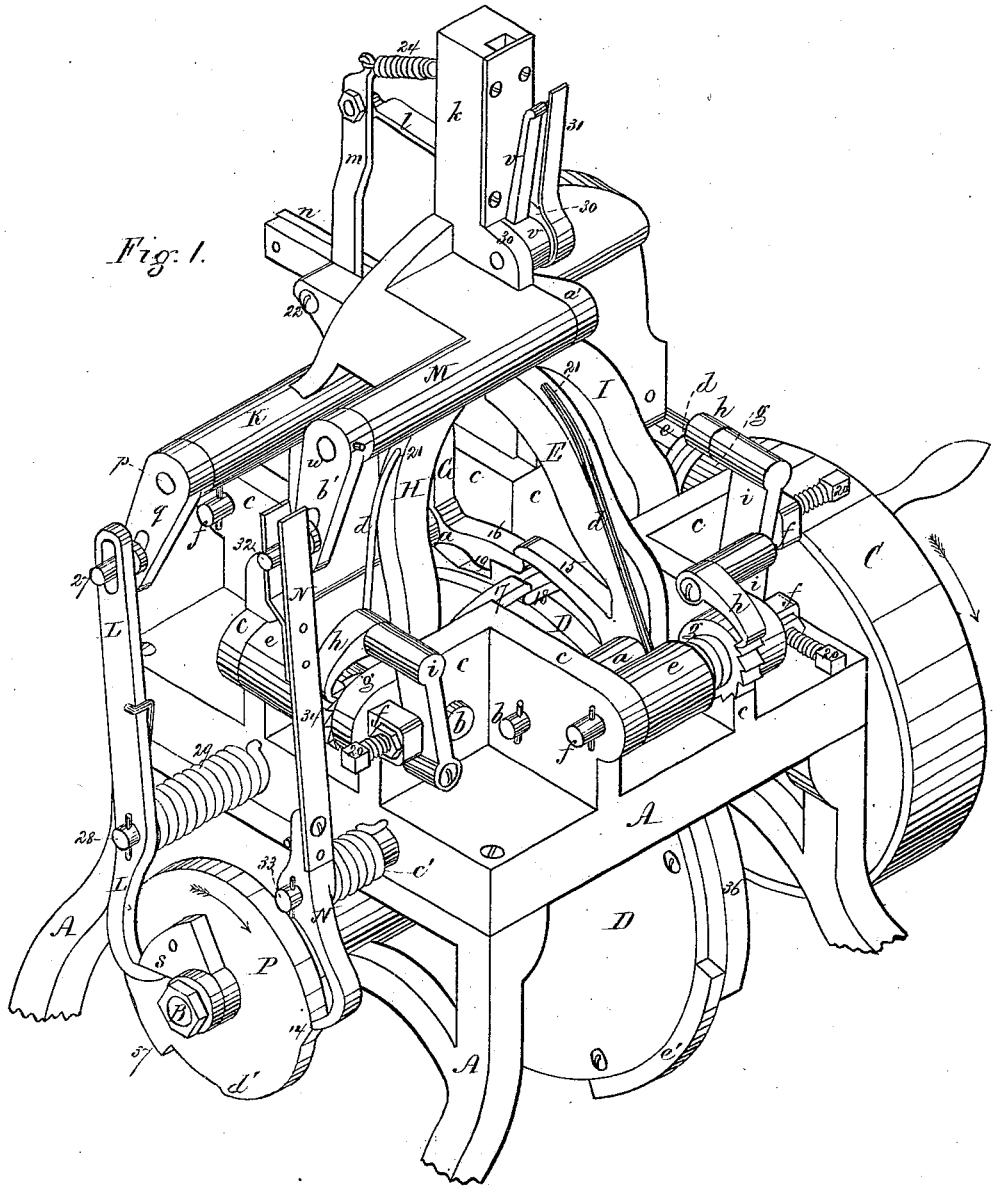
4 Sheets—Sheet 1.

