

(No Model.)

5 Sheets—Sheet 1.

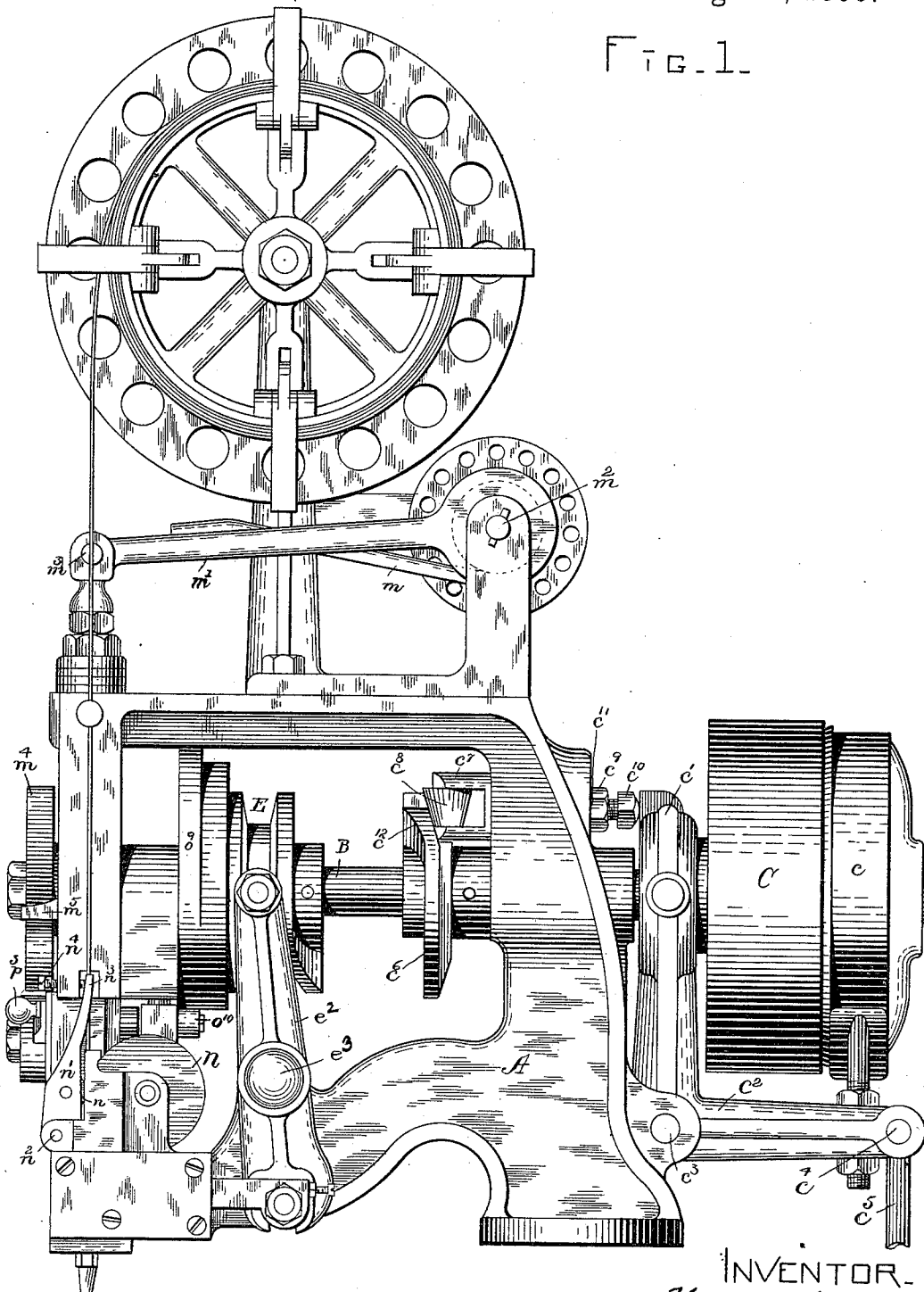
H. WEEKS.

NAIL MAKING AND DRIVING MACHINE.

No. 566,358.

Patented Aug. 25, 1896.

FIG. 1.



WITNESSES.

