L. FARNSWORTH.

Nail-Setting Machine for Boots and Shoes.

No. 198,590. **Patented Dec. 25, 1877.**

Fig 1.

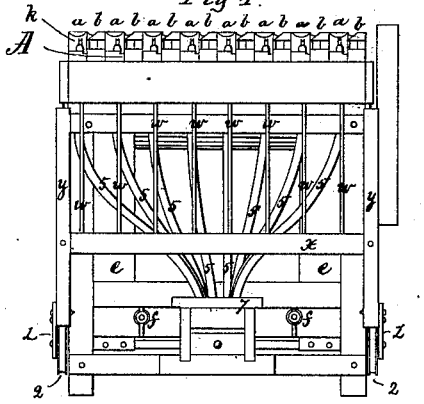

Fig. 2.

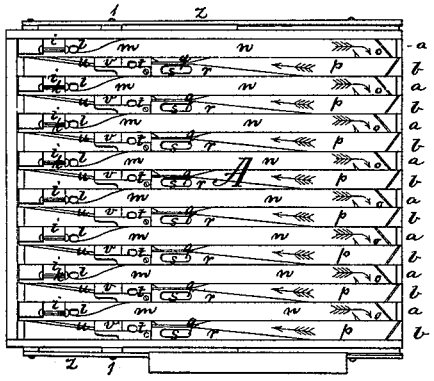

Fig. 3.

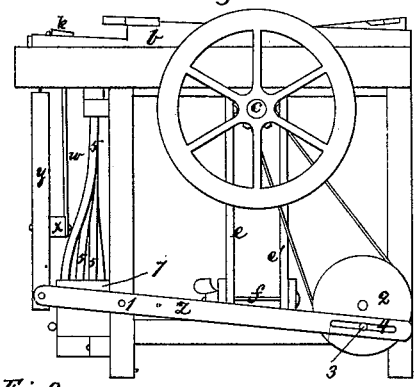

Fig. 4

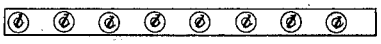

Fig 5.

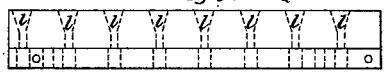

Fig 6.

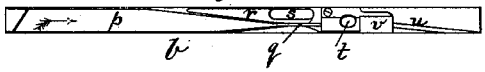

Fig 7.

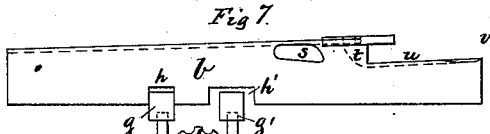

Fig 8.

Fig 9.

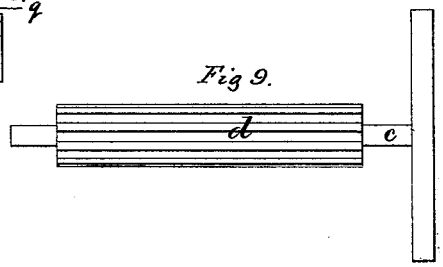

Fig 15

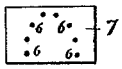

Fig 16

Fig 11.

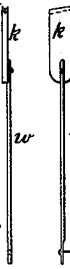

Fig 10.

Fig 12.

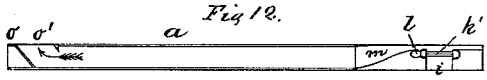

Fig. 17

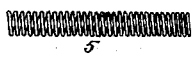

Fig 13

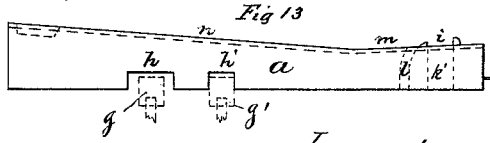

Fig 14.

Witnesses:

Henry Shadbourn.

Edward S. Blake.

Inventor:

Loring Farnsworth.

by Alban Andrew. attys.

UNITED STATES PATENT OFFICE.

LORING FARNSWORTH, OF NASHUA, NEW HAMPSHIRE, ASSIGNOR OF ONE-HALF HIS RIGHT TO WILBUR F. WRIGHT, OF SAME PLACE.

IMPROVEMENT IN NAIL-SETTING MACHINES FOR BOOTS AND SHOES.

Specification forming part of Letters Patent No. **198,590**, dated December 25, 1877; application filed December 3, 1877.

To all whom it may concern:

Be it known that I, LORING FARNSWORTH, of Nashua, in the county of Hillsborough and State of New Hampshire, have invented certain new and useful Improvements in Boot and Shoe Nail Setting Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in machines for automatically setting nails in boot or shoe sole or heel forms, or setting nails directly into perforated heels or soles for boots and shoes; and my invention consists in mechanism by which the nails that are laid upon the receiving-table are kept in constant circulation till they are singly delivered into receiving-throats and conducted to the heel-form or perforated heel-blank, by which arrangement one nail only is delivered at a time to each of the receiving-throats, and the balance of the nails kept in a constant circulation till required for delivery into the said throats or receivers.

