2 Sheets—Sheet 1.

L. GODDU.

LASTING-MACHINE FOR BOOTS AND SHOES.

No. 183,919. Patented Oct. 31, 1876.

Fig. 1.

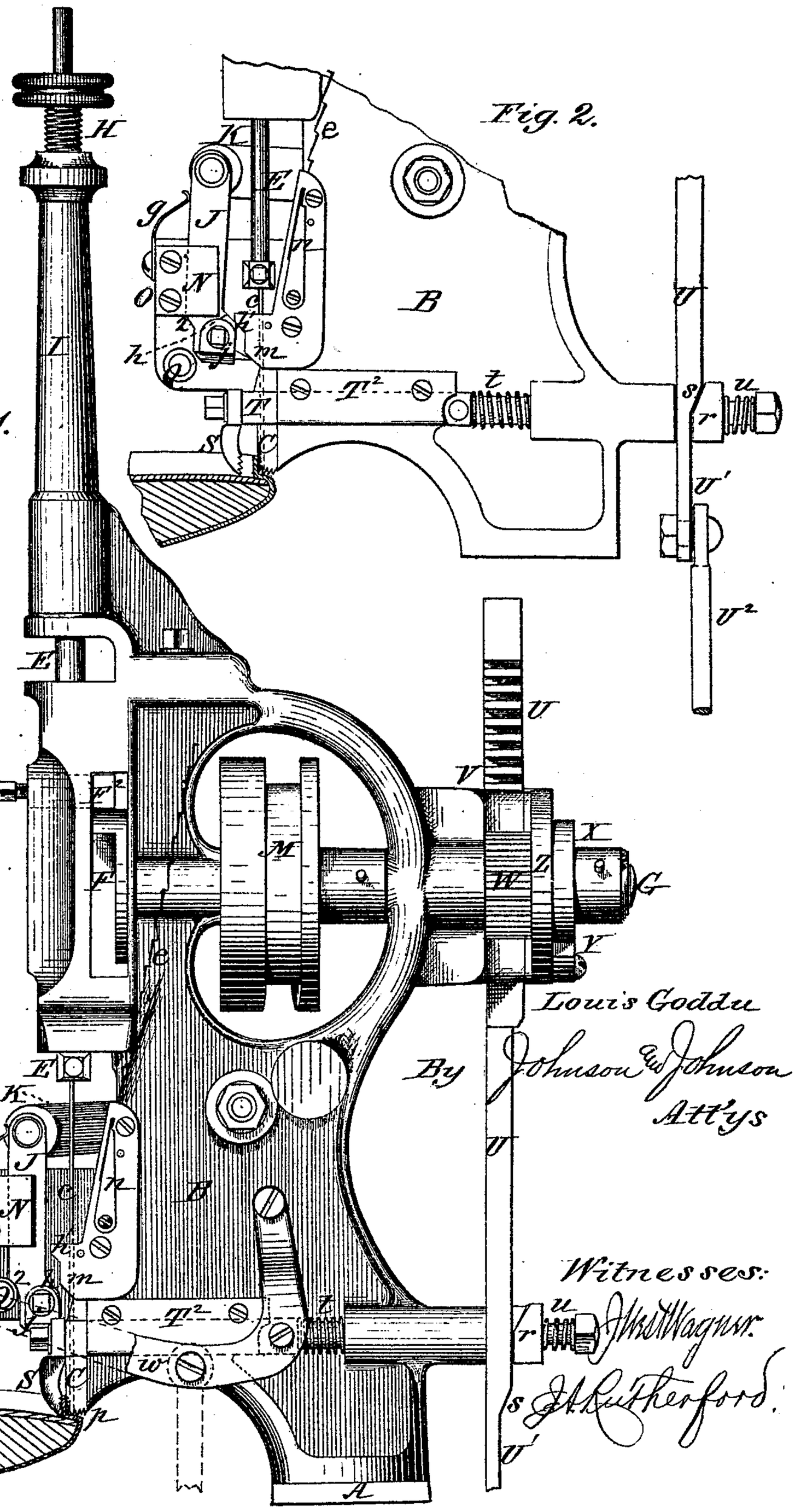
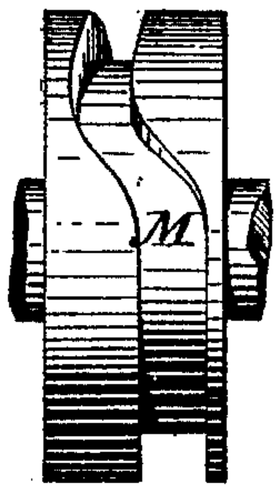


Fig. 8.



