(No Model.) 3 Sheets—Sheet 1.

J. B. FLINT.

NAILING MACHINE.

No. 555,314. Patented Feb. 25, 1896.

Fig: 10.

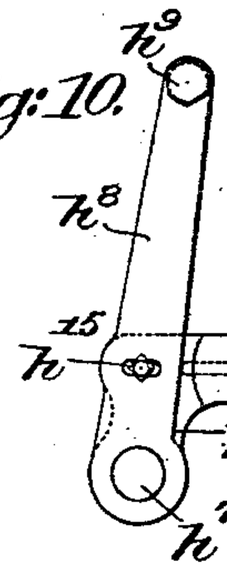


Fig: 1.

Witnesses.
Edward F. Allen.
Fred S. Gunby Jr.

Inventor.
John B. Flint.
by Crosby Gregory.
attys.

(No Model.) 3 Sheets—Sheet 2.

J. B. FLINT.

NAILING MACHINE.

No. 555,314. Patented Feb. 25, 1896.

Fig: 2.

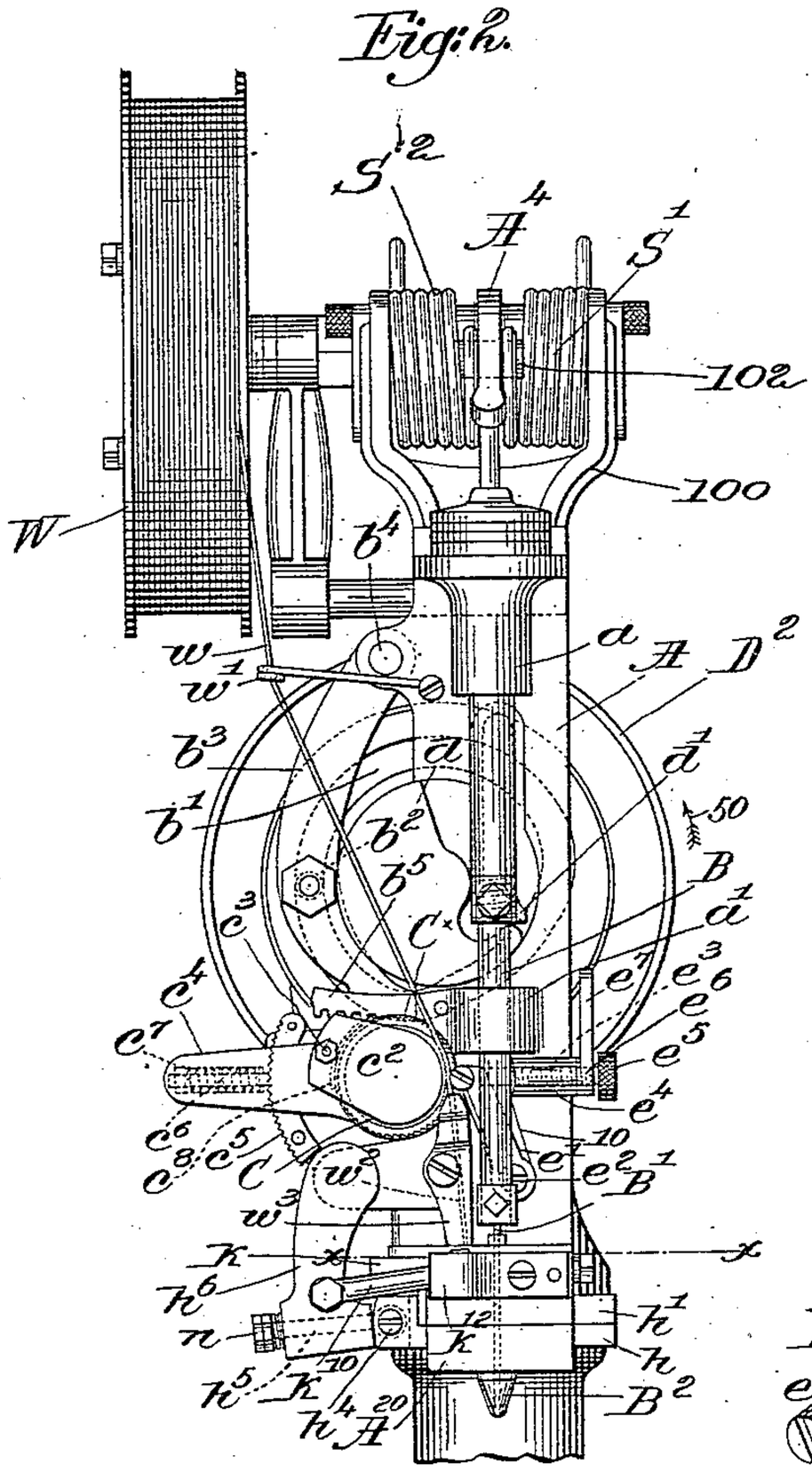


Fig: 8.

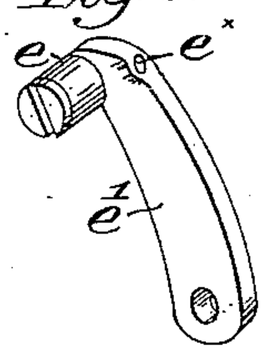
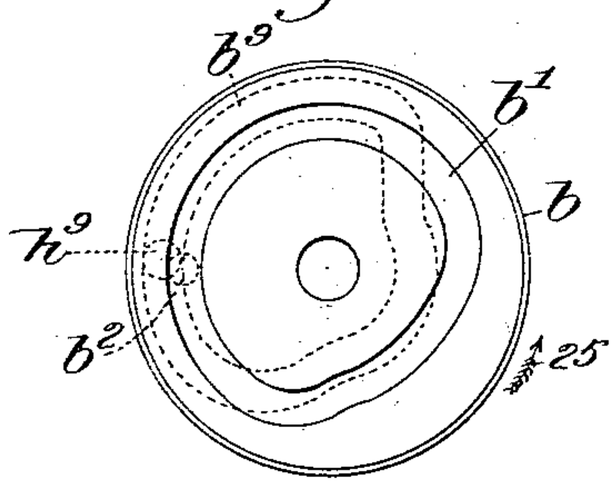


Fig: 3.



Witnesses.
Edward F. Allen.
Fred S. Grunbaf.

Inventor.
John B. Flint.
by Crosby & Gregory.
Attys.

(No Model.) 3 Sheets—Sheet 3.

J. B. FLINT.

NAILING MACHINE.

No. 555,314. Patented Feb. 25, 1896.

Fig: 4.

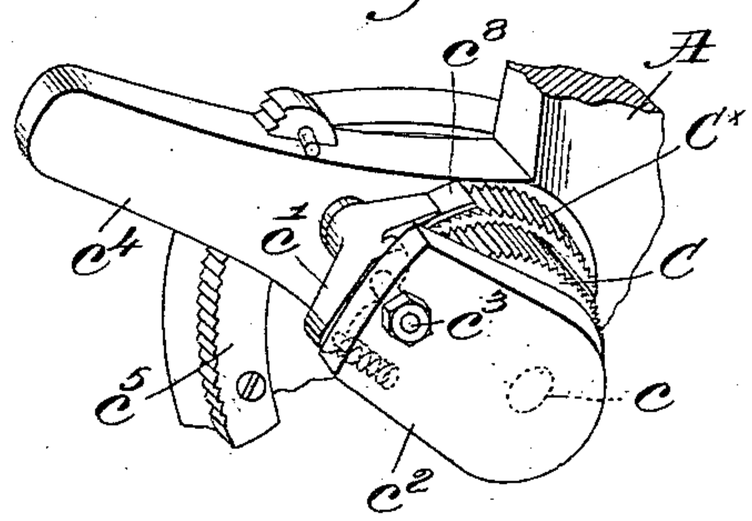


Fig: 7.

