3 Sheets--Sheet 1.

E. WOODWARD.

Pegging-Machines for Boots and Shoes.

No. 135,681. Patented Feb. 11, 1873.

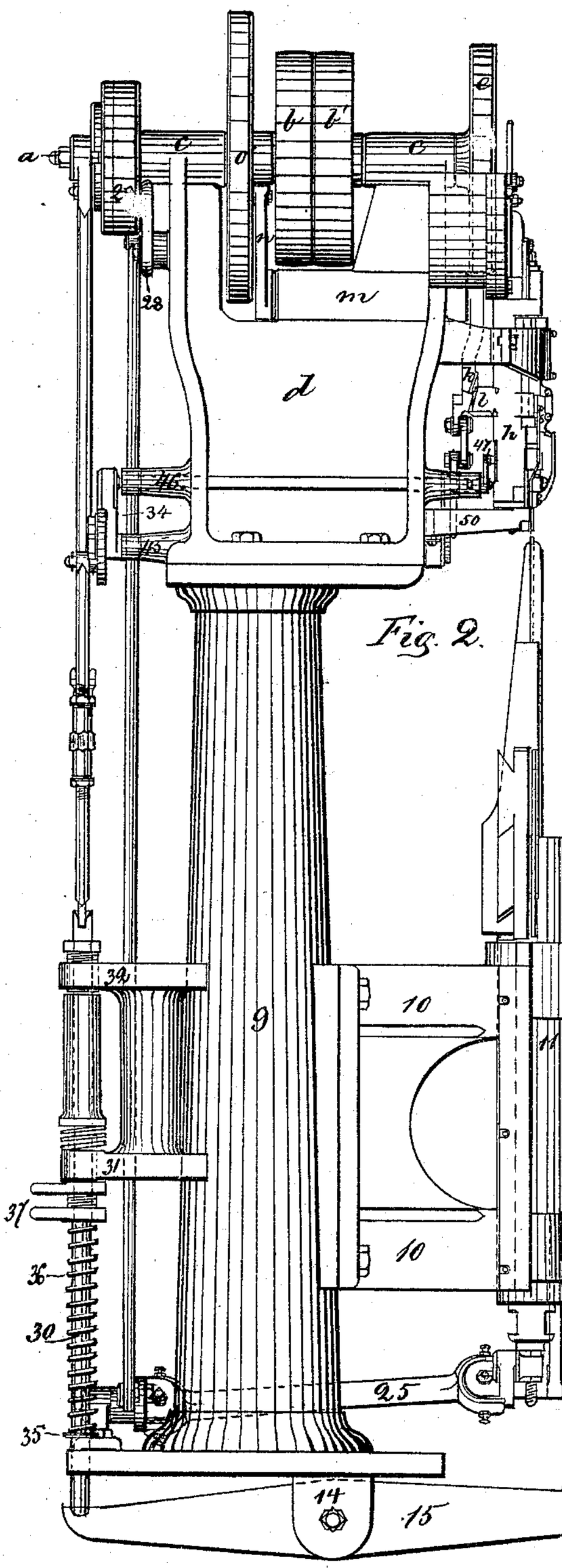


Fig. 2.

Fig. 11.

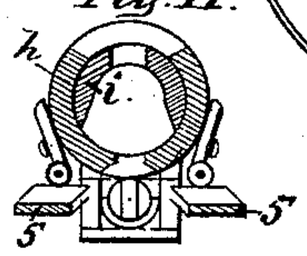


Fig. 12.

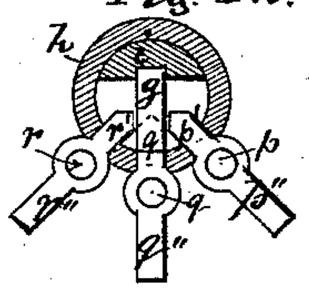


Fig. 1.

Witnesses:
George E. Phelps
Helen Andrén

Inventor:
Erastus Woodward
by
Aaron Andrén
his attys.

3 Sheets--Sheet 2.

E. WOODWARD.

Pegging-Machines for Boots and Shoes.

No. 135,681. Patented Feb. 11, 1873.

Fig. 6.

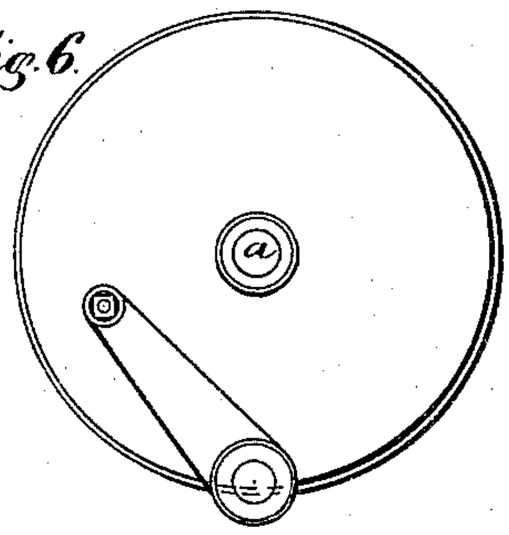


Fig. 5.