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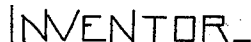
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by his attys.
Charles & Raymond

5 Sheets—Sheet 2.

NAIL MAKING AND DRIVING MACHINE.

Patented Aug. 25, 1896.



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(No Model.)

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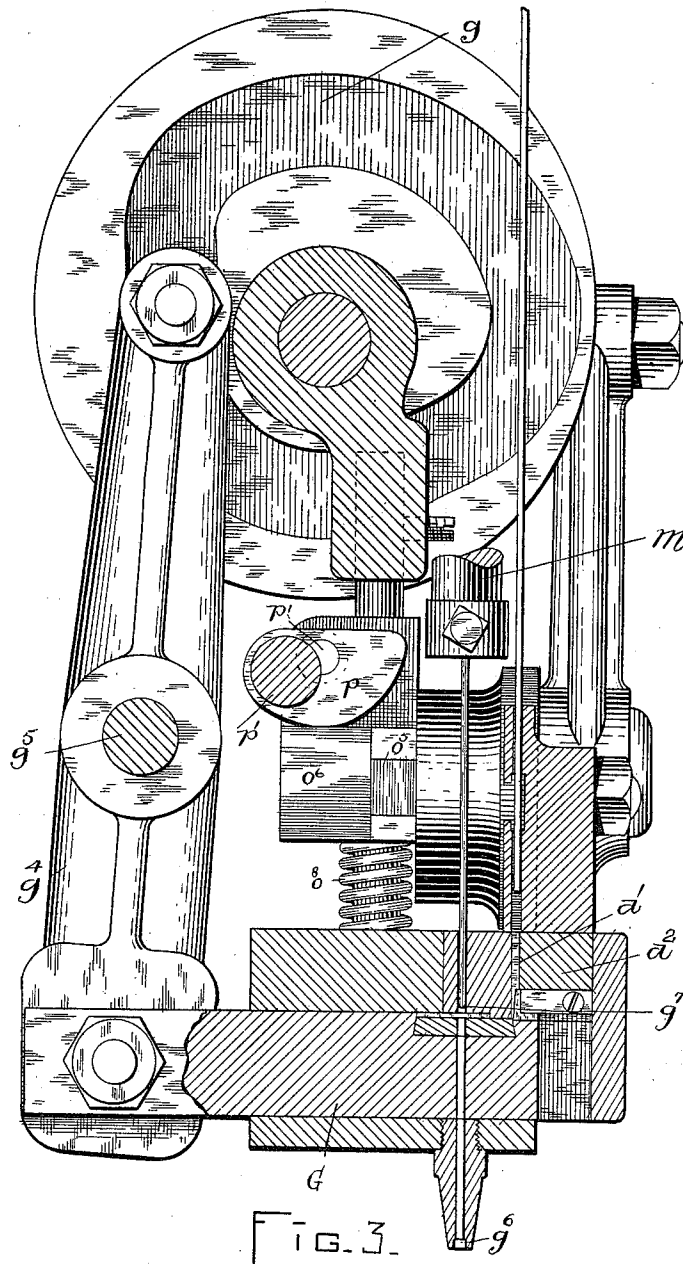


FIG. 3.

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(No Model.)

5 Sheets—Sheet 4.

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FIG. 6.

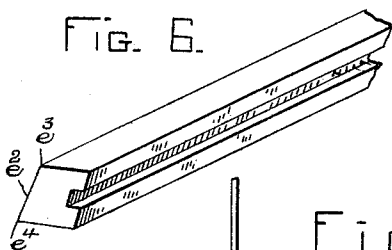


FIG. 4.

