2 Sheets—Sheet 1.

L. R. BLAKE.

BOOT AND SHOE NAILING MACHINE.

No. 189,837. Patented April 24, 1877.

Fig. 5.

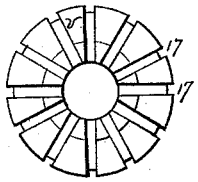


Fig. 1.

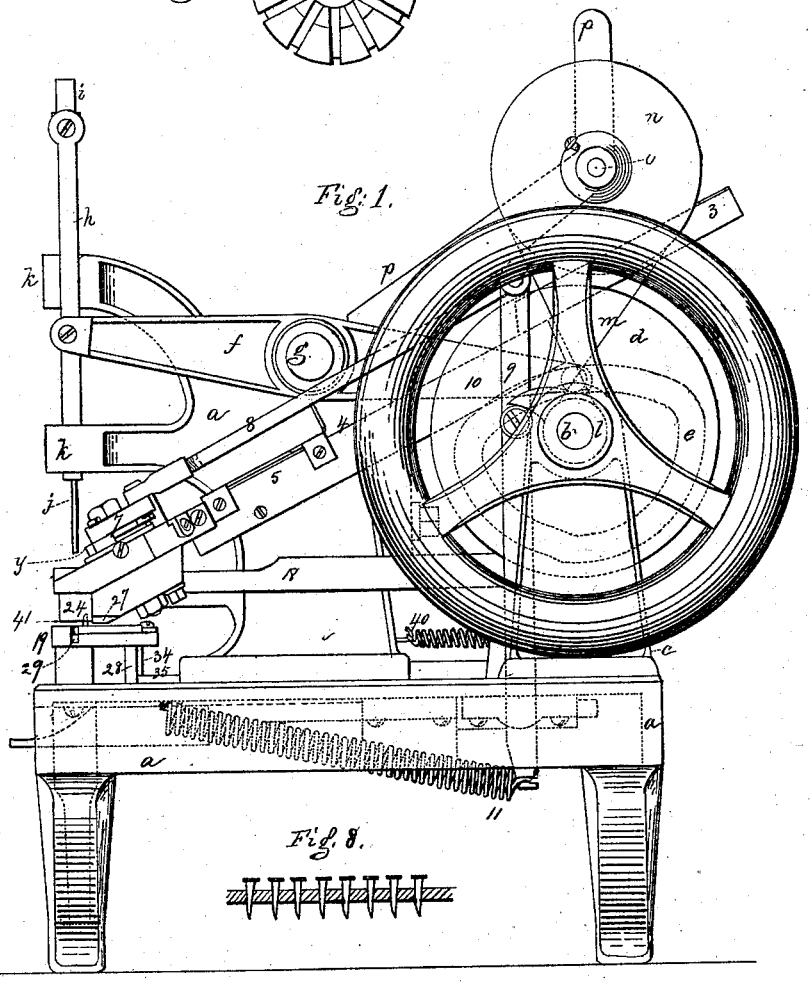


Fig. 8.

Fig. 9.

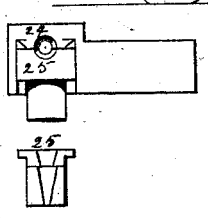


Fig. 6.

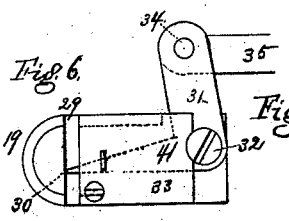
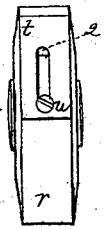


Fig. 7.



Witnesses.
L. H. Latimer.
W. J. Pratt.

Inventor.
Lyman R. Blake.
per Crosby & Gregory Attys.

2 Sheets—Sheet 2.

L. R. BLAKE.

BOOT AND SHOE NAILING MACHINE.

No. 189,837. Patented April 24, 1877.