Louis Goddu

By Johnson & Johnson

Att'ys

Witnesses:

J. Wesley Wagner.

S. A. Rutherford.

2 Sheets—Sheet 2.

L. GODDU.

LASTING-MACHINE FOR BOOTS AND SHOES.

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Fig. 3.

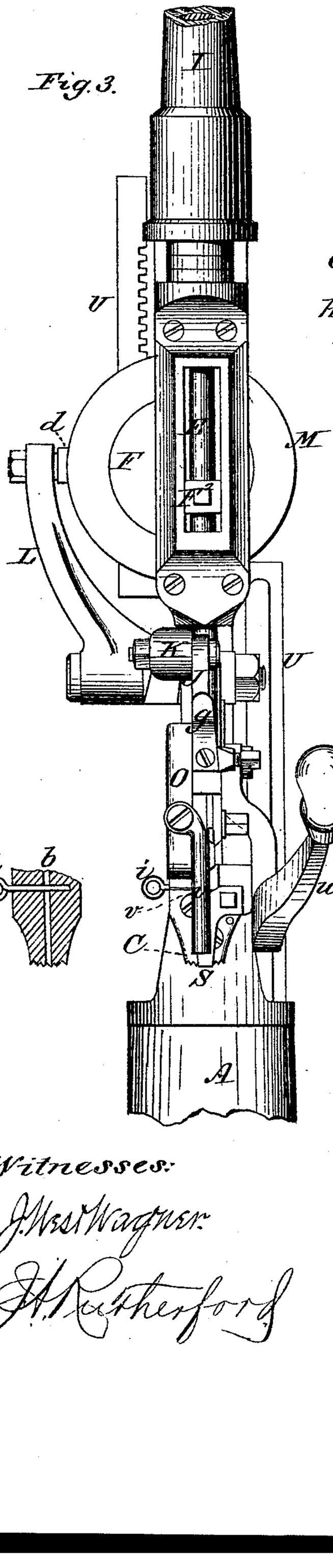

Fig. 4.

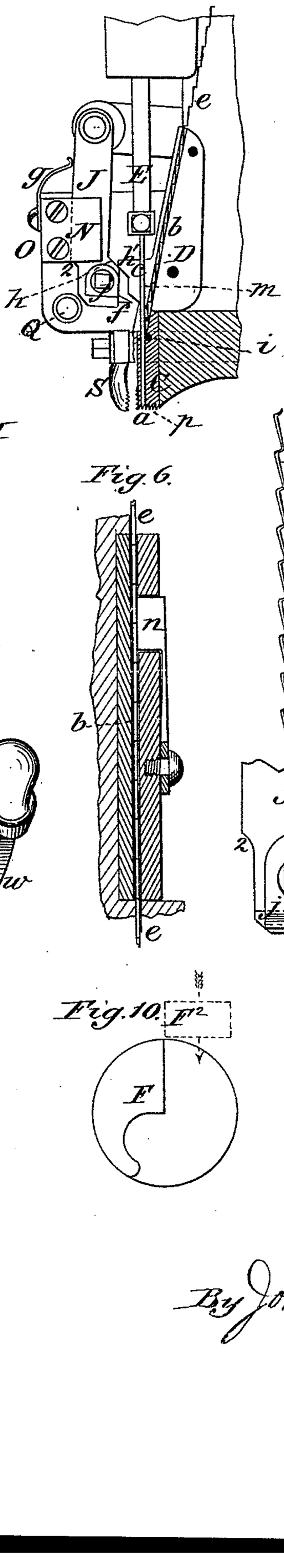

Fig. 5.

