

S. S. Putnam

Horse Shoe Nail Mach.

N^o 98,707

Patented Jan. 11, 1870.

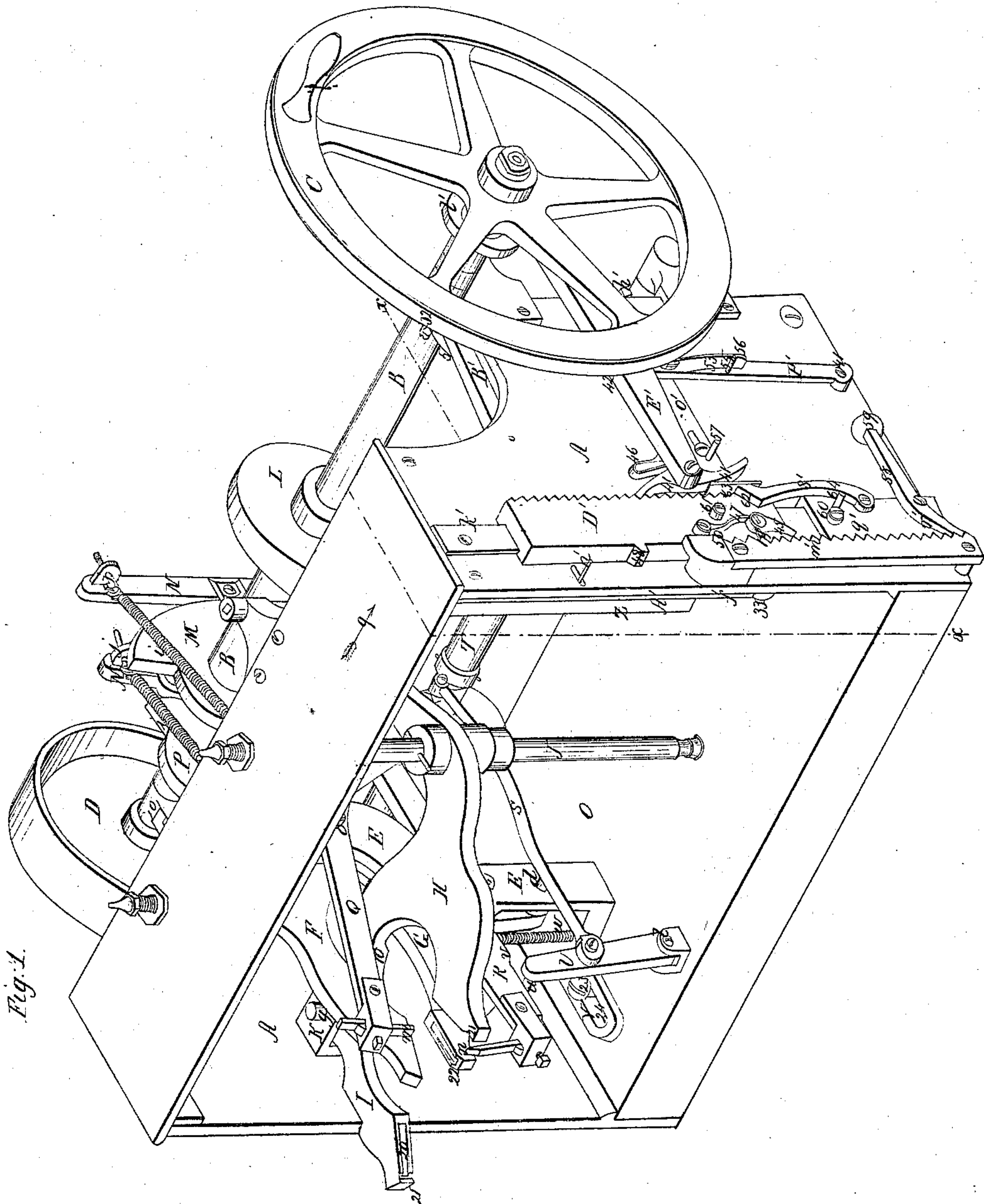


Fig. 1.