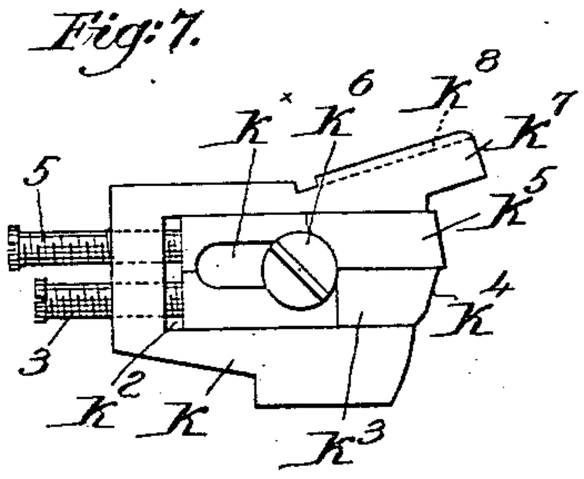


Fig: 9.

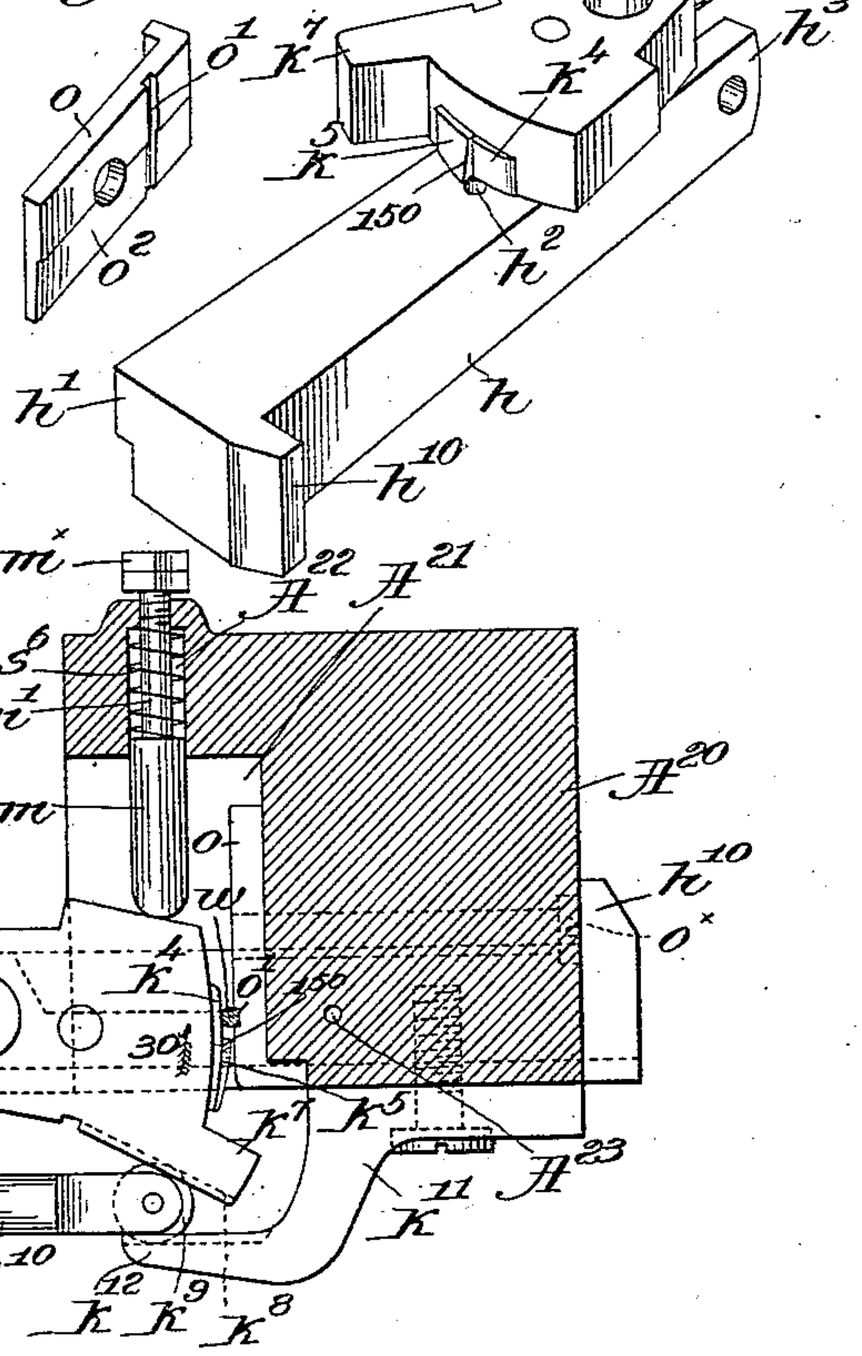


Fig: 6.