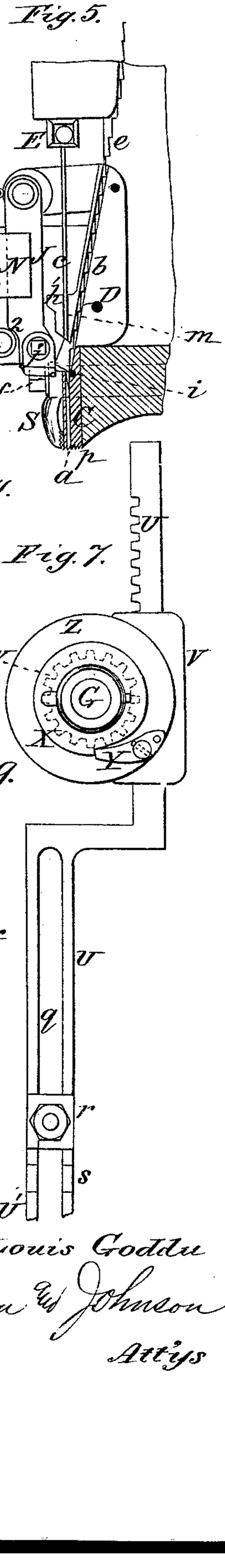

Fig. 6.

Fig. 11.

Fig. 7.

Fig. 9.

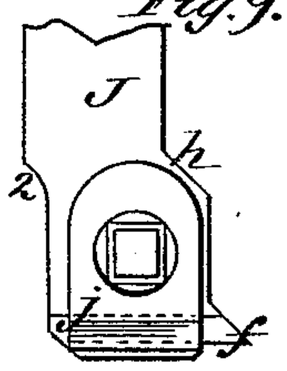

Fig. 10.

Witnesses:

J. Wm. Wagner.

H. Rutherford

Louis Goddu

By Johnson & Johnson

Att'ys

UNITED STATES PATENT OFFICE

LOUIS GODDU, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN LASTING-MACHINES FOR BOOTS AND SHOES.

Specification forming part of Letters Patent No. **183,919**, dated October 31, 1876; application filed August 31, 1876.

To all whom it may concern:

Be it known that I, LOUIS GODDU, of Boston, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvement in Machine for Lasting Boots and Shoes, of which the following is a specification:

In the manufacture of boots and shoes the upper must be stretched over the last, and tacked to the inner sole. To do this properly, tension is applied to the edge of the upper, and before this is released it is tacked in place. This has been done principally by hand, the workman holding the shoe on his knees, and by a pair of pinchers he seized the upper, drawing it tight over the last; then, holding the edge of the upper where it was drawn by the pinchers, he drove a tack. This operation is slow and expensive. The machines heretofore used to do this work are expensive, requiring a number for every factory, as each machine is adapted to only one size shoe, and, besides, the grain of fine shoes is liable to be injured in lasting.

By my method one machine will last any style or size of boots and shoes quickly, cheaply, and without injury to the finest material. This is of the greatest importance to manufacturers, as it saves large investments in machinery and much hard labor, and lessens the cost of manufacture.

My invention is a departure from the methods before used, and embraces the combination of seizing and griping devices, consisting of a fixed and automatic griping-jaw for the upper with mechanism for inserting nails, tacks, or pins, to hold the upper to the inner sole, and in which the edge of the upper is seized and drawn over the last, and presented to the fixed nose to receive the tack.

The operation of the griping and tacking devices is automatic, and the work is held and supported in the operator's hands, under and against the nose of the machine, after the manner of the new method of tacking shoe-soles practiced in the machine patented to me January 2, 1872, No. 122,377, and in which I dispense with a support for the last, and use the upward pressure of the hands, keeping the sole and last against the nose of the tacking mechanism, and in position to present the edge of the upper to the griping devices by which all the slack is taken out just before each nail is driven, and while the attendant is keeping the upper under tension. The release of the griping device, as also its clamping function, is in unison with the tacking operation, and the last can be fed along by the operator at each opening of the griping device, the fixed jaw of which is, in this case, formed by the nose or nail-tube; while the seizing-jaw or pincher is carried by a horizontal bar, which is controlled to gripe and hold the upper by suitable devices, and is released from such hold at the proper time by suitably-arranged spring; while a much stronger spring is arranged to adjust the gripe to the varying thickness of leather, and a set-screw enables the operator to give the proper pressure to hold the stock.

