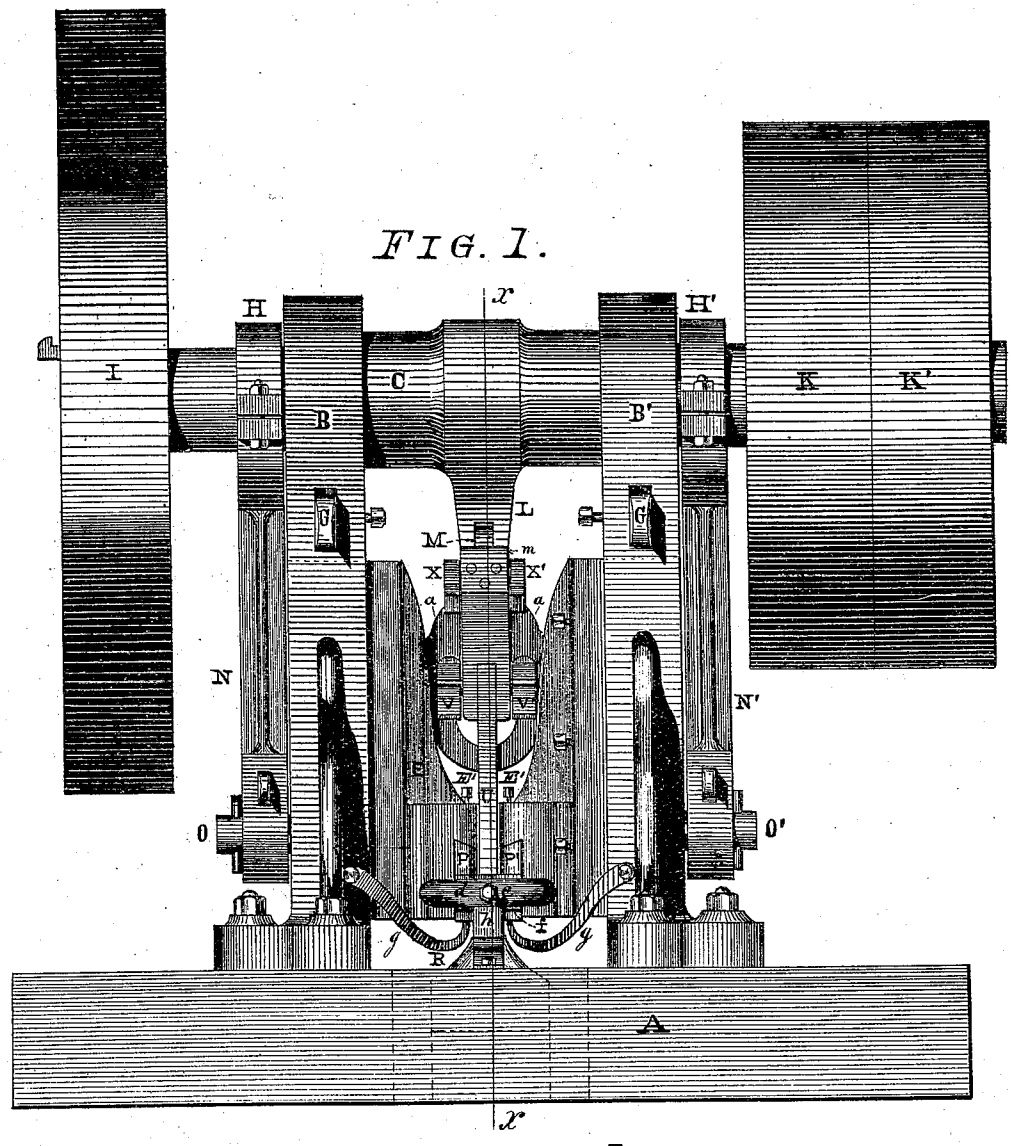
2 Sheets—Sheet 1.

E. SUCKOW.

MACHINE FOR FINISHING HORSESHOE NAILS.

No. 177,768. Patented May 23, 1876.

FIG. 1.



WITNESSES:

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2 Sheets—Sheet 2.

E. SUCKOW.

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FIG. 2.

