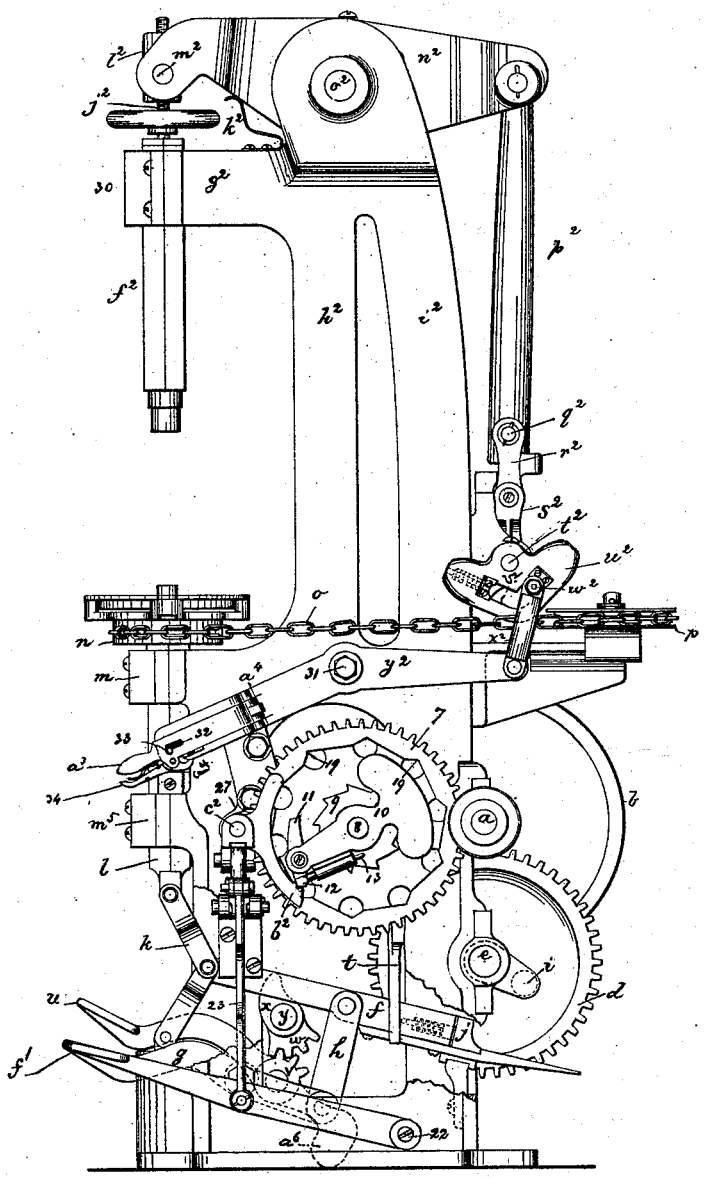
3 Sheets—Sheet 1.

C. W. GLIDDEN.

Heeling-Machine for Boots and Shoes.

No. 203,440. Fig. 1. Patented May 7, 1878.



Witnesses.

W. J. Pratt.

L. A. Baxter.

Inventor.

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by Crosby & Gregory Attys.

3 Sheets—Sheet 2.

C. W. GLIDDEN.

Heeling-Machine for Boots and Shoes.

No. 203,440. Patented May 7, 1878.

Fig. 2.

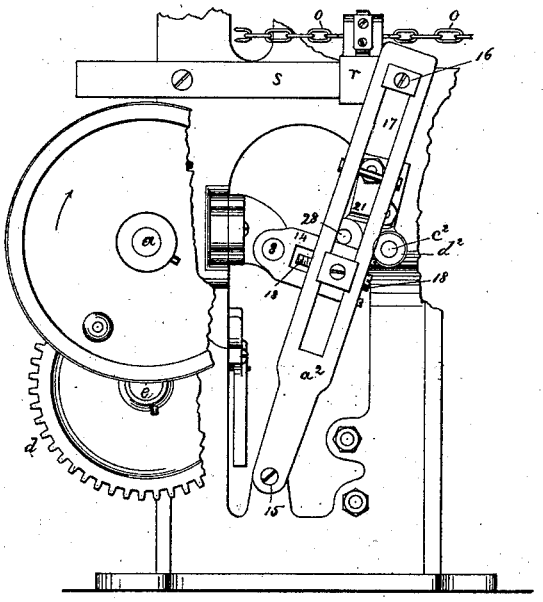


Fig. 3.