By means of a hand-lever I can operate and control the griping device, if desired, independent of its automatic operating connections and to increase the force of the gripe put into action by such automatic acting devices, which, in lasting heavy stock, is of special advantage.

The machine can be operated by steam or foot power, the latter being so arranged as to allow the griping device to be released after stretching the upper at any point so that the upper can be released, and another hold taken without driving a tack. By the same operation of the treadle or hand-lever the lining may be stretched and released separately from the upper, and then both seized and fastened to the inner sole.

The fixed nose and the movable jaw are properly rasped or corrugated to prevent the stock from slipping. To allow of the crimp or fold of the upper at the heel and toe, the movable jaw is made narrow or finger-like, and this also permits the tacks to be driven as close together as desired, without disturbing or raising the preceding driven tack, as the upper can be griped quite near its edge, and then, pressing back the last horizontally, the required tension is obtained without effecting the last driven tack.

A fulcrum arm or pry is arranged in front of the griping device, against which to press the upper surface of the last to obtain more leverage in drawing the upper over the last. This fulcrum arm is very advantageous in

lasting heavy stock, but in light stock it may be turned up out of the way.

The machine represented is adapted to drive nails or pins cut from a continuous or integral wire or rod of nails or pegs, having heads, and adapted to be readily fed and separated at the points where the different nails or tacks are joined in the wire length, as in a patent granted to me April 18, 1876, and numbered 176,295. In feeding such a continuous wire of distinct headed tacks, I employ a combined feeder and cutter in one device, which is suspended from an operating lever in a manner to be elevated in a position just over the shoulder or head, and then to carry the wire down to the limit of the descent of the cutter, and sever the nail just above the head. To effect this the cutter-feed device in descending has a movement toward the nail-passage to cause it to catch on the head of the tack and carry it down into the nose; while in its upward movement the cutter-feed device has an outward movement to clear and pass over the head of the next tack, and to clear the driver. In this way a reciprocating feed-dog serves also as the means for severing each tack from the wire. This action takes place against a steel pin, which is placed across the nail-passage in position to receive and bear the cut of the knife; and when one side of the pin is worn off it is turned partly round to present a new surface for the action of the cutter, and is replaced when thus worn out. As the extent of the upward movement of the feed-dog from the steel pin is always greater than the maximum length of the tack, and less than the length of two tacks, the feed-dog therefore always rises above the tack-head, so that in the descent of the dog it slips along the tack until it strikes the head, and then begins to feed it downward, so that tacks of different lengths can be fed and cut in this way without any alteration of the feed-dog. The severing of the tack from the wire against the steel pin tends to shove up the wire a little, which, in the maximum length of tacks, might prevent the feed-dog from striking the wire at the right point to feed the next length of tack, and the ascent of the feed-dog over the wire might tend to raise it. To prevent this I arrange a spring so as to enter the nail-passage and bear against the wire, and hold it from receding under the action of the cutter or other cause.

In the accompanying drawings, Figure 1 represents a side elevation of a lasting-machine embracing my invention, showing the upper held by the griping device and drawn over the last to receive the tack; Fig. 2, a similar view of a portion of the machine, showing the griping device released to feed the upper for a new hold; Fig. 3, a front elevation; Fig. 4, a detail sectional view of the feed-dog, wire-passage, and griping device, the feed-dog being in position to move inward over the shoulder in the wire to feed it down; Fig. 5, a similar view, the feed-dog being in the position it occupies when acting as the cutter to sever the tack from the wire; Fig. 6, a sectional view, showing the spring-bearing for the tacking-wire; Fig. 7, a view of the ratchet and rack devices which connect with the treadle, and by which the tacking and griping devices are operated; Fig. 8, the grooved cam; Fig. 9, the feed-cutting point and its carrying-arm detached; Fig. 10, the cam-lifter; and Fig. 11, the lap-headed wire.