My invention also relates to mechanism by which the nails are automatically headed—that is, arranged in such a manner as to be conducted toward the receiving-throats, all in one and the same position—that is to say, so as to lay all the nails so that they shall be presented with their points downward.

My invention further relates to mechanism by which the headed nails are collected in pools, from which they are lifted and delivered into the conductors leading to the heel-blank or perforated heel-forms.

My invention further relates to the combination, in a nail-setting machine, as above named, of nail-deliverers, a stationary guide-block, and flexible conductors for the nails from the deliverers to the perforations in the guide-block or heel-blanks.

My invention also relates to mechanism by which a longitudinal reciprocating motion is imparted to the nail-carriers of which the receiving-table is composed, for the purpose of feeding nails one by one to each of the receivers, and to circulate the remaining nails till required for use.

My invention also relates to a nail-carrier for nail-setting machines, having a converging feed-groove and a diverging waste-groove, and a waste-vent, through which the superfluous nails escape, to be circulated until required for feed to the receiver.

In the accompanying drawings, Figure 1 represents a front elevation of my invention; Fig. 2, a plan view of the same; and Fig. 3, a side elevation of the machine, seen from the right. Fig. 4 represents a plan view of the nail throats or receivers, and Fig. 5 a front view of Fig. 4. Fig. 6 represents a plan view of one of the nail-carriers, in which the waste-groove and waste-vent, as well as the heading mechanism, are located; and Fig. 7, a side elevation of the said carrier, and the mechanism by which the longitudinal reciprocating motion thereof is imparted from the rotary shaft of the machine. Fig. 8 represents an end view of the said carrier, seen from its forward end. Fig. 9 shows a side elevation of the driving-shaft, balance-wheel, and corrugated roller for imparting the reciprocating motion to the carriers. Fig. 10 shows a side view of one of the lifters by which the nails are taken singly from the pools and delivered to the throats or conductors. Fig. 11 shows an end view of the said lifter. Fig. 12 represents a plan view of one of the carriers, in which the receiving-throat is located, as well as the perforation for the vertical guidance of the aforesaid lifter. Fig. 13 represents a side view of the same. Fig. 14 represents an end view of the said carrier, seen from its forward end. Fig. 15 represents a plan view of the perforated guide-block, and Fig. 16 represents a similar plan view of the perforated nail-form into which the nails are delivered. Fig. 17 represents a side view of the flexible spiral-wire conductors for the nails.

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

A in Figs. 1 and 2 represents the receiving-table, on which the nails are scattered promis-

cuously. This table is composed of a series of bars or carriers, *a a a b b b*, arranged in pairs, side by side, as shown. One carrier, *a*, with another, *b*, constitutes a pair, on which the nails are independently carried, headed, and delivered into the receiving-throats. All of these carriers are reciprocated longitudinally during the operation of the machine, in such manner that the carriers *a a a* are moved in one direction, and the ones marked *b b b* are moved at the same time in an opposite direction; and this is accomplished by means of the rotary shaft *c*, on which is secured a corrugated roller *d*, that rotates between a pair of spring-bars, *e e'*, secured to the lower frame of the machine by means of thumb-screws *f f*, or similar devices. The upper ends of the spring-bars *e e'* are connected to horizontal cross-bars *g g'*, playing in recesses *h h'*, made in the under side of the carriers *a a b b*, as shown in Figs. 7 and 13. It will be seen by reference to said figures that the bar *g* fits snugly in the recess *h*, (shown in Fig. 7,) which is the rear recess, and that the bar *g'* fits snugly in the recess *h'*, (shown in Fig. 13,) which is the front recess, and that the forward recess *h'* in Fig. 7 is larger than its corresponding bar *g'*, and also that the rear recess *h* in Fig. 13 is larger than its corresponding bar *g*, which is done for the purpose of imparting a quick blow from the front to the rear of the bars *b b*, and easing off their return motion, at the same time as a quick blow from the rear to the front is given to the bars *a a*, with an easy and soft return motion in the opposite direction. By these means the nails are kept in a motion, as shown by the arrows in Figs. 2, 6, and 12—that is, from the front to the rear on the carriers *a a a*, and vice versa on the carriers *b b b*.

