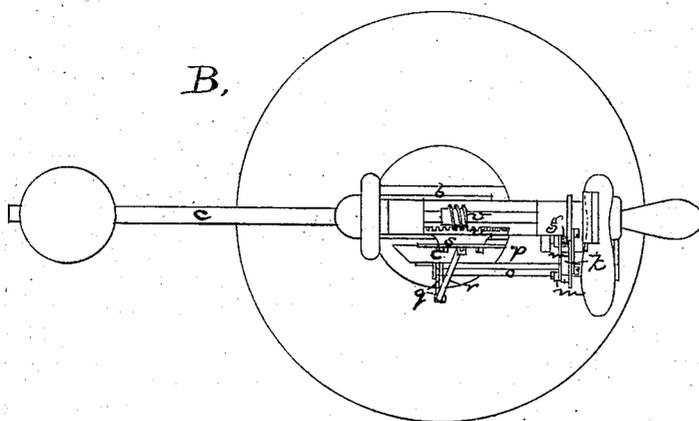
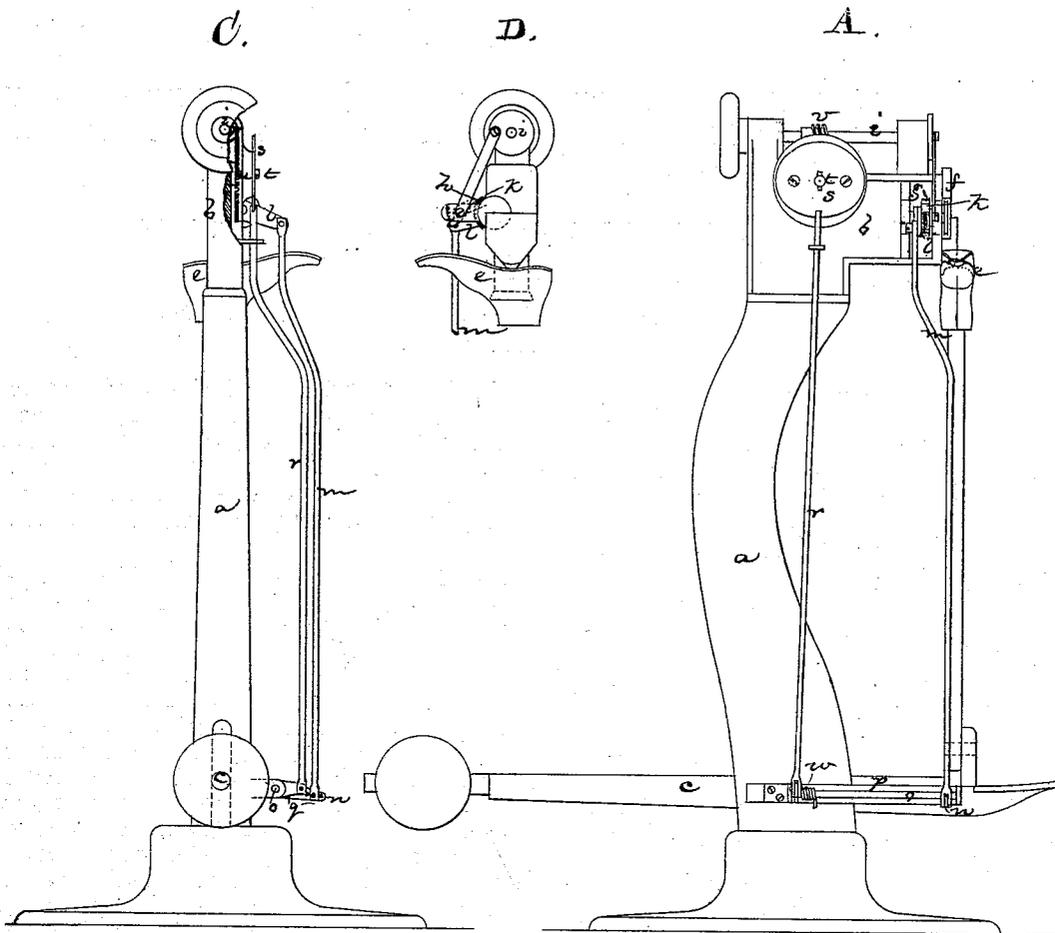


WILLIAM N. LINNELL:
 Boot and Shoe Nailing-Machines.

