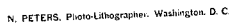


### Horseshoe Nail Machine.

Patented Jan'y 9, 1866.



# UNITED STATES PATENT OFFICE.

JAMES A. WHITNEY, OF MARYLAND, NEW YORK.

## HORSESHOE-NAIL MACHINE.

Specification forming part of Letters Patent No. 51,986, dated January 9, 1866.

*To all whom it may concern:*

Be it known that I, JAMES A. WHITNEY, of Maryland, in the county of Otsego and State of New York, have invented a new and useful Machine for Forging Nails; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a side view. Fig. 2 is a front view. Fig. 3 is a rear view. Fig. 4 is a side sectional view of a portion of the machine, showing the manner of cutting the finished nail from the rod. Figs. 5 and 6 are side sectional views of the die-faces, showing the manner in which they form the sides and edges of the nail.

This invention is designed more especially for forging horseshoe-nails from the ordinary nail-rods; and its object is to obtain a machine for the purpose, which will perform its work in a superior manner, and which will be comparatively simple in construction.

F is a solid cast-iron bed-piece, which rests on any suitable foundation, and which has a strong upright standard, H, cast upon it. On the front side of this standard H is firmly secured the vertical cylinder A, which is open at the top but closed at the bottom. The sliding piston E is made air-tight by suitable packing, and has its piston-rod D passing through the bottom of the cylinder A, the said bottom having packing around the rod to exclude the air from below the piston. At the lower end of this piston-rod D is secured the hammer B. *g* is a sleeve firmly attached to the piston-rod above the hammer, and is provided with a broad lip, *n*, projecting inward, with its inner edge sliding against the front surface of the standard H, below the cylinder A, and thus preventing the piston-rod from turning. The rotating cams *m m* act on the under side of this lip to elevate and release the hammer. It will be seen that by elevating the piston a vacuum is created underneath the same, thus causing the hammer, when released, to forcibly descend by the pressure of the atmosphere. By admitting a limited quantity of air to the under side of the piston, by means of the cock *k*, a cushion would be formed to moderate the force of the blow. Were the air freely admitted underneath, the pressure of the atmos-

phere being the same on both sides of the piston, the hammer B, the piston, and piston-rod would descend by their own weight alone.

Immediately below the hammer B, and firmly fixed in the bed-piece F, is the anvil C. In the middle of this anvil is a hole, which also extends downward through the bed-piece F, as at L, and which allows the finished nails to escape from the machine, and in front of this hole is the spur or lip *x*, which supports the rod during the process of cutting off the nail, all as will be hereinafter explained. The upper surface of the anvil is formed at each side into a die-face, as at *a'* and *a''*. In like manner the under surface of the hammer B is formed at each side into similar die-faces, as at *c'* and *c''*. The faces of the dies *a'* and *c'* correspond in shape to the edges of the nail to be forged, as is shown in Fig. 5, the said edges being formed between them. The die-faces *a''* and *c''* correspond in shape to the flat sides of the nail, which are formed between them, as is represented in Fig. 6, the end of the nail-rod being placed alternately between each pair of dies by means of the turning-holder *a*, as will be presently set forth. This holder *a* consists of a metal block or piece secured on the front end of the rod *v*, which forms its pivot, and which has on its opposite end a toothed sector, *o*. The holder *a* has a longitudinal slot or hole, *e*, in which the nail-rod is placed during the operation of forging, the cross-section of the said hole *e* corresponding with the cross-section of the rod. The front end of this hole may be expanded in order to allow the ready insertion of the said rod. A notch, *d*, is cut in the edge of the holder, and communicates with the slot or hole *e*, for the purpose of allowing the rod to be nicked or notched by means of the notching-chisel *h*, which is attached to the arm *j*, which projects from the front of the hammer B. The bent spring *c* has a hook, *i*, upon its end, which, in connection with notches in the nail-rod, gages and holds the same in place, the said spring being attached to the side of the holder *a*.

At the rearmost end of the rod *w*, opposite the cams *m m*, is a band or driving-pulley, *p*, and also a toothed pinion, *y*. This pinion *y* meshes into a toothed wheel, S, on the inner side of which is a circle of cams, *r r r*, with spaces *w' w' w'* between them.

The forked lever I is pivoted in the stand-

ard H, in front of the cams  $r$ , and, projecting backward, has a spur, R, which is operated by the cams  $r$ . This lever I may be provided with a weight,  $u$ , at its outer end, in order to assist the descent of the rack 1. Pivoted to the lever I is the rod  $t$ , the lower end of which, being provided with teeth, forms a rack, 1, which meshes into the toothed sector  $o$ .

N is a clasp or staple, which keeps the rack 1 in contact with the sector.