The machine represented in the drawings is adapted for foot-power, and as regards the tack-driving mechanism, and the manner of presenting and supporting the work to receive the tack, they are essentially the same as my Patent No. 122,377 aforesaid.

A standard, A, supports a head, B, which carries the operating devices for feeding the wire, severing a tack therefrom, driving it into the upper, and for seizing and holding the upper while being drawn over the last during the operation of driving each tack, and in which the seizing and releasing of the upper is automatic with the driving of each tack, or may be controlled at pleasure.

The nose, against which the operator supports the last in tacking, is formed at the base of the head, and preferably by a face-plate, C, within which the guide *a*, for the severed tack, is formed. The passage *b*, for the wire, extends upward from the guide *a*, and is formed so as to cause the wire to take the proper position in it to present the head or shoulder to the feed-dog.

The present adaptation is for the sole-fastening patented to me April 18, 1876, as aforesaid, and which is fed from a coil suspended just above the machine.

This wire-passage *b* is formed in a separate plate, D, bolted to the head so as to be out of the line of the descent of the driver *c*, which is carried by a bar, E, fitted to move vertically in guides in the head. It is raised by a cam, F, on a cam-shaft, G, against the force of a spring arranged in the turret I, and by which the driver-bar is forced down to drive the tack at each revolution of the cam F, which lifts the driver-bar by acting upon a guide-block, F^2, which may be adjusted as desired, and the force of the spring is regulated by a screw, H, at the top of the turret, to give the driver the required power to drive the tack.

The cam-shaft G is mounted horizontally in suitable bearings in the head, and is connected at its rear end with treadle devices, by which it is operated to operate the feeding, cutting, driving, and griping devices.

The device for feeding the wire of headed nails *e* consists of a steel cutter point or dog, *f*, carried at the lower end of a pendent arm, J, hung to the horizontal arm K of a bell-crank lever, whose upwardly-extending arm L, Fig. 3, works by an anti-friction roll, *d*, in a groove-cam, M, on the driver-operating shaft. The form of the groove-cam M is such as to cause the pendent arm J to descend and feed down the wire the length of a tack, cut it off,

and to rise out of the way, while the driver is held up under the full force of the compressed spring by the action of the lifting-cam, which then lets the driver fall. The pendent arm J rises and falls in a guideway, N, formed by an extension, O, from the head, and, in connection with it, has a movement toward the wire-passage to cause the dog-point *f*, in its downward movement, to enter the open side of the wire-passage, just over the shoulder or head of the tack, to catch on and feed it down. This inward movement is effected by a spring, *g*, which constantly exerts an inward force upon the arm J just sufficient to bear the feed-point against the wire. In the upward movement of the arm J it is also free to move outward, as the feed-point passes over the head or shoulder of the next tack by contact with it. Then, to carry the feed-point *f* out of the range of the driver, an incline, *h*, on the arm J, strikes against an inclined corner, *h'*, of the wireway, and forces said point outward in position to again slide over the tack and strike the head, as shown in Fig. 4. Just as the feed-point is reaching its limit of descent, a curved shoulder, 2, on the bar J, presses against a fixed stud, Q, on the extension O, and forces the feed-point suddenly and firmly against the wire, and severs it just at the bend which forms the head of the tack, leaving the cut wire to form the point for the next tack, as shown in Fig. 5.

To make the cut at the point at which each tack joins the head of the other, I arrange a cylindrical steel pin, *i*, across the wire-passage to support the wire at the point at which the cutter acts and at which the feed ceases, as the feed-dog forms also the cutter. As the cutter acts against this pin it cuts it away in time on one side, and by turning it a new surface is presented each time the pin is turned, until it is worn out, when a new one is inserted.

The cutting of the wire is, therefore, made against a pin, which lies across the closed side of the wire-passage, which, for a distance greater than the length of the tack and just above the severing-point, is open for the entrance of the cutting feed-point, and stands slightly inclining rearward from such point.

