(No Model.) 3 Sheets—Sheet 1.

L. GODDU.

BOOT AND SHOE NAILING MACHINE.

No. 385,802. Patented July 10, 1888.

Fig: 1.

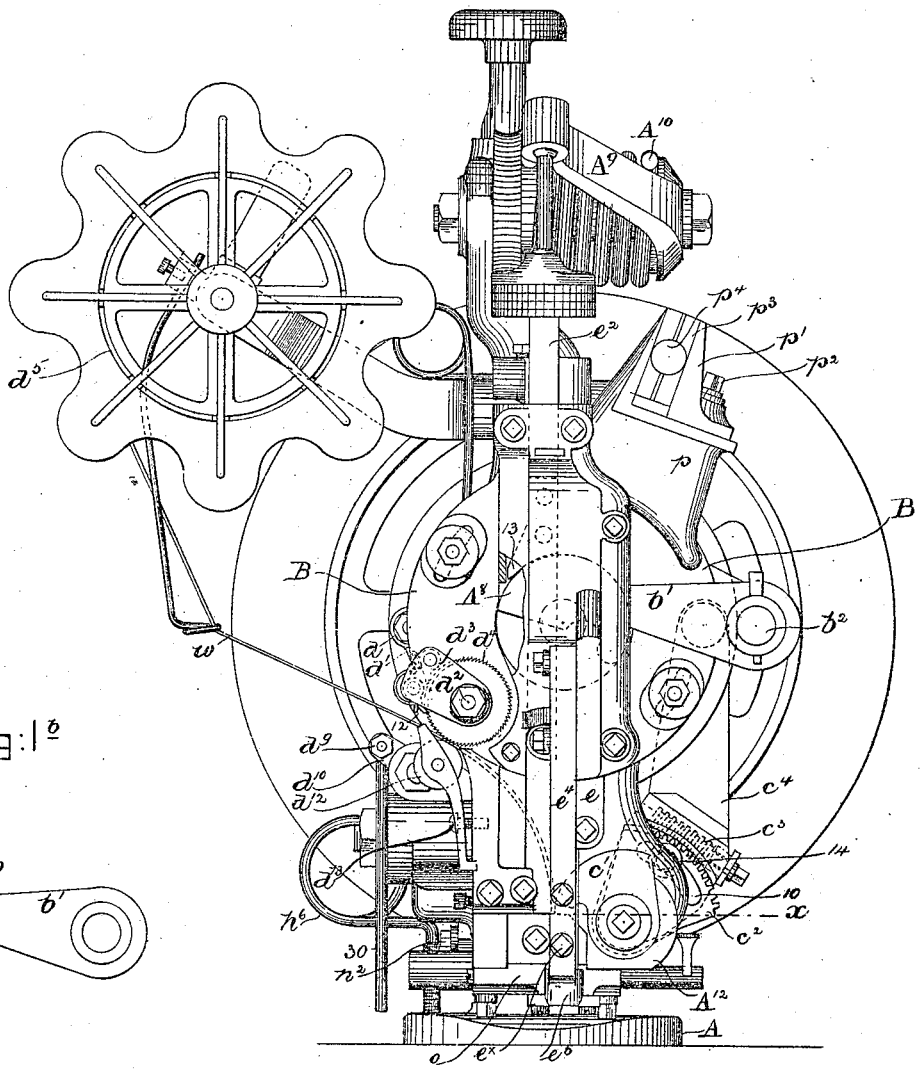


Fig: 1b

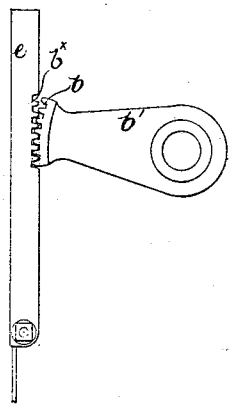
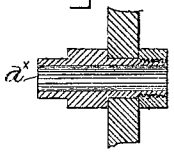


Fig: 1a



Witnesses:

Edgar A. Goddin

Howard F. Eaton

Inventor:

Louis Goddu

by Crosby & Gregory

attys.

(No Model.) 3 Sheets—Sheet 2.

L. GODDU.

BOOT AND SHOE NAILING MACHINE.

No. 385,802. Patented July 10, 1888.

Fig: 3.