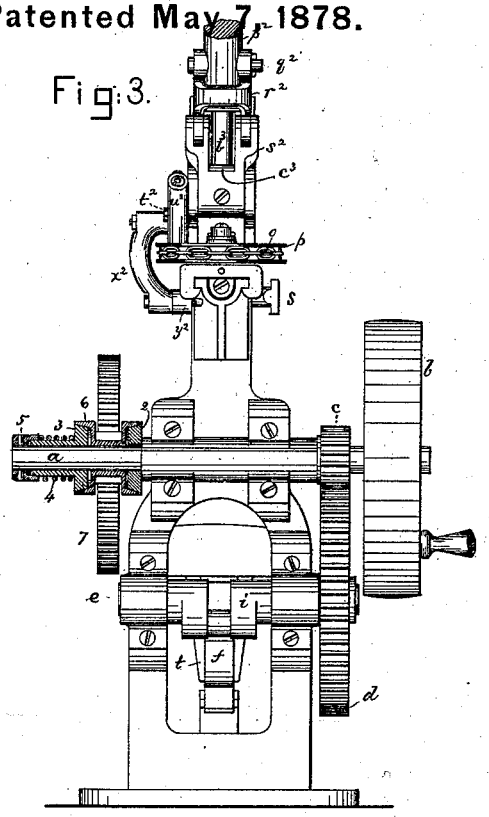


Fig. 4.

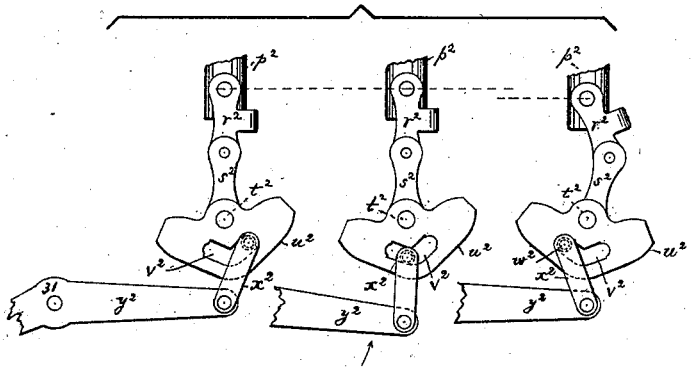
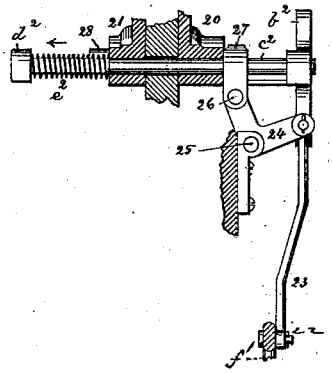


Fig. 5.



Witnesses.
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Inventor.
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3 Sheets—Sheet 3.

C. W. GLIDDEN.

Heeling-Machine for Boots and Shoes.

No. 203,440. Patented May 7, 1878.

Fig. 6.

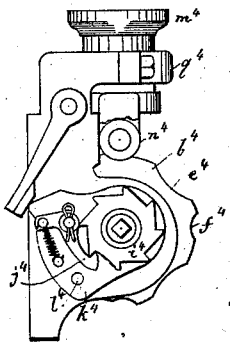


Fig. 7.

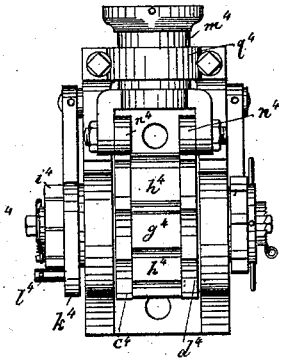


Fig. 8.

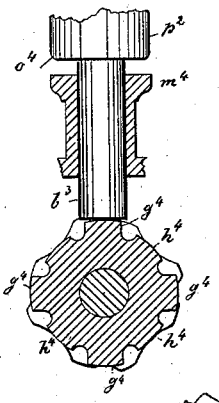


Fig. 10.