Fig. 4.

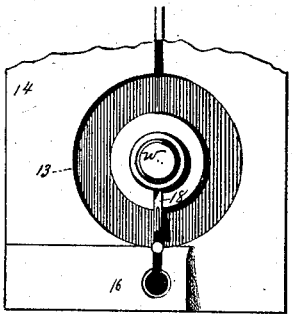


Fig. 2.

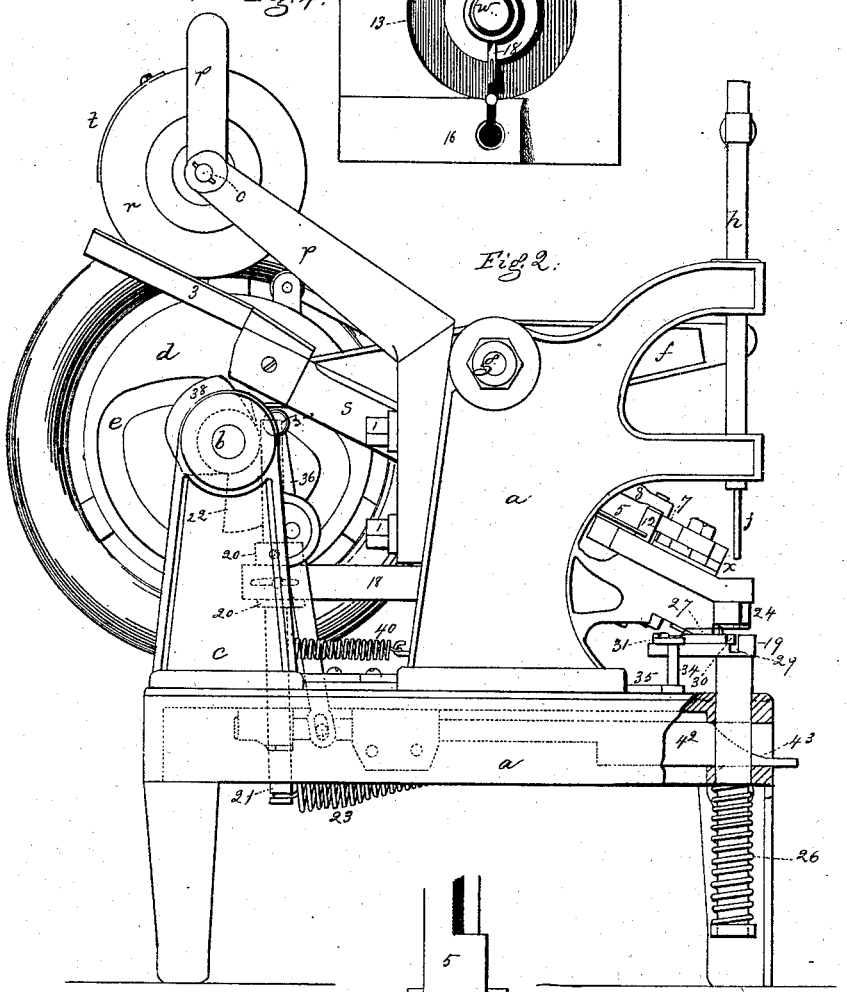
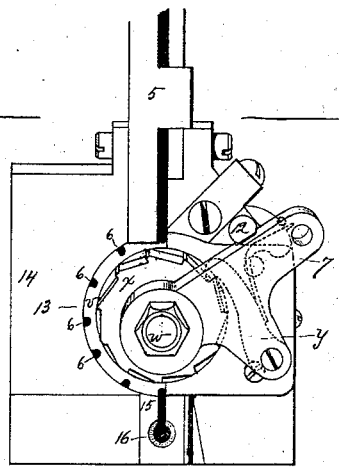


Fig. 3.



Witnesses.

L. H. Gratiner.

W. J. Pratt.

Inventor.