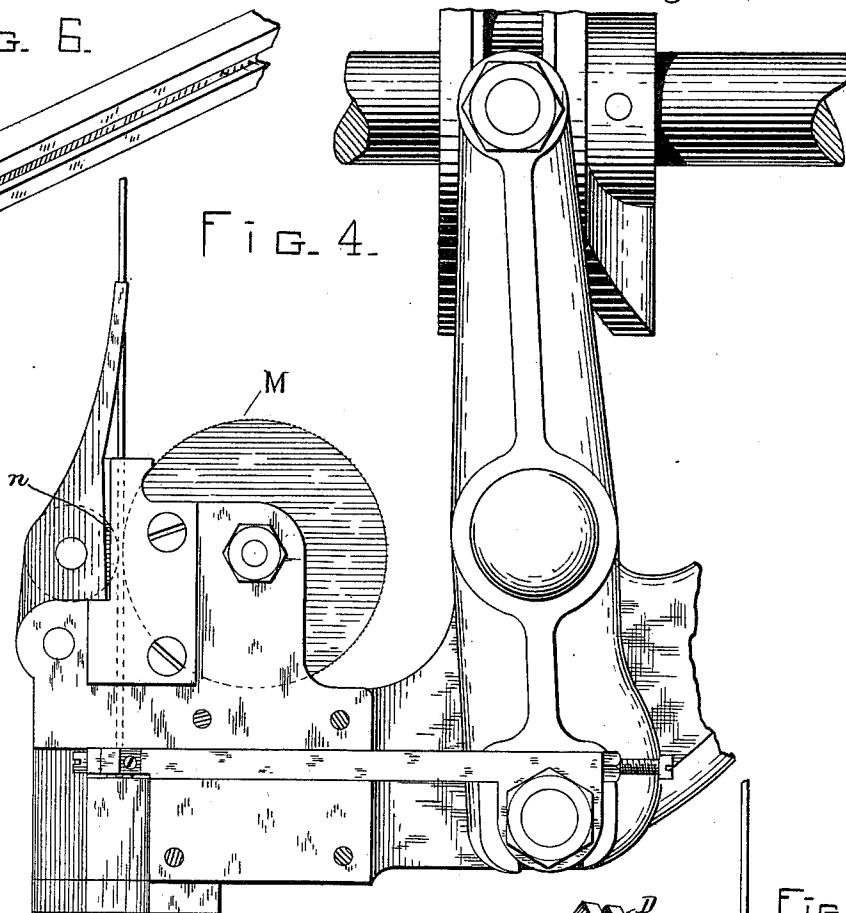


FIG. 7.

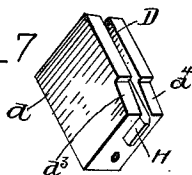


FIG. 8.

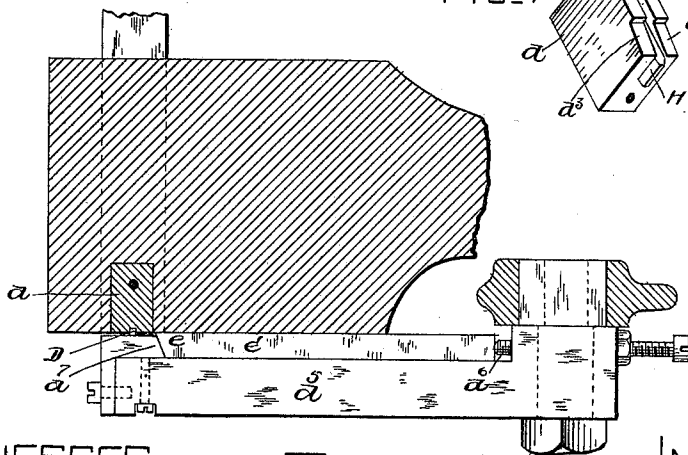
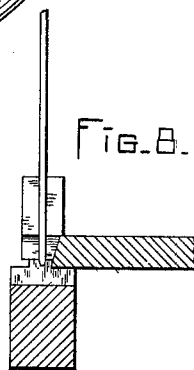
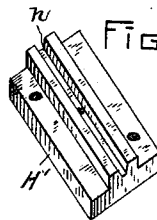


FIG. 9.



WITNESSES.

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FIG. 5.

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(No Model.)