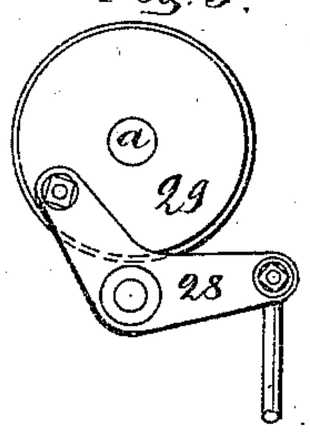


Fig. 3.

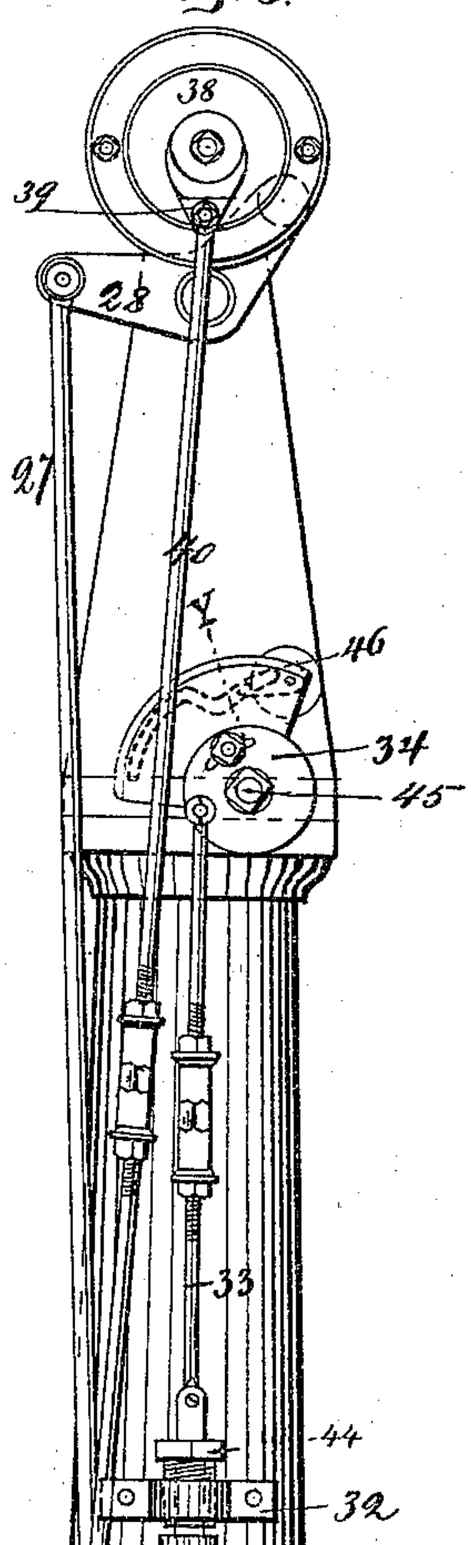


Fig. 7.

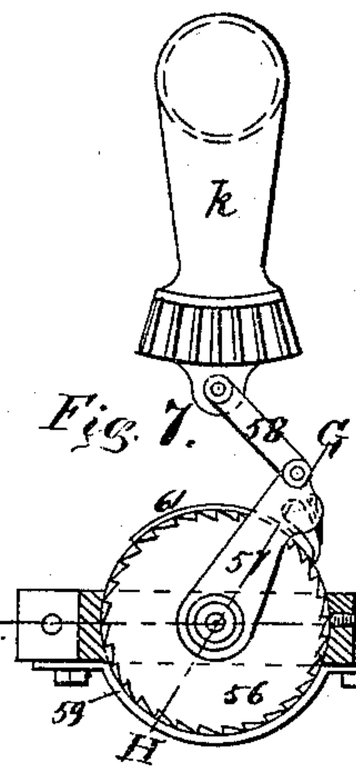


Fig. 13

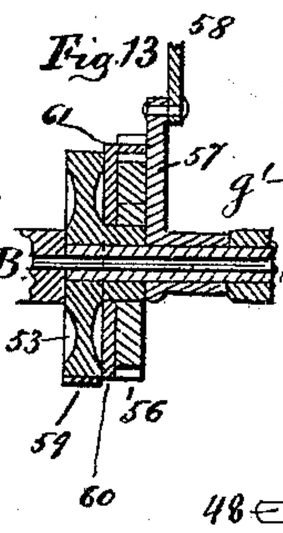


Fig. 10.

