standards, of the vertical shaft extending through the cross-piece and having an interrupted screw at its upper end adapted to receive that of a last, and means for rotating said shaft, substantially as specified.

21. In a lasting-machine the combination with the framework and last-supporting jack, of a plunger supported in the framework, means for operating the plunger, a bell-shaped socket secured to the lower end of the plunger, a head arranged within the socket, hammer-levers pivoted in the head and terminating below the socket in hammers having outer cam-faces adapted to be operated upon by the wall of the socket, and means for normally spreading the lower ends of the hammers, substantially as specified.

22. In a lasting-machine the combination with the framework and last-support, of a plunger, means for operating the same, a bell-shaped socket on the lower end of the plunger, a head arranged within the socket, bell-crank levers pivoted to the head, a spring interposed between the upper ends of the bell-crank levers and the socket, hammer-heads at the lower ends of the levers, and cam-faces at the outer sides of the levers and adapted to be operated upon by the wall of the socket, substantially as specified.

23. In a lasting-machine the combination with the framework, and last-supporting jack, of a plunger, a hammer arranged thereabove, means for vibrating the hammer, a socket of bell shape at the lower end of the plunger, a head arranged in the socket, means for retaining the head loosely within the socket, bell-crank levers pivoted to the head and terminating at their lower ends in hammers below the socket, cam-faces on the outer sides of the levers, a spring interposed between the upper ends of the socket and the branches of the levers, substantially as specified.

24. In a lasting-machine the combination with the framework and last-support, of a transverse shaft 146, a cam arranged upon the shaft, a hammer-lever pivoted above the cam and having a shoulder arranged in the path of the same, of a plunger arranged under the hammer-lever a bell-shaped socket at the lower end of the plunger, a head arranged within the socket, bell-cranks levers

pivoted in the head, hammers at the lower ends of the levers, cam-shaped faces at the outer sides of the levers and a coiled spring arranged between the bell-cranked levers and upper end of the socket, substantially as specified.

25. In a lasting-machine the combination with the framework, the last-supporting jack, a transverse shaft 146, a cam arranged thereon, a hammer-lever pivoted above the shaft and having a cam-shoulder in the path of the cam thereof, a lug on the lever, a latch pivoted above the lug, a cord for operating the same, a plunger supported below the hammer and provided with auxiliary hammers, substantially as specified.

26. In a lasting-machine the combination with the framework, the table, the last-support, a bail loosely hung above the support and having a lower transverse portion, means for normally supporting the bail, a block having a sheave, the pulley arranged for travel on the transverse portion and having a vertical bore, a plunger arranged in the vertical bore, hammers arranged at the lower end of the rod, and a hammer arranged above and adapted to operate on the rod, substantially as specified.

27. In a lasting-machine the combination with the framework, and the last-support, of the bearing-brackets in the upper end of the framework above the support, the bail 210 hung in the brackets, the spring for elevating the bail, the hook at the outer end of the framework, the block 212 having the pulley 213 arranged in the bail and having the vertical bore 214, the plunger 215 arranged in the bore and adapted to engage the hook, the auxiliary hammers at the lower end of the plunger, and the hammer arranged above the plunger and adapted to vibrate upon the same.

28. In a lasting-machine the combination with the framework, the table and the last-supporting jack, of ways arranged at the side of the jack, a tacker-plate having tack-holding devices arranged in the ways, a swinging tacker device adapted to operate upon the tacker-plate, means for normally retracting the tacker-plate, and devices arranged thereon and adapted to be engaged by the tacker device when lowered, substantially as specified.

29. In a lasting-machine the combination with the framework, the table, the last-supporting jack, ways at the side of the jack, a tacker-plate having projections and mounted in the ways, means for normally retracting the tacker-plate, of a swinging frame, tacking-plungers carried by the frame, hooks carried by the frame for engaging the extensions on the tacker-plate, and means for raising and lowering said frame, substantially as specified.

30. In a lasting-machine the combination with the framework, the table, the last-supporting jack, ways at the side of the jack, a tacker-plate having projections and mounted

in the ways, means for normally retracting the tacker-plate, of a swinging frame, tacking-plungers carried by the frame, hooks carried by the frame for engaging the extensions on the tacker-plate, means for raising and lowering said frame, and a vibratory hammer arranged above the frame and adapted to contact with the plunger carried by the tackers, substantially as specified.

31. In a lasting-machine the combination with the framework, the table, the last-supporting jack, of the hangers depending from the upper end of the frame, a crank connected with one of the hangers, a tacking device carried by the lower end of one of the hangers, a shaft at one side of the frame, a disk carried by the shaft and having a pin, a push-bar pivoted to the crank and means for raising and lowering said push-bar into and out of the path of the pin, substantially as specified.

32. In a lasting-machine the combination with the framework, the table, and the last-supporting jack, of hangers in the upper end of the frame, a crank arranged on one of the hangers, a push-bar connected to the crank, a bell-crank lever above the push-bar, a link between the same and the lever, a rod for operating the bell-crank lever, a disk, a shaft for the same, a pin on the disk adapted to strike the push-bar, a tacking device carried by the hangers, a locking-latch for the device, and a rod between the same and the push-bar, substantially as specified.