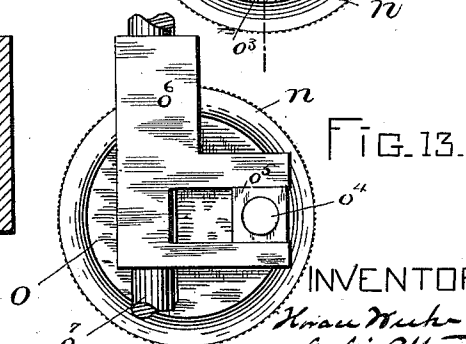
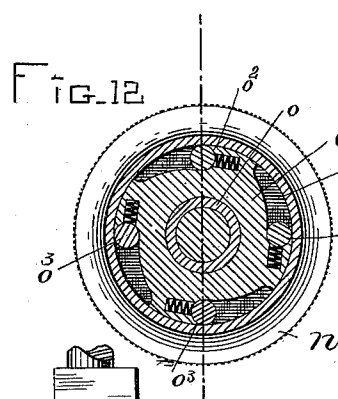
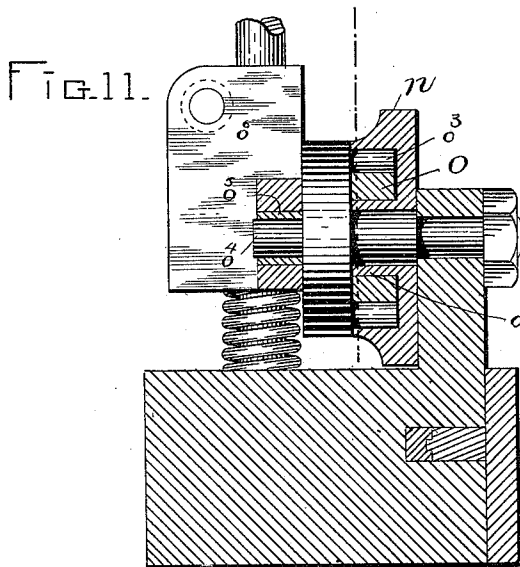
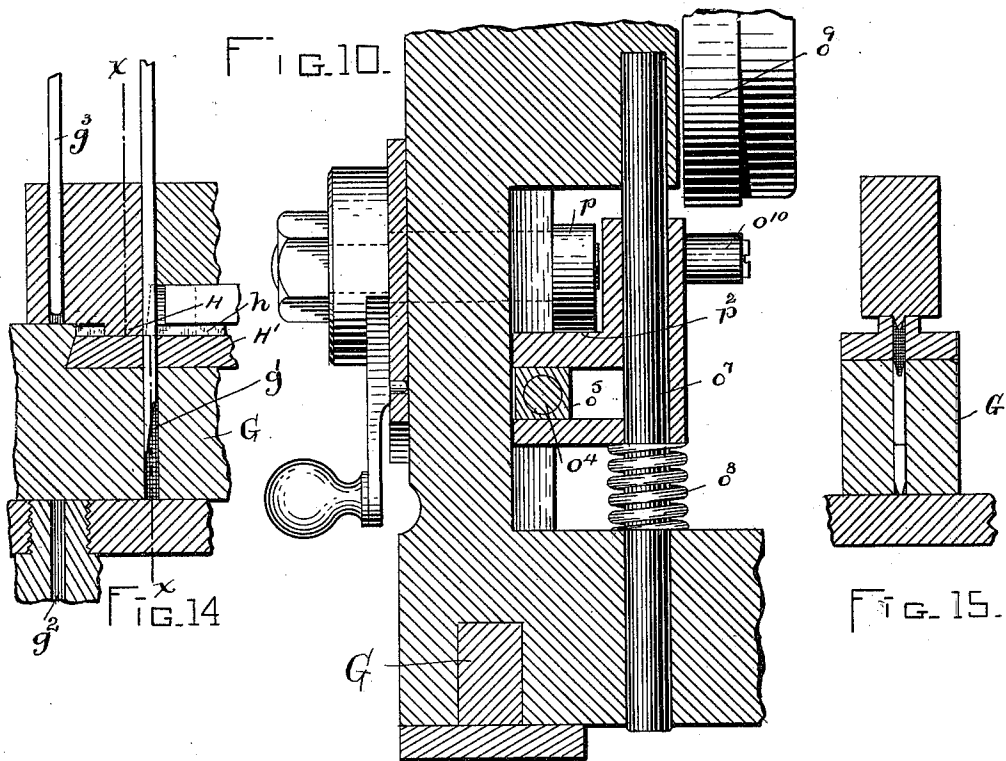
5 Sheets—Sheet 5.