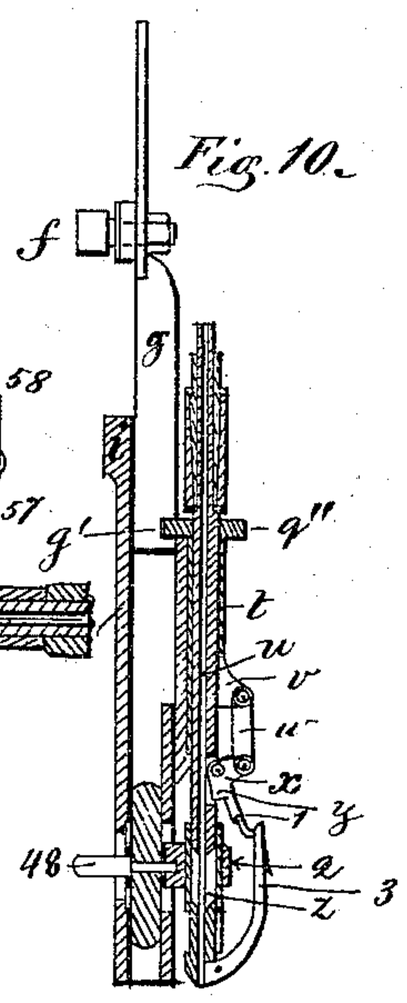


Fig. 8.

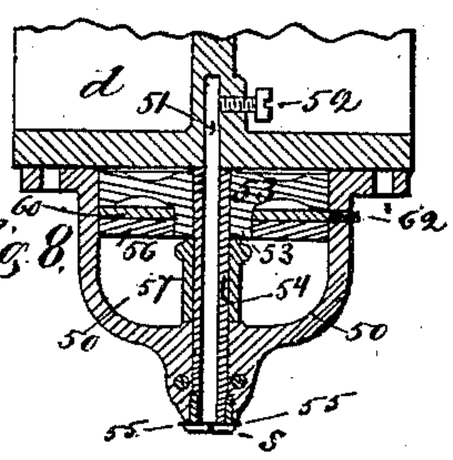
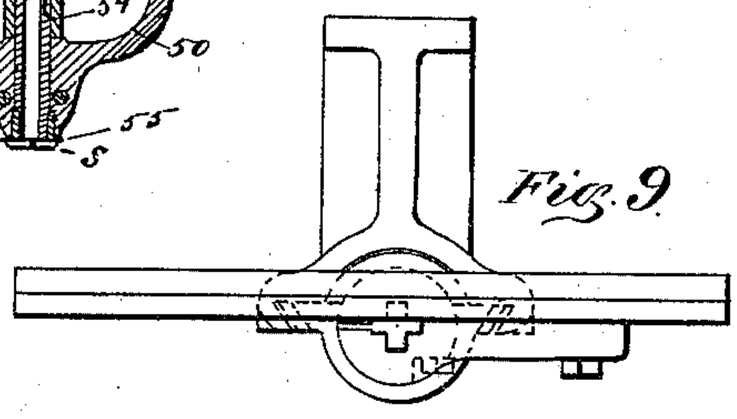


Fig. 9.



Witnesses:
George E. Phelps.
Helen Andrien.

Inventor
Erastus Woodward
by Andrien his attorney.

3 Sheets--Sheet 3.

E. WOODWARD.

Pegging-Machines for Boots and Shoes.

No. 135,681. Patented Feb. 11, 1873.

Fig. 4.

