# S. S. Putnam,

## Horseshoe-Nail Machine,

No. 37,107. Patented Dec. 9, 1862.

Fig. 1.

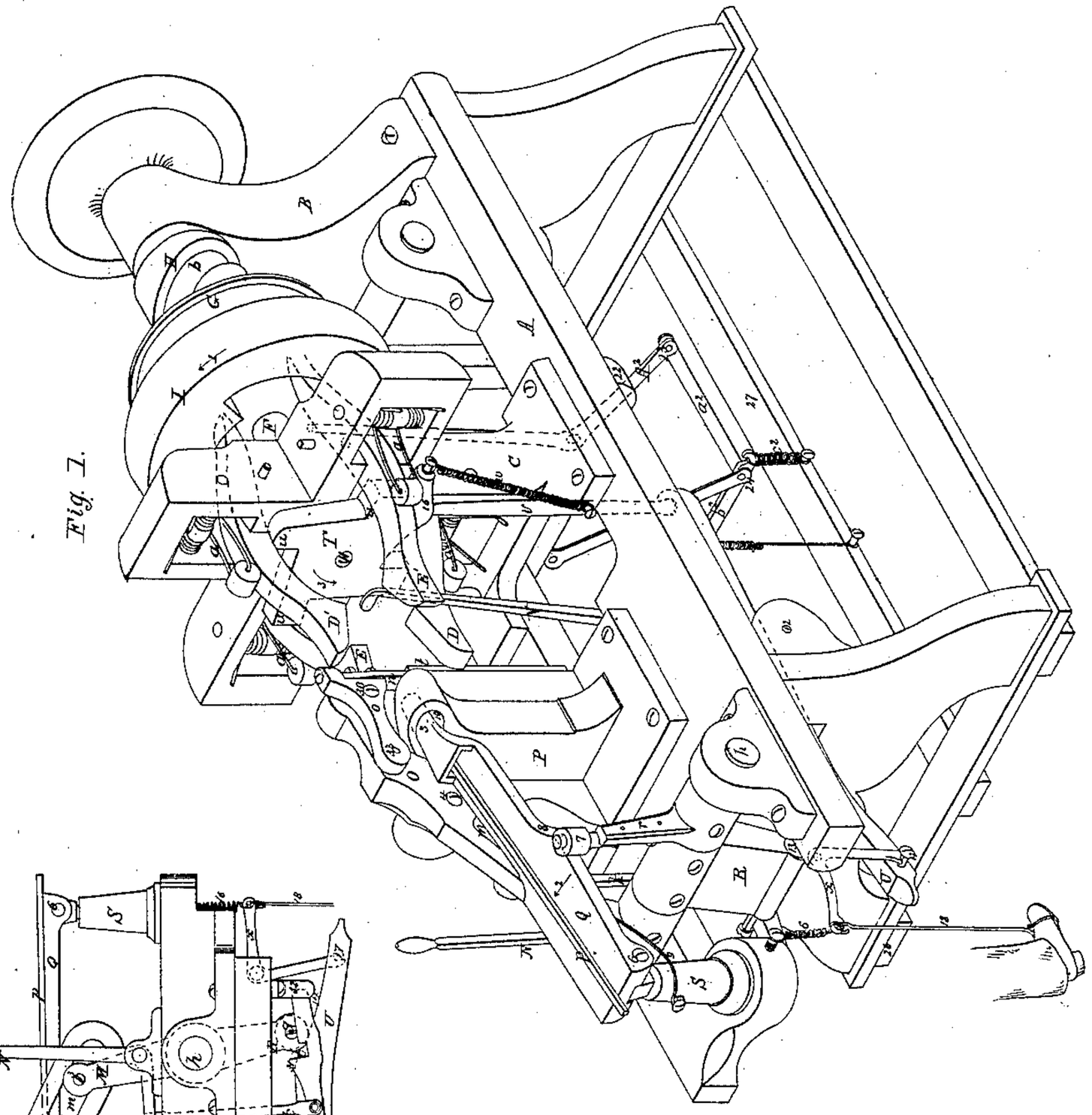


Fig. 2.