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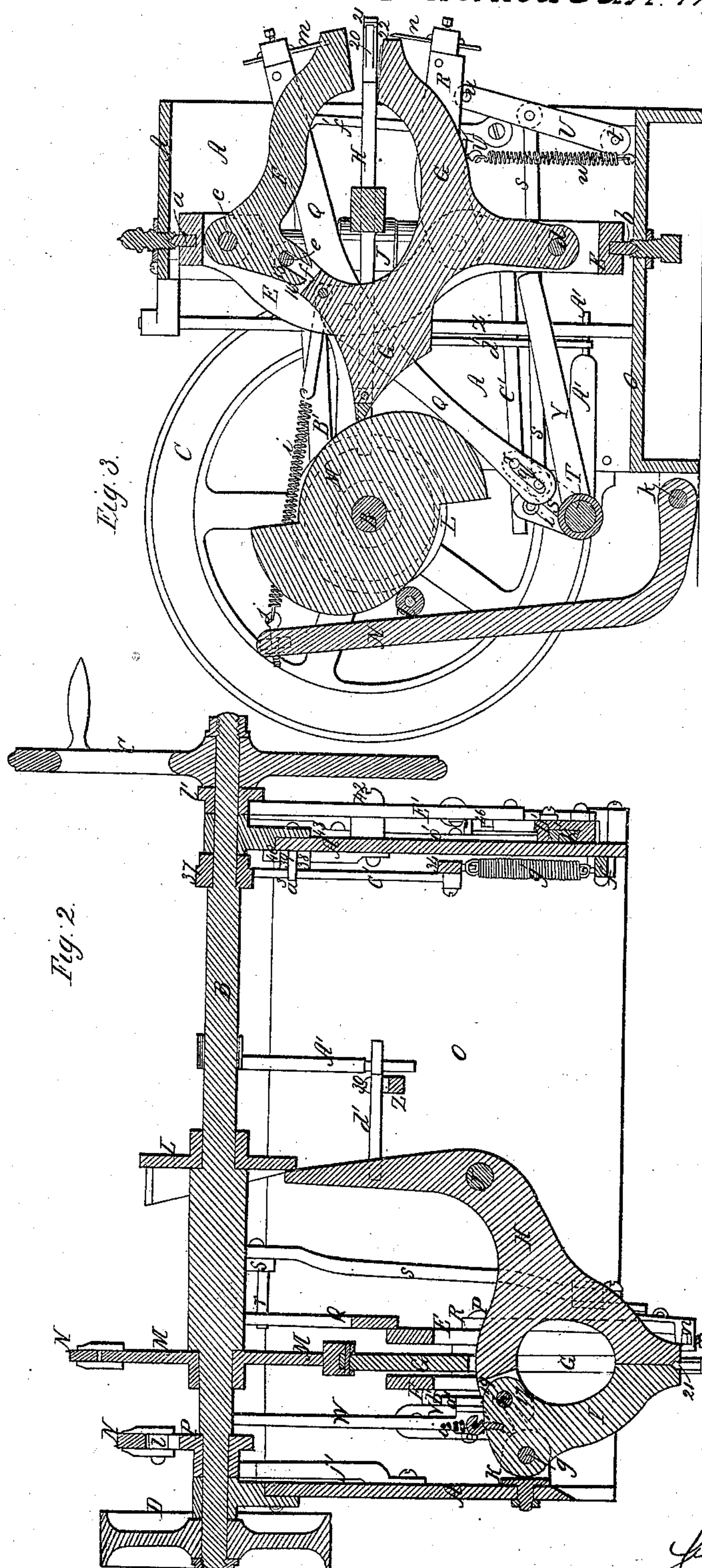
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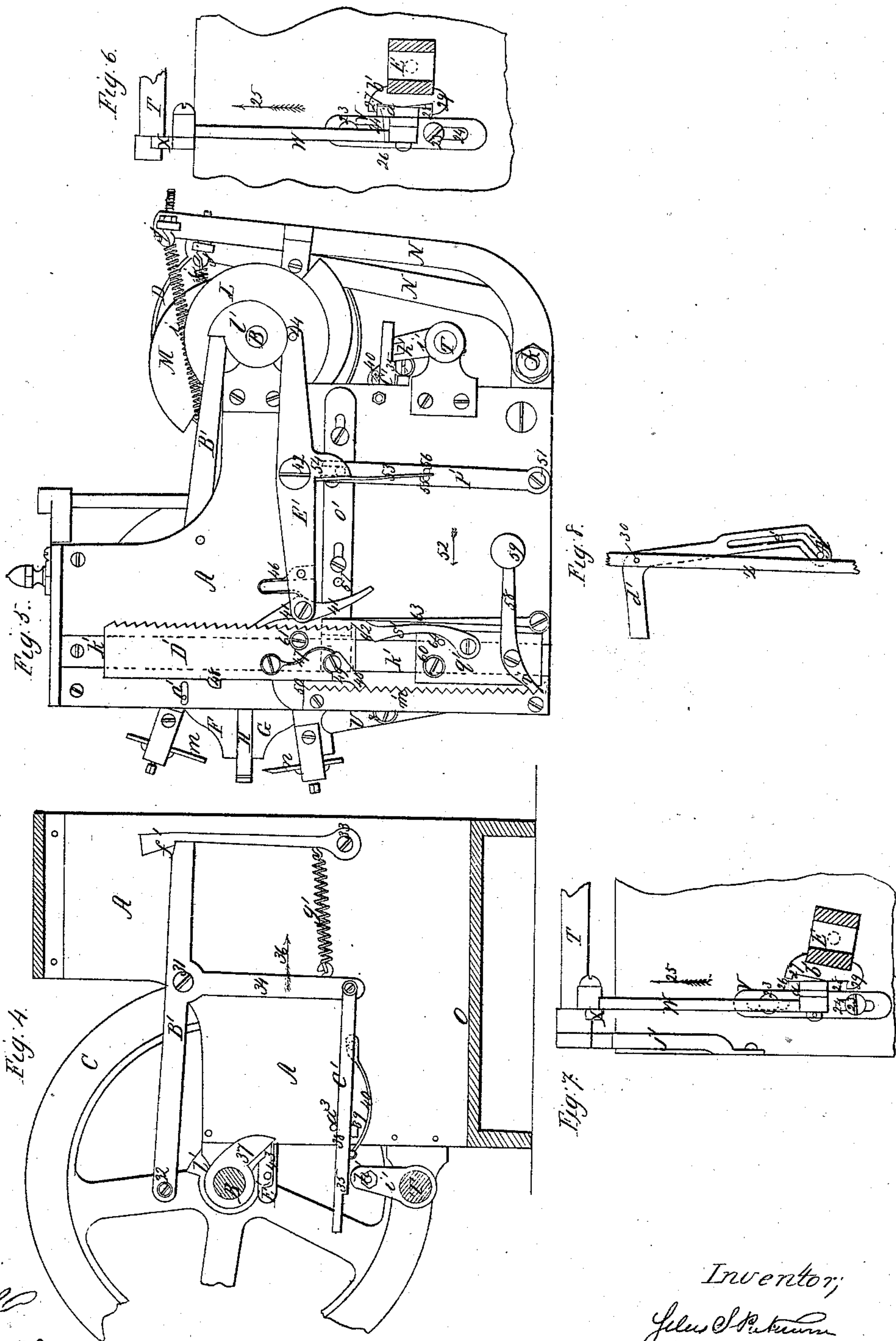
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UNITED STATES PATENT OFFICE