Lyman R Blake

per Crosby & Gregory Attys.

UNITED STATES PATENT OFFICE.

LYMAN R. BLAKE, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN BOOT AND SHOE NAILING-MACHINES.

Specification forming part of Letters Patent No. **189,837**, dated April 24, 1877; application filed May 5, 1876.

To all whom it may concern:

Be it known that I, LYMAN R. BLAKE, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improved Nailing-Machine for Boots and Shoes, of which the following is a specification:

This invention relates to a machine for inserting nails into the soles of boots and shoes, the soles so supplied with nails driven partially into or through them being then applied to a lasted boot or shoe, when the nails supported by the sole are driven into the overlapping edge of the upper and into the insole, thereby confining the sole in position.

The invention consists in a tack or nail tube and driver, in combination with a guideway to sustain and direct nails into a rotating carrier, a rotating carrier, and a transferrer to remove a nail from the carrier into the nail-tube, to be driven therefrom by the driver, substantially as described.

Also, in a nail tube and driver, in combination with a slotted support for the sole, and mechanism to automatically lock and release it, whereby the support is held rigidly during the time the nail is being driven partially into the sole, and is then released to prevent the nail being further driven, leaving the head of the nail projecting above the sole, substantially as described.

Also, in a slotted or grooved support, and mechanism to lock and release it, in combination with a guide-rod to prevent the support being turned, whereby the groove of the support is always retained in the same position with relation to the feed and edge gage, substantially as described.

Also, in a support for the sole, in combination with a feeding device, adapted to engage a partially-driven tack or nail, and move the sole, substantially as described.

Also, in a tack or nail tube, and a carrier provided with cells 6 and grooves 17, in combination with a reciprocating transferrer to engage the side of the nail next the center of the carrier, and move it laterally from the cell into the tube to be driven by the driver, substantially as described.

Also, in combination, a nail-carrying box, adapted to discharge headed nails at intervals into a slotted guideway, a slotted guideway, a rotating carrier, adapted to carry the nails singly from the guideway to a position opposite the nail-tube, and a transferrer to remove the tacks or nails laterally into the tube to be driven by the driver, substantially as described.

Also, in the sole-support, slotted to receive the points of the nails, in combination with an edge-gage attached to and moving with the support.

Also, in a support for the sole, provided with a recess to receive the points of the driven nails, in combination with a feeding device to engage the nail last driven to move the sole to receive the next succeeding nail.

Figure 1 represents the left-hand side of a machine provided with my improvements; Fig. 2, the right-hand side; Fig. 3, a top view of the nail-carrier and mechanism for operating it. Fig. 4 shows the carrier removed to represent the transferrer. Fig. 5 is an underside view of the carrier; Fig. 6, a top view of the sole support and feed; Fig. 7, an edge view of the nail-box; Fig. 8, a view of a portion of a sole with nails partially driven; Fig. 9, a detail of the nail-receiver.

The frame-work *a* of the machine is of suitable shape to properly support the different working parts. The main shaft *b*, sustained in bearings on standards *c*, is provided with cams and pulleys to move the different devices. The disk *d* is grooved at *e* to receive a pin or roller projecting from the lever *f* pivoted at *g*, and connected by link *h* with the bar *i*, provided with the driver *j*, the rod reciprocating in guideways *k*. At *l* (see dotted lines, Fig. 1) the shaft receives a belt, *m*, that extends about a belt-pulley, *n*, on a shaft, *o*, supported in arms of a hanger, *p*, attached to the frame *a* by bolts 1, and this shaft *o* carries a rotary nail-box, *r*, in which are placed the nails to be delivered to the guideway *s*. An adjustable door, *t*, on the nail-box, slotted, and retained, as shown in this instance, by a screw, *u*, is properly adjusted so as to permit several nails to fall out of the box at each rotation, through opening 2, and such nails drop upon the upper portion 3 of the guideway, the points of the nails dropping down through a slot in the bottom of portion 3, while their heads are supported by the walls of the slot,