S. S. PUTNAM.

Machine for Finishing Horseshoe-Nails.

No. 196,932. Patented Nov. 6, 1877.

Fig. 1.



Witnesses,
W. J. Cambridge
Chas. E. Griffin.

Inventor,
Silas S. Putnam
Per Teschemacher & Bearns
Attys

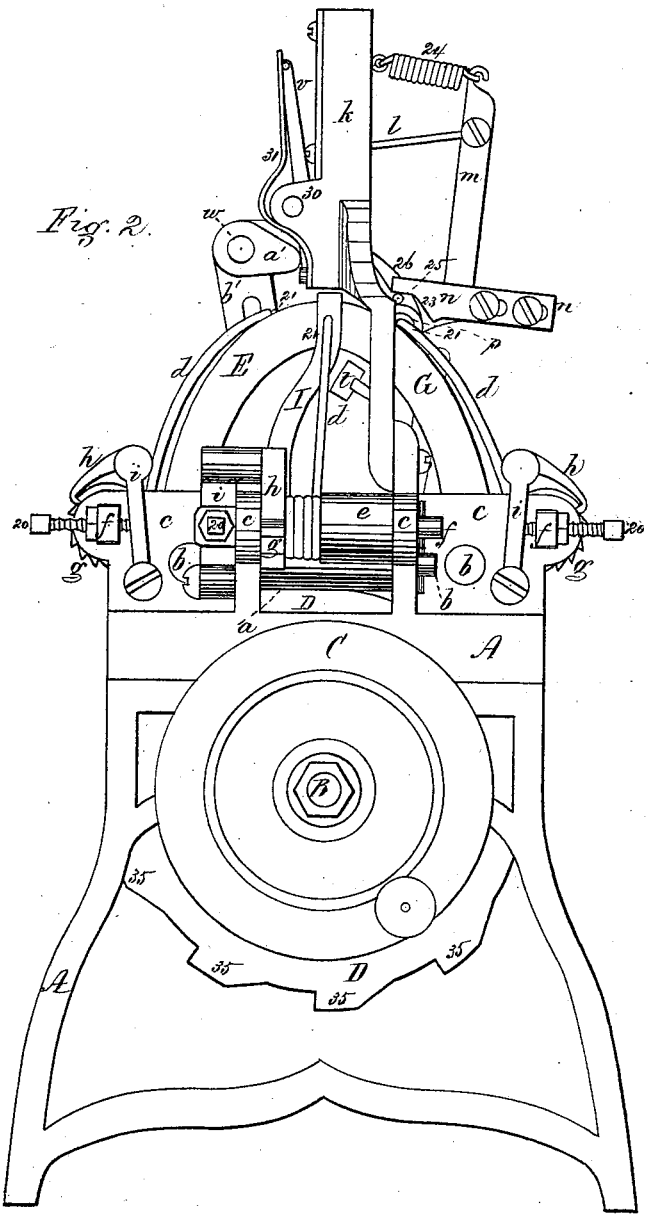
4 Sheets—Sheet 2.

S. S. PUTNAM.

Machine for Finishing Horseshoe-Nails.

No. 196,932. Patented Nov. 6, 1877.

Fig. 2.



Witnesses,
W. J. Cambridge
Chas. E. Griffin

Inventor,
Silas S. Putnam
Per Teschemacher & Stearns
Attys.

