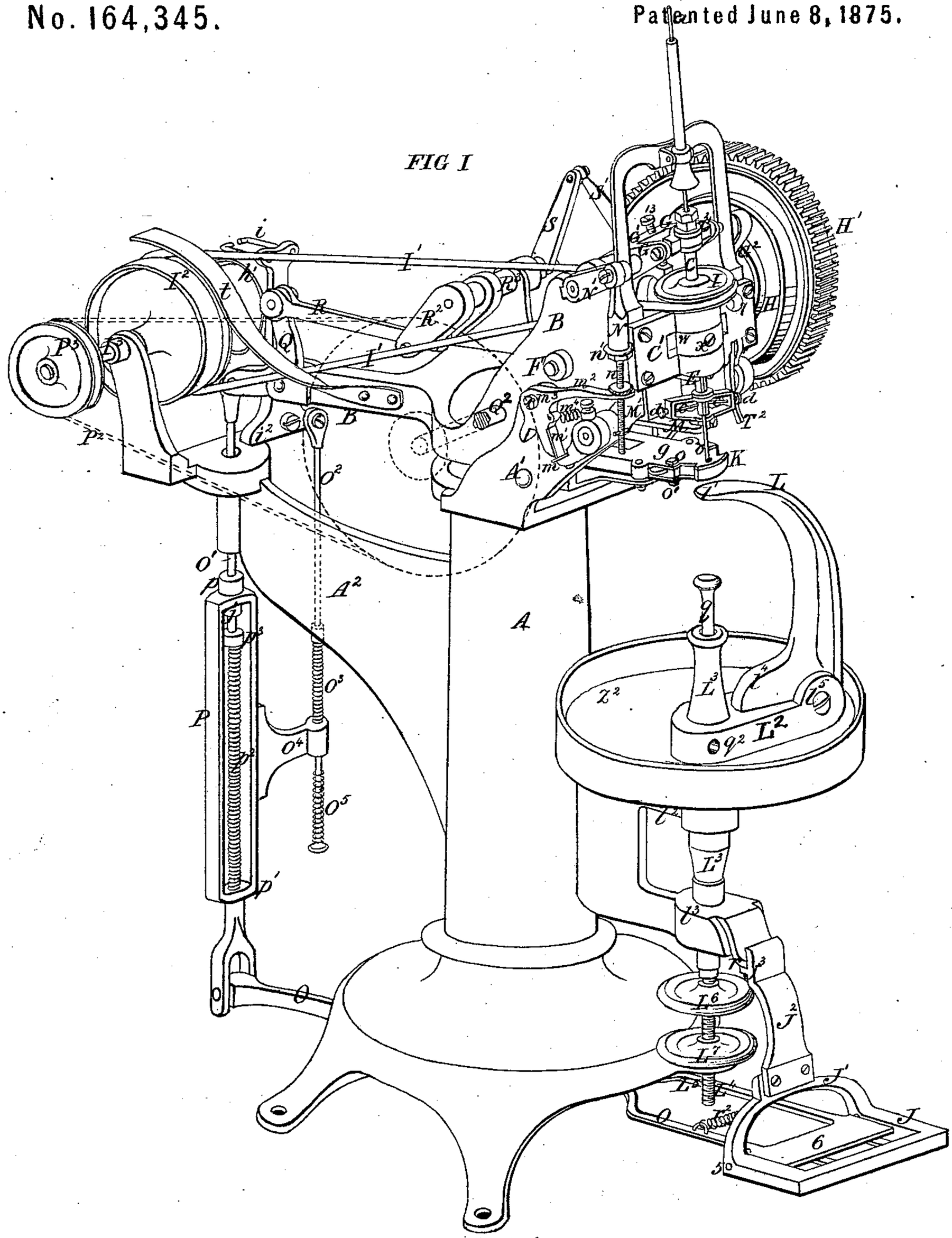
4 Sheets--Sheet 1.

C. TYSON.

Machine for Screwing the Uppers on to the Soles of Boots and Shoes.

No. 164,345. Patented June 8, 1875.

FIG I



WITNESSES

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4 Sheets--Sheet 2.

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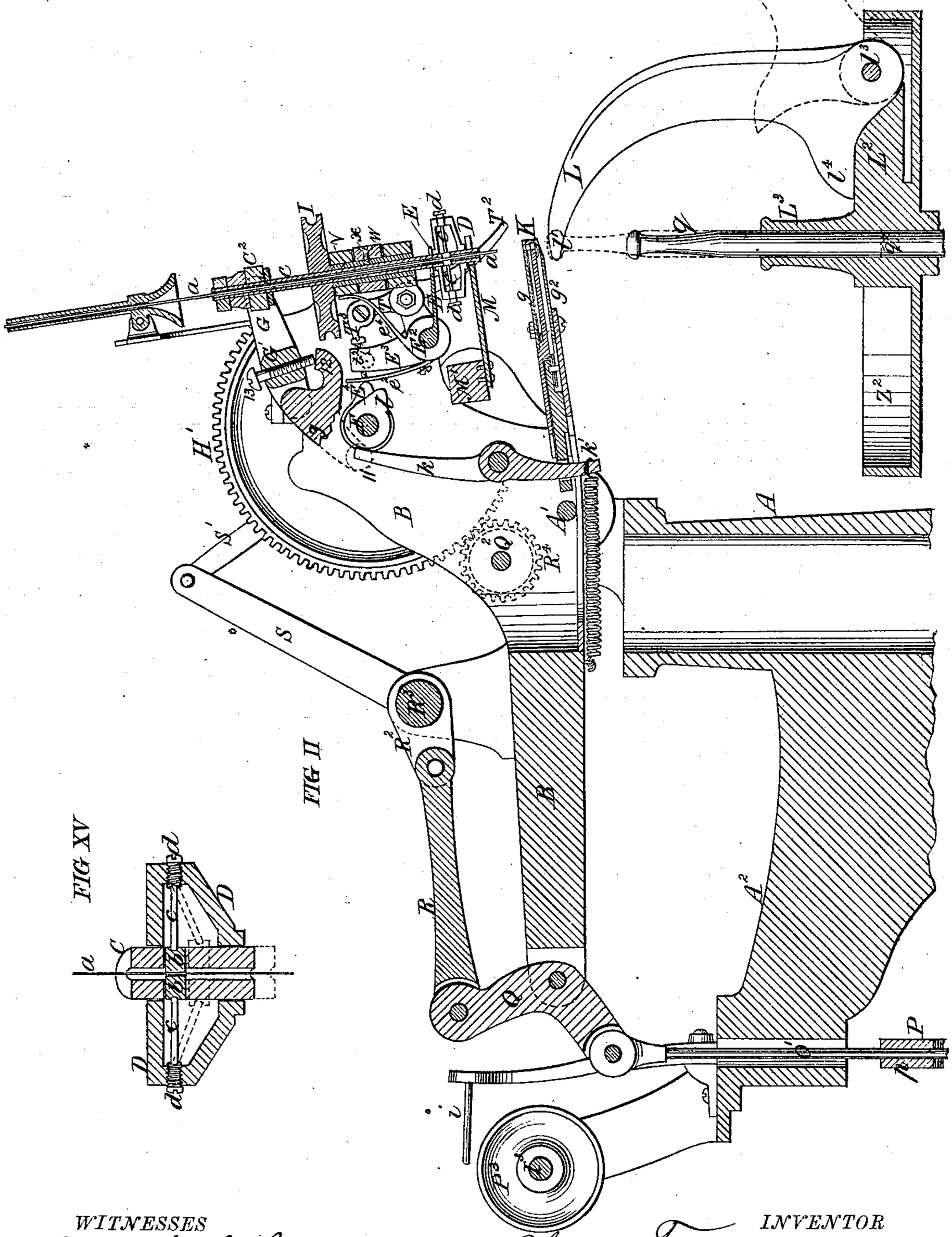

FIG II

FIG XV

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4 Sheets--Sheet 3.