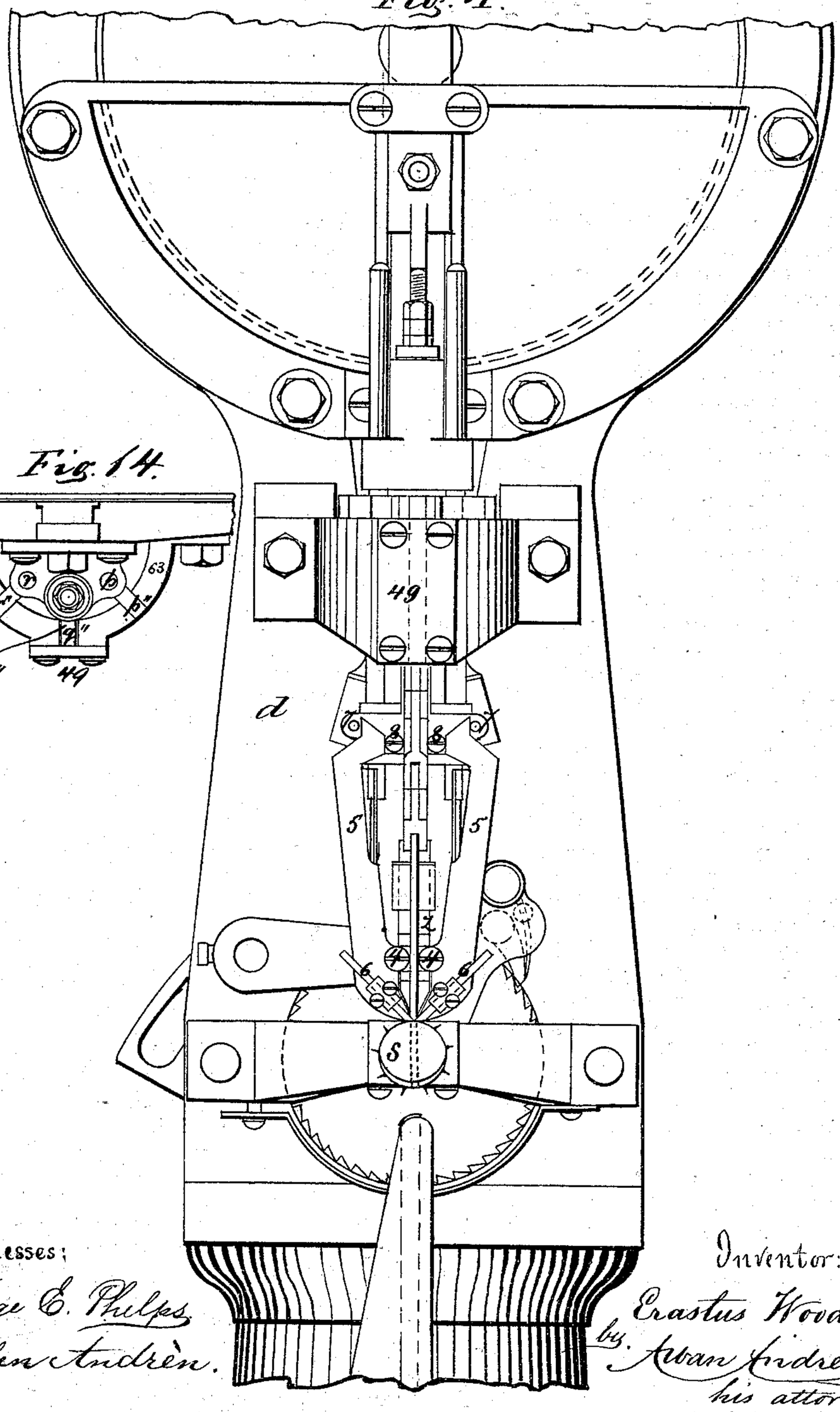


Fig. 14.

Witnesses:
George E. Phelps.
Helen Andrèn.

Inventor:
Erastus Woodward.
by Alban Andrén
his attorneys.

UNITED STATES PATENT OFFICE.

ERASTUS WOODWARD, OF CHARLESTOWN, MASSACHUSETTS, ASSIGNOR TO ASAHEL WHEELER, TRUSTEE FOR THE COMPOSITE CABLE-SCREW-WIRE ASSOCIATION.

IMPROVEMENT IN PEGGING-MACHINES FOR BOOTS AND SHOES.

Specification forming part of Letters Patent No. **135,681**, dated February 11, 1873.

To all whom it may concern:

Be it known that I, ERASTUS WOODWARD, of Charlestown, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Pegging-Machines for Boots and Shoes, of which the following is a specification:

My invention relates to improvements in pegging-machines for boots and shoes, consisting, first, in punching the holes in the stock, feeding the wire or wire-like material, cutting off the peg or pin, and driving the same all in the same location and with the same cam; second, in feeding the end of a wire or wire-like material perpendicularly and into a stationary throat or driving-tube in the location to be driven; third, in cutting off a peg or pin from a wire or wire-like material, and driving it in the same location without moving the end of the wire from the driver, but moving the end of wire and driver together; fourth, in the construction and arrangement of two drivers, one working above and the other below the stock; fifth, in the arrangement and use of a work-supporting presser-foot, provided with an opening to receive the point of an awl, and to allow the lower driver to pass through it; sixth, in the arrangement for pressing the stock together with a presser-foot cam, and holding it till the peg or pin is driven and riveted, as well as regulating the length of the peg; seventh, in the arrangement of a presser-foot and cam for partially regulating the length of the peg; eighth, in a contra motion of the peg-regulator at the longest peg, so as to allow the changing of the stock without stopping the machine, whereby the wasting of pegs is prevented; ninth, in a self-locking and registering apparatus for the awl, feed, and driver bar, so as to make them operate centrally with the hole in the throat-plate; tenth, in mechanism for feeding the stock and adjusting the said feed more or less, as may be desired.

On the drawing, Figure 1 is a front elevation. Fig. 2 is a side elevation. Fig. 3 is a rear elevation. Fig. 4 is an enlarged partial front elevation. Figs. 5 and 6 are details, showing the upper cams and levers. Fig. 7 is a detailed view of the feed arrangements for the stock, and Fig. 8 is a cross-section over the line A B, as shown in Fig. 7. Fig. 9 is a detailed ground plan of the post-supporter. Fig. 10 is a detailed longitudinal section of the wire-cylinder. Fig. 11 is an enlarged cross-section over the line C D, as shown in Fig. 1. Fig. 12 is an enlarged cross section over the line E F, as shown in Fig. 1. Fig. 13 is a cross-section over the line G H, as shown in Fig. 7; and Fig. 14 is a ground plan of the self-locking and registering apparatus.

Similar letters refer to similar parts wherever they occur in the drawing.