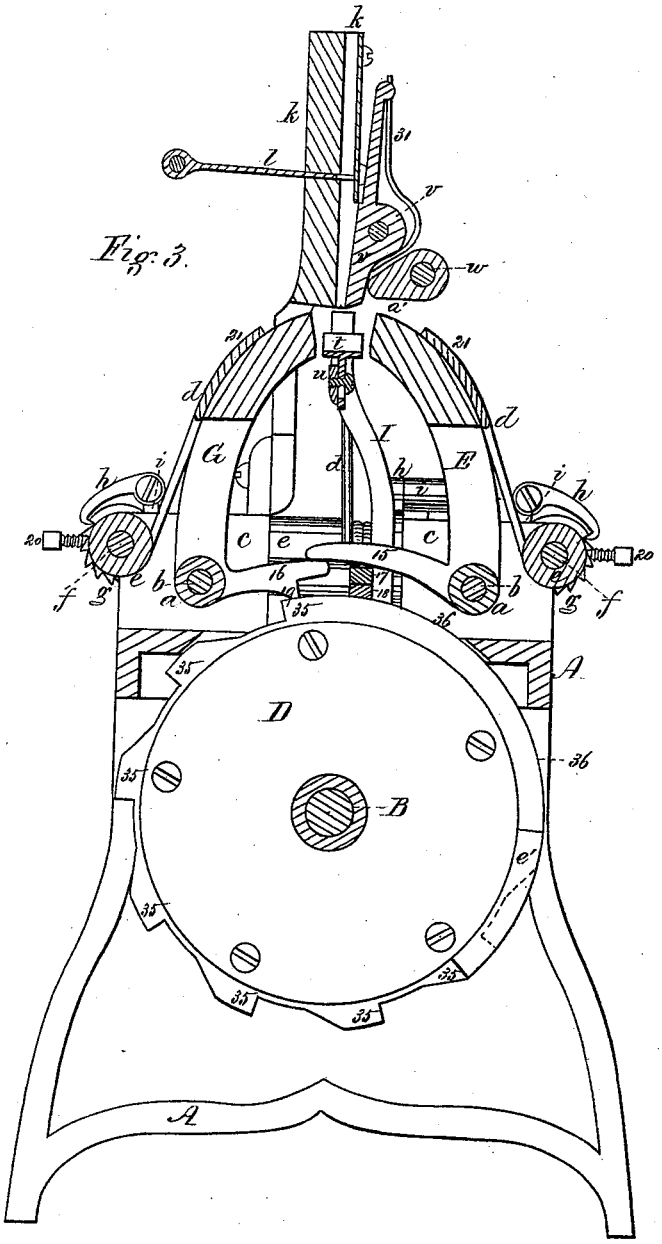
4 Sheets—Sheet 3.

S. S. PUTNAM.

Machine for Finishing Horseshoe-Nails.

No. 196,932. Patented Nov. 6, 1877.

Fig. 3.



Witnessed,
W. J. Cambridge
Chas. E. Griffin.

Inventor,
Silas S. Putnam
per Taschemacher & Stearns
Attys.

4 Sheets—Sheet 4.

S. S. PUTNAM.

Machine for Finishing Horseshoe-Nails.

No. 196,932. Patented Nov. 6, 1877.

Fig. 4.

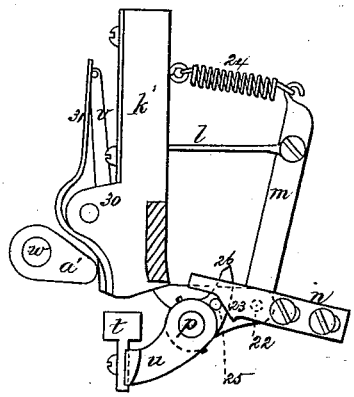
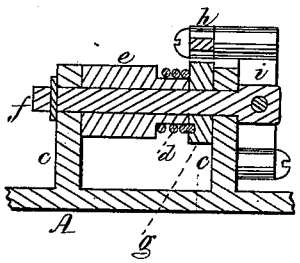


Fig. 6.

Fig. 5.



Witnesses,
W. P. Cambridge
Chas. E. Griffin.

Inventor,
Silas S. Putnam
per Teschemacher & Stearns
Attys.

UNITED STATES PATENT OFFICE.

SILAS S. PUTNAM, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN MACHINES FOR FINISHING HORSESHOE-NAILS.