C. TYSON.

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FIG VII

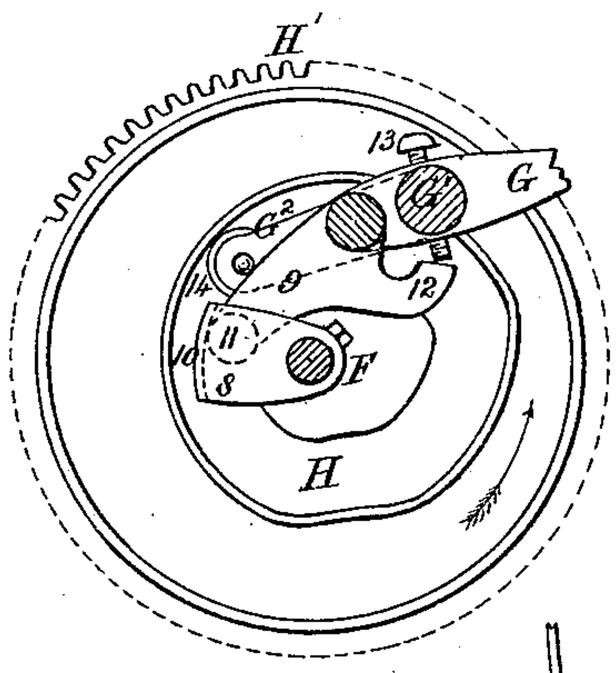


FIG VIII

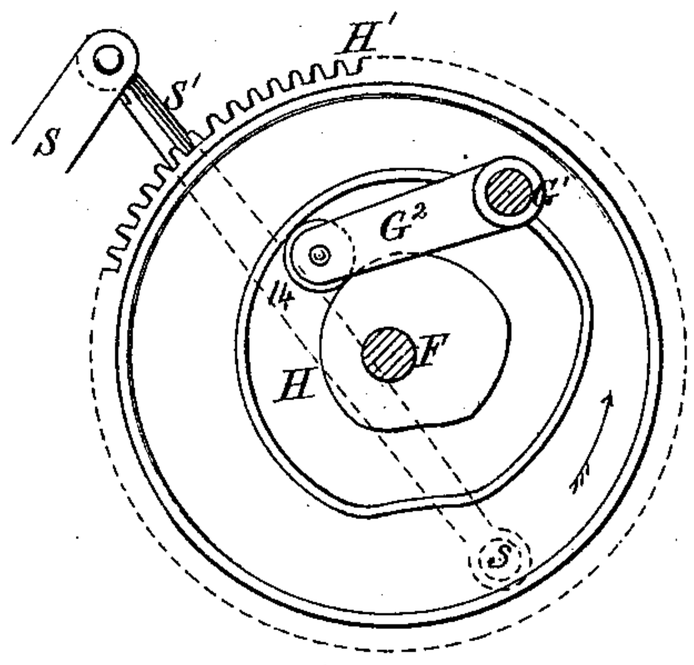


FIG III

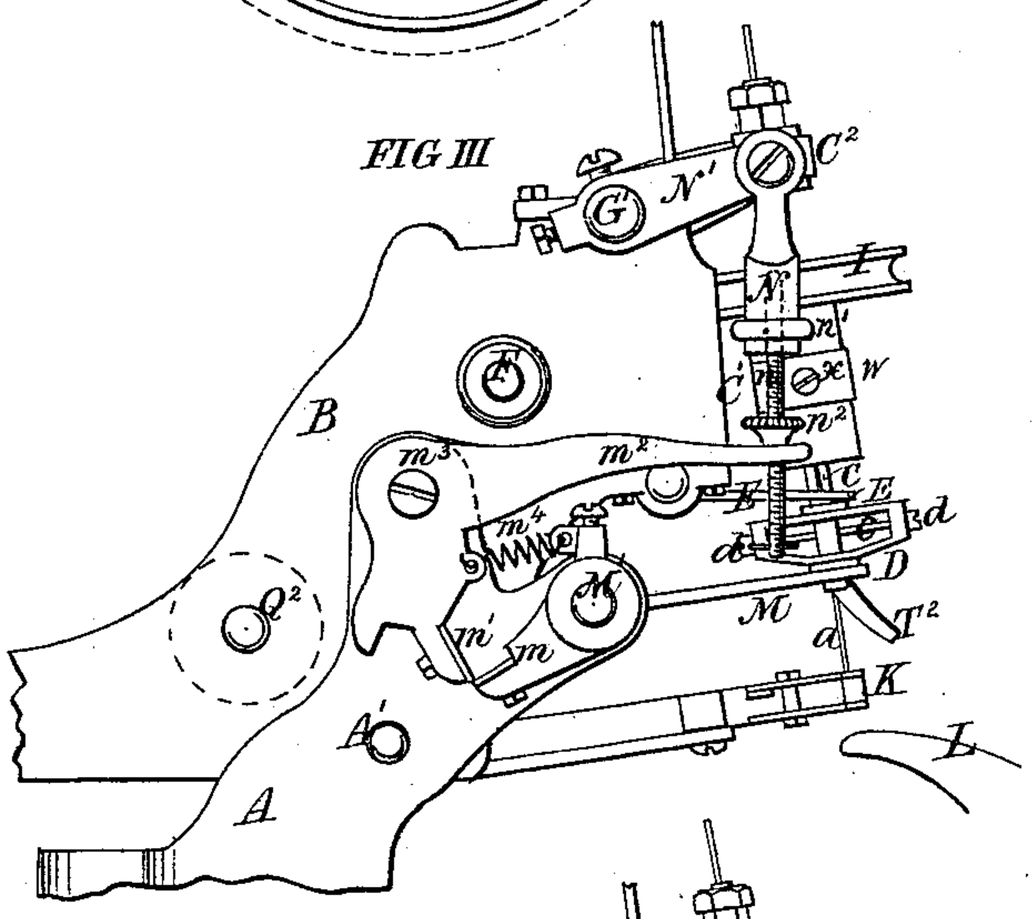


FIG VI

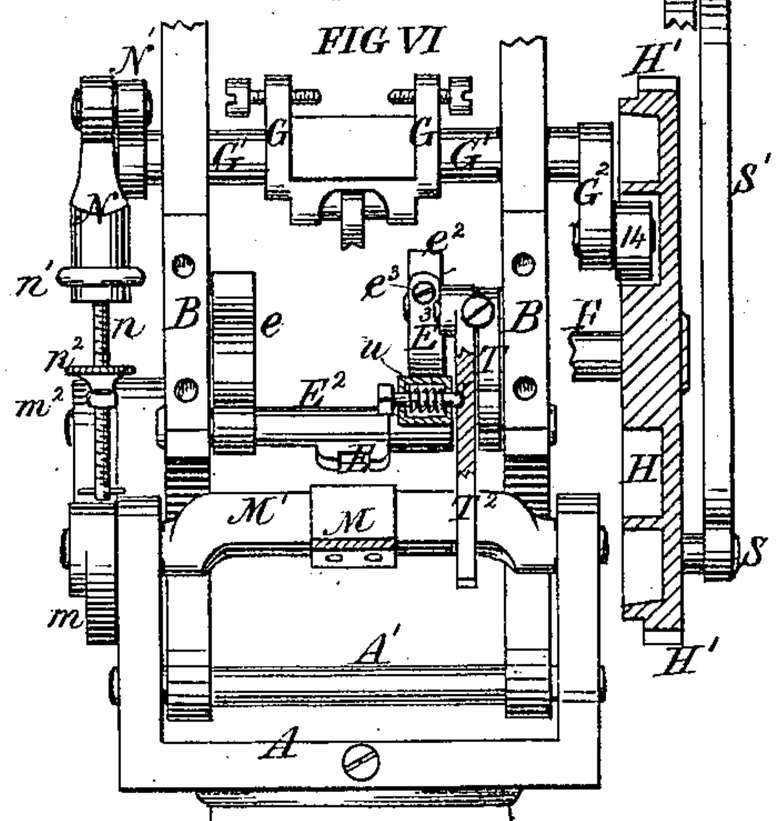


FIG IV