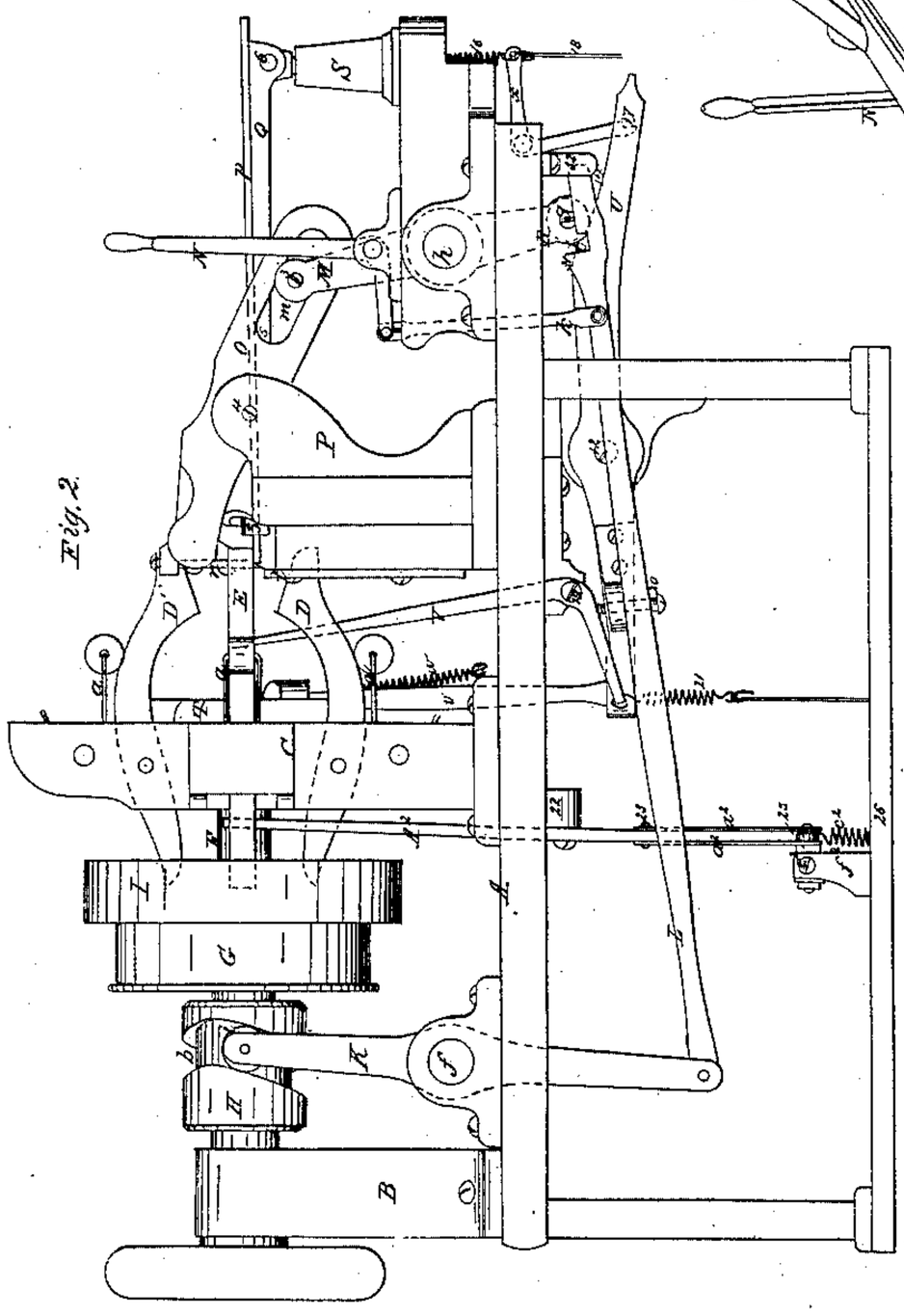


Fig. 3.

