



(No Model.)

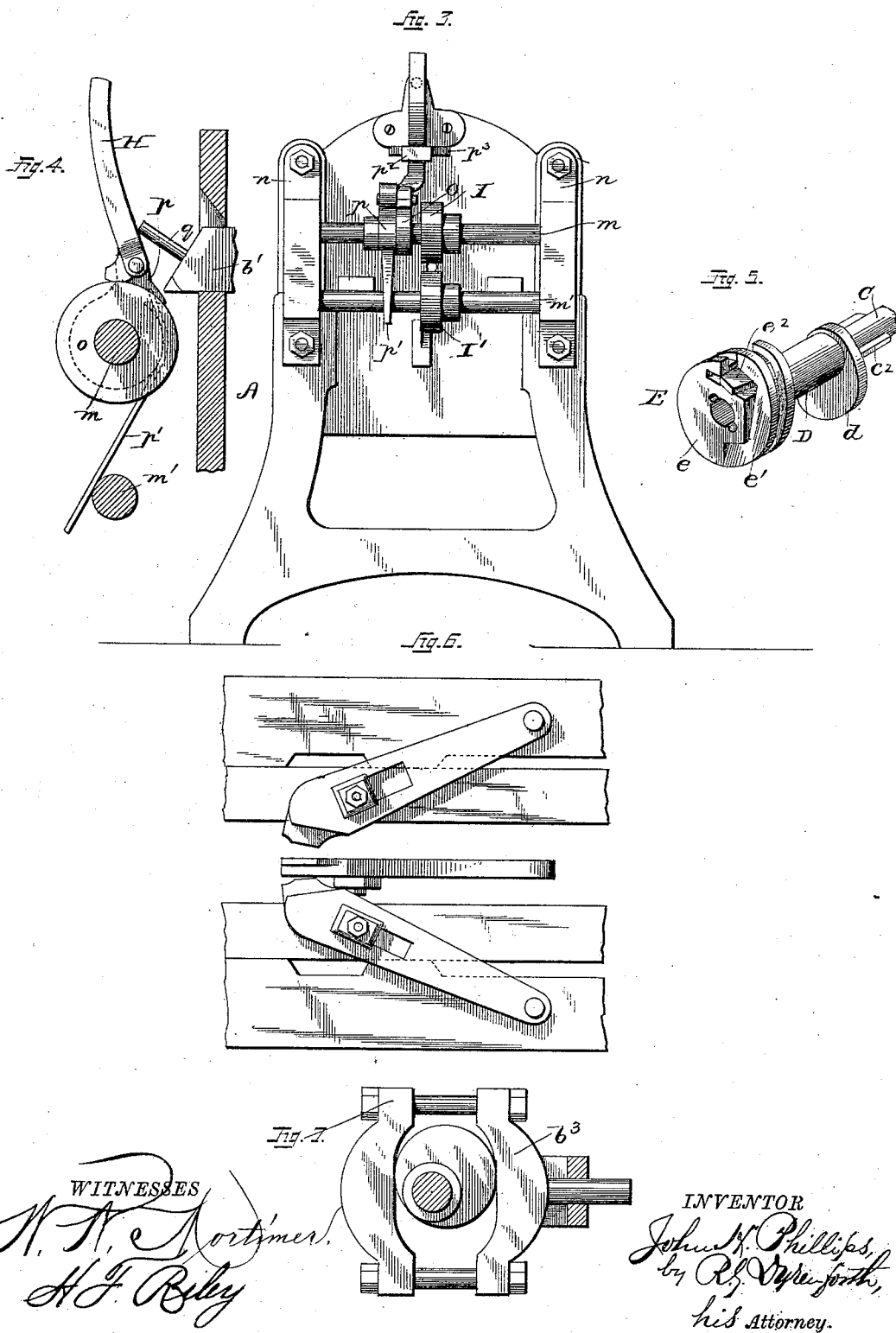
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J. H. PHILLIPS.

MACHINE FOR FORGING HORSESHOE NAILS.

No. 347,510.

Patented Aug. 17, 1886.