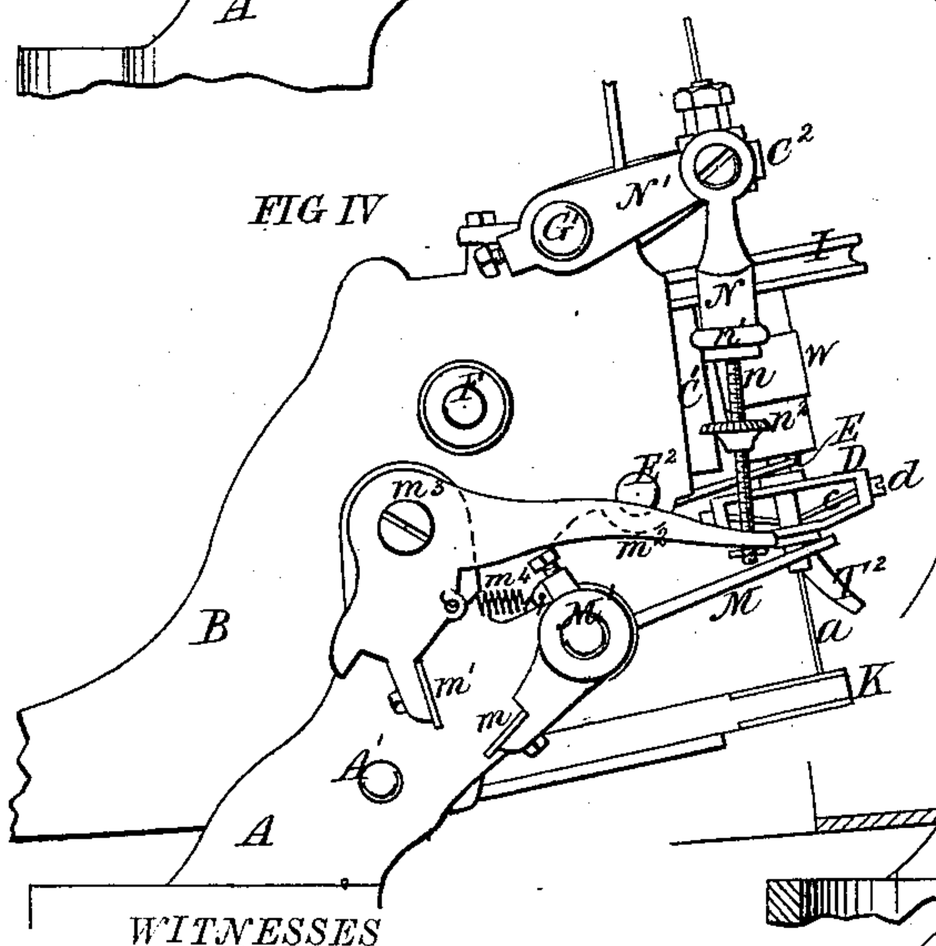
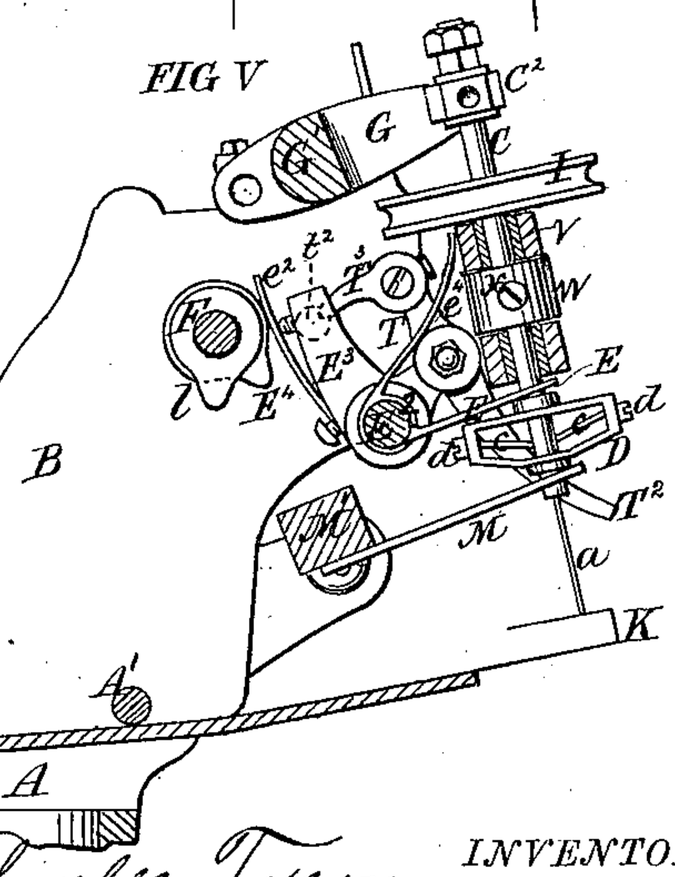


FIG V



WITNESSES

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4 Sheets--Sheet 4.

C. TYSON.

Machine for Screwing the Uppers on to the Soles of Boots and Shoes.

No. 164,345. *FIG IX* Patented June 8, 1875.