and then the nails slide down the slotted guideway *s*, their heads being properly supported on the surface 4, a cover at 5 preventing the nails from rising from the guideway and over-riding or crowding each other, and the nails in the guideway pass one by one into cells 6 of the rotating carrier *v*, supported on a stud or post, *w*, and provided with a ratchet, *x*, adapted to be engaged and moved by a pawl, *y*, (see dotted lines, Fig. 3,) pivoted on a pawl-carrier, 7, connected by a link, 8, with a lever, 9, provided with a friction-roll adapted to be struck by a cam, 10, to move the lever and pawl to actuate the carrier, a spring, 11, returning the lever and pawl-carrier. The stop 12 determines the backward position of the pawl-carrier.

The nail-carrier somewhat resembles an inverted cone. Its upper portion or face is flat, to receive and support the heads of the nails, one nail in each cell, the wall 13 of the plate 14, in which the carrier rotates, keeping the nails in the cells until opposite the opening 15, that leads to the opening 16 of the tack or nail tube or receiver, into which the driver descends. The under face of the carrier is grooved at 17 (see Fig. 5) to permit the reciprocating transferrer 18 (see Figs. 1, 4) to remove the nails singly from the cells 6, through the passage 15 into the tack or nail tube or receiver 16, from which they are driven by the driver into the sole held on the support 19, placed at the top of a post.

The transferrer is adjustably attached to a grooved block, 20, pivoted to a lever, 21, and moved by a cam, 22, on shaft *b*, (see dotted lines, Fig. 2,) the cam moving the lever and transferrer forward, and the spring 23 returning them.

This transferrer has at its end a groove, in which the nail is received, and the transferrer, passing through a slot in the post *w*, meets the nail at its rear side, and moves it from the cell into the receiver.

The tack or nail tube or receiver is composed of a stationary grooved block or jaw, 24, and a spring-pressed grooved block or jaw, 25. (See Fig. 9.) The tacks or nails are delivered singly into the opening or groove between the jaws. As the driver descends it meets the head of, and drives, the tack or nail down between the jaws, and partially into the stock, the jaws separating under the action of the tack head and driver. The tapering portions of the grooves in the jaws or blocks support the head until the point is entered into, and driven the desired distance through, the sole, when the support is released, and the driver, descending a little farther, moves the head of the tack or nail from between the jaws of, and below, the nail-tube. After the support is released, the further descent of the driver in contact with the tack-head does not drive the tack into the sole, but the sole and nail descend together under the action of the driver, and the head of the tack removed from the tube is left projecting some distance above the surface of the sole. After this the sole with its partially-driven tack or nail is moved for a new tack, and the support is elevated before the driver again descends.

The support 19, on the upper surface of which rests the sole to be supplied with nails, is adapted to be moved up and down in guides in the frame, a spiral or other spring, 26, holding it up against a fixed rest, 27, a guide-rod, 28, connected with a backward projection of the support and moving in a hole in the frame, preventing the shaft of the support from turning, and insuring the retention of the nail-receiving groove 29 always in the proper direction to permit the passage from it of the points of the nails.

The support is provided with a feeding device, consisting, in this instance, of a finger, 30, on a lever, 31, pivoted to the support at 32, covered in part by a plate, 33, and connected through a stud, 34, with a feed-actuating rod, 35, the rod being provided with a projecting toe adapted to be struck by the lower end of a lever, 36, pivoted at 37, and moved by a cam, 38, the lever moving the feed-actuating rod backward to give the lever and feed-finger 30 its forward or positive movement, a spring, 40, moving it backward. This feed-finger 30 is shown as adapted to engage the lower or point end of each nail after it is driven partially through the sole, and while it rests in groove 29, and, acting on the nail last driven, moves the sole along the proper distance, or the distance desired between the adjacent nails; but should a nail fail to pass through the sole, then it is obvious the sole would not be moved forward, for the feed would have nothing to engage. If desired, a feed finger or device may engage the nail above the sole.