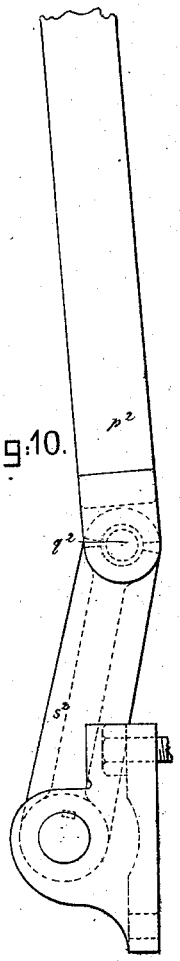


Fig. 11.

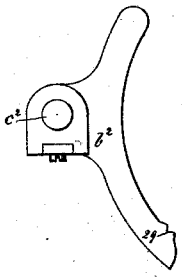


Fig. 14.

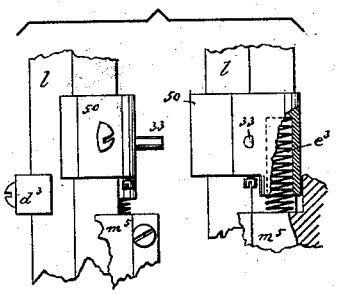


Fig. 9.

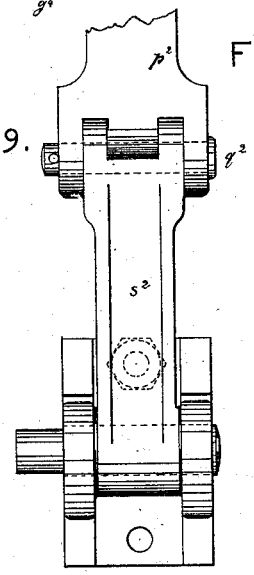


Fig. 13.

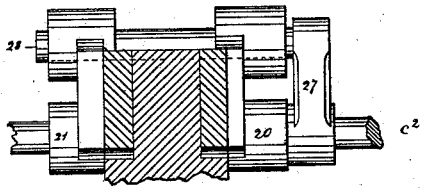
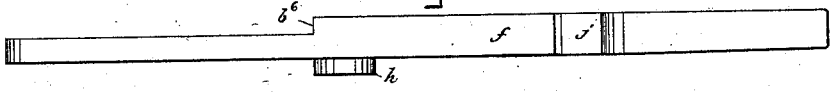


Fig. 12.



Witnesses.

W. J. Pratt.

A. Wunderwadel

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UNITED STATES PATENT OFFICE.

CHARLES W. GLIDDEN, OF LYNN, MASSACHUSETTS.

IMPROVEMENT IN HEELING-MACHINES FOR BOOTS AND SHOES.

Specification forming part of Letters Patent No. **203,440**, dated May 7, 1878; application filed February 18, 1878.

To all whom it may concern:

Be it known that I, CHARLES WOODBURY GLIDDEN, of Lynn, county of Essex, State of Massachusetts, have invented an Improvement in Heeling-Machines for Boots and Shoes, of which the following is a specification:

This invention relates to mechanism for heeling boots and shoes, and is an improvement upon that class of such mechanism wherein the heels are trimmed after they are secured to the sole. In other machines of this class it has been customary, after applying the nail-loaded heel to the sole and before applying the blind top-lift, to elevate by hand the lower end of the spindle, which determined the position of the last, such spindle being herein denominated the "last-spindle," with reference to the nail driving and trimming mechanism, so that the blind top-lift could be properly added.

One object of this invention is to combine with such last-spindle, which controls the vertical position of the last and its actuating-lever, a last-spindle-adjusting mechanism, to automatically change the position of the last-spindle and last, thereby placing them in proper position to permit the application to the shoe of, first, the nail-loaded heel, and then the blind top-lift. After the heel is applied the heel-trimming mechanism is operated in the usual manner.

Also, in combining such last-spindle mechanism with the nailing-spindle, which elevates the nail driving and trimming mechanism, through the instrumentality of a connecting-lever, which, as the nailing-spindle is raised and lowered, automatically changes the position of the last-spindle-adjusting mechanism to permit the application of the heel, and then of the blind top-lift.