# UNITED STATES PATENT OFFICE.

JOHN H. PHILLIPS, OF WHEELING, WEST VIRGINIA, ASSIGNOR OF ONE-HALF TO WILLIAM DAVIS, OF SAME PLACE.

## MACHINE FOR FORGING HORSESHOE-NAILS.

SPECIFICATION forming part of Letters Patent No. 347,510, dated August 17, 1886.

Application filed October 22, 1885. Serial No. 180,658. (No model.)

### *To all whom it may concern:*

Be it known that I, JOHN H. PHILLIPS, a citizen of the United States, residing at Wheeling, in the county of Ohio and State of West Virginia, have invented certain new and useful Improvements in Machines for Forging Horseshoe-Nails; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to machines for making horseshoe and other nails.

The object of the invention is to produce a machine whereby nails may be properly formed upon and cut from a strip of metal by as few operations as possible, in order that the machine may be comparatively simple and cheap in construction.

With this object in view my invention consists in a machine comprising two pairs of jaws or formers, between which the metal to form the nail is compressed to impart the required shape.

Furthermore, the invention consists in a machine comprising two pairs of jaws or formers operating successively upon the metal to form the blank, and a cutter whose operation is so timed as to sever the nail from the strip at the moment the operation of the last pair of formers is completed.

Furthermore, the invention consists in a machine for forming nails, comprising two pairs of formers between which the metal to form the blank is compressed, a cutter to sever the nail from the strip when the last formers have operated upon it, and a feed device, the operation of which is so timed as to move the strip or blank from which the nails are made into a position between the formers at the moment a completed nail has been severed from the strip.

Furthermore, the invention consists in an attachment to this machine whereby the feed device is held stationary during the operation of the formers, thus insuring the stability of the blank during the operations of shaping and cutting off the nail.

Finally, the invention consists in various novel details of construction, whereby the ob-

ject of the invention is attained and the general effectiveness of the invention insured.

The invention is illustrated in the accompanying drawings, in which Figure 1 is a side elevation of a machine constructed in accordance with my invention. Fig. 2 is a plan view. Fig. 3 is an elevation of the front end of the machine. Fig. 4 is a detail view on a larger scale of the mechanism for intermittently feeding the blank to the machine. Fig. 5 is a detail perspective view of an automatically-shifting cam, by which the properly-timed operations of the feed and cutting mechanisms are effected. Fig. 6 is a detail view of the horizontal shaping-jaws, and Fig. 7 is a detail view in side elevation of a cam and yoke by which motion is communicated from the driving-shaft to the shaping-jaws.

In the drawings the main frame of the machine is designated by the letter A, and B represents a projecting frame secured at one end of the main frame and designed to support the driving-shaft and part of the mechanism by which motion is communicated to the operative parts of the machine.

A' A' and A<sup>2</sup> A<sup>2</sup> represent, respectively, horizontal and vertical plates secured to the uprights of the frame, and to these plates are attached the arms, upon the ends of which are the formers whereby the blank is compressed into the desired form. The arms, which are connected to the horizontal plates, and which bear the formers by which the sides of the nails are formed, are designated by the letters *a a*, and those which are connected to the vertical plate, and which bear those which form the upper and lower sides of the nails, are designated by *a' a'*. These four arms are each pivoted at one of their ends to the plates A' A' and A<sup>2</sup> A<sup>2</sup>, so that the free end can be vibrated to bring the formers into contact with the blanks and away therefrom at the proper time. The free ends are provided with formers of such shape as to give the desired contour to that part of the nail-blank with which they come in contact, and the operations of the formers are such that the different pairs are brought successively in contact with the blank, the sides being first compressed between the horizontal formers to impart the desired shape, and then the verti-

cal formers are brought into play to shape the upper and lower faces of the nail.

The preferred means of bringing the movable ends of the arms  $a$  and  $a'$  into contact with the blank is by the reciprocating frames  $b$  and  $b'$ , which carry pins or studs resting and sliding in longitudinal slots in the arms. These arms being oblique with reference to the supporting-plates and the reciprocating frames, a movement back and forth of the frames will cause the free ends of the arms carrying the formers to approach and recede from each other.