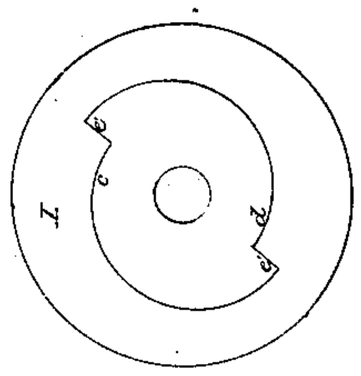
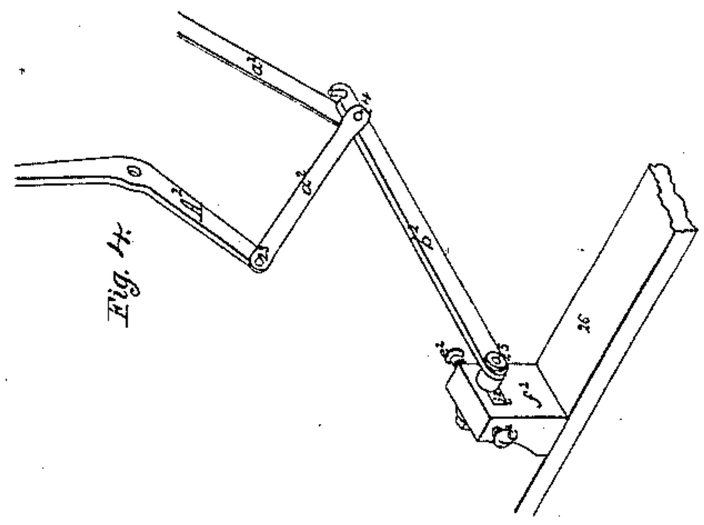


Fig. 4.



# UNITED STATES PATENT OFFICE.

SILAS S. PUTNAM, OF DORCHESTER, MASSACHUSETTS.

## IMPROVEMENT IN MACHINES FOR MAKING NAILS FOR HORSESHOES.

Specification forming part of Letters Patent No. **37,107**, dated December 9, 1862.

*To all whom it may concern:*

Be it known that I, SILAS S. PUTNAM, of Dorchester, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Machines for Forging Horseshoe-Nails and other Articles, 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 the machine; Fig. 2, a side elevation of the same; Figs. 3 and 4, details to be referred to.

My present invention consists in some improvements in machines for forging horseshoe-nails and other articles, by which the construction of the machine is simplified and its operations rendered more accurate and certain than in the machines for which Letters Patent of the United States were granted to me August 17, 1858, and June 11, 1861.

That others skilled in the art may understand and use my invention, I will proceed to describe the manner in which I have carried out the same.

In the said drawings, A is the frame of the machine, from which rises the standards B and C, the latter made in the form of a cross, which carries the hammers D D′ E E′, arranged in pairs and thrown together by springs *a*. A shaft, F, having its bearings in these two standards, is driven in the direction of the arrow 1 by a belt over a pulley, G. It carries a pulley, H, with a cam-groove, *b*, on its face, and a disk, I, (shown detached in Fig. 3,) on the inner face of which is formed two cams, *c d*, which raise the hammers, and as the shoulders *e e′* pass the outer ends of the hammer-helves the springs *a* are allowed to throw them together. A lever, K, is pivoted at *f* to the frame and carries a friction-roll, *i*, which lies in the groove *b* of the pulley H, by which this lever is vibrated. It is pivoted at its other end to a rod, L, which is constantly vibrated longitudinally, and is caused to engage with a pin, *g*, on a lever, R, attached to a shaft, *h*, which has its bearings in the frame-work, by being raised by a hand-lever, N, to the crank of which is pivoted a connecting-rod, *k*. The pin *g* catches in a notch, *l*, in the rod L, and while thus engaged the lever R is vibrated and the shaft *h*, to which it is attached, is rocked.