Also, in the combination, in a heel nailing and trimming machine, of the following instrumentalities, viz: the trimming-shaft, its arm, the trimming-lever connected with the carriage, the loose gear-wheel, provided with internal teeth-clutching mechanism to engage such gear-wheel, and a continuously-rotating shaft and loose pinion, and friction devices to operate the loose pinion, substantially as and for the purpose hereinafter described.

Also, in a heel nailing and trimming machine, a loose gear-wheel and clutching mechanism to rotate the trimming-shaft at suitable intervals.

Also, in a heel nailing and trimming machine, a trimming-shaft, a loose gear-wheel, clutching mechanism to engage them, and a pawl-holding device to hold the pawl of the clutching mechanism from contact with the loose gear-wheel, substantially as hereinafter described.

Also, in the pawl-holding device and trimming-shaft, and its fixed arm, combined with a stop, to arrest the rotation of the trimming-shaft as the pawl-holder removes the pawl from engagement with the loose gear of the trimming-shaft.

Also, in a continuously-rotating shaft, its loose pinion, and friction devices, combined with devices to adjust and regulate the amount of friction between the friction devices and loose pinion, according to the resistance offered to the movement of the trimming mechanism.

Also, in the combination, with the toggle-joint and nailing-spindle, of a shouldered lever and a connected treadle to lift it, in order that the link may be operated to straighten the toggle-joint, substantially as hereinafter described.

Also, in the combination, with a treadle and teeth located at its fulcrum, of a gear and cam or equivalent, to break the toggle-joint of and lower the nailing-spindle, substantially as hereinafter described.

Also, in the combination, with the connecting-lever located between the nailing-spindle and last-spindle-adjusting mechanism, of a hand-lever, to permit the connecting-lever to be disconnected from the nailing-spindle, substantially as hereinafter described.

Figure 1 represents, in side elevation, sufficient of a heeling-machine designed to apply heels to shoes and trim them to illustrate this invention; Fig. 2, an opposite side elevation of the lower portion of the machine, showing the trimming-lever and crank to operate the trimming mechanism; Fig. 3, a partial rear elevation of Fig. 1, the loose pinion on the main shaft and the friction devices being in section; Fig. 4, details showing different positions of the last-spindle-adjusting mechanism; Fig. 5, a detail of the pawl-holding mech-

anism, to operate in connection with the clutch mechanism of the trimming-shaft. Figs. 6, 7, and 8 represent modified forms of last-spindle-adjusting mechanism; Figs. 9 and 10, yet another modification thereof; Fig. 11, a detail of the pawl-holding device; Fig. 12, a top view of the lever connected with the toggle-joint; Fig. 13, a detail, showing the stop-pin for the trimming-shaft, and Fig. 14 a detail of the last-spindle.

This invention is an improvement upon the mechanism shown in United States Letters Patent Nos. 166,795, 166,756, and 166,765, to which reference may be had.

In this invention the reciprocating nailing-spindle will carry at its top the usual nail-driving and heel-trimming mechanisms, substantially as described in such patents, such devices operating in the order and as therein described.

The main shaft *a* of the machine, provided with a suitable driving pulley or pulleys, *b*, has a pinion, *c*, which engages a pinion, *d*, upon, and operates the crank or tappet shaft *e*, which at suitable times, by the elevation of the lever *f* through the foot-treadle *g* and link *h*, permits the crank *i* to strike the shoulder *j*, which moves the lever *f* horizontally, to straighten the toggle-joint *k* and lift the spindle *l*, which at top carries the usual heel-nailing and heel-trimming mechanism, substantially such as shown and described in the patents hereinbefore referred to. This nailing-spindle *l*, sustained in suitable boxes *m m*^{5}, has at its top a head, *n*, which receives about it a chain, *o*, such chain also passing about the adjustable sheave *p*, and being connected at its ends with a carriage, *r*, on the rail *s*.

The periphery of the head *n* is so grooved as to receive alternately the flat sides and then the edges of the chain *o*, which obviates slippage of the chain. The lever *f* extends through a guide, *t*, which prevents lateral movement thereof.