SILAS S. PUTNAM, OF DORCHESTER, MASSACHUSETTS.

IMPROVED MACHINE FOR FORGING NAILS FOR HORSESHOES.

Specification forming part of Letters Patent No. 98,707, dated January 11, 1870.

To all whom it may concern:

Be it known that I, SILAS S. PUTNAM, of Dorchester, in the county of Norfolk and State of Massachusetts, have invented certain Improvements in Machines for Making Horse-shoe-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 my improved machine. Fig. 2 is a horizontal section through the same in a plane passing through the side hammers. Fig. 3 is a section through the same in a plane passing through the vertical hammers, looking in the direction of the arrow 9, Fig. 1. Fig. 4 is a vertical section through the same on the line *xx* of Fig. 1, looking in the direction of the arrow 9. Fig. 5 is an elevation of one end of the machine, the fly-wheel being removed; Figs. 6, 7, and 8, details to be referred to.

My invention relates to that class of nail-machines in which the nail is formed by means of spring-hammers, and consists, first, in so arranging the hammers together in pairs that one hammer of a pair will operate the other and regulate its motions and throw, in order that both may strike the nail-rod at the same instant; and my invention also consists in vibrating one pair of the hammers (previous to cutting off the nail) to one side and away from the central position which they occupy when operating upon the nail-rod, for the purpose of allowing the cutters to be brought into the required position to do their work; and my invention also consists in so constructing the machine that the number of blows to which the nail is subjected while being formed may be varied and regulated as desired; and my invention furthermore consists in certain details, which will be fully described hereafter.

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 is the frame-work of the machine, in suitable bearings in which runs the driving-shaft B, which carries at one end the driving-pulley D, and at the opposite end the fly-wheel C.