First, the construction of my machine so as to punch the hole in the material, feed the wire, cut off the peg, and drive the same all in the same location and with the same cam, is carried out in the following manner: *a* is the driving-shaft, provided with a loose pulley, *b*, and a fixed pulley, *b'*. The shaft *a* is movable in bearings *c c*, attached or secured to the frame *d*, as shown in Fig. 2. *e* is a cam-wheel having a suitable groove cut on its face, in which a pin, *f*, Fig. 10, is operated in the usual manner. The said pin is connected to a bar *g*, that is vertically movable in the cylinder *h*. The cylinder *h* is made to swing partially around its axis *i*, that is held stationary to the face-plate and feed-wheel supporter attached to the frame *d*. The outside cylinder *h* is rocked partially around its axis *i* by means of the cog-segment lever *k* engaging in the cogs attached to the cylinder *h*. The lever *k* is attached to a rock-shaft movable in a bearing, *m*, as shown in Fig. 2. On the opposite end of the shaft, to which the lever *k* is secured, another lever, *n*, is attached, the upper end of which has a projecting pin or roll that plays in a groove that is cut on the face of the cam-wheel *o* that is keyed to the driving-shaft *a*. By this arrangement a rocking motion is imparted to the levers *n* and *k*, and from *k* to the cylinder *h*. On the circumference of the cylinder *h* are three distinct pieces held and operated by means of the cam-rod *g*. These three pieces are the awl-bar *p*, the feed-bar *q*, and driver *r*, all located on the cylinder *h*, as fully shown in Fig. 12. They are all in their right time operated by the rod *g* that has a suitable notch, *g'*, cut on it, in which the pro-

jecting fingers p' q' r' forming part of the rods p, q, and r, fit as the cylinder h is rocked partially around its axis. The centers of the bars p, q, and r are all at the same distance from the center of the cylinder h. A stationary throat-plate, s, having a perpendicular hole through it of the size of the peg, as shown in dotted lines on Fig. 4, is located beneath the bars p, q, and r, in such a manner that the center of the awl, peg, and driver-bar comes exactly over the center of the hole in the throat-plate s as the cylinder h is turned around its axis.

The operation of this my improved pegging-machine is as follows: First, the awl-bar p is automatically placed right over the hole in the throat-plate s, and the awl descends through the said hole and into the boot or shoe held beneath it; the awl is then raised to its original position, and the cylinder h is turned around its axis so far that the feed-bar q comes right over the hole in the throat-plate s when the continued wire is fed down into the said hole, and when fed down far enough is cut off. The cylinder h is now again turned automatically around its axis so far that the driver-bar r comes right over the hole in the throat-plate s when the driver descends and drives the peg. At the same time a lower hammer comes up from below inside the boot or shoe, and thus rivets the peg at both ends. The driver then rises upward, and the cylinder h is turned backward around its axis to its original position, namely, so that the awl-bar p comes right over the hole in the throat-plate s, during which operation the stock is fed forward, when the same operation is renewed.

The feeding of the wire is done by the following operating parts: From the cross-piece q'' descends a sleeve, t, that is movable up and down with the cross-piece q'', and surrounds the feed-pipe u, that is perforated with a vertical hole for the wire to pass through. On the sleeve t is an ear, v, to which is jointed a connecting-rod, w, the lower end of which is jointed to a knee-lever, x, that is movable around a fulcrum attached to the feed-tube u, as shown in Fig. 10. The lower end of the feed-tube u is movable and guided in a perforated stationary pipe, z, as shown. When the cross-piece q'' and sleeve t descends, the rod w turns the knee-lever x around its fulcrum, when the corner y on it is forced against the wire in the tube u, by which operation the tube u, sleeve t, and wire are all fed down together till the inside of the arm 1 (being part of the knee x) strikes the regulating-tube 2, when the corner y of the knee x lets go its hold on the wire that is cut off by the pair of knives to be hereinafter described. When the cross-piece q'' commences to move upward, the rod w turning the knee x around its fulcrum so that the outside of the arm 1 strikes against the lever 3 that is hinged to the lower end of the stationary tube z, whereby the lower corner of said lever 3 impinges against the wire and holds it stationary in the tube z, thus preventing the wire from moving up with the tube u and sleeve t, and keeping it flush with the end of the stationary tube z.

The apparatus for cutting off the peg or pin from the wire or wire-like material is arranged as follows: On the front of the cylinder h are inserted two screws or pins, 4 4, that pass through ears on the knife-levers 5 5, as fully shown in enlarged view on Fig. 4. The pins or screws 4 4 act as fulcrums, around which the knife-levers 5 5 operate. To the lower ends of the levers 5 5 are the cutting-knives 6 6 arranged and attached in a suitable way, so as to be adjustable as they wear off, or as they are resharpened. The upper ends of the levers 5 5 are operated by means of pins 7 7 8 8 working on ways or inclines on said levers 5 5. The said pins 7 7 8 8 or their equivalents are attached to the movable sleeve t, or to any other movable frame, by which the same result may be accomplished. As the pins 7 7 8 8 descend the knives 6 6 spread apart and allow the wire to be fed down in the throat s; but when the sleeve t with the pins 7 7 8 8 move upward the upper ends of the levers 5 5 spread apart, and the lower edges of the knives 6 6 meet together, thus cutting off the wire. After the wire is fed down the throat s and cut off to the proper length the cylinder h is turned around its axis so far that the driver-bar r comes right over the throat s, when the said driver-bar r drives the peg into the stock held beneath the throat s.