Fig: 5.

Witnesses.
Edward F. Allen.
Fred S. Grundy.

Inventor:
John B. Flint.
by Crosby & Gregory.
Attys.

UNITED STATES PATENT OFFICE.

JOHN B. FLINT, OF CHELSEA, MASSACHUSETTS, ASSIGNOR TO THE WIRE GRIP FASTENING COMPANY, OF CHICAGO, ILLINOIS.

NAILING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 555,314, dated February 25, 1896.

Application filed May 14, 1895. Serial No. 549,249. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. FLINT, of Chelsea, county of Suffolk, State of Massachusetts, have invented an Improvement in Nailing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention has for its object the production of a machine for nailing boots and shoes by means of nails or fastenings severed from a continuous wire which is intermittingly fed from a suitable source of supply to a combined severing and transferring mechanism, whereby the severed nail or fastener is moved into position to be driven into the work.

Prior to the severing and transferring of the severed nail its lower end is slabbed off by suitable means to reduce the end of the fastening which is to enter the material, and the operation of such means is so timed in its movement that the part of the wire which is to form the lower end of one fastener or nail is slabbed off prior to the severing and transferring of the fastener previously slabbed. Means are also provided under the control of the operator to vary the feed of the wire to adapt the length of the fasteners to the thickness of the sole or other stock into which they are to be driven.

Figure 1 in side elevation represents a nailing-machine embodying my invention, the standard or column being broken off between the base and the head to save space. Fig. 2 is a front elevation of the head of the machine shown in Fig. 1, the standard being omitted. Fig. 3 is a detached plan view of the cam for actuating the feed and the mechanism for pointing, severing and transferring the nail. Fig. 4 is a perspective detail, on a larger scale, of the feed-controlling device. Fig. 5 is a transverse sectional view, enlarged, taken on the line x x, Fig. 2, looking down. Fig. 6 is a perspective view of the transferrer and the pointing device. Fig. 7 is an under side view of the pointing device and its carrier. Fig. 8 is a perspective view of the presser-roll support. Fig. 9 is a perspective view of the positioning device to hold the wire as it is pointed; and Fig. 10 is a detail taken on the line y y, Fig. 1, and looking to the right.

The head A, fitted to a standard or column A′, broken out in Fig. 1 to save space; the driver-bar B, movable in bearings a and a' of the head and provided at its lower end in the usual manner with a driver B′; the nose B^2; the milled or notched feed-wheel C, loose on a shaft c; the pawl c'; the pawl-carrier c^2, fast on the outer end of the shaft c to move the pawl and rotate the feed-wheel intermittingly; the main shaft D, and the cam d, co-operating with a toe d' on and to lift the driver-bar B, are and may be all as common to machines of this class.

The main shaft D has fast thereon one member, D′, of a friction-clutch, the other member, D^2, being loose on the said shaft and provided with a hub D^3, normally held against a sleeve D^4 loose on the shaft by a spring s, Fig. 1, the sleeve being slabbed off and having an inclined shoulder 3, against which acts the inclined side of a wedge D^5 on the end of a slide-bar D^6 forked to embrace the slabbed-off portion of the sleeve, said slide-bar in practice being attached at its lower end to a treadle T pivoted to the base of the machine in usual manner.

Depression of the treadle against the action of the spring S moves the member D^2 to the left, Fig. 1, into engagement with the member D′, rotating thereby the main shaft by means of a belt, (not shown,) connecting the member D^2 with any suitable source of power.

The main shaft D is mounted in bearings A^2 A^3 on the head, and carries on its front end the cam d to lift the driver-bar B, the toe d' on the latter being adjustable to vary the stroke of the said driver-bar.