The cutter is secured to the arm J by a clamp-plate, *j*, and screw, so that it can be adjusted and renewed as required; and its point *f* stands out from the inner edge of said arm so as to act like a ratchet-pawl in making the feed.

The driver *c* works in a guide, *m*, in the nail-way-plate, and strikes and drives the tack from the point at which it was cut from the wire after the cutter feed-point has moved out of the way.

A brake or spring-presser, *n*, Fig. 6, is arranged to lie in the nail or tack passage from the side, and to bear upon the wire to prevent it from receding or slipping up, as it is liable to do under the action of the cutter and the tension of the coil in severing it, and especially as the cutter-feed point rides over the head or shoulder of each tack, and might thereby prevent the feed-point from passing above the tack-head. The spring-presser *n* does not obstruct the downward movement of the wire, but serves as a brake to hold it from rising under the conditions stated. This is important in insuring the proper feed of the wire. The extent of the vertical movement of the cutter feed-point is greater than the maximum length of the tack which may be used, and the feed-point must, therefore, always rise above the head or shoulder of the wire, so that, as the feed-point begins its descent, it slips along the nail until it strikes the head, and then carries it downward; and the machine thus requires no adjustment or alteration to adapt it to different lengths of tacks, less than double the length of the tack being driven. If longer than this, I alter the upward throw of the feed-dog and cutter.

The device for seizing and holding the upper, to allow it to be drawn over the last, consists of a fixed and movable jaw. The fixed jaw C forms the nose or that part against which the upper is held to receive the tack. It is comparatively wide, and has a rasped or serrated under and front surface, *p*. This is important, as by this means I am enabled to dispense with the pinchers in lasting parts of most boots and shoes, after using the grasping device to take out the folds and draw the upper tight over the toe and in the shanks.

I find that, by corrugating or having the under surface of the rest filled with short pins or pricks, and by pressing the upper firmly against it and moving the shoe horizontally, the tension is sufficient to take out the remaining slack in the uppers; and in cloth shoes, I think, by this method of getting tension, the griping device may be almost dispensed with. The movable jaw S is arranged just in front of the nose, and forms, in connection therewith, a griping-finger, between which and the fixed jaw the edge of the upper is placed from below and clamped. This griping-finger is carried by a horizontal bar, T, Fig. 2, fitted to move in a guide, T^2, at the side of the head, said finger being carried in line with the middle of the fixed jaw, and, being narrow, the upper, especially at the heel and toe, is easily crimped and folded and fed along between the finger and the wide nose. The griping end of the finger is on a level with the lower surface of the nose, and is rasped or serrated so that the upper cannot slip when clamped. The face or vertical side of the nose is also rasped or roughened. The shank of the finger-bar extends back beyond the head, and is combined with devices for automatically opening and closing it, to gripe and release the upper before and after each tack is driven, and in unison with such operation.

The devices for closing the finger to clamp the upper consists of a vertical rack-bar, U, fitted to move in a guide, V, in the head, and, by a slot, *q*, over the shank of the finger-bar,

as shown in Fig. 7. This rack-bar U is connected to the treadle, by which it is depressed, by means of a rod, U^2, and a pinion, W, fitted loosely on the cam-shaft G, gears with said rack-bar, and thereby turns the cam-shaft a full revolution by the full descent of the rack-bar, and lets fall the driver. The elevation of the rack-bar is effected by the action of a treadle-spring, which connects with the standard and constantly tends to draw the treadle and its rack-bar upward.

As the pinion W is fitted loosely upon the cam shaft, it turns freely thereon during the ascent of the rack-bar, and therefore does not revolve the cam-shaft; but, by means of a ratchet, X, or notched disk, Fig. 7, fixed to the cam-shaft, and a spring-pawl, Y, carried by a disk, Z, fixed to the pinion, the latter is locked to the cam-shaft as soon as the rack-bar begins to descend, and in this way the cam-shaft is revolved by the treadle to work the driver, feed, and cutter devices. I utilize the movement of this rack-bar to close the griping device in this way.