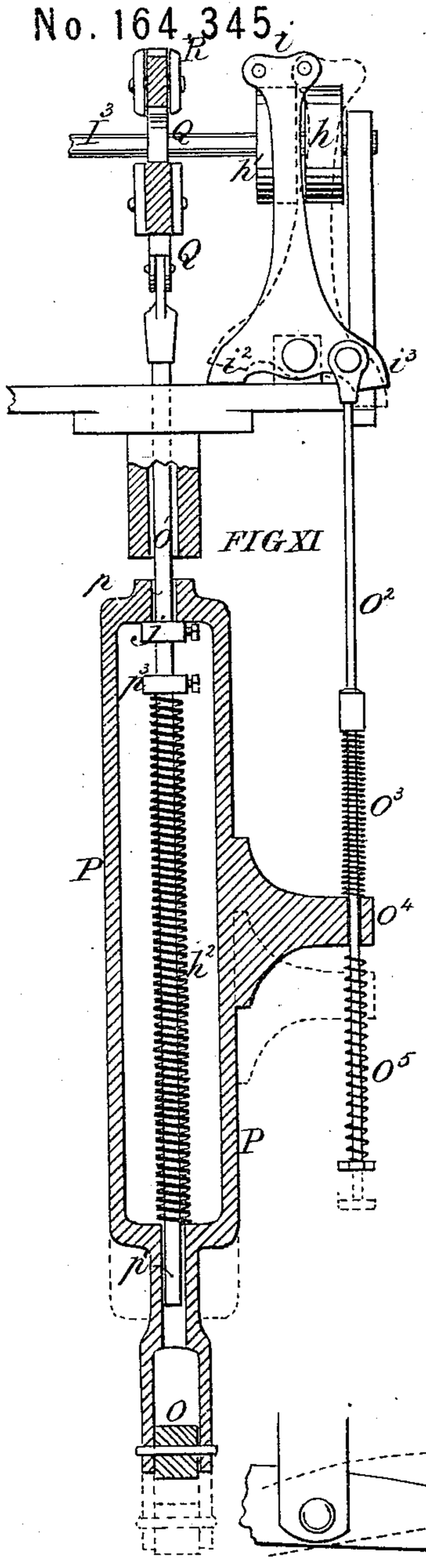


FIG XI

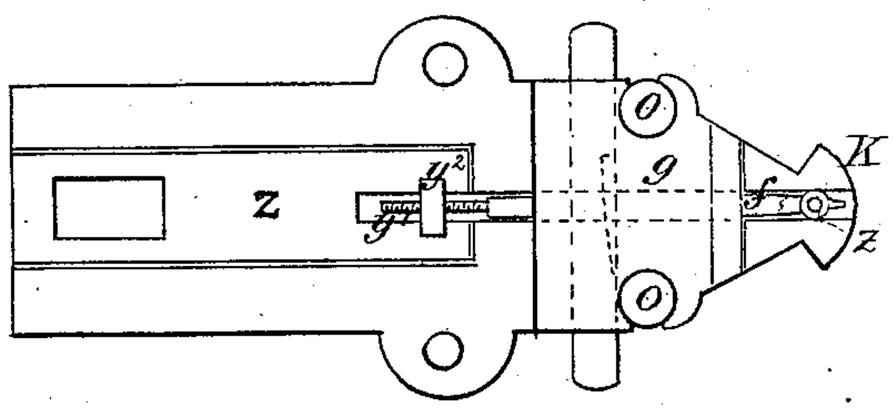


FIG X

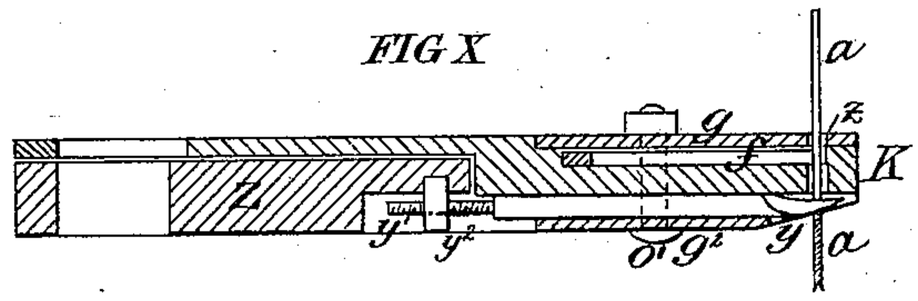


FIG XIV

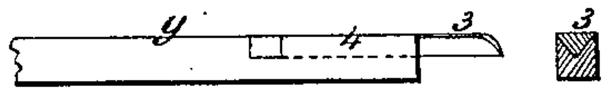


FIG XIII

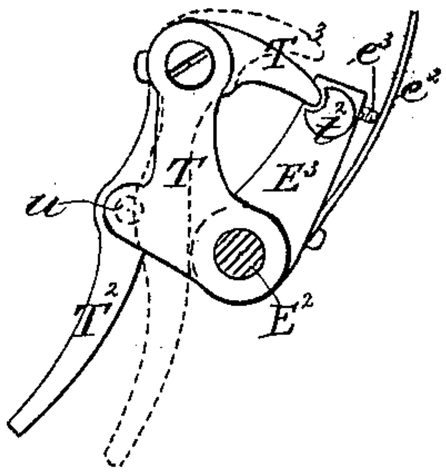
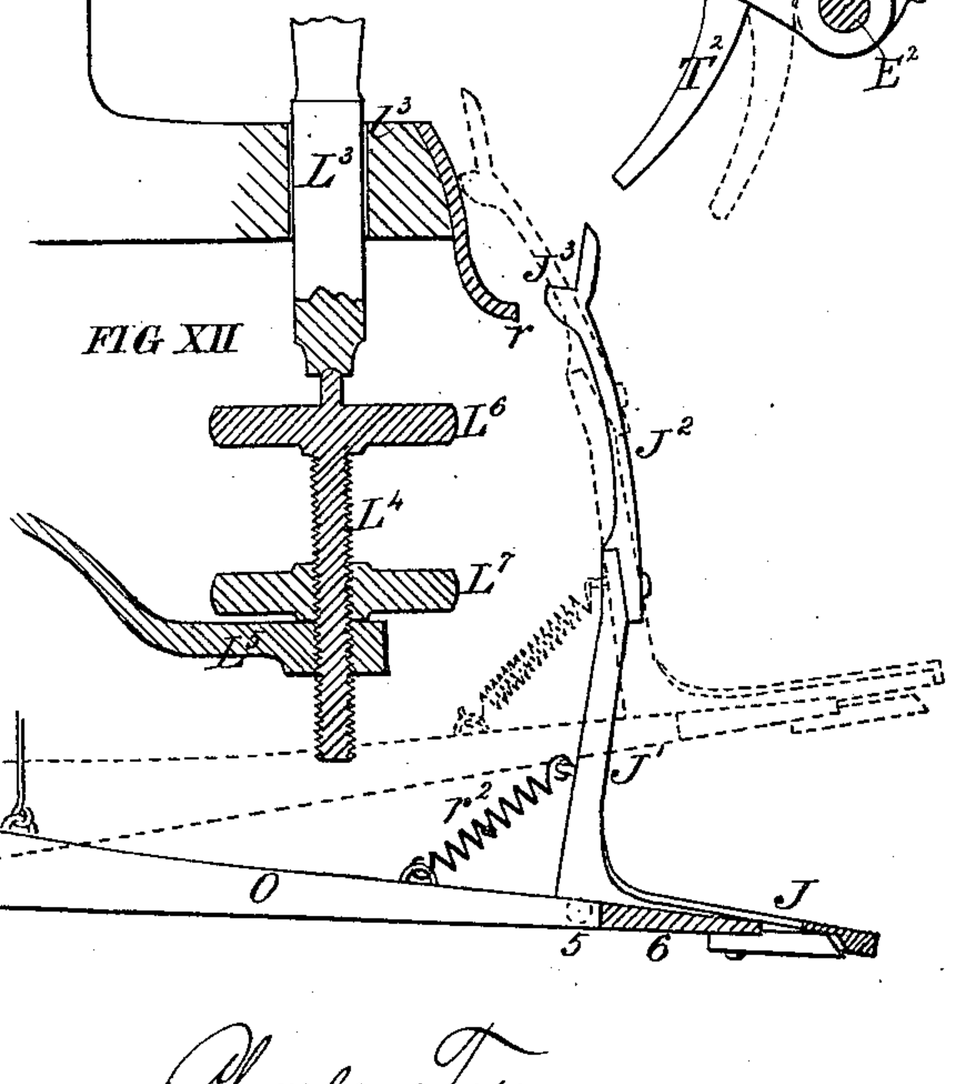