As best shown in Fig. 2, a yoke-like frame 100 is mounted on the head A back of the upper end of the driver-bar B to form bearings for a shaft 101 to which is secured an arm A^4 for depressing the driver-bar at the proper time. Instead of mounting a depressing-spring at one side of said arm, as is usual in machines of this class, I mount a spring at each side of said arm, as at S′ S^2, the springs being oppositely coiled, and their inner adjacent ends are attached to a pin or stud 102

on the arm, the other ends of the springs being held stationary in any well-known desired manner. By this construction I not only increase the power of the driving-blow, but I entirely obviate any tendency to twist the arm A^4 out of its proper path, as the springs perfectly center it, as it were, and prevent lateral movement.

While I have shown the two springs as separate, it will be of course obvious that a single spring coiled oppositely at each side of its center would be an equivalent therefor, the arm A^4 being connected to the center of such spring.

A disk d^2 having ratchet-teeth d^3 on a portion of its periphery is secured to the main shaft in suitable manner, as by a key $d^\times$ passed through the hub d^4 of the disk, and a pawl d^5 pivoted on the head engages the ratchet-teeth and prevents retrograde rotation of the main shaft after it has been started.

A cam b (shown separately in Fig. 3) is secured to the main shaft, the outer face of said cam having a groove b' therein entered by a roll or other stud b^2 on an arm b^3 pivoted at b^4 to the head and provided at its lower end with a segment-gear b^5 in mesh with and to oscillate a gear b^6 fast on the inner end of the rock-shaft c, mounted in a bearing A^5 on the head.

As best shown in Fig. 4, the feed-wheel C has attached thereto or forming a part of it a ratchet-wheel $C^\times$, the teeth of which are engaged by the pawl c' when the pawl-carrier c^2 is rocked by or through the movement of the arm b^3, as has been described. The pawl c' is pivoted on the pawl-carrier by means of a headed bolt c^3 extended through the latter and projecting from its inner side. An arm c^4 is loosely mounted on the shaft c adjacent the ratchet-wheel $C^\times$, and it is slotted to receive a curved rack-bar c^5 secured to a lateral web on the head, a spring-controlled locking-bolt c^6 carried by the arm c^4 normally engaging the rack-bar and maintaining the arm at any desired point thereon.

The bolt may be withdrawn by its head c^7 to permit adjustment of the arm, and to the inner face of the latter I have secured a measuring-shield c^8, interposed between the uniformly-reciprocating pawl c' and the periphery of the ratchet-wheel $C^\times$.

In order to readily vary the feed of the wire or fastening material according to the thickness of the stock the operator will move the arm c^4 up or down, as the case may be, to expose a less or greater number of teeth of the ratchet-wheel $C^\times$ to thus feed the wire for a less or greater distance according to the length desired for the fastening, that depending on the thickness of the stock.

The presser wheel or roll e is supported on the upper end of an arm e', (shown separately in Fig. 8,) pivoted at e^2 in a cut-away portion 10 of the head, (see Fig. 2,) the said roll being pressed toward the feed-wheel C by a threaded rod e^3 rotatable in an internally-threaded boss e^4 on the head, the inner end of said rod entering a depression $e^\times$ in the arm e', while its outer end is provided with a milled or other suitable head e^5 by which it may be rotated to adjust the feed mechanism to different diameters of wire. A lock-nut e^6 on the rod e^3 is provided with an extension or handle e^7 by which it may be readily turned to lock or unlock the adjusting-rod, preventing accidental movement thereof.

The wire w is led from a suitable reel W through a guide-eye w' to and between the feed-wheel C and presser-roll e, and thence through a passage w^2 (see dotted lines Fig. 2) in a fixed guide w^3 to the severing and transferring mechanism.

Referring now to Figs. 1, 2, and 5, the depending portion A^{20} of the head is transversely slotted to receive therein a slide-block h, (shown separately in Fig. 6,) having a longitudinal rib or fin h' on its outer side to enter a suitably-shaped portion of the slot. The thickness of the slide-block h is equal to the longest nail or fastening which can be severed from the wire, and a hole or passage h^2 is drilled in and entirely through the block to receive the leading end of the wire w when the said hole is beneath the guide w^3, said slide-block then being at one end of its stroke, its position when at the other end of the stroke being shown in Fig. 2. One end of the slide-block is slotted to form ears h^3, between which is pivoted at h^4 a rod h^5, extended loosely through an opening in the lower end of a rocker-arm h^6, in which it is retained by suitable check-nuts n. A suitable spring s^5, Fig. 2, interposed between the arm and check-nuts, permits movement of the arm slightly in advance of the transferrer. The arm h^6 is secured to or forms a part of a rock-shaft h^7 mounted in a sleeve-like bearing A^{10} on the side of the head, the other projecting end of the shaft having adjustably secured thereto an arm h^8 (see Figs. 1 and 10) carrying a roll or other suitable stud h^9 to enter a groove b^9 (see dotted lines, Fig. 3) in the rear face of the cam b.