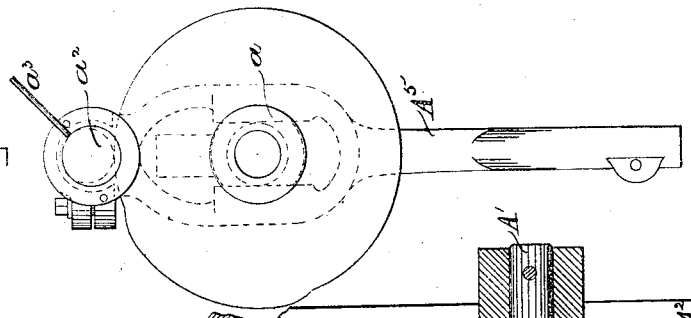
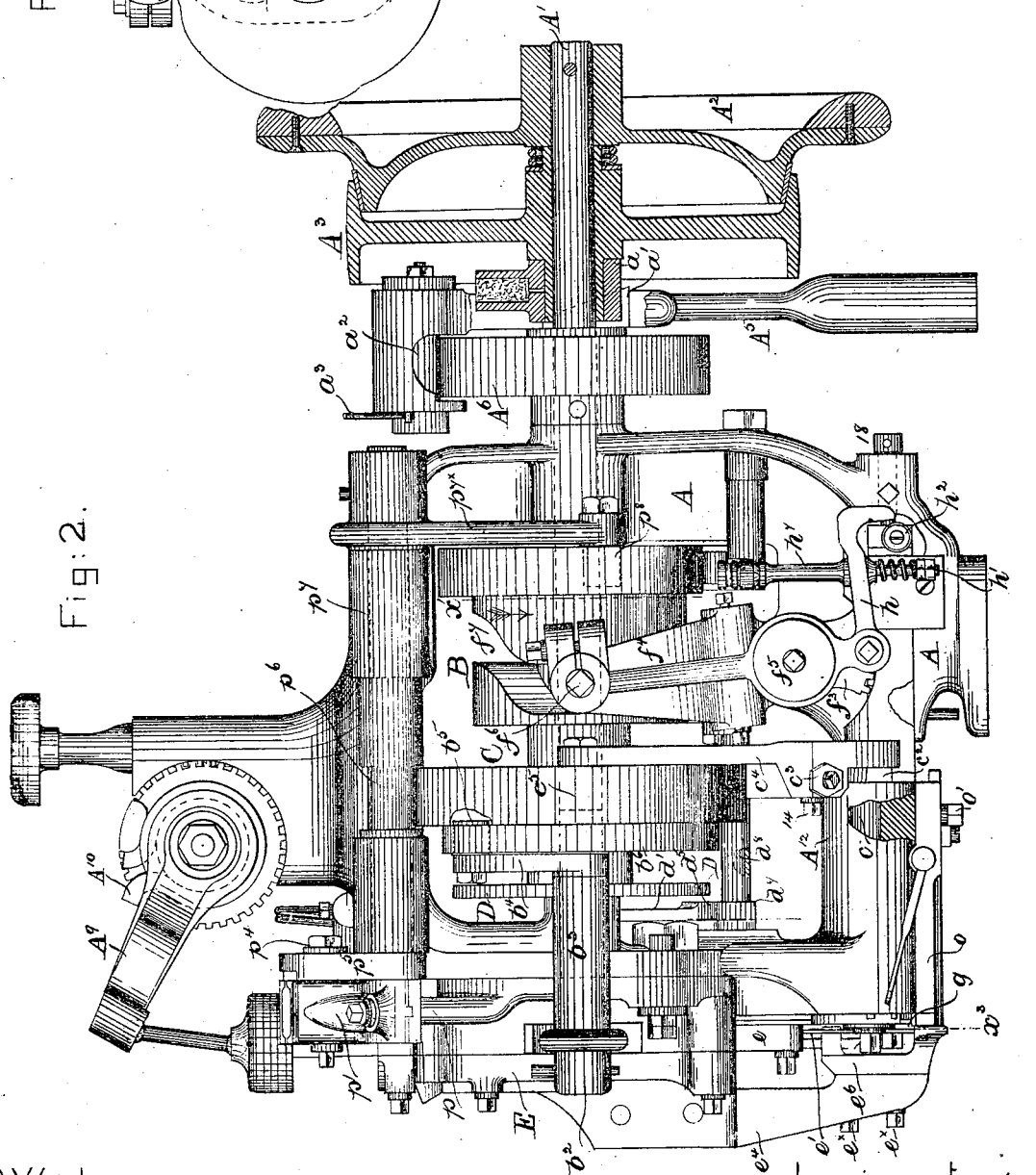


Fig: 2.