FIG XII



WITNESSES

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UNITED STATES PATENT OFFICE.

CHARLES TYSON, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO CHARLES D. BIGELOW, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN MACHINES FOR SCREWING THE UPPERS ONTO THE SOLES OF BOOTS AND SHOES.

Specification forming part of Letters Patent No. **164,345**, dated June 8, 1875; application filed May 20, 1875.

To all whom it may concern:

Be it known that I, CHARLES TYSON, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Screwing the Uppers to the Soles of Boots and Shoes; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

In a patent granted to me March 24, 1874, No. 149,007, for machine for screwing the uppers onto the soles of boots and shoes, I have described and claimed certain improvements by which the machine known as the Lemercier patent of 1862 is made automatic in its several operations of feeding the wire and forming the screw-threads thereon, driving the screws into the stock, and severing the proper lengths from the continuous wire to suit the varying thickness of the stock, by the co-operation of a clamp-depressor for griping the wire to make the feed; an arrester device for arresting the descent of the clamp to release the wire from further feed by the spindle; a work-pressing nose; and a work-supporting horn, the relative positions and movements of these several things harmonizing to feed and stop the feed to suit the thickness of the sole during the operation of inserting each screw.

My present improvements are designed to give greater efficiency to such machine, and to render it more perfect in its several operations, more durable, and to place it more completely under the control of the person manipulating the stock. These improvements embrace, among others, a toggle device operating in combination with the oscillating pivoted frame, the cam-wheel, and the yielding treadle-rod, to effect, by a positive action, the automatic alternate pressing and releasing action of the nose upon the stock during the operation. A hand stop-lever is employed in combination with the clamp-depressor, whereby the clamp-depressor may be detached from the action of its cam to control the operation of driving the screws at the will of the operator. A take-up device is combined with the action of the cam which drives the spindle, whereby any backlash or play is prevented at the time the clamp is set upon the wire, and the screw-threads thereby formed free of blanks or irregular threads, which such backlash would be liable to produce. A pivoted spring tread-latch is combined with the treadle and a fixed stop on the main frame, for joint operation with said treadle for holding the nose in working position with the horn, and allow the operator to have the freedom of his feet during the operation of screwing. A free connection of the spindle-connecting devices is made with the detent-arm, whereby the detent-points are caused to operate as an escapement with rigid coacting points, instead of a yielding and a fixed one combined, as in my said patent. A spring unites the coacting detent-points to bring both the latter and the arrester in their proper relative positions during the operation of the machine. A carrier for a yielding treadle-rod is combined with the pivoted oscillating frame and the treadle, and an adjustable stop-connection for obtaining a yielding pressure of the nose upon the work, and for compensating for different thicknesses of stock. A pan to catch and hold the brass cuttings is combined with the work-supporting horn.

In the accompanying drawings, Figure 1, Sheet 1, represents a view, in perspective, of a screw soling-machine embracing my invention; Fig. 2, Sheet 2, a vertical section of the upper portion thereof, the parts occupying the position they do in driving the screw and just before releasing it from further feed; Fig. 3, Sheet 3, an elevation of the detent and spindle screwing devices in the positions shown in Fig. 2; Fig. 4, same sheet, a similar view, showing the detent and screwing devices in the positions they occupy before the clamping of the wire; Fig. 5, same sheet, a section with the parts in position shown in Fig. 4; Fig. 6, same sheet, a front elevation with the guide-head plate and spindle removed and the grooved cam-wheel in section; Fig. 7, same sheet, a view showing the take-up device for the spindle in connection with the spindle operating

cam; Fig. 8, same sheet, the spindle-operating cam, showing the jointed-arm connection therewith for operating the oscillating frame; Figs. 9 and 10, Sheet 4, bottom and sectional views of the work-pressing nose; Fig. 11, same sheet, a view showing the treadle-rod, its frame-carrier and the connected band-shifter; Fig. 12, same sheet, a view showing the treadle spring-catch; Fig. 13, same sheet, a view of the stop hand-lever device of the depressor; Fig. 14, same sheet, the wire-cutter; and Fig. 15, Sheet 2, a sectional view of the automatic feed-clamping device for the wire.

Upon a fixed standard, A, a horizontal oscillating frame, B, is pivoted at A^1, and arranged to carry several of the operating parts of the machine. The spindle C is carried by this frame and forms the guide for the wire *a*, and is mounted at the front of said pivoted oscillating frame. This spindle has a rotary and axial movement to form the screw upon the wire and screw it into the material. The spindle carries at its lower end an automatic clamp for laying hold of the wire while cutting the screw and screwing it home, and the fixed frame A carries a device for automatically releasing the clamp after the wire has been driven home. In the combination and co-operation of the screwing-spindle with the clamp-slide D the latter is free to be moved up and down upon the spindle, and is constructed and operated as described in my said patent. This clamping device D is moved by and between an upper and a lower automatic device. The clamping of the wire holds it firmly while cutting the screw and driving it into the sole, and the clamp-head revolves with the spindle by its toggle-connection therewith. The clamping movement of the jaws *b b* is effected by a lever-depressor, E, Figs. 1, 2, and 6, fixed to and projecting from a rock-shaft, E^2, mounted in the pivoted frame B, so that its front forked end will straddle the spindle C above the clamp. The normal position of this arrester is horizontal, and it is held up against the lower edge of the guide-head C′ by a spring, *e*, Fig. 6, fixed to said rock-shaft E^2, so as to bear against the inner side of said guide-head. An arm, E^3, is mounted loosely upon this rock-shaft E^2, and is faced with a steel bearing-piece, e^2, Figs. 5 and 13, made adjustable by a set-screw, e^3, for wear, to receive the action of a cam, E^4, Figs. 2 and 5, on the cam-shaft F, carried by the pivoted frame.