It is desirable that the movements of the different pairs of formers take place alternately, in order that there may be no interference of the parts. To accomplish this the main driving-shaft C of the machine, which is mounted in the extension B, is provided with two eccentrics,  $c$  and  $c'$ , extending from opposite sides of the driving-shaft, and these eccentrics are inclosed by boxes situated upon the ends of the frames  $b$  and  $b'$ . Thus it will be seen that by the revolution of the driving-shaft the frames will be reciprocated and the two pairs of jaws brought successively into contact with the blank.

In the operation of the machine the horizontal arms are first brought into contact with the blank, imparting the desired form to the sides of the nail, and next the vertical arms are brought into operation and complete the forming of the nail, and as soon as the nail has been thus completely formed it is cut from the end of the blank and is dropped into a suitable receptacle. The cutter by which the completed nail is severed from the blank is carried upon the upper plate,  $A^2$ , and so situated that it will be brought into contact and operated as soon as the former carried by that arm is pressed against the blank.

In the drawings, K represents a lever pivoted near one end to the plate  $A^2$ , and having a depending arm, to which is attached a cutting-tool,  $k$ . The rear end of this lever bears upon and is operated by a cam,  $K^2$ , mounted upon a rock-shaft,  $K'$ , placed in suitable bearings in the frame of the machine. The rock-shaft is provided with a depending arm,  $K^3$ , to which is attached a bar,  $l$ , provided at its end with fingers, which are pressed inward in order to rock the shaft  $K'$  and force the cutter down at the proper time.

The blank is fed to the machine between the two wheels or rolls I and I', mounted upon parallel shafts, which are journaled in suitable brackets in the end of the machine. The upper of these shafts,  $m$ , is provided with a friction-wheel,  $o$ , and near this wheel is mounted the loose collar  $p$ , upon a projection from which is mounted the lever or dog H. This lever or dog is so constructed that as its upper end is moved outward its lower end will be brought into contact with the friction-wheel  $o$ , and the shaft upon which this wheel is mounted turned, thus moving the strip of metal into the machine by the revolution of the rolls I I'.

A spring,  $p'$ , is secured to the collar and bears against the shaft  $m'$ , and the tendency of this spring is to force the upper end of the lever H inward or to its normal position. The time at which the metal should be fed into the machine is when the vertically-moving formers have just completed their action upon the nail, and therefore I provide the frame  $b'$  with a pin,  $q$ , which, when the frame  $b'$  moves forward to bring these formers into action, comes in contact with the lever H and forces it outward, thus moving the blank into the machine.

The action of the two pairs of jaws upon the nail is a combined squeezing and pulling one, and it is therefore desirable that the strip be held firmly in place during the operations of the formers. To accomplish this the lever H is brought into frictional contact with the wheel  $o$ , and at its upper end is held against the outer end,  $p^2$ , of the frame  $p^3$ , by which it is guided in its movements back and forth, thus serving as a brake to prevent the turning of the rolls I I'. In order to hold the lever H in this position, I provide the rod  $i$ , which slides in suitable guides in the upper portion of the frame of the machine. This rod is connected to a rock-shaft, G, also mounted in the frame of the machine, by an upward-projecting arm,  $g$ , from the shaft.  $g^2$  represents a spring wound around the shaft G and bearing against the frame of the machine, the tendency of which spring is to turn the shaft in such direction as to force the rod  $i$  against the lever and retain it in that position. In order to relieve the lever from this retaining-pin to allow the metal to be fed into the machine, I provide the rock-shaft with a depending arm,  $g$ , to which is connected the rod  $h$ , having the fingers  $h'$ , so that by pressing inward upon the fingers  $h'$  the shaft G may be rocked and the pin withdrawn from the lever, allowing it to be moved back to take a new hold on the friction-wheel.

In order to operate the cutting-lever and release the lever H from the retaining-pin at the proper time, I provide the mechanism now to be described.