H. WEEKS.

NAIL MAKING AND DRIVING MACHINE.

No. 566,358.

Patented Aug. 25, 1896.



WITNESSES.

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UNITED STATES PATENT OFFICE.

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NAIL MAKING AND DRIVING MACHINE.

SPECIFICATION forming part of Letters Patent No. 566,358, dated August 25, 1896.

Application filed May 4, 1891. Serial No. 391,519. (No model.)

To all whom it may concern:

Be it known that I, HORACE WEEKS, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Nail Making and Driving Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The invention relates to a machine for making from wire a peculiarly-shaped nail and for driving the nail.

In the drawings, Figure 1 is a view in side elevation of a machine having the features of my invention. Fig. 2 is a view in front elevation of the machine. Fig. 3 is a view in vertical section upon the line of the driver. Fig. 4 is a detail view to illustrate a portion of the pointing cutter and devices for operating it, and also a portion of the wire-feeding mechanism. Fig. 5 is a detail view, in horizontal section and plan, further illustrating the wire-pointing mechanism. Figs. 6, 7, 8, and 9 are detail views of parts to which reference will hereinafter be made. Figs. 10, 11, 12, and 13 refer to the wire-feeding devices. Fig. 14 is a sectional view showing the nail-carrier, nail pointing, severing, and guiding devices. Fig. 15 is a section upon the dotted line *xx* of Fig. 14. Fig. 16 is a view, enlarged, in section and elevation, of the nail. Fig. 17 is a view, enlarged, of the waste cut from the point end of the nail. Fig. 18 is a view of the headed nail; and Fig. 19 is a detail view of the cutters, enlarged, to which reference will be hereinafter made.

The machine is adapted to make a nail like that described in my application for Letters Patent of the United States of even date herewith and to drive the same. The nail is represented in Figs. 16 and 18, and the waste in Fig. 17. It is made of wire, has a shank of uniform size, a point made up of a straight side, a long beveled side, the bevel starting from a shoulder and extending across the longitudinal center of the nail, two straight edges extending to short point-forming inclines or bevels, and a notched head, the sections of the head on each side of the notch being

adapted to be turned outward to form a lateral extending head.

The machine is organized to sever from the end of the wire the waste (represented in Fig. 17) to form the long bevel, to feed wire the nail-length, and then to sever the nail-length from the end of the wire and at the same time form the notch in the head. This forming of the notch also produces the short point-bevels above referred to. The severed nail is then transferred to a driver which drives the nail and also forms the head during the act of driving.

The invention therefore relates to mechanism for forming the above-described nail and driving it, and it further relates to various features of construction and organization which will hereinafter be more fully described.

Referring to the drawings, A is the frame of the machine. It is mounted upon a pedestal or column. (Not shown.)

B is the main shaft. It has bearings in the frame A at each end and it carries at its rear end the loose driving-pulley C, having one member of a clutch formed in it and the other member, *c*, of the clutch, which is fast to the shaft B. The pulley C is arranged to slide upon the shaft, and it has a grooved hub which receives the pins of a yoke or ring *c'* at the upper end of the bent lever *c²*, the lever being pivoted to the frame A at *c³*, and being connected at *c⁴* with the treadle-rod *c⁵*. A spring (not shown) operates through the lever to move the driving-pulley from engagement from the member *c* of the clutch. The driving-pulley is held in engagement with the member *c* upon the clutch, after the starting of the machine, by means of the cam *c⁶* on the shaft B, which actuates the lever *c²*, through the slide *c⁷*, which has a cam-roll *c⁸*, bearing against the cam. This slide is supported in the frame A and carries at its end *c⁹* a headed screw *c¹⁰*, which screws into a hole in the slide and is held in any desired position by the check-nut *c¹¹*. The head of the screw bears against the upper end of the lever *c²*. The cam *c⁶* is shaped to hold the slide *c⁷* in a position to lock the driving-pulley C in engagement with the clutch *c* after the

starting of the machine and for very nearly a revolution of the shaft, there being a notch or recess in the cam into which the roll c^8 is forced at the end of the revolution of the shaft B and to permit the disengagement by the spring of the driving-pulley C from the clutch member c . This is the position of the cam and slide represented in Fig. 1.