The slotted portion of the rack-bar embraces the rear end of the finger-bar T, which has a cushion or bearing-block, *r*, Figs. 1 and 2, against which a shoulder or cam, *s*, on the rack-bar acts as it descends, and, drawing the bar T back against the tension of a spring, *t*, closes the finger against the nose and gripes the upper fast, and holds it so griped until the upper is in proper position to be nailed to the inner sole, when the operator, by a still further descent of the treadle, causes the driver to be released and the nail driven. Or, if it is desired to release the gripe and take another hold of the upper at the same point or elsewhere, it can be done without driving a tack. This is of vital importance, as otherwise tacks would be driven which would have to be removed before the shoe could be lasted properly. The cushion-bearing block *r* and the shoulder or cam *s* are beveled to operate freely.

A spiral spring, *t*, on the finger-bar is compressed when the upper is griped, and acts to open the finger-jaw the moment the rack-bar is raised, to allow the cushion-block bearing to pass onto the narrow portion U′ of the rack-bar. The block-bearing *r* is cushioned against a spiral spring, *u*, of sufficient strength to give the proper gripe of the finger and yet allow it to yield for different thicknesses of upper. This is important, as otherwise the function of the griping-finger might fail to hold on thin stock or break in thick, if it had not this capability of self-adjustment.

By this construction the descent of the treadle applies the griping device previous to the operation of tacking, and the ascent of the treadle allows the feed of the shoe for the next tack.

The broad invention of a device which gripes and releases the upper before and after being tacked and fed, and in which the last is supported by the operator's hands while the upper is being drawn over the last and tacked, does not depend upon treadle connections or devices for operation, but may be operated by power in which a friction-pulley may be employed and combined to produce the proper co-operation of the griping device with the machine. Such a friction device is shown in nailing-machines patented to me.

In connection with the griping device, I employ a fulcrum or pry arm, *v*, Figs. 1 and 3, secured to the extension O in front of the griping-finger, so that when the upper is fast between the jaws, the operator turns the last up against the arm *v*, and enables him to draw hard on the upper, and take all the folds or looseness out of the thickest uppers and draw them close to the last. After pressing by this pry-arm the last is moved horizontally back under the nose, and held close up to receive the tack near the point where the tension is applied. The prying-arm stands out enough to give a good leverage for prying on the last. This operation is repeated, if desired, as each tack is driven, and the griping-finger opens for the feed of the upper. As the upper is griped in front of the nose, the last, in being pushed back, carries the upper beneath the nose and holds it in position to receive the tack, the operator applying the force of his hands to keep the upper hard up against the nose and under tension against the holding point or clamp in said nose.

The fulcrum-arm may be turned up out of the way in lasting light work, and for this purpose it is secured by a clamp-screw at its upper end.

I have also shown a device, which may be operated by hand or pedal, for operating the griping device independent of the other operations of the machine. This supplemental device consists of a hand-lever, *w*, pivoted to the head and to the finger-bar, with the handle standing to the front, so that the operator can grasp it and apply the gripe to the upper as he may desire, and while the rack-bar U is only connected to operate the feeding, cutting, and driving mechanism.

This hand attachment can be operated in connection with the automatic operation of the machine, and when the machine is so working, and the upper is griped, the force of the gripe may be increased by pressing down the lever *w* and holding it. In thick uppers this is of much advantage, as it enables the operator to push as hard as he pleases on the last to make the proper lay of the upper.

It is obvious that the finger-jaw may be carried by a lever pivoted in a vertical position to the front of the head, and operated by the same device which operates the driver, in which case a different arrangement of feeding and nail-cutting devices would be necessary, as described in my caveat for this invention.

By my invention I produce a simple and rapid lasting-machine, in which the work is held and fed by the operator without a jack or support, and boots and shoes can be lasted

as good as by hand, and more rapidly than by any other way known.

The following is claimed as new, namely:

1. The combination, with mechanism for feeding and driving tacks, substantially as described, of a fixed and movable device for griping and holding the edge of the upper, substantially as described, during the operation of taking out the slack and tacking the upper to the inner sole.