Witnesses:
Edgar A. Goddin.
Howard F. Eaton.

Inventor.
Louis Goddu.
By Crosby & Gregory Attys.

(No Model.) 3 Sheets—Sheet 3.

L. GODDU.

BOOT AND SHOE NAILING MACHINE.

No. 385,802. Patented July 10, 1888.

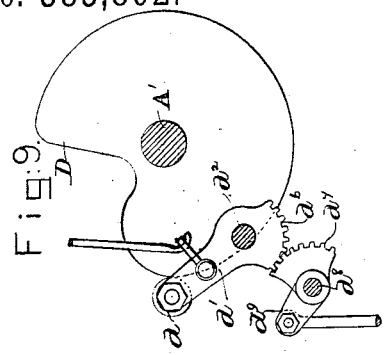


Fig:9.

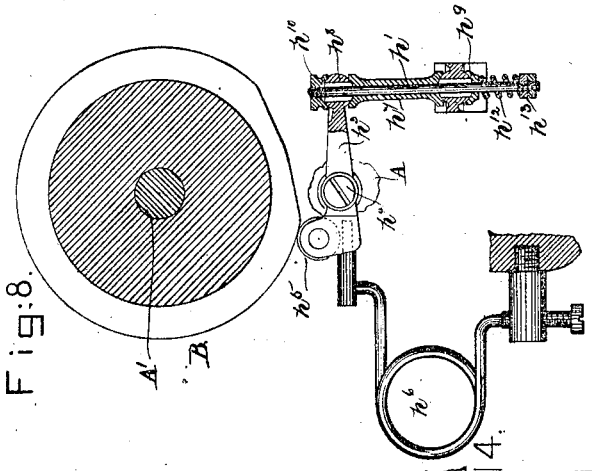


Fig:8.

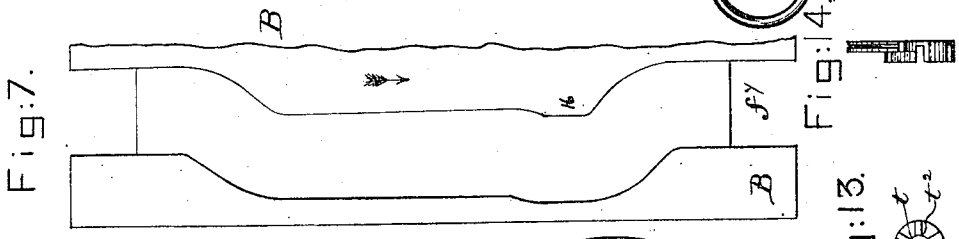


Fig:7.

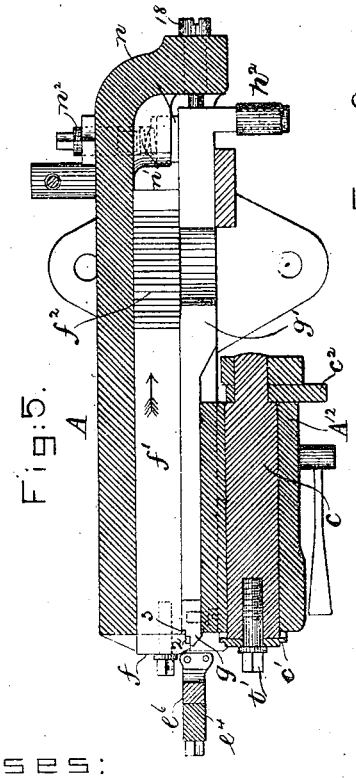


Fig:5.

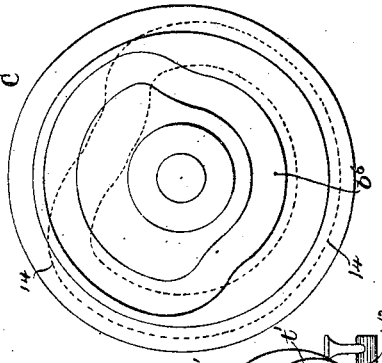


Fig:6.