The shaft B operates, through the cylinder-cam E, the cutter e . The cutter is formed at the end of the cutter-bar e' , (see Fig. 5,) and it is shaped substantially as represented in Fig. 6; that is, its cutting edge e^2 is shearing from the top to the bottom (see Figs. 5, 6, and 8) and the cutter is ground backward from the cutting edge. The face of the cutter is inclined from its corner e^3 inwardly to the corner e^4 . The cutter is reciprocated across the throat D. This throat receives the end of the wire from which the nail is made and it is formed in the edge of the block d , (see Figs. 5 and 7,) the recess in the said edge forming three sides of the throat, the other side being the face d' of the block d^2 . There is also formed in the edge of the block d the inclines $d^3 d^4$, across which the cutter and cutter-bar are moved.

The cutter-bar is represented as supported by a slide d^5 , mounted in a slideway in the frame of the machine, and it is secured or held thereto by means of a tongue upon the slide, which enters a groove in the cutter-bar, and also by means of the adjusting-screw d^6 (see Fig. 5) and the end gage d^7 . The screw d^6 not only serves to lock the cutter-bar to the slide, but it also serves to adjust it upon the slide as it is reduced in length through the grinding of its cutting edge. The slide is connected with the cam E by means of the lever e^2 , which is pivoted to the frame at e^3 , the lever having a forked end which receives a roll upon a stud extending laterally from the slide. (See Figs. 1 and 5.)

The cutter E severs from the nail-wire a piece of the shape represented in Fig. 17. This forms the long tapering surface f of the point of the nail. After the action of this cutter the wire is fed by the wire-feed mechanism to the nail-carrier G, which has been moved by its operative cam g (see Fig. 3) to a position to bring the nail-receiving hole g' in line with the throat d' , (see Fig. 14,) and the carrier G is then moved by its cam to bring the hole g' in line with the driving-throat g^2 and the driver g^3 . (See Fig. 3.) During this transferring movement of the nail-carrier a nail is severed from the wire and a V-shaped notch f' , formed in the head of the nail, and at the same time two short inclines $f^2 f^2$ upon the end of the wire, which afterward form a part of the point of the next nail in order, so that the nail, as a whole, has a point formed by the long tapering surface f and the short tapering surfaces $f^2 f^2$ and the straight edge f^3 , the shank f^4 , and the head-forming sections $f^5 f^5$, which are separated from each other by the notch f' .

To form the notched head and the short point-forming bevels $f^2 f^2$, the block d is formed with the downward-extending V-shaped die H. (See Figs. 7, 14, and 15.) This die H extends into the V-shaped recess h in the cutter-block H', secured to the nail-carrier G, (see Figs. 14 and 15,) and upon the movement of the carrier and cutter-block the portion of the wire held in the carrier and in the cutter-block below the surface or edge of the die H is severed from the wire above it, and this at the same time provides the notched head and the short point-forming inclines above referred to.

The nail-carrier G is connected with its cam g by means of the lever g^4 , pivoted at g^5 . The nail thus shaped having been brought beneath the driver g^3 is driven by it through the driving-throat into the work, the driver passing through the hole g' of the carrier and driving-throat g^2 and into its enlargement g^6 , (see Fig. 3,) where it acts to spread the head-forming sections $f^5 f^5$ of the nail laterally to make a laterally-extending head to the fastener. (See Fig. 13.) It will be understood that this action takes place after the point of the nail has been brought in contact with an iron-bottomed last or anvil in the act of driving. The head D thus upset is represented in Fig. 18. The driver has a rounded end g^7 , somewhat more obtuse and wider than the notch in the head and of a size not to fill the same, so that upon the point of the nail coming into contact with the last or anvil and being somewhat held thereby, and the head coming into the recess g^6 at the end of the throat, the end of the driver then acts to spread the notch and throw the head-forming sections $f^5 f^5$ away from each other and to a lateral position in relation to the shank of the nail. The driver is moved or driven downward by the coiled spring m , (see Fig. 2,) carried upon a drum or support, and which has an arm bearing upon the lever m' , pivoted at m^2 , and connected at m^3 with the upper end of the driver-bar M, to which the driver g^3 is secured. The driver-bar and driver are lifted and power stored in the spring m by means of the cam m^4 upon the front end of the shaft B. (See Figs. 1 and 2.) This cam is shaped to come into contact with the projection m^5 of the driver-bar and to lift it and hold it up until the nail has been brought into position beneath the driver, when the cam moves away from the projection m^5 and allows the spring to actuate the driver. The wire is fed by a feeding device comprising a roughened feed-roll N (see Fig. 4) and a tension-roll n , which is journaled in a hinged spring or yielding arm n' , opposite the roll N, the wire passing between the two rolls, and the tension-roll maintaining it in contact with the surface of the feed-roll. The yielding arm n' is pivoted at n^2 , and its upper end n^3 is acted upon by an adjusting-screw n^4 , whereby the degree of tension of the roll n upon the wire, or, in other words, the extent of force with which