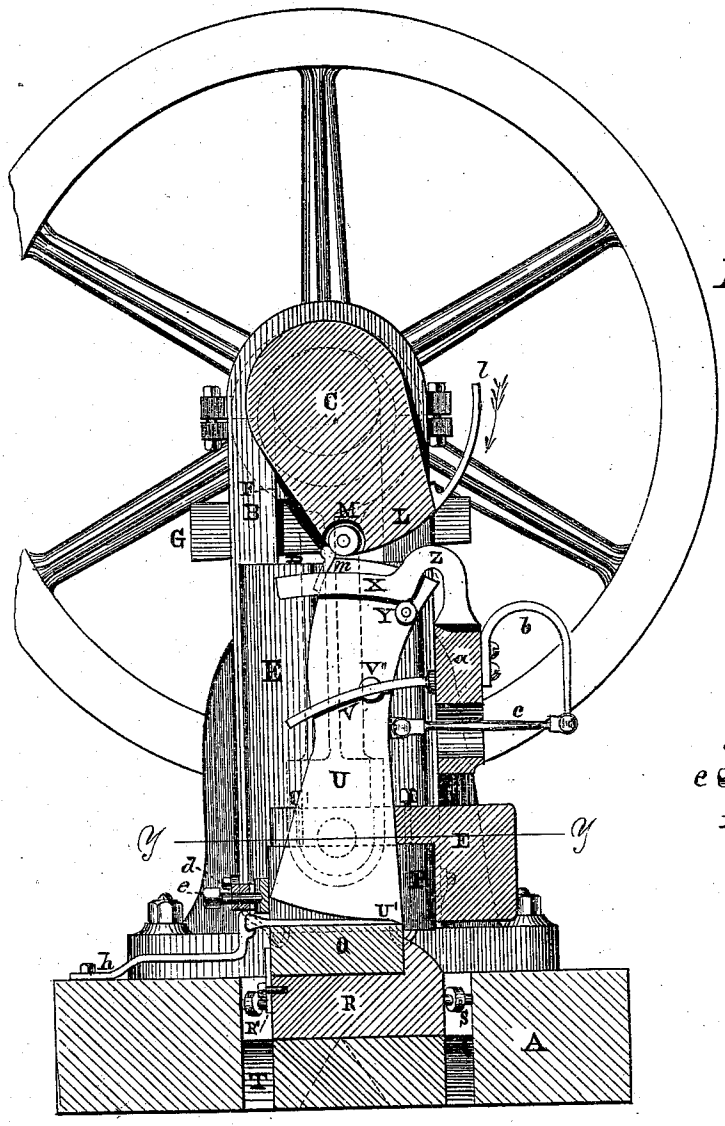
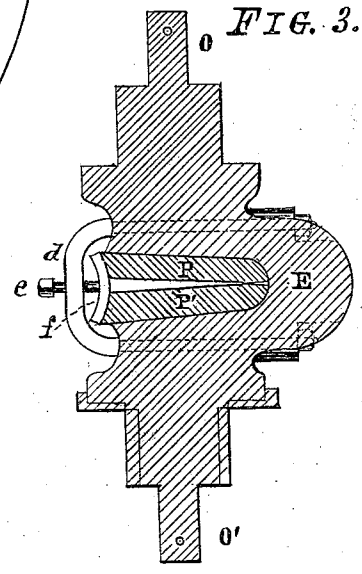


FIG. 3.



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UNITED STATES PATENT OFFICE.

EDMUND SUCKOW, OF BUFFALO, NEW YORK.

IMPROVEMENT IN MACHINES FOR FINISHING HORSESHOE-NAILS.

Specification forming part of Letters Patent No. **177,768**, dated May 23, 1876; application filed March 29, 1876.

To all whom it may concern:

Be it known that I, EDMUND SUCKOW, of Buffalo, in the county of Erie and State of New York, have invented a Machine for Trimming, Pointing, and Stiffening Horseshoe-Nails, of which the following is a specification:

My present invention relates to improvements on a machine for trimming, pointing, and stiffening machine-forged horseshoe-nails; and it consists in the arrangement, with a stationary punch, of a movable die, and a rocking shaping-bar operating within said die in such manner that the nail, after being properly trimmed by the action of the punch and die, is pointed and rolled or pressed before it leaves said die, the said shaping-bar subsequently acting as a stripper to deliver the nail from the die. The particulars of construction and operation of my machine will be hereinafter more fully explained.

In the accompanying sheets of drawings, which serve to illustrate my invention more fully, and, therefore, form a part of this specification—

Figure 1 is a front elevation. Fig. 2 is a transverse sectional elevation in line *x x* of Fig. 1, and Fig. 3 a section in line *y y* of Fig. 2.

Like letters of reference indicate similar parts in all the figures.