To the head of another lever, M, also attached to the shaft *h*, is pivoted at 3 a friction-roll, which plays in a slot, *m*, in a lever, O, which is pivoted at 4 to a standard, P. To the outer end of this lever is attached the cutter *n*, with which the nail is cut off from the rod after being forged. The cutter is attached to a block, *o*, which is pivoted at 30 to the side of the lever O, to adjust the position of the cutter, and is held in place by a screw, 33. It will be observed that as the roll on the lever M approaches the end 5 of the slot *m* the speed with which the cutter *n* is raised is increased; but when the roll approaches the other end of the slot the cutter is brought down with gradually-decreasing speed, but with the power increased.

In practice I find it of advantage to move the cutter rapidly out of the way after the nail is cut off, to get the cutter out of the way of the hammers. A lever, Q, on which the nail-rod *p* is laid, is pivoted at 6 to a block which turns in the head of a post, S, supported on the frame A. This lever is vibrated in the direction of the arrow 2, to throw the nail under the cutter, by a roller, 7, on the head of an arm, *r*, attached to the shaft *h*, the roller pressing on the cam or incline 8 on the side of the lever. It is moved in the opposite direction by a spring, 9, attached to the post S. The nail-rod passes through a nozzle, *s*, on the end of the lever Q, which is guided in an inclined slot, 10, in the head of the standard P. An anvil, *t*, for the cutter to strike against, is attached to the front of the standard P.

The hammers are caught and held open at the proper time when the nail is to be cut off by the following device: A block, T, pivoted at 11 to the face of the standard C, has four projections or shoulders, *u*, which, as the block is revolved in the direction of the arrow 3, catch under the hammers while they are thrown open and hold them until the block is revolved back again. A lever, U, pivoted at 12 to the frame-work of the machine, is vibrated by a roller, 13, on the side of the arm R, which is attached to the shaft *h*, the roller resting on a cam or incline, 14, on the top of the lever U. A connecting-rod, *v*, rests on the end of this lever and bears against a projection, 15, on the block T. This revolves the block T in the direction of the arrow 3, and a spring, *w*, attached to the projection 15 and to the frame A, turns the block in the opposite

direction to free the hammers, when permitted to do so by the revolution of the shaft *h* and the release of the lever U. This lever U, when depressed, is caught by a stop, *x*, which is pivoted to the frame-work, and is vibrated by a spring, 16, which causes a notch in the end of the stop to catch on a pin, 17, on the outer end of the lever. The hammers are thus held stationary (though the cam-wheel I continues to revolve) until the operator releases them, which he does by vibrating the stop *x* by pressing down with the foot on a rod, 18, attached to the end of the stop, as shown in Fig. 1. The lever U, when vibrated by the arm R to cause the block T to catch and hold the hammers, also throws forward a gage, V, by which the operator measures the proper length of nail-rod to be pushed through the nozzle S to make a nail. This gage V is a lever, which is pivoted at 19 to the frame-work and rises alongside of the hammer D, the head of the lever being bent over and somewhat flattened at the point where the nail-rod strikes it. A screw, 20, which passes through an ear attached to the side of the lever U, presses against the lever V to vibrate it and throw forward the gage when the outer end of the lever U is depressed by the arm R, and a spring, 21, attached to a brace, 27, of the frame, draws the gage back out of the way before the hammers are allowed to come together. It is requisite that the hammers should strike so that each pair will meet in the plane in which the nail-rod is placed, and that each hammer be thrown an equal distance by its spring *a*. This is more particularly important with the two side hammers, E E′, as it is by these that the head of the nail is formed, or rather the nail is hammered down on each side, leaving the head of the size required. If these two hammers are not accurately timed with respect to each other, the shoulder under the head will be lower on one side than the other, and spoil the nail.