The bearing piece e^2 is held in position to receive the action of the cam E^4 by a spring, e^4, Fig. 2, fixed to the hub of the arm E^3, and bearing against the inner side of the guide-head. Combined with this arm E^3 is a lever-locking device, fixed upon the rock-shaft E^2, for locking the loose arm E^3 to said rock-shaft E^2, so that the arm E^3 will receive the action of the cam E^4 to depress the lever E, at each revolution of said cam, upon and force down the clamp D to bite the wire to cause the spindle to form and drive each screw. The function of this locking device to release the arm E^3 from the action of the cam E^4 and its purpose will be stated hereinafter. The spindle is suspended from horizontal arms G G, mounted on a rock-shaft, G^1, which is operated by an arm, G^2, which receives a vibratory motion from a grooved cam, H, upon the face of a cog-wheel, H′, on the cam-shaft F, and thereby gives to the spindle its rising and driving movement, the cam H being of such form as to make the descent of the spindle gradual, and commencing just after the wire is clamped, and the ascent of the spindle to take place just after the screw is cut from the wire. The rotary motion of the spindle to cut and screw is produced by a sleeved pulley, I, driven continuously by a band, I^1, leading to a pulley, I^2, on the driving-power shaft I^3 at the rear of the frame. The pulley-sleeve *v* is secured in the guide-head, and the spindle has an axial movement therein to drive the screw while being revolved to cut the thread. The nose K projects forward from the under side of the pivoted frame B, and, during the above-stated operations of the spindle, the nose is brought down upon and firmly holds the work upon a beak-iron or horn, L, sustained in proper position for the purpose. This work-pressing nose carries both the screw-chaser and the cut-off for the wire. The unclamping movement of the clamp-head D is effected by a forked gage or arrester, M, mounted upon a rock-shaft, M′, in the fixed frame, and held by an escapement-detent in a fixed position between the clamp-head and the nose K to arrest the descent of the clamp-head and release the jaws *b b* from the wire, while the spindle continues its descent to the full length of its movement, which must be sufficient for the longest screw required. Immediately after releasing the clamp D the arrester is tripped, and is moved down out of the way by the still descending spindle. The device for holding and tripping the arrester M consists of a stop-projection, *m*, on the left end of the rock-shaft M′, and which is held in its fixed position by a detent, m^1, carried by an arm, m^2, pivoted at m^3 upon the fixed frame, and connected by an adjustable link, N, to an arm, N′, upon the rock-shaft G^1, which elevates and depresses the spindle through the cam H. The arm N′ must be of the same length and in the same radial position, or nearly so, as the arms G, which carry the spindle, to insure an equal movement of the detent-arm m^2 with that of the spindle-carrying arms. The point of the stop-projection *m* bears against the point of the detent m^1 to hold the arrester, as shown in Fig. 3, and as the arm m^2 is forced down by the arm N′ the detent m^1 moves back and leaves the stop *m* free to rise and the arrester to descend. The acting flat surfaces of the stop and detent are faced with steel to prevent wear.

The stop and detent move in the arcs of circles from their respective centers, and they are connected to each other by a coil-spring, m^4, the action of which tends to elevate the

arrester to receive the action of the clamp; but the descent of the clamp with the spindle brings up the stop-point *m*, and by the spring-connection the detent is also brought up until the point *m* abuts against the detent m^1, and the arrester is thereby held fast until the detent m^1 is tripped to allow the arrester to be free to move down out of the way of the spindle-clamp by the forcing down of the detent-arm m^2. This action takes place always when the spindle has descended a distance equal to that between the nose K and the beak-iron L, and which is always governed by the thickness of the stock upon which the nose bears. The detent-arm m^2 has a free connection with the adjustable link N, to allow it to have a free movement and no wearing parts; and the link is adjusted by a screw-rod, *n*, screwed into the link, and secured at its proper adjustment by a lock-nut, n^1, said screw-rod *n* being provided with a button, n^2, which acts upon the end of the detent-arm m^2, to depress it to effect the tripping action of the detent. The relative positions and angles of the stop and the detent must be such as to effect the action stated with accuracy. After the spindle has made its full descent it is raised, and with it the clamp, by the cam H. The arrester follows the clamp-head up to bring it in position to be again caught by the detent, and the clamp-head is at the same time brought into position to again clamp the wire.

In Fig. 3, the detent device is shown in the position just before the escapement takes place, and while holding the arrester to act upon and release the clamping device; and in Fig. 4, the positions of the parts are shown after the escapement has taken place and the wire released, and while the screwing-spindle is making its full descent. This detent and its connection with the working parts of the machine being fully described in my said patent, a detail description is not deemed necessary in this patent.

The length of the screw is severed to suit varying thicknesses of work and of the sole, such as the shank of the sole, which requires a shorter screw, in the manner also pointed out in said patent.

The beak-iron is adjusted in the manner and for the purposes stated in my said patent in relation to the nose. The nose is brought into position over and near the material upon the beak-iron L by a treadle, O, pivoted at the base of the frame, and acting through a rod, O^1, to depress the front end of the pivoted frame which carries said nose. This action of the treadle O at the same time shifts the driving-belt from a loose pulley, *h*, to a fixed pulley, *h'*, as shown in Fig. 11, upon the driving-shaft I^3, and thereby revolves the spindle, and puts in motion the operating mechanism of the oscillating frame. The treadle-rod O^1 is carried by an open frame, P, pivoted to the rear end of the treadle O, and the treadle-rod O^1 has a free movement within the open frame by passing through a guide-opening, *p*, at its upper end, and into a socket-guide, p^1, near its lower end.

A coil-spring, p^2, surrounds the treadle-rod, and, bearing upon the lower end of the open frame, constantly tends to depress the nose when in working position. This spring has its upper end confined by an adjustable stop, p^3, clamped to said rod by a screw, while the ascent of the treadle-rod is limited by an adjustable stop, *j*, bearing against the under side of the open frame. This treadle-rod O^1 is connected to one arm of a bell-crank lever, Q, pivoted to the rear end of the oscillating frame, and united by its other arm to a yielding frame or toggle-lever, R, connected with a crank-arm, R^2, mounted on a short shaft, R^3, on the oscillating frame, and operated by a jointed rod, S S', connected with a crank-pin, *s*, on the outer face of the cam gear-wheel H'. This construction makes a fixed connection and gives simple, effective, and easy motions to the oscillating frame. By this construction the nose has a descent within fixed limits, and yet by its yielding treadle-rod O^1 it is allowed to press alike upon the sole without regard to its thickness, as the spring p^2 of the treadle-rod forms a resisting force (the treadle being held by a catch) and yields when the nose presses upon the sole, and thus compensates for any inequality in the thickness of the sole while pressing upon it. The nose holds the work by the action of the jointed rods and the toggle-lever connections with the treadle-rod O^1, and the nose is so held during the descent of the screwing-spindle, which is while the cam-shaft is making a half-revolution. In this movement the toggle-lever R is held in a horizontal position by means of the toggle-crank R^2 being so fixed upon its shaft, and the jointed rods S S' being so connected with the crank-pin *s* of the cam-wheel that they will be held stationary during a half-revolution of said cam-wheel pin. The jointed-rod connection with said wheel-pin effects this result, by moving with the crank-pin *s* without giving motion to its connected rods S S' on the toggle-crank shaft. In this way the nose is held upon the work until the screw is driven and clinched by the descent of the spindle, by the cam acting upon the armed rock-shaft G^1, which carries it. The band-shifter *i* is pivoted upon the fixed frame, and connected by a side rod, O^2, to the open treadle-rod frame P by an arm, O^4, through which the side rod O^2 passes. The shifter has two arms, i^2 and i^3, at its lower end, and is pivoted to the frame between these arms, to one of which, i^3, the side rod O^2 is connected, and forms a stop to limit the movement of the band upon the loose pulley, while the other forms a stop to limit the movement of the shifter to bring the band onto the fixed pulley. The shifter-rod O^2 is provided with two springs, O^3 and O^5, one above and the other below the arm O^4 of the open frame. The lower spring O^5 is to cushion the descent of the treadle-rod frame P in