When the toggle-joint is to be sprung backward the operator depresses the outer end of the treadle *u*, weighted at its inner end *a*^{6}, which causes the pinion *v* at the axis of the treadle to partially rotate the pinion *w* and the cam *x* on the shaft *y*, so that the cam *x* strikes a suitable shoulder, *b*^{6}, upon the lever *f*, and breaks or pulls back the toggle-joint, as shown in Fig. 1.

The main shaft *a* has secured to it one member, 2, of a friction device, (shown as a cone,) the other conical member, 3, being connected with a sleeve placed loosely about such shaft. The spring 4, in connection with this member 3 of the friction device, is made to exert more or less pressure thereon by means of an adjustable nut, 5, or other equivalent device attached to the shaft *a*. Between the members 2 3 of this friction device, and upon the shaft *a*, is placed the loose pinion 6, shaped at its sides to correspond with the members 2 3. The pinion 6 engages a toothed gear, 7, placed loosely upon the trimming-shaft 8. The gear 7, besides having gear-teeth at its periphery, has ratchet-teeth 19 upon its face, and at its center has a ratchet, 9. The shaft *a*, rotating continually, rotates the pinion 6 and toothed gear 7, unless the resistance offered to the action of the trimming mechanism is greater than it can bear without breaking, when the pinion 6 slips on the shaft between the friction devices.

The trimming-shaft 8 has fixed to it at one end a weighted arm, 10, provided with a pawl, 11, the short arm 12 of which is acted upon at one side by a spring-pressed pin, 13, or suitable spring, which so moves the pawl, when not supported at its opposite side by the pawl-holding device *b*^{2}, as shown in Fig. 1, as to cause the pawl to engage one of the ratchet-teeth 19 of the gear 7, which, as it is rotated, rotates with it the trimming-shaft 8, thereby causing its arm 14, (see Fig. 2,) provided with an adjustable crank-pin, to vibrate the trimming-lever *a*^{2}, the crank-pin fitting a slot, 17, in the lever *a*^{2}. The dotted upper end of lever *a*^{2} receives within it a loose block, 16, attached to a pin on the carriage *r*, which connects with chain *o*. The pawl-holding device *b*^{2}, (see details, Figs. 5 and 11,) attached to a rod, *c*^{2}, sustained in suitable bearings 20 21, and provided at its outer end with a collar, *d*^{2}, preferably made adjustable, receives between it and the bearing 21 a spring, *e*^{2}, which draws the rod in the direction of the arrow, Fig. 5.

This rod and the pawl-holder can be moved in the opposite direction by means of a treadle, *f*^{1}, pivoted at 22, and connected, by link 23, with an elbow-lever, 24, the latter being pivoted at 25, and connected at 26 with an arm, 27, secured to the rod *c*^{2}. This arm 27 has a stop-pin, 28, which, when the rod *c*^{2} is in the position shown in Figs. 5 and 2, projects into the path of movement of the arm 14, to stop it, and consequently the movement of the trimming-lever *a*^{2} and the usual trimming mechanism operated by it, at the completion of the trimming movement, thereby retaining such trimming lever and mechanism in suitable position to again be moved to commence and trim another heel. As the trimming mechanism reaches the end of its return-stroke the clutching mechanism, composed of the arm 10 and pawl 11, in its rotation brings the lower outer end of the short arm of the pawl 11 against the lower end of the pawl-holder *b*^{2}, disengages the pawl from the teeth 19 of the gear 7, and the end of the pawl, as it reaches the notch 29, (see Fig. 11,) enters and is held by it, thereby stopping the rotation of the trimming-shaft, until the pawl-holder is again moved by the lever *f* to release the pawl and permit it to become engaged with the gear 7, as before described, as will be done when another heel is to be trimmed.