It will be seen that by raising and lowering the lever I the rod  $t$  will communicate an alternate partially rotary motion to the sector  $o$ , and that it thus turns the holder  $a$  alternately in opposite directions. It should be mentioned that a strong chisel or knife, Z, is firmly secured in the front edge of the hammer B, and between the two die-faces  $c'$  and  $c^2$ , for the purpose of cutting the finished nail from the rod. The cams  $r$ , with their intermediate spaces  $w'$ , are represented in Fig. 3 in red lines.

The nail-rod being held in the holder  $a$ , as will be hereinafter set forth, the rotation of the band-pulley  $p$  causes one of the cams  $m$  to elevate the hammer B, and at the same time causes one of the cams  $r$  to elevate the lever I, which, operating the sector  $o$ , causes the holder  $a$  to turn toward the right, thus bringing the end of the nail-rod upon the face  $a^2$  of the anvil, as shown in dotted red lines in Fig. 2, where it remains until the hammer has fallen. The continued motion of the band-wheel then brings the other cam  $m$  against the under side of the lip  $n$ , thus elevating the hammer again. While this is being done the continued motion of the wheel S causes the spur R to drop into the succeeding space  $w'$ . This, of course, reverses the motion of the sector  $o$ , and consequently the position of the holder  $a$ , which, being thus turned back, brings the end of the nail-rod over upon the other die-face,  $a'$ , as shown in plain red lines in Fig. 2, where it remains until the hammer has fallen. When the hammer rises again the next cam  $r$ , elevating the lever I, brings the holder to its first position, which is again reversed, when the spur R falls into the next space  $w'$ . The end of the nail-rod is thus placed alternately between the die-faces  $a' c'$  and  $a^2 c^2$  until the nail is forged. It then becomes necessary to cut the finished nail from the rod, which is done by stopping the holder at a point midway between the dies and allowing the descent of the hammer to cut off the nail, by means of the chisel Z, the nail-rod resting upon the lip X, and the nail falling from the machine through the hole L. This stopping of the holder at a point midway between the two pair of dies is accomplished by making one of the cams  $r$  but half as high as the rest, as at  $r'$ , in consequence of which this cam  $r'$  raises the lever I but half as high, and operates the sector  $o$  but half as much, as is done by the other cams  $r r$ . The holder being thus brought into the position represented in Fig. 2, in black lines, the descent of the hammer causes the

chisel Z to cut off the nail, which falls down through the hole L, as aforesaid. At the same time the chisel  $h$ , striking the nail-rod through the notch  $d$ , makes a nick or notch in the upper corner of the same. When the hammer next rises the said rod is pushed inward until the nick just formed therein catches in the hook  $i$  of the spring  $c$ , which thus gages the length of rod necessary to form the nail and holds the rod in place. The spur R falling into the next space  $w'$ , the end of the nail-rod is brought between the pair of die-faces  $a' c'$ . The next cam  $r$ , reversing the position of the holder, brings the end of the said rod between the other pair of die-faces,  $a^2 c^2$ , and so on until the nail is finished and cut off, as just hereinbefore explained.

It will be seen that inasmuch as it is intended to forge and cut off a nail at each revolution of the wheel S, and as the hammer makes two strokes at every revolution of the pinion  $y$ , there should be as many cams  $r r$ , including  $r'$ , as the wheel S is times larger than the pinion  $y$ , and as many spaces  $w' w'$  as there are cams. The rod is, of course, heated in a suitable furnace previous to forging the nails, and the nicks or notches formed in the same by the chisel  $h$ , having their sides inclined, allow the rod to be drawn from under the hook  $i$  of the spring  $c$  in order to reheat the said rod.

It is evident that by altering the shape and size of the die-faces  $a' c'$  and  $a^2 c^2$ , nails and spikes of various kinds may be made with this machine; also, that the operation of the said faces, with that of their accessory devices, would be the same if the hammer itself were some other than an atmospheric one. Thus, perhaps, a hammer could be employed of such size as to strike a blow of sufficient force by its weight alone, or the force of the blow be increased by means of a suitable spring, or instead of a sliding hammer a pivoted one might perhaps be employed; but I believe the arrangement shown to be, upon the whole, the best, and have accordingly described it in this specification.

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

1. The die-faces  $a' a^2$  and  $c' c^2$ , placed opposite each other, substantially as shown, and used in connection with any suitable device for turning the nail-rod, all substantially as set forth, for the purpose specified.

2. The combination of the holder, a chisel,  $h$ , and spring  $i$ , for gaging the blanks, as described.

3. Cutting the finished nail from the nail-rod by means of a knife or chisel attached to the hammer, when done automatically and without stopping the hammer, substantially as herein set forth and shown.

JAMES A. WHITNEY.

Witnesses:

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JOSEPH SUMMERVILLE.