Specification forming part of Letters Patent No. **196,932,** dated November 6, 1877; application filed May 19, 1875.

To all whom it may concern:

Be it known that I, SILAS S. PUTNAM, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improved Machine for Pointing and Finishing Forged Horseshoe-Nails, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a perspective view of a machine constructed in accordance with my invention. Fig. 2 is an elevation of one side of the same. Fig. 3 is a vertical section through the center of the same; Figs. 4, 5, and 6, details.

My invention relates to a machine for pointing and finishing forged horseshoe-nails, whereby they are hardened and rendered stiff and fit for driving; and consists in a conductor having a movable stop for catching the nail when first dropped therein, and provided at its lower end with a mechanism for griping and holding the nail in a position to be acted upon by the hammers, and releasing it when finished.

My invention also consists in a novel arrangement of the arms through which motion is communicated from the cam-wheel to the hammers, whereby the arms are prevented from intercepting the nails as they drop from the conductor after being finished.

My invention also consists in a peculiar device for regulating the tension of the springs which operate the hammers.

My invention also consists in certain details, to be fully described hereinafter.

To enable others skilled in the art to understand and use my invention, I will proceed to describe the manner in which I have carried it out.

In the said drawings, A represents the frame-work of the machine, in suitable bearings in which runs the driving-shaft B, to which are secured the driving-pulley C and a cam-wheel, D, for operating the four vertical hammers E G H I, which are arranged in pairs, as seen in Fig. 1, so as to operate alternately on opposite sides of the blade of the nail. Each of these hammers is provided with a sleeve, *a*, formed in one and the same piece therewith, through which passes a short shaft, *b*, upon which the hammer is rocked, and by which it is supported between vertical plates or cheeks *c*, rising from the frame-work.

From the lower end of each hammer projects a tail or arm, the end of the arm 15 of the hammer E overlapping and resting on the end of the arm 16 of the hammer G, whereby the motion of the hammer G, when operated by the cam-wheel D, is communicated to the hammer E. In a similar manner the end of the arm 17 of the hammer H overlaps and bears on the end of the arm 18 of the hammer I, so that, as the hammer I is moved by the cam-wheel, its motion will be transmitted to the hammer H.

The arm 18 extends under the arm 15, and between it and the cam-wheel D, these arms crossing each other at right angles, and being prevented from interfering with each other by a projection, 19, on the under side of the arm 16, which serves to elevate the arm 15 sufficiently to keep it at all times out of contact with the arm 18.

The hammers, which are arranged as above described, are operated alternately in pairs, the two hammers of a pair, when released by the cam-wheel D, being thrown toward each other to give the blow by coiled lever-springs *d*. Each of these springs is coiled several times around the small portion of a sleeve, *e*, which is supported between the plates *c* by a shaft, *f*, the end of the spring which is bent entering a hole in a disk, *g*, which is free to turn on the shaft *f*, and occupies the space between the end of the small portion of the sleeve *e* and the adjacent plate *c*. A portion of the circumference of the disk *g* is provided with ratchet-teeth, with one of which engages a pawl, *h*, which is secured to the upper end of a lever, *i*, pivoted to the outside of one of the plates *c*, and against this lever bears a set-screw, 20, by means of which the disk *g* may be moved in order to put more or less tension on the spring *d*, and thus vary the force with which the portion 21 bears upon the hammer.

The spring of the hammer E is set up to exert a greater pressure than that of the hammer G, so as to cause the arm 15 to remain continuously in contact with the arm 16 while

the hammers are being thrown together, which thus insures their both striking the nail at the same time.

A similar adjustment of the springs of the hammers H I is made for the same purpose.

The face of each of the hammers is inclined to correspond with the taper or shape of the side of the nail on which it operates, and as the nail is drawn down to a point by the repeated blows of the hammers upon the opposite sides of its lower portion, it is reduced in thickness and width, and slightly elongated, which operation serves to condense, smooth, and harden the iron, so as to render the nail stiff and fit for driving, thus avoiding the necessity of hammering it upon an anvil previous to use, as has heretofore been necessary.