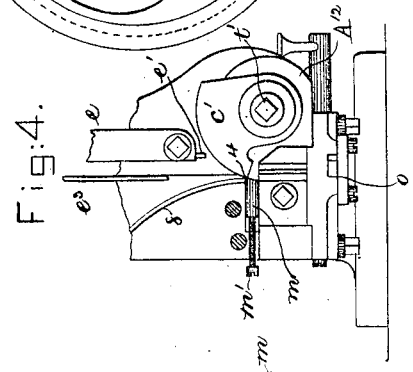


Fig:4.

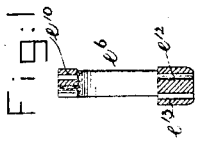


Fig:11.


Fig:10.


Fig:14.


Fig:13.

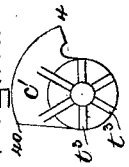


Fig:12.

Witnesses:
Edgar A. Goddin
Howard F. Eaton.

Inventor:
Louis Goddu.
by Lovejoy & Gregory.
Attys.

UNITED STATES PATENT OFFICE.

LOUIS GODDU, OF WINCHESTER, ASSIGNOR TO JAMES W. BROOKS, TRUSTEE, OF CAMBRIDGE, AND FRANK F. STANLEY, ASSOCIATE TRUSTEE, OF SWAMPSCOTT, MASSACHUSETTS.

BOOT AND SHOE NAILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 385,802, dated July 10, 1888.

Application filed April 24, 1888. Serial No. 271,673. (No model.)

To all whom it may concern:

Be it known that I, LOUIS GODDU, of Winchester, county of Middlesex, and State of Massachusetts, have invented an Improvement in Boot and Shoe Nailing Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object to improve that class of nailing-machines wherein pieces of wire are cut off in succession from a long length of wire, preferably in coil form, the said pieces so cut off varying in length according to the variations in the thickness of the stock between the nose and horn or anvil, the said pieces being pointed and headed to form nails of the length required for the stock resting on the usual horn or anvil, in which stock the next nail is to be driven, my present invention being an improvement on the machine described in United States Patent No. 215,117, dated May 6, 1879.

One of the features of my present invention relates to the clamping-dies for holding the wire at one point while the wire just above the said dies is being cut and headed, the said clamping-dies, the head-forming portion of the nail next to be driven having been made, being moved sufficiently to complete the separation of the nail from the main body of the wire and transfer it into position under the driver to be driven, the separation of the nail from the wire leaving the end of the point at right angles to the body of the nail, thus insuring a point which will drive without glancing.

Another portion of my invention includes the combination, with clamping-dies, of a circularly-moving header, which cuts into and partially severs the wire in the processes of upsetting the head, the said header serving the further purpose of holding the wire firmly at what is to be the point of the next nail, while the clamping-dies referred to, by their horizontal movement, complete the severance of the headed nail from the wire.

My invention also consists in the combination, with the main shaft, its friction or clutch pulley, the cam for actuating the feeding devices for the wire, and the cam-slide for forcing the two parts of the pulley in driving-contact, of a cam to control the point at each rotation of the said main shaft at which its rotation may be stopped, the machine being thereby stopped in such positions that the larger part of the said feeding-cam is in operative position with relation to the feeding mechanism, holding the same in the position from which it is to start to move forward, as will be described.

The mechanism just referred to by its use insures the feeding of the wire only by its actuating-cam and prevents the same being fed by the action of the horn through the measuring devices between it and the feed-roll.

Figure 1 in front elevation, partially broken out, shows a sufficient portion of the head of a nailing-machine embodying my present invention to enable the same to be understood, the usual column on which the head stands being omitted. Fig. 1ª shows the stud on which the feed-wheel turns; Fig. 1ᵇ, a detail of the awl-bar and the segmental lever for actuating it; Fig. 2, a right-hand side elevation thereof, with the clutch-pulley and part of the frame broken out; Fig. 3, a detail showing the cam and the wedge actuated by it. Fig. 4 is a detail showing the clamping-dies, the header, and other parts, to be described, immediately back of the throat-plate, which acts as a guide for the awl, the front cap forming part of the wire-passage being also omitted to show a part of the wire-passage and the die therein at its lower end. Fig. 5 is a partial longitudinal section in the line x, Fig. 1. Fig. 6 is a detail of the cam-wheel and its cam-grooves for actuating the bender and the wire-feeding devices at the proper times. Fig. 7 shows the cam for moving the clamping-dies developed. Fig. 8 is a sectional detail in the line x', Fig. 2. Fig. 9 is a detail of the cam for actuating the wire-feeding devices and some of the parts actuated by it. Fig. 10 is a detail of the dies; Fig. 11, a sectional detail of the nose and awl and driver guide in the line x^3. Figs. 12 and

13 are details showing the rear side of the cutter and header c' and the end of the sleeve, and Fig. 14 an edge view of the header.