As it is difficult to adjust the throw of the springs *a* exact enough, I have devised a compensating attachment which operates as follows: Two bent levers, $A^2$, one for each side hammer, are pivoted to a cross-brace, 22, of the frame, and extend up so as to press against the inner ends of the hammer levers, as shown dotted in Fig. 1. To the lower ends of these levers are pivoted at 23 rods $a^2$, which meet at 24, where they are pivoted to a lever, $b^2$, which is pivoted at 25 to a stud, $f^2$, on the brace 26 of the frame, and is drawn down by a spring, $c^2$, attached to the brace 27 of the frame. By this device the power of the supplementary spring $c^2$ is applied to both hammer-helves, and if the force of the spring *a* on one hammer tends to throw this hammer faster than the opposite one, the greater part of the force of the spring $c^2$ will be applied to the slowest hammer, and will thus equalize and adjust the blow as required.

If found necessary, the same device may be applied to the other pair of hammers. Where there is much difference in the strength of two of the springs *a*, it is desirable to throw more of the assistance of the supplementary spring $c^2$ on one hammer-helve than on the other one of the pair. For this purpose I have made the pivot 25 adjustable in a slot, $i^2$, in the stud $f^2$, as shown in Fig. 4, so that it can be moved toward either end of the slot by turning the set-screws $e^2$. This carries the lever $b^2$ and pivot 24 toward either side of the machine.

The notch *l* in the rod L is formed with a shoulder, 31, on one side higher than the other side of the notch. When the hand-lever N is released, this end of the rod L falls so far that the pin *g* clears the lower side of the notch, but not the other, so that, although the pin is out of the notch after the nail has been cut off, the shoulder 31 strikes it at the next swing of the rod L and carries it back against a stop, 32, where it is left until the lever N is again vibrated by the operator. This insures leaving the parts in the proper position with the cutter *n* up out of the way of the hammers and the nozzle *s* in the central line of the machine.

So far as I know or believe, I am the first to operate four hammers by a single cam revolving around the plane in which the nail-rod is fed into said hammers. The importance of a single cam in connection with two pairs or sets of hammers working at right angles to each other is obvious, because, however rapid the cam may revolve, there is and can be no difference in the beats of the two pairs of hammers, and any and all wearing of the cam or its shaft, or its bearings, acts equally upon both sets or pairs of hammers, and does not impair their alternate uniform action. When two or more cams or cam-shafts are used, this cannot be done, for uneven wearing alone will throw the hammers out of perfect beat or time. In my patent of the 17th August, 1858, I show this single cam for operating the four hammers, but placed in front of the pivots of the hammer-helves. I found in practice that placing the cam in that position, though it operated just as well on the hammers, yet it was subject to be covered by the scales jarred from the nail-rod, and besides the heat of the nail-rods and of the hammers dried or burned the oil on the cams, thus causing much friction and wear upon the rubbing parts. To avoid this and to protect the cams, I was obliged to reorganize my machine, and to place my cam where it would not be subjected to the scales or to the heat, both of which were detrimental to the free action of the cam and its co-operative parts, and by making the cam on the inside of the disk I and arranging it behind the pivots of the hammer-helves I accomplished the purpose aimed at, protecting it from the scales and from the heat of the nail-rods and hammers, and thus prevented wearing and friction.

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

1. In combination with a revolving cam for operating four hammers in pairs of two, the

arranging of said cam behind the pivots of the hammer-helves, for the purpose of protecting said cam and its co-operative parts from the scales and heat of the nail-rods and hammers, and thus protecting them from cutting, wearing, and undue friction by the drying or burning of the oil, substantially as described.

2. The method, substantially as herein described, of operating the cutter *n*—viz., by the lever M and slotted lever O.

3. The block T and its connections for stopping and holding the hammers, substantially as specified.

4. Regulating the throw of a pair of hammers by applying thereto the power of a supplementary spring, substantially in the manner set forth.

5. Operating the gage-lever V by the lever U, which forms part of the device for arresting the hammers.

SILAS S. PUTNAM.

Witnesses:
THOS. R. ROACH,
P. E. TESCHEMACHER.