No. 127,779.

Patented June 11, 1872.



WITNESSES.
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IMPROVEMENT IN BOOT AND SHOE NAILING-MACHINES.

Specification forming part of Letters Patent No. 127,779, dated June 11, 1872.

To all whom it may concern:

Be it known that I, WILLIAM N. LINNELL, of Cambridge, in the county of Middlesex and State of Massachusetts, have invented certain Improvements in Machines for Nailing Boots and Shoes; and I do hereby declare that the following, taken in connection with the drawing which accompanies and forms part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

In uniting the soles and uppers of boots and shoes upon nailing-machines and with nails cut from a continuous wire, two methods of supporting the shoe and presenting it to the nailing mechanism are used, in one of which the shoe is supported upon and presented by the top of a salient arm called a horn, as may be seen in United States Letters Patent Nos. 76,150 and 122,985, and in the other of which the shoe is mounted upon and presented by a last, this method being shown in United States Letters Patent Nos. 87,473 and 102,155.

As the thickness of the soles to be united varies greatly from shank to toe, especially in thick-soled work, it is desirable to cut each nail to a length equal to the thickness to be united by it, and for this purpose several inventions and improvements have been devised, in all of which, by means of the relative movements of the devices, between which the parts to be united are held, the feed of the wire to the cutters is so automatically regulated that the nail cut is of or substantially of a length corresponding to such thickness. In the patents 76,150 and 122,985 this is accomplished by making the feed and presser mechanism essentially stationary or vertically immovable, and having a vertically-moving support, the movement of the support in accordance with the change in thickness of the parts gripped between it, and the presser and feed mechanisms regulating the movement of the wire-feed mechanism. In the patent 87,473, by making the support stationary during the nailing operation, and having a variably-moving presser-foot, the extent of movement of the presser-foot determines the extent of feed of the wire to form the nail.

In the patent 102,155 the vertically-moving support determines the length of wire, (as it does in the patent 87,473,) the shoe being supported upon a last and jack, and there being a gauge which corresponds to the sole-face of the last, near the edge thereof, or in the nail-entering line.

The present invention embodies not only the principle shown in the 87,473 patent, in that the change of wire-length for the various nails is automatically determined by the thickness of the parts to be united, but also the modification of such principle shown in the 102,155 patent, inasmuch as the gauge is used in said latter patent to determine the extent of movement of the feed-pawl in contact, or while in contact with the teeth of the ratchet-wheel. In said latter patent, however, the gauge directly encompasses the shoe, while in this invention it is located at another part of the machine, said gauge in this invention consisting of a rotary cam or pattern-plate, the edge of which is made to conform to the bottom or sole-face of the last, at the edge thereof, so that by connecting such edge by a link with the end of an arm upon a shaft, another arm of which shaft is connected with a feed or pawl-regulating shield on the feed-ratchet, the position of the shield is always contingent upon the position of the rod, determined by the part of the cam or pattern-plate in contact therewith. The pattern or cam-wheel is placed on the face of a gear or worm-wheel, the teeth of which mesh into the teeth of a worm on the shaft that drives the wire-feed pawl, and as the feed moves, the shoe and the fastenings are in succession cut and driven, the shaft turns the pattern-wheel and changes the position of the shield which regulates the pawl-feed. The pattern-wheel is so made that in feeding a shoe entirely around the wheel makes one rotation, and its changing position as it rotates during the feed of the shoe is such that the position of the shield is automatically changing during the whole nailing process, and the change corresponds to the change in the thickness of the parts to be united, the shield always being kept in position, so that the wire cut is of a length corresponding to the thick-

ness gripped between the sole-face of the last and the presser-foot.