Rising from the top of the frame-work A is a conductor, *k*, into which the nails to be pointed are dropped, one at a time, with the head uppermost, the nail being arrested by its point striking a movable slide or stop, *l*, attached to a bent lever, *m*, which is pivoted at 22 to the frame-work, and has secured to its lower end a horizontal arm, *n*, provided with an incline, 23, which is struck in order to move the arm against the resistance of a spring, 24, and withdraw the stop *l* by a pin, 25, on an arm, 26, secured to one end of a rock-shaft, *p*, supported in a long bearing, K. The opposite end of this shaft *p* is provided with a crank, *q*, the pin 27 of which enters a slot at the upper end of a long lever, L, which is pivoted on a stud, 28, and is moved at the required time against the resistance of a spring, 29, by a cam, *s*, on the end of the driving-shaft B.

The arm *n* is made adjustable on the lever *m* by means of screws and slots, so that the position of the incline 23 with respect to the pin 25 may be varied as desired; and the pin 27 is made adjustable within a slot in the crank *q*, so that the throw of the latter may be regulated as required.

As soon as the stop *l* is withdrawn, through the connections described, the nail drops still farther down within the conductor *k*, until it is arrested by its point striking a V-shaped stop, *t*, (Figs. 3, 4, 6,) the arm of which is secured to a curved arm, *u*, attached to the end of the rock-shaft *p*, the movement of which is so timed that the stop *t* will be brought up into a position to catch the point of the nail before the stop *l* is withdrawn. This stop, which is made V-shaped in order to center the nail, is now raised slightly, (which is effected by the peculiar shape of the cam *s*,) so as to bring the nail into the exact position with respect to the faces of the hammers necessary to insure the perfect formation of its point.

The shank of the stop *t* is secured to the arm *u* by a screw passing through a slot to admit of the stop being adjusted to the exact position desired.

The nail is griped and held firmly (after being brought into the exact position required by the stop *t*, as above described, and before the hammers commence to operate) in the following manner: *v* is a lever which is pivoted between lugs 30, that portion of the lever below the point where it is pivoted forming one side of the lower portion of the conductor *k*, and against a pin projecting from the upper end of this lever bears a flat spring, 31. *w* is a rock-shaft which is supported in a long bearing, M, and carries at one end a cam, *a'*, which bears against the lower end of the lever *v*, and serves to force it inward against the resistance of the spring 31, so as to cause it to gripe the nail.

To the outer end of the shaft *w* is secured a crank, *b'*, the adjustable pin 32 of which is embraced by the bifurcated end of a long lever, N, which is pivoted upon a stud, 33, and is moved at the required time against the resistance of a spring, *c'*, by a projection, 14, on a cam-wheel, P, on the driving-shaft B, and thus, through the mechanism described, the necessary movement is imparted to the lever *v* to cause it to gripe the nail at the desired time.

The upper portion 34 of the lever N consists of a flat spring, by which construction the lever *v* is caused to gripe the nail with a yielding pressure, as is necessary, owing to the varying thicknesses of the nails which pass through the conductor.

As soon as the nail has been griped the cam *s* passes out of contact with the end of the lever L, which is then moved by the spring 29, causing (through the connections described) the V-shaped stop *t* to be withdrawn out of the way, its movement in this direction being arrested by the arm 26 coming into contact with the frame-work, as seen in Fig. 2, the arm thus serving as a stop to prevent the arm *u* from striking the adjacent hammer G.

The hammers now commence to operate upon the point of the nail, which is thus drawn out and perfectly formed, so as to be fit for driving without requiring to be hammered and drawn out by the blacksmith, as has heretofore been necessary.

At the same time that the stop *t* is withdrawn, the stop *l* is advanced by the spring 24 so as to intercept the next nail which is dropped into the conductor.