The edge of the sole is held pressed against the guide 41, which may be adjustable to or from the slot 29, and, instead of the feed shown, I might use some other well-known class of feed that would engage the sole, as in the well-known McKay sewing or nailing machines, or as in United States Patent No. 36,163.

The lower end of lever 36 is slotted, (as shown in dotted lines, Fig. 2,) to receive a pin on a slide-bar, 42, provided at its forward end with an incline, 43, and extending through a slot in the post of the support, and through a slot in the frame *a*, and during most of the time that the nail is being driven into the sole the support is held up by the bar, but just before the head of the nail reaches the sole, or the driver reaches its lowest downward position, the support is released by drawing back the bar, and then the support rests on the spring, and the driver, in its further downward movement, pushes the nail-head and sole down without driving the nail, and the feed takes place.

A sole set or studded in this way with partially-driven nails may be placed in position upon a lasted shoe, for an outsole, and the

nails being driven farther by a hand-hammer, will enter the upper and inner sole, and their heads may be driven against the face of the outer sole. This process of manufacturing a shoe is not herein claimed, as it forms the subject of another application for patent. I have herein shown a separable tube to yield to the tack or nail being driven, but I do not herein broadly claim such a separable tube, for I have made it the subject of another application for patent. Any usual headed nail may be used, a nail provided with a clinching-point being preferred.

The sole may or may not be provided with small perforations to receive the points of the nails, to prevent the nails from running, but the holes will be made smaller than the shanks of the nails, so that the nails will bind closely in such holes, and it will be found that a sole provided with nails in this way will hold longer than when the holes for the nails are made substantially as large as the body of the nail.

It is obvious that the driver-bar, carrier, and feed may be operated, and the support be held and released, by levers or rods constructed differently from the levers and rods of the drawing without departing from this invention, and the machine may be provided with an awl-bar operated in any well-known way.

The jar of the parts in the operation of the machine is sufficient to cause the nails to move freely down the guideway.

I claim—

1. A tack or nail tube and driver, in combination with a guideway to sustain and direct nails into a rotating carrier, a rotating carrier, and a transferrer to remove a nail from the carrier into the nail-tube to be driven therefrom by the driver, substantially as described.

2. A nail-tube and driver, in combination with a slotted support for the sole, and mechanism to automatically lock and release it, whereby the support is held rigidly during the time the nail is being driven partially into the sole, and is then released to prevent the nail being further driven, leaving the head of the nail projecting above the sole, substantially as described.

3. A slotted or grooved support, and mechanism to lock and release it, in combination with a guide-rod to prevent the support being turned, whereby the groove of the support is always retained in the same position with relation to the feed and edge-gage, substantially as described.

4. A support for the sole, in combination with a feeding device adapted to engage a partially-driven tack or nail, and move the sole, substantially as described.

5. A tack or nail tube and a carrier, provided with cells 6, and with grooves 17, in combination with a reciprocating transferrer to engage the side of the nail next the center of the carrier, and move it laterally from the cell into the tube to be driven by the driver, substantially as described.

6. In combination, a nail-carrying box adapted to discharge headed nails at intervals into a slotted guideway, a slotted guideway, a rotating carrier adapted to carry the nails singly from the guideway to a position opposite the nail-tube, and a transferrer to remove the tacks or nails laterally into the tube to be driven by the driver, substantially as described.

7. The sole-support slotted to receive the points of the nails, in combination with an edge-gage attached to and moving with the support.

8. The combination, with a nail-tube and driver, of a support for the sole and mechanism to hold it pressed upward against the under side of the sole while the tack is partially driven, and then to release it to prevent the tack being driven its whole length, substantially as described.

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

LYMAN R. BLAKE.

Witnesses:

L. H. LATIMER,

W. J. PRATT.