Second, as has heretofore been shown, I feed my wire perpendicularly into a stationary throat or driving-tube. Formerly the wire on pegging-machines has been fed in an inclined direction to the way in which it is to be driven; but I have the great advantage on my machine to feed and drive the wire in one and the same direction, and, this being a perpendicular one, without any inclination to one side or the other.

Third, the remaining portion of the wire in the feed-tube, after the peg is cut off from it, never changes its distance from the driver, as it has already been shown that the feed-tube and driver swing together around the axis i of the cylinder h.

Fourth, the peg is driven, clinched, or riveted from below inside the boot or shoe, as well as from above. This is accomplished in the following manner: The frame d is secured and rests on a standard, 9, to the front of which is attached a suitable frame, 10, in which the vertical cylinder 11 is made to swing around its axis in bearings, and is movable in suitable guides. The upper end of the cylinder 11 is attached to an arched frame, 12, having arched ways cut thereon, in which the presser-foot 13, provided at its base with corresponding-arched guides, is made to move in a manner as fully shown in full and dotted lines on Fig. 1. The presser-foot 13 is provided with a vertical perforation, in which moves the lower driver 18, shown in dotted lines on Fig. 1.

The driver 18 is provided at the lower end with a small roller, 19, that rolls on the arched frame 20 as the presser-foot is moved on its arched ways or guides. The lower driver or hammer 18 is surrounded with a coiled spring, 21, the action of which holds the roller 19 always in contact with the arched frame 20. The said arched frame 20 has a downward-projecting rod, 22, attached to it. Said rod projects through a hole made in the cylinder 11, and the lower end of it is jointed to a universally-jointed rocking-lever, 23, that is supported in an arm, 24, which is jointed to the lower bearing for the cylinder 11. The lever 23 is operated by the universal-joint rod 25, to the other end of which is jointed the rocking-lever 26, shown in Fig. 3. A rod, 27, connects the lever 26 to one end of the knee-lever 28, the other end of which is provided with a pin that is guided and operated in a groove cut on the face of the cam-wheel 29, as shown in Figs. 3 and 5. By this arrangement a positive lift is given to the riveter 18, no matter how thick or thin the stock may be that is operated upon. The presser-foot 13 may be placed in a vertical position, as shown in full lines on Fig. 1, or it may be held in any suitable inclined position, as shown in dotted lines on the same figure, according to the shape of the work that is to be pegged. The lower driver 18 rests on the arched frame 20, which, being of the same curvature as the ways on which the presser-foot 13 travels, allows the driver 18 to operate in any position of the presser-foot. The lower driver 18 may be timed in its operation so as to work before, at the same time, or after the upper driver rivets the peg, according to whether the peg is to be riveted on the under side alone or on both sides, or on the upper side alone, to suit the requirements in each case.

Fifth, the presser-foot 13 is, as before stated, perforated, so that the lower driver can pass up through it. By this construction of the presser-foot a recess is formed in the upper end of it, into which the awl may descend after passing through the stock; and it matters not, therefore, whether the stock is uneven in thickness at different places, as the awl can at all times pass right through the stock and descend into the open upper end of the presser-foot.

Sixth, the arrangement for pressing the stock together, and holding it so till the peg or pin is driven, is carried out and operated as follows: Under the standard 9 is a bearing, 14, that serves as a fulcrum, and supports the treadle-lever 15, the forward end of which is provided with a foot-plate, 16, on which the operator places his foot when it is desired to place or replace a boot or shoe on the upper part of the presser-foot, for which purpose a connecting-rod, 17, connects the lever 15 to the lower bearing for the cylinder 11, as shown in Fig. 2. On the rear end of the lever 15 rests the vertical rod 30, the upper end of which is guided in bearings 31 32 attached stationary to the standard 9. The extreme upper end of the rod 30 is jointed to an adjustable link, 33, the upper end of which is connected to a rocking cam, 34, by which the length of the peg is partially regulated, as will hereinafter be more fully described. A collar, 35, is attached firmly to the rod 30; and a coiled spring, 36, surrounds the rod 30 and presses with its lower end against the collar 35, and with its upper end against an adjustable nut, 37, screwed in the bearing 31, as shown in Figs. 2 and 3, by which the strength of the spring 36 is easily adjusted. The spring 36 is for the purpose of balancing the weight of the cylinder 11, with its bearings, arched frame 12, and the presser-foot 13; and also for the purpose of forcing the upper end of the presser-foot against the stock that rests between the feed-wheel and the said presser-foot; but, as this spring 36 is not alone reliable to hold the presser-foot in a rigid position during the punching and riveting of the stock, I employ a cam-wheel, 38, having a groove cut on its face with a throw more than the depth of the teeth on the face-wheel. A pin or roll, 39, plays therein, and is jointed to an adjustable rod, 40, the lower end of which is connected to a cam-lever, 41, that is hinged to ears made on the sleeve 42, which is loose on the rod 30, between the bearings 31 and 32, as fully shown in Fig. 3. Between the lower end of the sleeve 42 and the bearing 31 is placed a suitable spring, 43, that lifts the sleeve 42 up against the lower end of the adjustable nut 44 as soon as the lever 41 ceases to act. The inner end of the lever 41 is made as a cam, that takes hold directly on the rod 30, or on a plate placed between the cam 41 and the said rod 30, by which arrangement the cam 38 operates the rod 40, and presses down and locks the cam-lever 41, sleeve 42, and rod 30 together, and presses them down and holds them rigidly in that position. As the motion from the rod 30 is communicated to the lever 15, connection 17, cylinder 11, and presser-foot 13, it is easily seen that the presser-foot is pressed upward an additional distance equal to the depth of the teeth on the feed-wheel, by which the stock is pressed together, the feed-wheel points pressed in the stock, and length of peg regulated, and held so rigidly during the descent of the awl, feed of the wire, and driving of the peg, after the performance of which the cam 38 releases its hold on the cam 41 and rod 30, when the feeding of the stock takes place without this extra pressure.