2. In a machine for lasting boots and shoes, the combination, with the nose or fixed jaw C, of a griping-finger or device, S, adapted to act with the fixed jaw in seizing and holding the edge of the upper against the nose or fixed jaw, and in position beneath it to receive the driven tack at the point of tension upon the upper, and to release the hold or gripe to feed for the next tack.

3. The fixed nail-tube or jaw C, provided with an under and side rasped surface, as described, against which the edge of the upper may be held either by the seizing-finger S or by the upward pressure of the hand, as may be desired, and herein specified.

4. The combination, in a lasting-machine, with the wide nose or fixed jaw C, of the narrow griping-finger S, operating as and for the purpose herein set forth.

5. In a machine for lasting boots and shoes, in which the upper is seized and held against a fixed jaw while the operator takes out the slack, a seizing or griping device, S, having a cushioned or yielding action to adapt it to different thicknesses of uppers.

6. The combination, with the fixed and movable griping-jaws for the upper, of the horizontal bar T, which carries the griping finger or jaw, the reacting-spring *t*, and the cam rack-bar U, which connects said griping-finger with the operating cam-shaft G and the treadle, as described, whereby the griping device co-operates with the feeding, severing, and nail-driving devices, to gripe and release the upper during the operation of lasting.

7. The combination, with the griping-finger S and its carrying-bar T, of the cushion-bearing *r*, and the cam rack-bar U *s*, as and for the purpose herein specified.

8. The combination, with the griping-finger or jaw S, of an independent lever device, *w*, connected therewith for operating said jaw, in connection with its automatic operating devices, and independently of them, for the purpose set forth.

9. In a machine for lasting boots and shoes, the combination, with a griping device which takes out the slack and presents the edge of the upper to receive the tacks, of a fulcrum or pry bar, *v*, against which the last is pressed to obtain greater leverage in taking the slack out of stout uppers.

10. In a lasting-machine, the feed-dog cutter *f*, operated by proper mechanism, to have a compound movement to enter the nail-passage, feed the continuous integral wire of headed tacks, and to sever the nail or tack from said wire, leaving said tack in position to be driven.

11. The combination, with a feed-dog cutter, *f*, which both feeds and cuts the nail or tack from a wire of integral headed nails or tacks, of a pin-support, *i*, within and across the wire-passage, against which the cutter acts to sever each nail or tack.

12. The combination, with the vertically-moving pendent feed-cutter arm J, of the fixed stud Q, against which the said arm acts to sever the tack at the limit of its feed.

13. The combination, with the vertically-moving pendent arm J, carrying the feed-dog cutter *f*, as described, and a spring, *g*, for bearing said pendent arm inward, of a nail-way or passage, open at one side for the entrance of said dog to feed the wire, as described.

14. The combination, with the vertically-moving pendent arm J, carrying a feed-dog cutter, *f*, as described, and an open nailway or passage, of the projection *h'* at the top of the open nailway, against which the arm strikes in rising to carry the feed-dog cutter out of the way of the driver in driving the severed tack or nail.

15. The combination, with the nailway or passage adapted to receive a continuous wire of integral nails or tacks, of a brake or spring presser, *n*, which, entering said passage, presses upon the wire, as and for the purpose stated.

16. The combination, with the pendent arm J, its cutter feed-dog *f*, and devices for controlling its ascent and descent with respect to the nail-wire, of the bell-crank lever K L and its operating-cam M, whereby said feed-cutter dog is operated vertically to make the feed.

17. In a machine for lasting shoes, which operates to drive tacks or pins while the upper is pressed against the fixed nose, a griping device for seizing the upper, so constructed and operated that the upper may be grasped and adjusted in any direction at pleasure, without removing it from contact with the nose, against which it is held, and without operating the tack-driving mechanism, substantially as described.

18. The feeding-point *f*, operated to have a downward and inward movement to feed and sever the nail, and a compound upward and outward movement of greater extent than the maximum length of the nail, whereby the feeder and cutter is adapted for different lengths of tacks less than double the length of the tack being driven.

In testimony whereof I have affixed my signature in the presence of two witnesses.

LOUIS GODDU.

Witnesses:

N. S. HOTCHKISS,

GEO. T. ANGELL.