it presses the wire against the feed-roll N, is varied.

The feed-roll is caused to rotate in a direction to feed the wire by means of a clutch which is adapted to engage it to revolve it forward, be disengaged from it at the end of the feed movement, and be returned to again engage it. This clutch is represented as a disk O, mounted upon a stud o , and having a section extending in a recess in the side feed of the roll. This section has tangential surfaces o' , ending in the shoulders o^2 , and upon which are mounted the rolls o^3 . These rolls, when against the shoulders o^2 , permit the disk O to be rotated without causing the feed-roll to be revolved, and they are in this position during the reverse movement of the disk. Upon the forward movement of the disk they are caused to be wedged between the tangential surfaces and the inner surface of the feed-roll surrounding them, and the feed-roll is thereby caused to be turned with the disk. The disk is oscillated by means of the eccentric-pin o^4 , carried by the slide-block o^5 , mounted in the block o^6 , which has a vertical movement upon the rod o^7 which supports it, the vertical movement being imparted to it in opposition to the stress of the spring o^8 by the edge cam o^9 , (see Fig. 10,) the cam coming in contact with a roll o^{10} , carried by a stud extending from the block o^7 . The extent of movement of this block o^7 of course varies the extent of the feed. If the movement is short, the feed-roll is rotated correspondingly, and any increase in the length of the movement increases the extent of rotation of the feed-roll. The movement of this block is varied by means of the cam p upon the end of the shaft p' . This cam is shaped to bear upon the block o^7 at p^2 (see Fig. 10) and to permit the spring o^8 to vary its position, according as the cam is turned to bring a portion nearer to or farther from its center into contact with the block. This movement of the block varies the position of the cam-roll o^{10} in relation to the cam o^9 , so that a longer or shorter section of the cam is operated upon it, as may be desired. The regulating-cam p is moved and held in any desired position by means of the lever p^3 , secured to shaft p' and carrying a pin p^4 , which engages the registering holes p^5 in the segment-plate p^6 . (See Fig. 2.) It will be observed that the end of the wire before the action of the pointing-cutter e extends into the V-shaped groove or recess h in the cutter-block H' and at the extreme end of said groove, (see Figs. 8 and 19,) the cutter-block and carrier then being in the position represented in Fig. 19, and the point-forming cutter e is reciprocated across the dies d^3 d^4 , and also across the end of the cutter-block H' while it is held in the position represented in Fig. 19, the cutter e being of a width to extend upon the side of the cutter-block. (See Figs. 8 and 19.) The waste removed from

the wire by the cutter e is ejected by it from the machine at s . (See Fig. 2.)