About two-thirds of the circumference of the wheel D is provided with cams or projections 35, the remainder being plain or concentric, as seen at 36 in Fig. 3, all four of the hammers being arrested and held apart when the concentric portion 36 arrives beneath the arms 16 and 18 of the hammers G I, and during the time it is traveling in contact therewith.

Immediately after the motion of the hammers has been arrested, the point of the projection 37 of the cam-wheel P passes out of contact with the lower end of the lever N, when the latter is moved by the spring *c'*, causing the shaft *w* to be rocked, which depresses the point of the cam *a'*, and allows the lower portion of the lever *v* to be thrown

out by the spring 31, when the nail, being no longer held, will drop down in a finished state.

After a short interval (which insures the nail dropping out of the conductor when the machine is running at a high speed) another projection, *d'*, on the cam-wheel P strikes the lower end of the lever N, and, through the connections described, forces the lower end of the lever *v* inward sufficiently to prevent the succeeding nail, when released by the withdrawal of the stop *l*, from dropping through the conductor, which it would otherwise do, the V-shaped stop *t* not having been raised at that time to a sufficient height to catch and hold the nail.

As the cam-wheel P continues to revolve, the projection 14 again strikes the lever N, to cause the nail within the conductor to be griped and held, when the hammers commence to act, and the operation continues as before.

The movement of the hammers is so timed that one pair will be separated before the other pair is released to give a blow, thus preventing any danger of their interfering with each other, and both pairs are held open, as before described, by the concentric portion 36 of the cam-wheel D while the pointed nail is being released and another dropped down and secured in a position to be operated upon by the hammers.

It will be seen that the arms 15 16 17 18 of the hammers are not placed directly beneath the conductor *k*, and, consequently, will not interfere with the nails as they drop therefrom.

The number of projections 35 on the cam-wheel D may be varied according to the number of blows to which it is desired to subject the nail.

The arm 18 of the hammer I is prevented from dropping into the last notch of the cam-wheel D by a curved piece or guard, *e'*, which is secured to the wheel at the side of this notch, and forms a continuation of the concentric or plain portion 36. By this means the hammers H I are prevented from being thrown together at the instant that the nail is released from the conductor, and all liability of its being caught and crushed, as might otherwise be the case, is avoided.

The piece *e'* does not, however, prevent the projection 19 of the arm 16 from dropping into the last notch of the cam-wheel, and, consequently, one more blow is given by the hammers E G than is given by the hammers H I.

The above-described machine performs its work in a rapid and reliable manner, and gives the nail a perfect point, fit for driving.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The conductor *k*, with its movable stop *l*, for catching the nail when first dropped therein, in combination with a mechanism for griping and holding the nail while being subjected to the blows of the hammers, and releasing it when finished, substantially as set forth.

2. The spring-lever N, in combination with the cam-wheel P and the nail-griping device, whereby a yielding pressure of the latter is secured, substantially as and for the purpose set forth.

3. In combination with the lever *v* and its spring, the rock-shaft *w*, provided with the crank *b'*, cam *a'*, and spring-lever N, operated by a suitable cam, substantially as described.

4. In combination with the arm *u* and V-shaped stop *t*, the arm 26, for preventing the arm *u*, when depressed, from striking the adjacent hammer, substantially as set forth.

5. The guard *e'*, in combination with the cam-wheel D and the arms 17 and 18 of the hammers H I, substantially as and for the purpose set forth.

6. In combination with the cam-wheel D, the hammer-arms 15 16 17 18, arranged substantially in the manner and for the purpose described.

7. In combination with the hammer-spring *d*, the sleeve *e* on the shaft *f*, the toothed disk *g*, pawl *h*, lever *i*, and screw 20, for regulating the tension of the spring, substantially as described.

Witness my hand this 17th day of May, A. D. 1875.

SILAS S. PUTNAM.

In presence of—

GEORGE W. MEARS,
S. S. PUTNAM, Jr.