The head A or frame-work of the machine will in practice be mounted upon a column, as in the patent referred to. This head contains bearings for the main shaft A′, having fast on it the part A^2 of the clutch or friction-pulley, the other part, A^3, being loose on the said main shaft. The loose part A^3 has a long hub (see Fig. 2) where the pulley is broken out, on which is mounted loosely a sleeve, *a*, slabbed at its sides, as best shown by dotted lines in Fig. 3, the said sleeve being embraced by a forked part of a slide-bar, A^5, having at one side a wedge, *a′*, the inclined face of which acts against correspondingly-inclined shoulders of the said sleeve in the upward movement of the slide-bar A^5, it in practice being attached at its lower end to a rod jointed to the rear end of a treadle pivoted to the base of the machine in usual manner.

The slide-bar A^5 at its upper end carries an eccentric-roll, a^2, having a handle, a^3, by which it may be turned to place the face of the said roll out of the range of the cam A^6 when it is desired that the main shaft be rotated by hand, as when adjusting the machine or the operator is getting ready for work.

The cam A^6 is of such shape that should the operator remove his foot from the treadle, which was depressed preparatory to clutching the pulleys to start the machine, the said pulleys cannot become unclutched until in the rotation of the main shaft the roll *d* on the arm or lever *d′* for actuating the feeding device is on the highest part of its actuating-cam D, fast on the shaft A′. The main shaft has fast upon it inside the head a cam, B, and beyond it a cam, C, and the cam D. The cam D (shown separately in Fig. 9) acts upon a roll, *d*, mounted upon the upper end of an arm, *d′*, (see Fig. 1,) fixed to the shaft d^2, to which is attached the pawl-carrier d^3, having one or more pawls to act upon the feed-wheel d^4, which serves to feed the wire *w* intermittingly from the reel d^5, the said feed-wheel being mounted loosely upon a hollow stud, $d^\times$, (see Fig. 1^a,) surrounding the shaft d^2, the feed-wheel being substantially such as described in the said patent. The arm *d′* has a series of segmental teeth, as d^6, which engage a segmental rack, d^7, forming part of a rock-shaft d^8, having an arm, d^9, to which is pivoted a foot, 30, common to my said patent, the said foot in practice entering a regulating device such as shown and described therein, and marked 28 in the said patent, the position of this device, determined by its connection with the horn, being changed according to the thickness of the stock on the horn, the position of the said device also determining the length of the nail to be made and driven. The wire is fed between the said feeding-roll d^4 and a pressure-roll, d^{10}, supported upon a lever or block, d^{12}, and having extended through it and into the head a suitable screw d^{13}, by which to regulate the pressure of the pressure-roll in the wire lying on the wire-feeding roll d^4.

The swinging feeding-head E of the machine is substantially the same as in United States Patent No. 265,227. This head carries the awl-bar *e*, to which is attached the awl *e′*, and also the driver-bar e^2, to which is secured the driver e^3. The swinging head has attached to its front side a depending arm, e^4, to which, by screws $e^\times$, is attached a block, e^6, which serves the purpose of not only a nose to guide the nail to the work upon the usual horn, but also as a guide for the awl *e′* and for the driver e^3. The block e^6 has at its upper end a hole, e^{10}, in which the driver always remains and moves, the said block immediately below the hole e^{10} having a passage, e^{12}, (see Fig. 11,) into and through which the nail is to be driven from the clamping-dies when the driver in its descent strikes the nail. The block e^6, at its lower end, next the hole e^{12}, has a hole, e^{13}, in which works the awl *e′*, the block e^6 moving with the swinging head and guiding the said driver and awl.

The swinging head, carrying the awl and driver bars, turns about a center coincident with the axis of rotation of the shaft A′, and the driver is lifted by the cam A^8, (see Fig. 1,) acting, as usual, against a lug or block, 13, on the driver-bar, the arm A^9 and spring A^{10}, as shown in Patent No. 265,227, actuating the driver at the proper time.