Rotation of the cam b in the direction of the arrow 25, Fig. 3, reciprocates the slide-block h, moving it from the position shown in Fig. 5 to that shown in Fig. 2, to transfer the severed nail into the path of the driver B′, to be driven thereby through the nail-passage 100 in the nose B^2 into the work.

The part A^{20} of the head is cut away rearwardly above the slide-block h to receive therein a swinging carrier k, pivoted by a stud k' (see Figs. 5 and 6) to the head, and normally pressed outwardly by a plunger m, movable in a recess A^{22}, Fig. 5, the reduced shank m' of the plunger extending through the head, and its inward movement is controlled by check-nuts $m^\times$, a spiral spring s^6 surrounding said shank between the end of the recess and the plunger m, and pressing the latter outward against the carrier.

The under side of the carrier k is longitudinally recessed at k^2, Fig. 7, to receive therein a clamping device k^3 having a cam-face k^4 and a cutter k^5.

As best shown in Fig. 7, the shanks of the cutter and the clamping device are cut out to form a slot $k^\times$, through which the shank of a set-screw k^6 passes into the carrier, the head of the screw acting on both and holding them firmly in position when adjusted by means of screws 3 and 5, threaded into the end of the carrier.

By means of the adjusting-screws the cutter k^5 or the clamping device k^3 may be moved to cause more or less of their operating ends to project beyond the inner end of the carrier k.

An outwardly-inclined lug k^7 on the carrier k is preferably grooved at k^8, (see dotted lines, Fig. 5,) to receive a roll k^9 on the end of a link k^{10} attached to the rocker-arm h^6, as clearly shown in Fig. 2, a bracket k^{11}, rigidly secured to the head, presenting a track k^{12} to guide the roll k^9 and keep it in parallelism with the slide-block h.

The movement of the arm h^6 to slide the block h to the right, Fig. 5, moves the roll k^9 far enough to swing the carrier k on its pivot, in the direction of the arrow 30, to carry the leading edge of the cutter k^5 against and past the part of the wire w in its path, slabbing it off at one side to reduce it thereat and form the leading end for a nail. This slabbing operation is performed before the wire is severed, and between the fixed guide w^3 and the top of the slide-block h, and obviously the wire must be positioned and held while subjected to the action of the cutter. For this purpose I secure to the side of the recess A^{21}, above the slide-block, a plate o (shown separately in Fig. 9) by a suitable screw $o^\times$, said plate having in its outer face a vertical groove o' in the vertical plane of the path of movement of the hole h^2 of the slide-block and below and just to one side of the fixed guide w^3.

When the wire w is fed down into the slide-block the part between it and the guide w^3 enters the groove o' and it is forced tightly therein by the cam-face k^4 of the clamping device k^3, the wire projecting from the groove, and the swinging movement of the carrier k moves the cutter k^5 into engagement with and to slab the wire so held. A depressed portion o^2 in the face of the plate o permits the cutter to enter far enough into the wire to slab it properly and to permit the escape of the piece cut from it. As the slabbing is progressing, the movement of the slide-block h to the right, Fig. 5, acts to sever the wire, the upper edge of the hole h^2 acting as a movable cutter while the lower edge of the plate o at the bottom of the groove o' forms a fixed or stationary cutter. The nail thus severed remains in the hole h^2 of the slide-block and is transferred thereby into position over the passage 100 in the nose B^2 and beneath the hole A^{23} in which the driver B′ moves in correct position to be driven out of the transferrer at the next descent of the driver into the work held against the nose.