Seventh, the arrangement of the presser-foot and cam for the partial regulation of the length of the peg is constructed as follows: The adjustable connecting-rod 33 is jointed to the adjustable cam-disk 34, that is made to rock around a stud or pin, 45, secured to the frame *d*. The cam-disk 34 is operated partly by the spring 36 and partly by the cam 38, rod 40, cam-lever 41, and sleeve 42, as heretofore

described. The rear of the cam 34 has a groove cut on its face, as shown in dotted lines on Fig. 3, in which plays a pin attached to an arm on the rocking shaft 46, to the opposite end of which is attached a lever, 47, the extreme end of which is jointed to the pin 48, shown in Fig. 10. The pin 48 is connected rigidly to the regulating-sleeve 2, that regulates the feed of the wire, as heretofore shown in Fig. 10 and described. The groove on the cam 34, as shown in Fig. 3, is so made that the length of the peg is regulated from the part marked Y to the end of the right-hand side thereof, in such a manner that when the rod 33 is pressed downward (and the presser-foot is pressed upward) the shaft 46 is rocked in such a manner as to raise the end of the operating-lever 47, when the regulating-sleeve 2 is also automatically raised to correspond with the lift of the presser-foot 13, by which arrangement the knee-lever *x y* ceases to feed the wire down the feed-tube as soon as it comes in contact with the regulating sleeve or incline 2.

Eighth, the cam 34 also serves for another purpose, namely, that of preventing the wasting of pegs when the treadle 16 is pressed down during the placing or replacing of a boot or shoe or any other stock. This is accomplished in the following manner and by the following arrangement: The left-hand side of the groove on the cam 34 to the left of the line *y* rises very suddenly to the greatest throw of the cam, where it remains as a circular arch, as by this means, when the treadle 16 is pressed down and the rod 30 pressed up so far that the pin on the shaft 46 comes to the place marked Y, (which is the place for the longest pegs,) should the rod 30 be pressed up any further it will raise the levers on the shaft 46, and with them the regulating-sleeve 2 very suddenly to its highest position, when no feeding of the wire will take place, even if the machine should be kept in motion. If not for such an arrangement the machine would continue to cut and feed the wire during the time the stock was replaced on the presser-foot, whereby a great many pegs would be wasted.

Ninth, the self locking and registering apparatus for the vertical awl, feed, and driver-bar is arranged as follows: As the cylinder *h* is rocked around its axis *i* it is very important that the awl, feed, and driver should each in their turn be exactly over the center of the hole in the throat *s* when they are pressed down; and to accomplish this I secure to the frame *d* an arched guide, 48 48, made in halves, that are held together by means of the cap or plate 49 screwed on them, as shown in Figs. 4 and 14. Under the cap 49 is a space or groove left, as shown at q''' in Fig. 14. This space is made a little wider at the top than the width of the registering cross-pieces p'' q'' r'' that are attached to the outside of the bars *p*, *q*, and *r*, as shown in Fig. 12; but the central and lower part of said groove q''' is made of exactly the same width as the cross-pieces p'', q'', and r''. The advantage of this arrangement is so that in case the cylinder *h* should be rocked a trifle more or less (owing to the wear of the parts) than the required distance for placing the bars *p*, *q*, and *r* exactly centrally over the hole in the throat-plate *s* they may be in that case guided, by means of the registering-pieces p'', q'', and r'', in the tapering upper part of the groove q'''; and when once in the said groove the pieces p'', q'', and r'' are guided exactly, and without the least side play, in the lower and parallel part of said groove q''', when the awl, feed, or driver bar is sure to come exactly over the hole in the throat-plate *s*.