E is a frame or head, of the form seen in Figs. 1 and 3, which is supported between the

bed and cap of the machine upon pivots *a b*, so that it may be vibrated to one side, for a purpose to be explained hereafter. Within this frame are pivoted, at *c d*, the vertical hammers F G, which are connected together by a pin, *e*, so that the hammer G will operate the hammer F and regulate its motions, which thus insures their both striking the nail-rod at the same time.

The portion 15 of the hammer F fits into the bifurcated portion 16 of the hammer G, and is provided with a slot, *f*, which receives the pin *e* and causes the hammers to work together.

H I are the side hammers, which are so formed and arranged that their connecting portions will work between the vertical hammers F G, one, H, being attached to a vertical shaft, J, while the other, I, is pivoted, at *g*, to an ear or projection, K, attached to the frame-work A; and these hammers are connected together so that they will have a motion similar to that of the hammers F G, above described, and strike the nail-rod at the same time by means of a pin, *h*, which passes through the flat portion 17 of the hammer I, and works in slots (one of which is seen dotted) in the bifurcated portion 19 of the hammer H.

By thus forming and arranging the hammers with the connecting parts of one pair between the other pair, as above described, I am enabled to operate each pair without interfering with the other.

The portion of the pin *e* which connects the hammers F G is flattened where it passes through the slot *f*, so that it will slide without turning therein, the flattening of the pin giving it a more extended bearing-surface, and thus reducing the wear at this point. The portions of the pin *h* which work in the slots of the hammer H are also flattened for the same purpose, the central round portion of the pin *h* forming a shoulder, which prevents it from falling through the lower slot in the portion 19 of the hammer H.

The hammers F G H I, which are arranged as above described, are operated alternately in pairs by cams L M on the driving-shaft B, each pair being thrown together when released by a spiral spring, *i*. One end of each of these springs is connected to one of the hammers of a pair, while its opposite end is

secured by an adjustable screw-connection, *j*, to the upper end of a lever, *N*, pivoted at *k* to the bed-plate *O*. These levers are drawn back, so as to put an additional tension upon the springs *i* just previous to the hammers being released by means of the cams *M P* on the shaft *B*, which strike against rolls *l*, the greatest tension on the springs being at the instant of their release. The durability of the springs is thus increased, as they are allowed to remain slack when not required for use.

In the face of each of the hammers *H I* is formed a groove, 20, of a form corresponding to one side of the shank of a finished nail, the head being formed in a groove, 21, which is made by cutting away the outer edges of the hammers, so as to leave a space corresponding to the width of the head of the nail.

The vertical hammers are made, the lower one, *G*, with a groove corresponding to the form of one side of the nail, and having its outer edge beveled, as at 22, and the upper one, *F*, with a perfectly smooth face, so as to give the required form to the sides of the nail on which they operate.

I will now proceed to describe the manner in which the finished nail is cut off after being operated upon by the hammers.

m n are the cutters, which are secured to levers *Q R*, pivoted to the frame *E* at *o p*.

The lever *Q*, which is bent at the rear, as seen in Fig. 3, is provided at its lower end with a slot, *q*, in which works a pin, *r*, projecting from an arm, *S*, which is keyed to a rock-shaft, *T*, having its bearings in the framework, and operated in a manner to be afterward described. To this arm *S* is pivoted a connecting-rod, *s*, the opposite end of which is pivoted to a lever, *U*, which is pivoted at *t* to the bed-plate *O*, and from the upper end of this lever projects a pin, *u*, which rests against the under side of the lever *R*, which has formed on it an incline, *v*, so that when the lever *U* is vibrated through the connections described the pin *u* will strike the incline *v* and raise the lever *R* and lower cutter *n*, against the resistance of a spring, *w*, while at the same time the lever *Q*, with its cutter *m*, is brought down by means of the pin *r* and slot *q*, before described.

Previous, however, to the cutters being brought into action, they are brought into line with the nail-rod, and the hammers *F G* at the same time vibrated to one side out of the way in a plane at right angles to that in which they operate, in the following manner: *V* is a slide, which is secured to the bed-plate *O* by screws 23, passing through slots 24, and operated by a connecting-rod, *W*, attached to an arm, *X*, Figs. 6 and 7, projecting from the shaft *T*. On one side of the slide *V* is a projection, *a'*, which fits into a notched piece, *b'*, secured to the lower end of the hammer-frame *E*, and thus, as the slide is moved by the arm *X* in the direction of the arrow 25, the end 26 of the projection *a'* bears against the shoulder 27 of the piece *b'*, vibrating the frame *E* on its

pivots *a b*, and carrying the hammers *F G* to one side and the cutters *m n* into line with the nail-rod, as required, the vibration of the frame *E* being arrested when the cutters have been brought into the required position by the end 26 of the projection *a'* passing off the shoulder 27, as seen in Fig. 7. As soon, however, as the finished nail has been severed from the rod by the cutters *m n* the slide *V* is carried forward in a direction contrary to the arrow 25 by the arm *X*, causing the end 28 of the projection *a'* to strike against the shoulder 29 of the piece *b'*, and return the frame *E*, with its hammers and cutters, back into its original position, as seen in Fig. 1.