33. In a lasting-machine the combination with the framework, the table, and the last-supporting jack, of the bearings in the upper end of the frame, the hangers pivoted in the bearings, means for swinging the hangers, cross-bars connecting the hangers, a plunger-rod arranged in the openings in the cross-bars, a hammer above the plunger-rod, means for operating the same, offsets formed in the cross-bars, bolts passing through the offsets, a socket-plate loosely engaging the hangers, and connected with the plunger, guide-plates arranged on the bolts and loosely engaging the hangers and having openings corresponding to the sockets, tacking-plungers arranged in the sockets and in the openings, springs between the lower ends of the offsets and the upper ends of the bolts, substantially as specified.

34. In a lasting-machine the combination with the framework, the table, the last-supporting jack, and the hammers, of a tacker-plate comprising upper and lower members perforated to receive the hammers, and the semicylindrical spring-fingers arranged in the openings of the lower plate, and having their upper ends headed between the upper and lower plates, substantially as specified.

35. In a lasting-machine the combination with the framework, the table, and the last-supporting jack, of the opposite horizontal guides, the tacker-plate arranged for movement in the guides, means for normally re-

tracting the tacker-plate, the projections 140 and 141 extending up and laterally respectively from the tacker-plate, the swinging hangers, the plunger arranged therein, the hammer for operating upon the plunger, the plunger-rods arranged in the hangers, and the angle-bars 134 for engaging the projections on the tacker-plate, substantially as specified.

36. In a lasting-machine the combination with the framework, the table, and the last-supporting jack, of the bearings in the upper end of the framework, the hangers depending therefrom, one of said hangers being arranged in the path of a lateral projection 121 of one of said hangers, a screw arranged in said lateral projection and bearing on said hanger for adjusting the same, the lower end of said hangers being provided with offsets 123, the notched plates 128 and 129 arranged for engaging the hangers below the offsets, the headed bolts 125 engaging the plates and passing upwardly through the offsets, the springs 127 arranged on the bolts, the sockets 132 on the under side of the plate 128, the holes 133 in the plate 129 below the sockets, the spring-actuated pin arranged in the sockets and holes the angle-bars 134 having depressed ends, the ways at the side of the last, the tacker-plate having tubes arranged in the ways, and the projections 140 and 141 extending from the front and rear ends of the plate in the path of the depressed ends of the angle-bars, substantially as specified.

37. In a lasting-machine the combination with the framework, the table and last-supporting jack, of the horizontal ways, the tacker-plate arranged for movement in the ways, means for retracting the plate, a hopper arranged above the ways, agitating devices carried by the hopper and tubes extending from the hopper to the various openings in the plate, substantially as specified.

38. In a lasting-machine the combination with the framework, the table and last-supporting jack, of the ways at the side of the jack, the perforated tacker-plate mounted for movement in the ways, the loosely-supported hopper arranged above the ways, means for agitating the hopper, and the series of tubes leading from the hopper to the openings in the tacker-plate, substantially as specified.

39. In a lasting-machine the combination with the framework, the table and the last-supporting jack, of the horizontal ways, the perforated tacker-plate arranged therein, the hopper arranged above the tacker-plate, the discharge-tubes leading to the openings in the tacker-plate, the gate arranged above the tubes in the discharge of the hopper, and devices carried by the tacker-plate for operating the gate, substantially as specified.

40. In a lasting-machine the combination with the framework, the table and the last-supporting jack, of the ways at the side of the jack, the perforated tacker-plate mounted for movement in the ways, the standard above

the ways, the springs carried by the standard, the hopper supported by the springs, agitating devices extending into the hopper, tubes leading from the hopper to openings in the plate, the lever 207 pivoted above the hopper, the pitman between the lower end of the same and the hopper, the superimposed shaft and devices carried by the shaft for striking the lever, substantially as specified.

41. In a lasting-machine the combination with the framework, the table and the last-supporting jack, of the ways at the side of the jack, the perforated tacker-plate arranged in the ways, the hopper supported above the tacker-plate, and the series of discharge-tubes leading from the discharge of the hopper to the openings in the tacker-plate and loosely connected at their upper ends to the hopper, and means for vibrating the tubes and hopper, substantially as specified.

42. In a lasting-machine the combination with the framework, the table and last-supporting jack, of the horizontal ways, the perforated tacker-plate arranged for movement in the ways, the superimposed hopper having the slotted chute and bottom, the gate having the fingers 191 and openings 188 and 189 arranged below those in the chute, the opposite shafts, the bell-cranked arms carried by the shafts, the projections for engaging the fingers, the sliding tacker-plate, projections carried thereby for operating the arms, and the tubes leading from points below the cut-off or gate to the openings of the plate, substantially as specified.

43. In a lasting-machine the combination with the framework, the table and lasting-jack, of ways, the perforated tacker-plate arranged therein, the superimposed hopper having the inclined discharge provided with rods, the framework 185 having ways below the end of the discharge of the hopper, the gate arranged for reciprocation in the ways and having the fingers 191 and the openings 188 and 189, the transverse shafts having the cam portions 193, the arms 195 and 196, the curved arms 198 and 200, the springs 194 for resting on the cams, and the tubes 202 arranged between the shafts below the openings in the gates and extending to the openings in the tacker-plate, substantially as specified.

44. In a lasting-machine the combination with the framework, the table having the opening, the subjacent yoke-plates, the transverse bar 8^a and the lasting-jack carried thereby, of the pairs of blocks 250 having opposing inclined faces, the adjusting-bolts 251 passed therethrough, and the eccentrics 252 for adjusting the blocks, substantially as specified.

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

JNO. M. HOLLADAY.

Witnesses:

JOHN W. GARDNER,
W. S. DUVALL.