The awl-bar *e* is provided at one side (see Fig. 1^b) with rack-teeth $b^\times$, which are engaged by the segmental rack *b* at the end of an arm, *b′*, connected to the rock-shaft b^2, extended through a sleeve-bearing, b^3, fixed with relation to the head E and in line with the center of the shaft A′ and the center of oscillation of the said head. The opposite end of the said rock-shaft b^2 has an arm, b^4, provided with a roller or other stud, b^5, (shown partially in Fig. 2,) which enters a cam-groove, b^6, at the front side of the cam C, the said groove being shown in Fig. 6. The awl is moved up and down positively, and the toothed segment *b* is always in correct engagement with the teeth $b^\times$, notwithstanding the oscillation of the head.

The head of the machine has a long sleeve-like bearing, A^{12}, through which is extended a rock-shaft, *c*, having attached to its front end the header *c′*, the said rock-shaft at its rear end having secured to it a sector-like arm, c^2, provided at its periphery with worm-teeth (see Fig. 1) to be engaged by the threads of a screw-worm, c^3, (shown by dotted lines,) extended into an arm, c^4, loosely mounted on the said rock-shaft *c*, the sector c^2 having a slot, 10, to receive through it a set-screw, 14, carried by the said arm. Rotation of the adjusting-worm c^3 moves the arm c^4 with relation to the sector arm c^2, so as to give the desired extent of throw to the header and to compensate for any wear of the header as the same in use is ground or worn away.

The upper end of the arm c^4 has in it a roller

or other stud, c°, (see dotted lines, Fig. 2,) which enters the cam groove 14 (shown by dotted lines, Fig. 6) at the rear side of the cam-wheel C. The clamping-die is composed of two parts, f g, (best shown in the detail, Fig. 5,) the part f being carried by a slide-bar, f', while the part g is carried by a slide-bar, g', the two parts, when brought together as shown in Fig. 5, leaving a space, as 2, in which may enter the wire w. The part g has a shoulder, 3, (see Fig. 5,) in order that when the part f' is moved positively in the direction of the arrow upon it (see Fig. 5) the part g will be moved in the same direction with the part f. The bar f' is toothed, as shown at f^2, and is engaged by the toothed sector f^3 at the lower end of an arm or lever, f^4, pivoted at f^5 and provided at its upper end with a roller or other stud, as f^6, which enters the groove f^7 in the cam B.

The lever f^4 at its lower end has pivoted to it in the pitch line of the teeth of the sector f^3 a locking device, h, herein shown as a hook having a cam-face, the said locking device having extended through it a controlling rod, h', by which the locking device may be moved at the proper time to engage it with or disengage it from a roller or other stud, h^2, on the bar g'.

The controlling-rod h' is loosely jointed to one end of a lever, h^3, (see Fig. 8,) pivoted at h^4, and provided at its other end with a friction-roll, h^5, which is acted upon by a spring, h^6, to engage the hook with the stud h^2, the said hook being lifted positively by the periphery of the cam B.

The controlling-rod h' carries loosely upon it a sleeve, h^7, having rounded or concaved ends, which bear, respectively, upon the rounded, convexed, or ball-like upper side of the locking device, and a like surface, h^8, of the lever h^3, the rod also having upon it a loose washer, h^9, and a collar, h^{10}, both concaved, and a spring, h^{12}, and an adjusting-nut, h^{13}, the said sleeve and the spring and the parts described obviating any lost motion in the locking device. The force of the spring h^{12} is made adjustable by the nut h^{13}.

Fig. 4 shows the wire-channel 8, through which the wire is fed. At the lower end of this channel I have placed a point-forming die, m, made adjustable as to its position by means of a screw, m', the inner end of the said die having a groove, 7, (see Fig. 10,) the shape of one-half the point of the nail.