The operation of the machine is as follows: The wire, having, of course, the point-forming bevels f^2 previously formed, rests in the machine in the position represented in Figs. 3, 8, and 19. Upon the starting of the machine the cutter e moves past the dies d^3 d^4 , and the end of the cutter-block H' severs from the end of the wire a piece of the shape represented in Fig. 17, and forming in the end of the wire the long point-forming bevel f . This forward-and-back movement of the cutter e is immediately followed by the movement of the cutter-block H' and nail-carrier to bring the throat of the carrier beneath the wire-feed passage. The wire is then fed by the wire-feeding mechanism to advance a nail-length into the throat of the carrier, the parts then having the position represented in Fig. 14, and the wire of full gage being in the cutter-block hole and against the V-shaped cutter H. The cutter-block and carrier are then moved to sever the portion of the wire in the throat of the carrier from the wire above it and upon the lines represented in Fig. 16, that is, so as to form the head-forming cavity f' in the fastening, and the movement of the cutter-block and nail-carrier is continued until the fastening is brought beneath the driver, when the driver descending drives the nail through the throat, spreads the head-forming notches and forms the head in the enlargement of the throat, the point of the nail having come into contact with a clenching surface, which holds the nail sufficiently to permit the driver to thus bend outward the head-forming sections f^5 , and the machine then comes to rest. It is understood, of course, that after the forming of the head the driver still continues its driving action until the head is embedded in the substance into which it is driven.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. The combination in the nailing-machine of the wire-feed, the block d , having the throat D and the dies d^3 , d^4 , and reciprocating cutter e , the nail-carrier G, having the cutter-block H', in which is the V-shaped recess h , the die H to enter said recess, and the plunger or driver g^3 , as and for the purposes described.

2. The combination of the block d , having the V-shaped die H, extending downward from the block to the carrier G and cutter-block H', having the V-shaped recess h , into which the die H extends, and the plunger or driver g^3 , as and for the purposes described.

3. The combination of the feed-roll N, the tension-roll n , the oscillating clutch for actuating the feed-roll, having an eccentric, a slide connected with said eccentric and a cam for actuating said slide, as and for the purposes described.

4. The combination of the feed-roll N, the tension-roll *n*, the oscillating clutch for actuating the feed-roll having an eccentric, a slide connecting with said eccentric and a cam for actuating said slide to move it in one direction, and a spring for moving it in reverse direction, substantially as described.
5. In a nailing-machine, the block *d*, having the driver-throat extending through it, the side-cutting dies *d*³, *d*⁴, upon it, the V-shaped die H extending from its bottom and integral with the block and the recess or throat D, substantially as described.
6. The combination of the feed-wheel N, the tension-roll *n*, an oscillating clutch for actuating the feed-wheel operated by a crank or eccentric, a reciprocating slide connected with said crank or eccentric operated in one direction by a cam, and in the other direction by a spring, an adjusting-cam *p* to operate upon said slide in opposition to the spring, means for moving said adjusting-cam comprising a shaft upon which it is mounted and a lever or handle *p*³ and a latch for locking it in any determined position, as and for the purposes described.
7. In a nailing-machine the combination of devices for forming in the head of the nail a V-shaped notch, mechanism for feeding the nail to the nose of the machine having a driving-throat about the size of the nail and the driving-throat having an enlargement *g*⁶ at its lower end, the driver having a driving end shaped to spread the notches in the recess *g*⁶ and form a head, as and for the purposes described.
8. The combination in a machine for driv-

ing nails having a V-shaped head forming end, the nose of the machine having a driving-throat about the size of the nail and provided with the cavity or enlargement *g*⁶ at its lower end and the driver having a driving end of a form to spread the notches in the cavity *g*⁶, as and for the purposes described.

9. The combination in a nailing-machine of the following instrumentalities, a wire-feed for feeding the wire to the driving-throat of the nail-carrier, a point-forming cutter and its actuating-cam timed to sever a section from the end of the wire and form the point before the wire is fed into the carrier and cut off, a carrier having a throat to receive the point end of the nail, and also having a die with a V-shaped recess, a stationary die of V shape extending into said recess, a cam for actuating said nail-carrier, a cut-off to sever the pointed wire against the die to form a notched head and to transfer the fastening beneath the nail-driver and hold it there during the action of the driver, the said driver and means for reciprocating the same, as and for the purposes described.

10. The combination in a nailing-machine, of the die-block *d*, having the dies *d*³, *d*⁴ and H, the cutter-block H', having the recess *h*, into which the die H extends and the end face in continuation of the die-faces *d*³, *d*⁴ and the cutter *e* movable across the said dies *d*³, *d*⁴ and the face of the cutter-block below the same, as and for the purposes described.

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Witnesses:

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