Tenth, the feed of the stock is done as follows, Figs. 7, 8, and 13, related heretofore: An arched bearing, 50, is screwed to the front of the frame *d*, as shown in Fig. 8. The throat-plate *s* is attached to a pin or shaft that projects through the bearing 50 and the frame *d*, in which it is held stationary by means of a set-screw, 52, as shown. A friction-wheel, 53, is secured to a hollow spindle, 54, that is movable loose around the stationary throat-plate shaft 51. The forward end of the hollow spindle 54 is made a little larger in diameter than the throat-plate *s*, and provided with feed-teeth 55, as shown in Figs. 1, 4, and 8. These feed-teeth are made very sharp and pointed, so as to penetrate the stock easily and carry it along without much pressing together. The friction-roller 53 is also secured to the ratchet-wheel 56, as shown. The ratchet-wheel 56 is operated by means of a pawl-lever, 57, that is jointed to and operated by the connecting-rod 58 and cog-segment lever *k*, shown in Fig. 7. Under the friction-wheel 53 is, held stationary to the frame *d*, a friction-strap, 59, that can be tightened onto the circumference of the wheel 53 by means of screws, as shown, for the purpose of holding the feed-wheel steady during the operation of the machine, when no feeding of the stock takes place. For the purpose of adjusting the length of the feed I employ a disk, 60, movable around the hub of the friction-wheel 53, and secured in place by means of a suitable set-screw, 62, as shown. This disk 60 has on the upper part of it an arched shield-plate, 61, that projects over the ratchet-wheel 56, as shown in Figs. 7 and 13, the object of which is to let the pawl slip over one or more of the teeth on the ratchet-wheel 56 without taking hold of such parts, by which arrangement the feed of the ratchet-wheel can be adjusted with nicety. The disk 60, with its shield 61, can be turned around the hub of the wheel 53, so as to allow the pawl to slip over one or more teeth on the ratchet-wheel 56 without taking hold of them, as may be desired.

Having thus fully described the nature, construction, and operation of my invention, I wish to secure by Letters Patent and claim—

1. A pegging-machine constructed in the

manner described, so as to first punch the hole in the stock, then feed the wire or wire-like material, and then cut it off, and lastly to drive it through a stationary throat-plate or driving-tube, all in the same parallel direction.

2. A pegging-machine in which the peg or pin is cut off from a wire or wire-like material and driven in the same location without changing the relative position of the remaining wire, awl, and driver to each other.

3. A pegging-machine in which the driver is operated above and the riveter below the stock.

4. The work-supporting presser-foot 13, in combination with the mechanism for operating the riveter 18 from below the stock.

5. The arrangement and use of a cam, 38, connecting-rod 40, cam-lever 41, sleeve 42, rod 30, lever 15, connection 17, cylinder 11, and presser-foot 13, or their equivalents, for the purpose of pressing the stock together and holding it till the peg or pin is driven and riveted.

6. The arrangement of the movable sleeve 2, pin 48, lever 47, rock-shaft 46 with its lever, cam 34, connection 33, rod 30, spring 36, treadle-lever 15, connection 17, and the cylinder 11 with the presser-foot 13, or their equivalents, for the partial regulation of the length of the peg, as fully set forth.

7. In combination, the regulating-sleeve 2 and its connecting parts, the presser-foot 13 and its connecting parts to operate the rod 30, and the rocking-cam 34 with its groove Y, as cut to move the peg-regulating sleeve 2 suddenly upward at the longest peg, and to allow the changing of stock without stopping the machine, for the purpose of preventing the waste of pegs, as fully shown and described.

8. In combination with the rocking awl, feed, and driver bars *p*, *q*, and *r*, and their registering projections *p''*, *q''*, and *r''*, the arched frame 63, provided with a tapering groove *q'''*, as and for the purpose set forth.

9. The feed arrangement for the stock, consisting in the support 50, friction-wheel 53, and strap 59, shield-wheels 60 61, ratchet-wheel 56, and pawl-lever 57, operated in the manner and for the purpose as set forth and described.

10. In combination, the feed-tube *u*, sleeve *t*, connection *w*, knee-lever *y*, regulating-sleeve or incline 2, the operating-rod *g*, and the locking-lever 3, as and for the purpose shown and described.

11. The mechanism for operating the riveter positively, consisting of the cam 29, lever 28, rod 27, universally-jointed levers 23 and 26, shaft 25, rod 22, arch 20, roller 19, and riveter 18, or their equivalents, as and for the purpose set forth.

12. In combination, the stationary axis *i*, operating-bar *g*, movable cylinder *h* with the awl, feed, and driver bars *p*, *q*, and *r*, and the knife-levers 5 5, arranged and operated in the manner as herein shown and described.

13. A swinging presser-foot or work-supporting point 13, as constructed to swing in any direction around the upper end as a center for the purpose of pegging a boot or shoe, as herein shown and described.

ERASTUS WOODWARD.

Witnesses:
ALBAN ANDRÉN,
JAMES B. GARDNER.