shifting the band from the loose to the fixed pulley; and the upper one O^3 is to cushion the movement of the treadle-rod frame in shifting the band upon the fixed pulley when the nose is brought down for work. The spring-rod connection also allows the shifter to be shifted by hand, to stop the machine without disturbing the holding position of the nose; and a piece of iron put under the stop-arm i^2 will hold the shifter in the position just stated, and shown by dotted lines in Fig. 11, so that the nose can be raised and lowered to make adjustments, and for examining the machine without disturbing the shifter. A belt, P^2, from the pulley P^3 on the driving-shaft I^3 gives motion to a shaft, Q^2, a pinion, R^4, Fig. 2, on which, matches with the cog-wheel H′ of the cam-shaft, and thus automatically operates the several parts.

The screw-chaser *f* is made adjustable, and is arranged on the upper side of the nose, which has a vertical opening, *z*, through it, for the passage of the wire in contact with the screw-chaser. The cutter *y*, for cutting off the screw, is arranged in the under side of the nose, and united to a slide, Z, by which the cutter is connected to a lever, *k k′*, pivoted in the tilting-frame, and operated by a cam, *l*, Fig. 2. The stem y^1 of the cutter has a screw-thread, and is screwed into a nut, y^2, Figs. 9 and 10, fixed in the slide Z, whereby the cutter is held in place, and may be removed and replaced when necessary. The cutter itself is a steel point, 3, with a short shank, 4, and the stem y^1 has a groove, into which the shank 4 is soldered. (See Fig. 14.) This gives the advantage of replacing the cutter when broken without requiring a new stem, and as the cutter is required to be as light or thin as possible to make a close cut, it is liable to be broken. Its replacement in this way is of special advantage, and is effected by removing the stem, unsoldering the broken cutter, and soldering another in the stem-socket. The beak-iron L is arranged so that its acting-point *l* will be directly below the nose K. It is pivoted at its lower end to a horizontal arm, L^2, so as to be turned back out of the way. This pivoted horn is for use in screwing on the soles, and, being of metal, clinches the inner ends of the screws when the latter strikes it as they are screwed home. The horn is turned back out of the way upon its pivot l^5 when the sole-work is finished, and the heel portion of the soles are supported for operation by a post, *q*, which fits snugly within a deep socket in the vertical stem L^3, and which is elevated and supported within said socket at the proper height by a pin passing through the arm L^2 and stem at q^2, beneath the post. A horizontal pan, Z^2, is fixed upon the stem L^3, so as to catch and hold the cuttings made in forming the screw-threads upon the wire.

I have combined with the treadle a foot-latch, J, which operates automatically in connection with a stop, *r*, on the main frame to hold the nose down to its working position, whereby the operator has perfect freedom of his feet during the operation of driving the screw. This foot-latch J is pivoted to the treadle at 5, and consists of an angular frame, which borders the foot-piece of the treadle on a level therewith, and a connecting-bow, J^1, rising from the arms, in position to support and bring the latch-arm J^2, with its shoulder J^3, in front of the curved stop *r*, upon which it constantly bears by the action of a spring, r^2, attached to the treadle and the bow of the foot-frame. The latch-arm shoulder J^3 when the treadle is depressed, passes beneath the stop *r*, and thus holds the treadle in the fixed position.

In depressing the treadle, the operator presses with the toe portion of his foot upon the plate 6 of the treadle, which leaves the catch free to pass under the stop and hold the nose down.

To release the treadle the operator presses his foot upon the front bar of the catch-frame to move the stop J^3 out enough to clear the stop *r*, as shown in Fig. 12, and the treadle, being then pulled up by a spring in the standard A, instantly shifts the driving-band by the shifter *i* from the fixed to the loose pulley and stops the machine.

A brake-arm, *t*, is fixed to the rear portion of the oscillating frame, in a position to bear upon the pulley I^2, and to stop the machine when the treadle is released by the elevation of the nose. The depression of the nose instantly raises the brake and releases the driving-pulley I^2.

To give the operator control over the clamping and feeding of the wire without stopping the machine, I have combined with the loose lever E^3 on the depressor-shaft E^2, an arm, T, fixed thereon, and carrying a pivoted hand-lever, T^2, provided with a hook-end, T^3, and arranged in such position as to bear upon a lateral projection, t^2, of the loose lever E^3, and thus lock the two together, so that the cam E^4 will operate the depressor at each revolution. This locking of the loose lever to its shaft is effected by locking the pivoted hand-lever T^2 to the fixed arm T by means of a spring-pin, *u*, Fig. 6, fitted in the arm T, so as to catch into a shallow cavity in the side of the hand-lever below its pivot when said lever is pulled out, as shown in Fig. 13, Sheet 4, in which position the hook end T^3 of the hand-lever T^2 bears against the lateral projection t^2 of the loose lever. The face of this lateral projection has a groove to receive the hook end T^3, and insure its proper working.

To unlock the loose lever E^3, so that it will not operate the depressor-shaft, the hand-lever T^2 is forced in to disengage it with the spring-pin *u*, and raise the hook end above the range of motion of the lateral projection t^2, as shown by dotted lines in Fig. 13, and thereby suspend the action of the depressor, and give the operator control of the screw-driving operation at will, independent of the running of the machine.

This is of very special advantage, as it may happen that the operator gets the work in a wrong position to receive the screw; and, moreover, it gives the advantage of running the machine by a person less skilled at the work.

The handle of the pivoted lever T^2 extends downward just below the spindle guide-head, and in convenient reach of the operator's thumb or finger, to push it in or pull it out over the spring-pin while he still holds the work with both hands. In thus throwing the clamp-depressor out of action the detent device will work without contact, and thereby save much wear of these parts.

The fixed arm T has a projection, which carries the spring-pin *u*, and the lever works in a slot in said projection to hold it in proper position with said pin, whether locked with it or disengaged from it. The guide-head plate C^1 has a hole, 7, through which to insert a screw-driver to adjust the bearing-plate e^2 of the loose lever E^3, for the action of the cam.

The working of the roller of the rock-shaft arm G^2 in the grooved cam H will necessarily cause some lost motion or backlash by wear of these parts in the movement of the spindle at the time the clamp is set upon the wire, and thereby be liable to cause some blanks or inequalities in the screw-threads by reason of a want of perfect unison in the vertical and rotary movements of the spindle. To prevent such lost motion or backlash I combine an adjustable take-up flanged cam, 8, on the cam-shaft F, with an adjustable arm, 9, on the rock-shaft G^1, (see Fig. 7, Sheet 3,) in such manner that as the take-up cam 8 revolves its flange-lip 10 engages with a pin, 11, on the adjustable arm 9, and takes up any lost motion or play at the time the spindle and its clamp are being forced down. The take-up arm 9 is pivoted between short arms on the rear side of the rock-shaft G^1, and has a branch arm, 12, extending back, and bears upon an adjusting-screw, 13, passing through the rock-shaft G^1, by which to hold the pin-end of the arm 9, and adjust it out to compensate for any wear in the parts, and to keep the pin 11 up against the flange 10 of the take-up cam.