A sleeve, D, carrying a cam,  $d$ , is mounted near one end of the drive-shaft C, and is caused to turn with the shaft by means of feathers or splines  $e^2$ , which fit in grooves in the bearing-surface of the sleeve. The sleeve D is provided at its outer end with a grooved sectional wheel, E, the office of which is to cause the sleeve D, carrying the cam  $d$ , to slide back and forth upon the shaft C, bringing the said cam into contact with one of the fingers  $h' h'$  or  $l' l'$ , either to operate the cutting mechanism or to release the lever H from the holding-pin. This wheel E is made up of the stationary part  $e$  and the movable part  $e'$ . The movable part  $e'$  is pivoted at one end to the part  $e$  in such manner that the faces of the two parts will be in approximately the same plane, and at the other end it is connected with the fixed part by means of a block,  $e^2$ , in such manner that it may be shifted to bring

the grooves of the two parts in different planes. The block  $e^2$  is seated in a suitable opening made in the stationary portion  $e$ , and it is so constructed that it will project a short distance beyond the wheel upon that side to which the stationary part has been shifted.

F represents a toothed plate or rack secured to the extension B of the frame, which has fixed upon it a rack or toothed plate,  $F'$ , and an adjustable stop,  $f$ , and a stationary stop,  $f'$ . The groove of the wheel E is engaged by the teeth of the plate  $F'$ , and when the movable part of the wheel is moved out of line with the stationary part the groove in the periphery is spiral and causes a sliding movement of the sleeve D, to which the wheel is attached, and shifts the cam  $d$  to bring it in contact with the fingers  $h'$  or  $h''$ . As the wheel reaches either end of the rack  $F'$  the block  $e^2$  comes in contact with either the stop  $f$  or  $f'$ , and throws the movable portion  $e'$  of the wheel over to the opposite side, thus changing the direction of the sliding motion of the sleeve.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in a nail-machine, of the frame, two pairs of formers mounted upon suitable arms and operating upon different sides of the nail, the said arms being slotted, and slides provided with pins entering slots in the arms, whereby the formers are brought into contact with the blank and removed therefrom.

2. The combination, in a nail-machine, of the frame, a pair of jaw-arms operating in a horizontal plane, and a pair of jaw-arms to operate in a vertical plane, the said jaw-arms being slotted and connected with and operated by slides reciprocating in the frames, substantially as described.

3. In a nail-machine, the combination of the frame, a pair of jaws arranged to operate in a vertical plane, and a pair of jaw-arms to operate in a horizontal plane, connected with and operated by slides adapted to be reciprocated in said frame, a cutter in said frame, and mechanism for operating said cutter after the

operation of the jaws, substantially as described.

4. In a nail-machine, the combination, with the frame, of the vertical and horizontal jaw-arms pivoted thereto, slides connected with and operating said jaws, yokes connected with said slides, a driving-shaft fitted with cams operating in said yokes to alternately reciprocate said slides, as set forth.

5. In a machine for the manufacture of nails, the frame, nail-strip-feeding mechanism, the vertical and horizontal jaw-arms connected with and operated by slides reciprocating in the frame, a rotating shaft having cams for reciprocating said slides, a cutter pivoted in the frame, and mechanism, substantially as described, for operating alternately the feeding mechanism and the cutter, as set forth.

6. In a nail-machine comprising the shaping-jaws and their operating-slides, feeding mechanism and a rotary driving-shaft, arms connected with the feeding and cutting devices, provided with fingers, and the sleeve D, carrying the cam  $d$ , and the grooved wheel E, rotating with and sliding upon said shaft, combined with the rack or toothed bar provided with teeth engaged by and operating the grooved wheel to reciprocate the sleeve upon the shaft to operate alternately the feeding and cutting devices, as set forth.

7. In a nail-machine, the combination, with the frame and the driving-shaft mounted therein and a bracket carrying the rack or toothed bar provided with suitable stops at each end, of the sleeve D, carrying a cam,  $d$ , and the grooved wheel E, consisting of the fixed portion  $e$  and the movable portion  $e'$ , connected with the fixed portion at one end by means of a pivot, and at its other end by means of the block  $e^2$ , pivoted to the fixed and to the movable portions, substantially as shown, and operating as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN H. PHILLIPS.

Witnesses:

R. G. DYRENFORTH,  
W. H. DYRENFORTH.