The spindle *f*^{2}, called the "last-spindle," to which is attached the usual last and its adjusting and carrying devices, substantially

such as described in the patents referred to, but not necessary to be herein shown, is guided in a bearing, 30, in the bracket g^2, projecting from the frame-work h^2 i^2 of the machine. The upper end of this spindle f^2 is connected with a screw-threaded shaft, j^2, having a hand-wheel, k^2, to rotate it, the shaft entering a threaded block, l^2, pivoted at m^2, at the forward end of the lever or walking-beam n^2, pivoted at o^2. The hand-wheel and spindle permit the spindle to be lengthened or shortened to adapt the machine to operate upon nail-loaded heels of any desired thickness. The axis o^2 of the lever n^2 is so located with reference to the frame-work h^2 i^2 that the strain exerted upon the frame when the heel is being nailed to the shoe is in the line in which the frame is capable of withstanding the greatest strain. The strain upon the frame at such time is very great, and the frame herein shown has been planned and designed to withstand great strain. At the rear end of the lever n^2 is a rod, p^2, having a cross-pin, q^2, which rests in bearings, as shown in Figs. 1, 3, and 4, of a link, r^2, mounted upon a link, s^2, attached to a shaft, t^2, such rod p^2 and the connecting link or links and the shaft t^2 constituting one form of last-spindle-adjusting mechanism.

This shaft t^2 has at one end a cam-plate, u^2, slotted at v^2 to receive a pin, w^2, of a link, x^2, joined to the connecting-lever y^2, pivoted at 31 to the frame of the machine. The front end of this connecting-lever y^2 has a hand-lever, a^3, pivoted at a^4, and provided with a slot, 32, to receive a pin, 33, projecting from the nailing-spindle l. A locking-lever, 34, connected with lever a^3, holds it in engagement with the end of lever y^2. The foot b^3 of the rod p^2 is located between the arms of the link s^2.

Fig. 1 of the drawings shows the different parts of the mechanism in the position they will occupy just before elevating the spindle l to apply a nail-loaded heel to a shoe. In such figure it will be noticed that the cam-plate u^2 has been so operated upon by the lever y^2 and link x^2 as to rock the shaft t^2 and place the links s^2 r^2 and rod p^2 in substantially a straight line, thereby placing the last-spindle f^2 in its lowest position. As the toggle-joint k is straightened to lift the spindle l^2 the pin 33 on such spindle, within the slot 32 of the hand-lever a^3, turns the connecting-lever y^2 on its axis, and brings the pin w^2 of link x^2 into the position shown in the central diagram, Fig. 4. This upward motion of the spindle nails the heel upon the shoe, after which it is desired to add the blind top-lift to such heel. To do this the toggle-joint k is broken, the spindle is permitted to descend, and in so doing the pin w^2 passes into the left-hand end of the slot v^2 of the cam-plate u^2, and turns it and the shaft t^2 so as to place the links s^2 r^2 and rod p^2 out of line, as shown in the right-hand diagram of Fig. 4, the foot b^3 then resting upon the portion c^3, such portion resisting the descent of the rear end of the lever n^2, (as the spindle l is lifted to attach the heel or blind top-lift placed next the heel previously nailed upon the shoe,) instead of the links s^2 r^2, which received strain when the spindle l was raised to nail the body part of the heel to the shoe.

When the last-spindle-adjusting mechanism is in the position indicated at the right-hand diagram of Fig. 4, its lower end is elevated somewhat higher than when such mechanism is as shown in the central or left-hand diagram, and consequently space is afforded for the blind top-lift between the heel already applied to the shoe and the nailing devices upon which the blind top-lift is placed before the spindle l is raised to attach the blind top-lift and trim the heel.

When the machine is employed to nail shoe-heels which it is not subsequently desired to cover with blind top-lifts, then the hand-lever a^3 will be disengaged from the pin 33 of the spindle l, so that the connecting-lever y^2 will no longer change the position of the last-spindle-adjusting mechanism, and consequently such mechanism will occupy a fixed position. The nailing-spindle l will have attached to it a cushion, d^3, to strike the top of the lower bearing m^5 to ease the shock in descending. The blocks so secured to the spindle l and holding the pin 33 will also be made to bear upon a spring, e^3, as shown in Fig. 14.

Instead of the particular last-spindle-adjusting mechanism herein shown, the rod p^2 may have its cross-pin q^2 supported directly at the upper end of the link s^2, it being somewhat lengthened, (see detail, Figs. 9, 10,) thereby dispensing with link r^2. In such modification the joint between p^2 and s^2 will preferably break toward the frame i^2.