When the spindle is descending, the inner face of the grooved cam H will act against the roller 14, and thus any play there may be will work no detriment; but when the depressor is forcing down the clamp-head D the strain will be such as to cause the roller 14 to be forced against the outer face of the cam, and thus there would be lost motion were it not for the action of the take-up cam.

In operating the machine, the operator places the work upon the horn or the post, as may be, and depresses the treadle O, to bring the nose K down near the sole, but not upon it, the treadle determining such descent and interlocks the projection J^3 with catch *r*, and holds the nose in such position that it will not be required to move so great a distance for action upon the work. This movement simultaneously shifts the band from the loose to the fixed pulley *h'*, and the screwing-spindle and the cam-shaft F are set revolving by the bands I^1 and P^2. The nose then descends to hold the work by the action of the toggle-lever R, in connection with the spring-rod O^1 of the treadle and the jointed rods S S' of the cam-gear wheel H'. In this position the nose is held during the descent of the screwing-spindle, which is effected by the grooved cam. As soon as the spindle commences its descent with the clamp the depressor E also commences its descent by the action of the cam E^4, and, moving more rapidly than the spindle, overtakes and forces the clamp down to gripe and hold the wire firm with the spindle. The depresser is then released from its cam, and the spindle and clamp continue their descent during a half-revolution of the cam-shaft by the action of the connecting-arms G G^2, forcing the wire through the opening *z* in the nose and cuts the thread, and drives the screw through the sole and against the horn. At this point the clamp-head has pressed upon the arrester M sufficiently to release the jaws *b b* and release the wire. This action of the arrester primarily determines the length of the screw to suit the thickness of the sole, and at this point the arrester is set free by the tripping of the detent m^1, by the joint action of the arms m^2 N N' connecting with the spindle-driving rock-shaft G^1. The action of the arrester M is always governed by the thickness of the stock between the nose and the horn L, and the clamp will continue to drive the screw during that portion of the descent of the spindle which will be equal to the thickness of the stock. As the nose has more or less working action, according to the thickness of the stock, so will the detent-link connection N be brought down a portion of the distance required to effect the release of the arrester, as described. The arrester, being free, descends with the clamp D, and the spindle continues the remainder of its descent idly.

The cutter y^3 is driven forward by the cam *l* and levers *k k'*, and cuts off the screw after it has been fully driven. The cam H at this point acts upon the roller-arm G^2 to elevate the screwing-spindle and at the same moment, and in unison therewith, the crank-pin *s* of the cam-wheel H' operates through its jointed rods S S' to flex the toggle-lever R, and thereby depress the rear end of the tilting-frame and elevate the nose.

In this way both sides of the sole are screwed from shank to shank, the beak-iron being swung round to turn the toe.

The machine is stopped by pressing upon the outer bar of the treadle-catch J, which moves the latter from the catch *r*, and the spring-rod O^2 instantly shifts the band, and the treadle-rod, being depressed, raises the nose and applies the brake.

In working upon the heel portion of the sole the beak-iron is turned back, as shown by

dotted lines in Fig. 2, and the stem-post *q* raised and supported in its socket.

The following is claimed as new in sole-screwing machines, namely:

1. The combination, with the pivoted oscillating frame B, of a toggle-crank device carried thereby, and having a crank-pin connection with the cam-shaft F, and a lever-joint connection with the yielding treadle-rod O^1, to effect the automatic alternate pressing and releasing action of the nose upon the stock, essentially as herein set forth.

2. The combination, with the treadle O and the oscillating frame B, of a yielding treadle-rod, O^1, having a stop, *j*, and the lever device Q, for uniting said oscillating frame by a positive connection, and form a yielding resistance by the treadle-rod, to compensate for the varying thicknesses of stock pressed by the nose, substantially as herein set forth.

3. The combination, with the clamp-depressor E, by means of which the wire is clamped to the spindle, of a hand stop-lever device, whereby the operator is enabled to relieve the clamp-depressor from the action of the cam E^4, and control the operation of driving the screws without stopping the machine.

4. The combination, with the hand controlling-lever device T^2 T^3, and its spring-pin *u*, of the fixed and loose arms T E^3, and the interlocking projection t^2, whereby the fixed and loose arms are locked and unlocked to receive the action of the cam E^4 to operate the clamp-depressor E, and to render such action non-effective in relation to the depressor, as set forth.

5. The combination, with the spindle and its operating-cam H, connected for operation substantially as described, of a take-up device, whereby any backlash or play of the spindle is prevented while cutting the screws, and the latter thereby formed free of blanks or irregular threads.

6. The combination, with the cam H, the spindle C, and the rock-shaft connection therewith, of the take-up cam 8, and an adjustable lever, 9, on said rock-shaft, whereby to effect a perfect adjustment in preventing backlash of the screwing-spindle, substantially as herein set forth.

7. The combination, with the treadle O and a fixed stop, *r*, of a pivoted spring-treadle latch, for joint operation with said treadle, substantially as and for the purpose stated.

8. The combination, with the pivoted oscillating frame, the nose which it carries, and the treadle O O^1 of the pivoted spring-treadle latch J J^3, and the fixed stop *r*, substantially as and for the purpose herein set forth.

9. The combination, with the spindle-connecting devices, and the rod N *n*, uniting the detent therewith, of the detent-arm m^2, having a free or sliding connection upon the rod *n*, whereby the detent-points are caused to operate as an escapement with rigid coacting-points, as herein set forth, and for the purpose stated.

10. The combination, with the detent-carriers, of the connecting-spring m^4 and the arresting device M, whereby both the detent and the arrester are held in proper positions for joint operation.

11. The combination, with the treadle O, and its yielding rod O^1, of the carrier-frame P, having a movement with the treadle-rod O and the band-shifter O^2, and a slight movement independent of them when the treadle is depressed, as set forth, and for the purpose stated.

12. The combination, with the pivoted oscillating frame, and its pressing-nose, of the yielding treadle-rod O, its adjustable stop *j*, and the carrier-frame P, connected and operating substantially as and for the purpose set forth.

13. The combination of the pivoted band-shifter *i*, and the stops i^2 i^3 with the rod O^2, its springs O^3 and O^5, and the treadle, for the purpose stated.

14. The combination, with the rotatable work-supporting horn L, of a guard-pan, Z^2, to catch and hold the brass cuttings, as described.

15. In a sole-screwing machine, the combination, with the cutter-stem *y*, of the separate cutter-point 3, having its shank 4 soldered in an open angular socket in the stem, to render the cutter-point solid, and allow it to be removed and renewed when broken, and without requiring a new cutter-stem.

In testimony that I claim the foregoing I have affixed my signature in presence of two witnesses.

CHARLES TYSON.

Witnesses:

A. E. H. JOHNSON,

J. W. HAMILTON JOHNSON.