The reciprocating carriers *a a a* are each composed of the following elements, viz: a pool, *i*, in which the nails are collected after being turned or headed, all in the same direction; a perforation, *k'*, through which the lifter *k* moves up and down for the purpose of taking a single nail at a time from the pool *i* and depositing it into the throat or receiver *l*, which delivery is accomplished from the rear to the front by the reciprocating motion of said carriers *a a a* and their lifters *k k k*. Each carrier *a a a* is also provided with a descending plane, *m*, descending from the side of the pool *i* toward the central part of the carrier, for the purpose of relieving the pool *i* quickly from its surplus nails, and to allow such surplus nails to continue in circulation up on the ascending plane *n*.

At the rear of each carrier *a a a* is a stop-wall, *o*, and passage *o'*, by means of which the nails that are in circulation on the inclined plane *n* are delivered at the rear end of the carrier *b*. Each of the carriers *b b b* is composed of the following elements, viz: a converging groove, *p*, that descends from the rear of the machine toward the central part of the carrier, where it terminates as a single-nail groove, *q*, that is only wide enough to allow one single nail to pass at a time. To the right of the converging groove *p* is a waste or overflow diverging groove, *r*, that terminates as a waste-vent, *s s*, through which the superfluous nails are allowed to escape upon the ascending plane of the carrier *a*, to be again circulated. From the single-nail groove *q* the nails are carried to the heading or turning mechanism, for the purpose of turning all the nails with their heads in one and the same direction—viz., to the front of the machine. This heading mechanism consists of the quarter-turn hole *t*, (shown in Figs. 6 and 7,) into which the nails that progress with their heads foremost drop down head foremost directly on the feed-channel *u*, leading to the pool *i* on the carrier *a*. The nails that progress toward the hole *t* with their points foremost are carried automatically beyond the said hole, and when carried far enough the heaviest portion of the nail—that is, the head portion—drops down first, and in this manner all the nails are delivered upon the feed-channel *u* with their heads all pointing toward the front of the machine.

For the purpose of preventing such nails that for any reason should not be properly turned or headed from dropping onto the feed-channel *u*, I provide the header or turner with a projecting side-tapering piece, *v*, (shown in Figs. 7 and 8,) by which such nails are guided onto the carrier *a*, to be again circulated, as before described.

The lifters *k k* are each provided with a groove, *k''*, in their upper ends, as shown in Fig. 11, into which the nail is gathered from the pool *i* previous to and during its delivery into the throat or receiver *l*.

The lifters *k k k* are each jointed in their lower ends to the rods *w w*, secured in their lower ends to the cross-bar *x*, attached to the upright movable guide-posts *y y*. The lower ends of the posts *y y* are each jointed to the levers *z z*, having fulcrums 1 1, and are rocked by means of the rotary cranks 2 2, having pins 3 3, playing through slotted holes 4 4 in the rear of the levers *z z*.

The lifters *k k* may, however, be operated in any other suitable manner without departing from the spirit of my invention.

5 5 5 represent the flexible conductors from the throats *l l l* to the perforations 6 6 6 (shown in Fig. 15) in the guide-block 7. These conductors 5 5 are made flexible and in the form of coiled wires, as shown in Fig. 17, by which they can easily be moved nearer together or farther away in their lower ends, so as to fit into any desired pattern on the guide-block 7.

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

1. In a nail-setting machine for boots and shoes, a nail-receiver, A, consisting of the longitudinally-reciprocating bars or carriers *a a a b b b*, upon which the nails are continually circulated until delivered into the throats *l l l*, substantially as and for the purpose set forth and described.

2. A nail-setting machine for boots and shoes, consisting of longitudinally-reciprocating nail-carriers *a b*, in pairs, one of which is provided with descending and ascending planes *m n*, and the other one provided with a converging groove, *p*, single-nail groove *q*, heading or turning hole *t*, and feed-channel *u*, from which the nails are delivered into the pool *i* on the carrier *a*, substantially as and for the purpose set forth.

3. In a nail-setting machine, a longitudinally-reciprocating nail-carrier, *b*, provided with the converging groove *p*, in combination with the diverging waste-groove *r* and waste-vent *s s*, substantially as and for the purpose set forth.

4. The herein-described heading or turning mechanism, consisting of a longitudinally-reciprocating bar, *b*, with its nail-groove *q*, turning-hole *t*, and escape-incline *v*, as and for the purpose set forth.

5. In a nail-setting machine for boots and shoes, the combination, with a nail-pool, *i*, of the vertically and laterally movable jack or lifter *k*, substantially as and for the purpose set forth.

6. In a nail-setting machine, the combination, with the throats *l l l* and a perforated guide-block, 7, of the flexible spiral-wire conductors 5 5 5, substantially as and for the purpose described.

7. In a nail-setting machine for boots and shoes, the combination, with the longitudinally-reciprocating bars *a a a b b b*, of the spring-bars *e e* and the corrugated rotary roller *d*, substantially as and for the purpose set forth.

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

LORING FARNSWORTH.

Witnesses:
ALBAN ANDRÉN,
HENRY CHADBOURN.