A is the bed-plate of my machine, made of cast iron of sufficient thickness to sustain the superstructure, and the pressure exerted by the shearing and rolling action of the various elements of my machine. Upon this bed-plate are fastened, by suitable means, two standards, B B′, of such height as to admit the operating parts below the main shaft C situated in the upper end of said standards. These standards are provided with slot-holes D properly finished, and serving as guides for the reciprocating cross-head, or, more properly, die-stock E, the upper extremities of these slot-holes being semicircular, and serving as bearings for the main shaft C, in conjunction with boxes F, which are made adjustable by the keys G passing transversely through the standards below the said boxes F. C, as hereinbefore said, is the main shaft. It is provided with two eccentrics, H H′, one on each side of the standards B B′, and with the balance-wheel I on one and the main driving and idle pulleys K K′ on the opposite end. Centrally between the standards this main shaft has a cam-projection, L, provided with an anti-friction roller, M, set into a recess in the forward end of said cam, and just protruding the face of said cam L. E is the die-stock. It slides within the slot-holes D, and is reciprocated by the eccentrics H H′, and connecting-rods N N′ engaging with the studs O O′ attached to the die-stock E. Its arrangement for adjustment or wear is similar to that found in cross-heads of steam-engines, *i. e.*, gibs properly provided with set-screws. P P′ are two die-plates set edgewise into the die-stock E, as shown in Figs. 1 and 3. These die-plates are beveled on one of their edges, fitting corresponding recesses in the die-stock, and adjusted for wear by the screws E′, and they are curved to give the proper shape to the nail. Contrary to the usual practice I make the interior space between the die-plates P P′ parallel, *i. e.*, without clearance. This I have done to better discharge the nail after it is compressed, which discharge would be very troublesome were the space between said plates tapering toward the cutting-edges of said die-plates. Q is the punch set into the block R, and retained therein by the plate R′, and a bolt passing through said plate into the punch-block. Its contour is that of the nail to be produced, and fits the die-plate snugly.

The punch-block is made adjustable by means of the adjusting-screws S. These screws wedge the punch-block into the opening T in the base A, and allow the shifting of the punch until it exactly meets the dies P P′. Instead of these screws, I may provide the bed-plate with lugs and set-screws for such adjustment. U is a rocking shaping-bar, operating within the dies P P′, and die-block E. Its lower extremity is curved and provided with the toe U′, as shown in Fig. 2, and fits the space between the die-plates P P′ snugly. V V′ are two flat springs, arranged on each side of the shaping-bar U, and connected therewith by the slotted stud V″ passing through said bar. They serve to elevate the bar U, as will be hereinafter more fully described.

X X′ are two cam-shaped guides on the upper extremity of the bar U, secured to the brace-piece *a* and engaging with the rollers Y Y′, attached to the said bar below the guides. *a* is a brace-piece connecting the two standards B B′ in the rear. To this brace-piece are attached the hereinbefore-mentioned cam-guides X X′, and also the return bent spring *b*, which is connected to the pressure or shaping bar U by the link or rod *c*. *d* is a shackle, provided with a set-screw, *e*. It passes through the die-stock E, as indicated in Fig. 3, and serves to retain the die-plates P P′ in proper position, and also to strengthen the said die-stock, which, being slotted, has a tendency to open in front. *g* are four spring-guides, attached with one end to the standards, and reaching with the other end to within a short distance of and above the punch Q, the point of suspension or attachment being considerable above the opposite extremity, for the purpose hereinafter mentioned. *h* is a curved-blade spring, attached to the bed-plate A with one end, and reaching to near the punch Q. Its free end is provided with two projections, the lower one of which is about even with the surface of the punch, and the distance between them equal to the nail-head to be introduced between these projections.

The operation of my machine is as follows: A forged nail is introduced into the projections on the spring *h* to reach over the punch Q, the spring-guides *g* assisting in placing the nail properly and nicely over the punch. Now, the shaft C revolving, the eccentrics H H′ move the die-block E downward, and the dies P P′, coming in contact with the nail while descending, shear the same to proper size. During the downward movement of the dies, the springs *g* are bent downward, and recede from the punch to allow the cuttings to pass into the openings T in the bed-plate A. By the time the die-block E has reached its lowest point, the projecting cam L has passed over the head of the shaping-bar U, and forced the same downward for some distance, and the roller M has just come in contact with the stop *m* on the front of said shaping-bar. This downward movement of the shaping-bar U has the effect of, first, releasing the anti-friction rollers Y Y′ from the curves Z; second, to press with its toe U′ upon the point of the nail and beveling the same; and third, to depress the springs V V′. As the cam continues its movement in the direction of the arrow, Fig. 2, it will move the upper end of the bar U along, causing the lower end to roll over the nail between the dies, and resting upon the punch, and to press the same with considerable force, which may be increased or diminished by either providing the punch-stock R with set-screws to rise or lower the punch Q, or by placing strips of metal under the punch. The effect of the shaping-bar rolling over the nail is to compress the same between the dies, which will harden and stiffen it, and at the same time cause it to lengthen.