Fig. 5 shows the clamping-dies as opened in the position that the dies will occupy when the wire w is to be fed from the feeding-channel 8 into the space 2 between the clamping-dies, the end of the bar g' at such time resting against an adjustable stop-screw, 18, the header c' at such time being in the position in Fig. 4, or elevated. The wire w having been fed into the said space 2, the cam B in its further rotation in the direction of the arrow, Fig. 2, causes the lump 16 (see Fig. 7) to act upon the roller or other stud, f^6, at the upper end of the lever f^4 and draw the bar f' in the direction of the arrow upon it in Fig. 5, thus effectually clamping the wire w between the dies f g, the faces of the dies being suitably corrugated, if desired, to corrugate the body of the wire now to be made into a nail. The end of the wire having been firmly clamped, the rock-shaft c is moved so that the portion 4 of the header c', it moving in the arc of a circle, contacts with the wire w in the space 7 at the inner end of the point-forming die m, and the corner 4 of the header cuts into the wire in a circular direction and pushes in advance of it a portion of the wire down toward the clamping-dies f g, thus forming a head, the portion of the wire next above the head so formed, and to constitute the point of the nail next to be made, remaining in the recess 7 of the point-forming die m, and between it and the periphery of the said header, which at such times holds the wire firmly at the junction of the head and point referred to. In this condition the cam B, the hooked part of the locking device h having been thrown down to engage the stud h^2 about as the head was formed, acts to turn the lever f^4, so that it, by its teeth in engagement with the bar f' and by the hooked locking device, positively moves the said die-holding bars forward in unison, firmly clamping and carrying with it the nail, the said dies at such time moving horizontally away from the point-forming die and header, the header remaining in position until the wire is severed, the jaws continuing to move and to hold the nail clamped until the nail has been placed nearly in the line of descent of the driver, when the locking device h is lifted from the stud h^2, thus releasing the bar g' from pressure and permitting it to immediately come to rest by reason of the friction device n in contact with it, the bar f' having given to it a slight forward movement, the dies at the time the nail arrives directly under the driver being in position to leave sufficient space for the entrance into the die of the driver to enable it to drive the headed nail from the dies out through the throat-passage e^{12} into the stock on the usual horn. (Not shown.) The nail having been driven, the awl descends into the stock to feed the stock, the driver comes up and remains up, and the awl comes up, and at the same time the dies are retracted by the lever f^4, the die-bar f' starting first and moving until a corner thereof meets a shoulder, 3, of the die g, when both dies thereafter move back together until the rear end of the die-bar g' meets the stop 18, referred to, when the die-bar f' is again given a slight forward movement, while the die-bar g' is held frictionally, the movement being sufficient to open the dies, as before stated, for the entrance of the wire, as in Fig. 5.

The friction device n, which acts against the die-carrying bar g', consists of a block extended through a slot in the rear end of a bar,

f', the said block receiving in it not only a spring, n', but also the inner end of an adjusting-screw, n^2, as best shown in the detail, Figs. 1 and 5, the rotation of the screw regulating the effective pressure of the spring n^2 upon the block n.

Herein the swinging head E has at its upper end an extension or shoulder, as p, with which co operates an adjustable block, p', held in place by a screw, p^2. The projection and block hold between them a pair of gibs, p^3, which fit over a crank-pin, p^4, adjustably attached to an arm, p^5, of a rock-shaft, p^6, held in bearings p^7, the said rock-shaft having fixed upon its inner end an arm, p^8, (shown by dotted lines, Fig. 2,) which enters a cam-groove at the rear face of the cam-hub B. The presser-foot o, bolted to a rigid part of the head by bolts o', is and may be all as in United States Patent No. 310,816. The ball-and-socket like portions co-operating with the controlling-rod and joining the locking device with the lever h^3 for moving it permits the controlling device to be made toward and from the stud h^2, and also to follow the lever h^4 in its movements without cramping or twisting strains.

The forward end of the rock-shaft c is tapped at t (see Fig. 13) and threaded to receive the bolt t', employed to connect the combined header and cutter c' to the said rock-shaft. The forward end of the rock-shaft c, as shown in Fig. 13, is provided with several radial slots, as t^2, which receive in them the several radial fins t^3, projecting from the rear side of the combined header and cutter c, as shown in Fig. 12.

As the header c' becomes worn and is ground back, the point 4 must be carried forward, and to do this the rock-shaft c is adjusted by the worm c^3 to enable the corner 4 to come into correct operative position with relation to the point-forming die m; but the limit of adjustment of the header by the worm c^3 is equal to the distance only between one and the next radial projection t^3. So to accommodate for yet greater use of the header, I have provided the latter with radial projections t^4, so that the header may be taken off and applied to the rock-shaft c and be confined in different positions thereon, and yet in all its positions be adjustable for the given distance by the worm referred to.

If desired, the circular surface or periphery of the header from the corner 4, which enters the wire to the heel 40, (see Fig. 12,) may be grooved more or less from the said corner to the said heel to thereby shape that part of the point of the nail which is brought in contact with the header.