My invention may be stated as consisting in combining with a shoe-nailing mechanism a pattern located away from the shoe-supporting jack, and so formed and so connected with the shoe-feeding and wire-feeding mechanism that it is automatically operated, and through its automatic movement effects or insures a feed movement of the wire corresponding to the thickness gripped between the sole-face and the presser or nail-tube foot of the nailing-machine.

The drawing shows in side elevation, Figure A, in plan, Fig. B, and in rear elevation, Fig. C, a machine embodying my invention, or that part of the mechanism of a nailing-machine with which my invention is directly connected. A partial front elevation is shown at D.

a shows the standard; *b*, the head; *c*, the weighted pedal-lever; *d*, the jack-standard, pivoted to the forward end of said lever; *e*, the boot upon the last; *f*, the front plate, in or at the back of which are located the feed mechanism, the nail-tube foot, and the wire-feed and nail-cutting mechanism. *g* denotes the ratchet-wheel, by rotative movement of which the feed of the wire is effected. *h* is the feed-pawl, reciprocated by connection with the shaft *i*. *k* is the shield, over which the pawl slides at its retreat, and by movement beyond which (and not until movement beyond which) it is thrown into contact with the ratchet-wheel to effect the feed of the wheel and of the wire. The shield has an arm, *l*, which, by a link or rod, *m*, is jointed to an arm, *n*, on a rocker-shaft, *o*, journaled in bearings on the side of a piece, *p*, fixed to and tipping with the jack-lever *c*. This shaft also has an arm, *q*, to which is jointed a vertical rod, *r*, extending up to the periphery of a pattern-wheel, *s*, the edge of which wheel a slit or fork at the end of the rod embraces. This pattern-wheel turns on a stud-pin, *t*, and is fixed to or forms part of a worm or gear wheel, *u*, meshing into the tooth of a worm, *v*, on the driving-shaft *i*, rotation of the shaft serving to effect the feed of the wire, the severing of the nail, and the driving of the nail; and the feed of the shoe also turning the wheel, the relation being such that the feed of a shoe entirely around imparts to the pattern-wheel a complete rotation. The sole-face of the last being of given form, corresponding to

the inner surface of the inner sole, the pattern-wheel is made of such contour that at every movement of the shoe to bring any part of the sole thereof directly under the nail-tube and presser-foot to be nailed the pattern-wheel is moved, and by its movement actuates the rod *r*, (or causes it to be actuated, either by direct pressure of the wheel-periphery to carry the rod down, or by enabling a spring so to act to carry the rod up,) imparts movement to the shaft *o* and rod *m*, and through the rod *m*, to the shield *k*, positioning the shield, so that it leaves so much and only so much of the ratchet-wheel (in the path of movement of the pawl) open to contact of the pawl, as will insure a feed of wire equal to the thickness of parts beneath the nail-tube foot, (or a given extent in excess of or less than such thickness, as may be required,) the relation of the sole-face of the last and the peripheral form of the pattern-wheel, and their relative and corresponding movements being such that the position of the shield is always controlled by the part of the sole-face of the last under the nail-tube foot, and is so controlled through the agency of the pattern-wheel.

Under this invention a pattern may be located in some other position, so long as connection is made between the feed movements of the shoe and the pattern, so that the position of the pattern is controlled by position of the shoe, and by the changing position of the shoe the position of the feed-pawl shield is correspondingly changed through the agency of such pattern.

I claim—

In combination with a shoe-nailing machine using wire or wire-like material, and with the wire-feed ratchet and pawl, and a shield for varying the feed of the ratchet by the pawl, a pattern located away from the shoe, and determining by its position prior to each nail-cutting operation, the position of the shield, and through the position of the shield the length of wire cut for each fastening, substantially as described.

Executed this 21st day of February, A. D. 1872.

WILLIAM N. LINNELL.

Witnesses:

FRANCIS GOULD,
M. W. FROTHINGHAM.