When the cam L has passed the pressure-bar U this will commence to return to its original position by the action of the spring *b* and rod *c*. Its movement, however, is somewhat retarded by the yielding continuation *l* of the cam L acting as a spring, and preventing a too sudden action of the bar U. Now the die-block will begin to move upward, and also the shaping-bar U, the former through the action of the eccentrics, and the latter by the springs V V′, until the rollers Y Y′ strike the upper curve Z in the guards X X′, and stop said bar, while the die-block still continues its movement. This stopping the bar U also stops the nail between the dies, and finally discharges the same. Thus the bar U acts as a stripper for the receding die. By this time all the moving parts have returned to their original positions, and the nail is finished, leaving the die perfectly bright and smooth, and of superior quality.

The lengthening of the nail when in the dies affects the spring *h* in a manner to cause it to recede from the punch, although preserving its horizontality. As soon as the nail is discharged from the dies it will return to its normal position with sufficient momentum to throw the nail backward, clearing the field for the next nail to be acted upon.

The machine, as described, is arranged for a continuous motion. This, however, may not be very desirable for new operators who have not acquired sufficient skill to introduce the nail while the machine is in motion, and for this reason I provide the same with clutches or similar devices, such as are now in common use on power-presses for producing an intermittent motion of the follower and its accessories. I may also construct a self-feeder to deliver the nail-blanks automatically, and run the machine at a sufficient continuous speed.

If I should find it necessary I should modify the action of the shaping-bar U by giving to it a reciprocating motion instead of the rocking movement by suitable means, such as cranks, eccentrics, cams, and anti-friction rollers, and other well-known agencies, whereby I am enabled to use this machine for other than the special purpose for which I have designed the same, such as shearing and forming knives, forks, spoons, and many other articles that now require separate operations.

Having thus fully described my invention, in order to enable others skilled in the art to which it appertains to make and use the same, I desire to secure by Letters Patent of the United States—

1. The process of producing machine-finished horseshoe-nails, consisting of first shearing the forged nail by suitably-arranged punches and dies into its proper shape broadwise, and then

subjecting the same to the action of a shaping-bar rocking over said nail, whereby it is pointed, stiffened, and compressed to its proper thickness, all when remaining in and confined by the dies, substantially as described.

2. The combination, with the stationary punch Q, of the movable dies P P′ and the rocking shaping-bar U, operating within said dies, in the manner and for the use and purpose set forth and described.

3. The rocking shaping-bar U, combined with the springs V V′, cam-shaped guards X X′, and the rollers Y Y′, for the purpose mentioned.

4. The rocking shaping-bar U in combination with the cam L, as described.

5. The rocking bar U, having the toe U′, for the purpose hereinbefore mentioned.

6. The combination, with the cam L, of the roller M, shaping-bar U, having the stop *m*, springs V V′, spring *b*, cam-shaped guides X X′, with the return-curve Z, and the rollers Y Y′, the whole being constructed and arranged substantially as described.

7. The combination, with the die-block E, of the removable dies P P′, retained within said die-block by the shackle *d*, set-screw *e*, and transverse plate *f*, substantially as described.

8. The combination, with the punch Q, of the curved spring-guides *g*, constructed and applied in the manner and for the object stated.

9. The spring *h* attached to the bed-plate with one of its extremities, and having on its opposite end two projections to receive the head of the nail to be operated upon, said spring being arranged to partake of the movement of the nail when confined between the cutting-dies, and to discharge the same from the machine, when the nail is released from said dies, substantially as described, for the object stated.

10. The combination, with the standards B B′, of the eccentrics H H′, connecting-rods N, shaft C, cam L, rocking bar U, dies P P′, and the punch Q, constructed and arranged substantially as described, for the use and purpose stated.

In testimony whereof I have hereto set my hand in the presence of two subscribing witnesses.

EDMUND SUCKOW.

Witnesses:
MICHAEL J. STARK,
FRANK HIRSCH.