I claim—

1. In a nailing-machine, the combination of the following instrumentalities, namely: a point-forming die, clamping-dies to grasp and hold the wire firmly between them, a header to cut into the wire resting in or against the point-forming die to form a head and point, and means to move the said clamping-dies, they clamping the wire with relation to the point-forming die and header, while the header holds the wire between itself and the point-forming die, the movement of the changing-dies severing the wire at the junction of the head and point of the nail, substantially as described.

2. In a nailing-machine, a nose having a passage for a nail, a driver to drive the nail, a point-forming die, and the header to act upon the wire opposite the point-forming die to simultaneously shape the head and point of the nail, combined with a pair of jaws having reciprocating movements with relation to each other, as described, whereby the said jaws left open for the reception of the wire are clamped upon the wire while the header operates thereon, and are then moved bodily, yet clamping the wire to sever it completely from the main body of the wire and form a nail, the said jaws taking the nail so severed into position substantially in line with the path of movement of the driver and releasing the nail to permit the driver to descend between the jaws to drive the nail, the jaws being then retracted into position to again receive the end of the wire, substantially as described.

3. In a nailing-machine, a die, f, and its carrying-bar provided with rack-teeth, and a die, g, and its carrying-bar provided with a stud, combined with a lever to actuate the carrying-bar for the die f, and with a locking device carried by the said lever to engage the said stud, to operate substantially as described.

4. In a nailing-machine, a die, f, and its carrying-bar provided with rack-teeth, and a die, g, and its carrying-bar provided with a stud, combined with a lever to actuate the carrying-bar for the die f, and with a locking device carried by the said lever to engage the said stud, and with means to actuate the said lever and said locking device at the proper times, substantially as described.

5. In a nailing-machine, the combination, with the point-forming die, of the header, its attached rock-shaft provided with a toothed sector, and a lever, c^4, adjustable with relation to the said rock-shaft and sector, to operate substantially as described.

6. In a nailing-machine having devices for forming headed nails, the swinging head and its attached block e^6, provided with a throat for the passage of the nail, and with openings for guiding the awl and driver, combined with awl and driver bars and their attached awls and drivers, to operate substantially as described.

7. In a nailing-machine, the main shaft, the clutch or friction pulleys thereon, and a wedge to operate the said pulleys, combined with a cam on the main shaft to control the operation of the wedge, to operate substantially as described.

8. In a nailing-machine, the jaws f g and their carrying-bars, the one provided with a rack and the other with a stud, as h^2, and a le-

ver, f^4, and locking device, combined with a controlling-rod and means to operate it, the said controlling-rod being provided with ball-and-socket-like portions to obviate any lost motion when the locking device is moved, substantially as described.

9. In a nailing-machine, the swinging head, the driver-bar therefor, its driver, and an awl-carrying bar provided at its edge with rack-teeth, and the cam C, combined with a rock-shaft having an arm which is actuated by the said cam, and an arm, b', provided with a segmental series of teeth in engagement with the rack-teeth of the awl-bar, the center of motion of the rock-shaft being in the same plane as said center of motion of the swinging head, whereby the arm b' is enabled to actuate the awl-bar positively notwithstanding the swinging of the head, substantially as described.

10. In a nailing-machine, the combination, with the die g, having a shoulder, 3, and its carrying-bar, of the die f and its carrying-bar, the die f moving the die g with it in one direction by coming in contact with the shoulder portion 3 of the die g, substantially as described.

11. In a nailing-machine, the clamping-die f and its carriage and means to operate it, combined with the clamping-die g, its carrying-bar g', and the stop 18, to arrest the motion of the carrying-bar g' before arresting the movement of the die f in the same direction, for the purpose set forth.

12. In a nailing-machine, the clamping-die f and its carriage and means to operate it, combined with the clamping-die g, its carrying-bar g', and the stop 18, to arrest the motion of the carrying-bar g' before arresting the movement of the die f in the same direction, and with a friction-clamp to clamp the said bar g', substantially as described.

13. In a nailing-machine, the point-forming die, the vibrating header c', and its shaft, combined with a series of radial fins or projections between the said rock-shaft and header, substantially as described.

14. In a nailing-machine, the point-forming die, combined with a circularly-moving oscillating plate forming both the cutter and header, substantially as described.

15. In a nailing-machine, the point-forming die, combined with a circularly-moving oscillating plate forming both the cutter and header and grooved at its periphery, substantially as described.

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

LOUIS GODDU.

Witnesses:
GEO. W. GREGORY,
J. C. SEARS.