Figs. 6, 7, and 8 show a modified form of last-spindle-adjusting mechanism, wherein, instead of links, as shown in Fig. 1, there is employed a pattern-cylinder, b^4, having rims c^4 d^4, provided with depressions e^4 f^4, and between them supporting-surfaces g^4 h^4 at different distances from the center of the pattern-cylinder to receive the foot of the rod p^2, the highest surface g^4 being uppermost when the nail-loaded heel is being applied, and the lowest surface h^4 being uppermost when the blind top-lift is being applied. The axis of the pattern-cylinder has a ratchet, i^4, which is engaged by a pawl, j^4, on a pawl-carrier, k^4, connected through pin l^4 with a link, such as link x^2, (see Fig 1,) so that the pattern-cylinder is rotated each time the spindle l descends.

The lifting-collar m^4, guided in the yoke q^4, has rollers n^4, which ride upon the rims c^4 d^4 as the pattern-surface is rotated, the elevations on the rims elevating the collar, so that its upper end acts against the shoulder o^4 on the rod p^2, and lifts the foot b^3 of such rod sufficiently to permit the surface g^4 or h^4 to be brought beneath it. Then the rollers, entering one or the other depressions, e^4 f^4, permit the collar to descend from lifting contact with the rod p^2, and the foot to bear directly upon

the higher surface g^4 or lower surface h^4 as the nailing-spindle is lifted.

A spring will preferably be placed under the forward end of the lever n^2, as shown in dotted lines, Fig. 1, to counterbalance the weight of the last-spindle and its part when the blind top-lift is being applied.

The blocks at the ends of the slot in the cam-plate w^2 are supported by springs, as shown in dotted lines, to ease the blow of the pin w^2 therein when the nailing-spindle is permitted to fall.

I claim—

1. In a heeling-machine provided with mechanism to nail a heel to a shoe, the last-spindle and last-spindle-adjusting mechanism, to automatically change the position of the last-spindle to permit the application of the main body of the heel, and then of the blind top-lift, substantially as described.

2. In a heeling-machine, the nailing-spindle, last-spindle-adjusting mechanism, and a connecting-lever to operate them in unison, substantially as and for the purpose described.

3. The combination, in a heel nailing and trimming machine, of the following instrumentalities, viz: the trimming-shaft, its arms, the trimming-lever connected with the carriage, the loose gear-wheel provided with internal teeth 19, clutching mechanism to engage such gear-wheel, and a continuously-rotating shaft and loose pinion, and friction devices to operate the loose pinion, substantially as and for the purpose described.

4. In combination, in a heel nailing and trimming machine, the trimming-shaft, its loose gear-wheel, and clutching mechanism, to engage the wheel and rotate the trimming-shaft at suitable intervals, substantially as described.

5. In combination, in a heel-nailing and trimming-machine, a trimming-shaft, a loose gear-wheel, clutching mechanism to engage them, and a pawl-holding device, to hold the pawl of the clutching mechanism from contact with the loose gear-wheel, substantially as described.

6. The pawl-holding device, trimming-shaft, and its fixed arm, in combination with a stop to arrest the motion of the trimming-shaft as the pawl-holder removes the pawl from engagement with the loose gear of the trimming-shaft, substantially as described.

7. The continuously-rotating shaft, its loose pinion, and friction devices, combined with devices to adjust and regulate the amount of friction between the friction devices and loose pinion, according to the resistance offered to the movement of the trimming mechanism.

8. The combination, with the toggle-joint and nailing-spindle, of a shouldered lever and a connected treadle to lift it, in order that the link may be operated to straighten the toggle-joint, substantially as and for the purpose set forth.

9. The combination, with a treadle and teeth located at its fulcrum, of a gear and cam, or equivalent, to break the toggle-joint of and lower the nailing-spindle, substantially as dedescribed.

10. The combination, with the connecting-lever, located between the nailing-spindle and last-spindle-adjusting mechanism, of a hand-lever to permit the connecting-lever to be disconnected from the nailing-spindle, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES W. GLIDDEN.

Witnesses:
G. W. GREGORY,
L. A. BAXTER.