It will be obvious from the foregoing that the wire is slabbed off just before the next preceding nail is severed from the wire and transferred to the path of the driver, enabling the wire to be more firmly held while being slabbed, the slide-block h acting both as a severing device and a transferrer for the severed nail. An offset or ear h^{10} on the slide-block acts as a stop to limit its movement on the back stroke, and as the slide-block returns to its original position the plunger m forces the carrier k outward ready to position and slab the next section of wire as it is fed down by the feeding mechanism. By means of the screw 5 the depth of the slabbed-off portion of the wire is regulated, and the clamping device can be adjusted by its screw 3 for different diameters of wire.

To adjust the stroke of the slide-block h I have secured the arm h^8 in an adjustable manner to the rock-shaft h^7 by means shown in Figs. 1 and 10, wherein an arm h^{12} is rigidly secured to the shaft h^7 and provided with an offset-ear h^{13} extended across the arm h^8. This ear is provided with an adjusting-screw h^{14}, the inner end of which bears against the edge of said arm h^8, and a set-screw h^{15} passes through a slot h^{14} in the latter and into the arm h^{12}. By loosening the set-screw h^{15} the arm h^8, which is loose on the rock-shaft h^7, can be moved thereon relatively to the arm h^{12} according to the adjustment of screw h^{14}, and after adjustment the two arms h^8 h^{12} are clamped together by the set-screw h^{15}. Wear can thus be compensated for and the parts made to move in their proper timing.

My invention is not restricted to the exact shape and construction of the parts herein shown and described, as it will be obvious that they can be modified and altered without departing from the spirit and scope of my invention.

The direction of rotation of the main shaft D is shown by the arrow 50, Fig. 2.

By an inspection of the cutter k^5 (shown in Figs. 5 and 6) it will be seen that the cutting-edge 150 is inclined outwardly from the upper end, so that the portion slabbed off from the wire will taper downward, thus reducing or sharpening the leading end of the fastener.

I claim—

1. In a nailing-machine, a fixed plate to hold the wire, a laterally-swinging carrier, an adjustable clamping device and an adjustable cutter mounted in said carrier, and means to swing the carrier to clamp the wire between the plate and clamping device, and to thereafter slab off a portion of the wire in the further movement of the carrier, substantially as described.

2. In a nailing-machine the following instrumentalities, viz: a fixed guide for the wire; a transferrer intermittingly movable beneath it and having a hole to receive the

wire; a fixed plate having a groove to partially embrace the wire between the guide and transferrer; a clamping device to force the wire into said groove and to hold it therein, and a cutter to slab off a portion of the wire held in said groove, subsequent movement of the transferrer severing the portion of wire held therein and moving it into position to be driven, substantially as described.

3. In a nailing-machine the following instrumentalities, viz: a nose having a nail-passage therein; a reciprocating transferrer movable past the upper end of said passage and having a hole to receive the end of the wire; a swinging carrier; an adjustable cutter therein adapted to slab off a portion of the wire exposed adjacent the transferrer; and means to reciprocate the transferrer, to thereby also sever the wire, and to actuate the carrier, substantially as described.

4. In a nailing-machine, a fixed plate having a groove to partially embrace the wire; a transferrer reciprocable beneath said plate and having a hole to receive the portion of wire to be severed; a carrier pivoted at one side of said plate; a clamping device therein to hold the wire in the groove, and an adjacent cutter to slab off a portion of the wire so held; means to reciprocate the transferrer, and connections between said means and the carrier, to swing the latter positively in a lateral plane, substantially as described.

5. In a nailing-machine, a pivoted cutter-carrier having an outwardly-inclined portion, a cutter adjustable in the carrier, a fixed track, and a roll adapted to move on said track between it and the inclined portion of the carrier, to swing the latter on its pivot, substantially as described.

6. In a nailing-machine, a rocker-arm, a cam to actuate it, a transferrer, a rod connecting said arm and transferrer in a yielding manner, to reciprocate the transferrer, a laterally-swinging cutter-carrier having an outwardly-inclined portion, a cutter mounted in said carrier, a fixed track parallel to the path of the transferrer, and a rigid link directly connected at one end to the rocker-arm and provided with a roll to move on the track between it and the inclined portion of the carrier, to swing the latter before the transferrer begins its movement, substantially as described.

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

JOHN B. FLINT.

Witnesses:
JOHN C. EDWARDS,
MARGARET A. DUNN.