The vertical hammers are arrested and held apart while the finished nail is being cut off and the rod fed forward for the next nail by means of an arm or stop, *Y*, Fig. 3, which is attached to the rock-shaft *T*, and vibrated by it at the required time into a position to intercept the hammer *G*, thus preventing the hammers *F G* from being thrown together by their spring *i* when the point of the cam *M* has passed out of contact with the rear end of the hammer *G*.

The side hammers are also arrested at the same time by means of a bent lever or stop, *d'*, Fig. 8, pivoted at 30 to a vertical post, *Z*. The longer arm of this lever *d'*, which is bent at its lower end, is provided with a slot, *e'*, in which works a lever, *A'*, attached to the rock-shaft *T*, and thus when the end of the lever *A'* is carried down by the shaft *T*, it enters the inclined portion of the slot *e'*, depressing the short arm of the lever *d'* into a position to intercept the rear end of the hammer *H*, as required.

I will now proceed to describe the manner in which the number of blows to which the nail is subjected previous to being cut off may be varied as desired.

B' is a T-shaped lever, pivoted at 31 to the frame-work *A*, and carrying at one end a friction-roll, 32, its opposite end catching under a latch, *f'*, which is pivoted at 33, and held up to the end of the lever *B'* by a spring, *g'*, which is attached to the vertical arm 34 of the lever *B'*, to the lower end of which is pivoted a rod, *C'*, provided at its outer extremity with a notch or shoulder, 35; and when the latch *f'* is tripped in a manner to be presently described, the lever *B'* is released and vibrated by means of the spring *g'*, carrying the arm 34 (in the direction of the arrow 36) into such a position as to cause the shoulder 35 of the arm *C'* to drop over a pin, *h'*, Fig. 5, projecting from an arm, *i'*, on the rock-shaft *T*, the roll 32 at the same time falling down onto a cam, 37, on the driving-shaft *B*; and thus as this cam revolves it raises the end of the lever *B'*, carrying the rod *C'* in a direction contrary to the arrow 36, thus vibrating the shaft *T*, which, through the connections described, vibrates the hammer-frame *E*, operates the stops for arresting the hammers, and brings the cutters into action to sever the nail. The rod *C'* is kept down

while moving in a direction contrary to the arrow 36, so as to prevent the shoulder 35 from slipping up off the pin h' by means of a flat projection, 38, which passes under a pin, 39, projecting from the frame A; and as soon as the shaft T has been rocked the distance required the projection 38 passes out from under the pin 39, when the rod C' is thrown up by a flat spring, 40, freeing the shoulder 35 from the pin h' , when the shaft T is carried back by a flat spring, j' , so as to return the mechanism with which it is connected to its original position, the end of the lever B' opposite to the roll 32 at the same time catching under the latch f' , by which it is held as required. A pin, a^3 , serves to prevent the arm C' from being thrown up too far by the spring 40.

The latch f' is tripped, when it is required to bring the above-described mechanism into action, in the following manner:

D' is a drop or slide, which moves vertically on a dovetailed guide, k' , secured to the frame A, and is raised by means of a pawl, 41, attached to the end of a lever, E', which is pivoted at 42 to the frame-work, and vibrated against the resistance of a spring, 43, Fig. 4, to raise the slide D' by means of a cam, l' , on the driving-shaft B, which bears against a pin, 44, Fig. 5, the slide D' being supported after it is raised by the retaining-pawl 45, which engages with the teeth of a vertical plate, m' , secured to the frame-work. 46 and 47 are springs which bear on the pawls 41 and 45, which are so formed that they may be held by their springs either in or out of contact with the teeth.

As the slide D' is raised a beveled projection, 48, on one side strikes against a pin, n' , projecting from the latch f' , thus tripping it, when, by means of the mechanism above described, the hammers are arrested and the finished nail cut off. As the slide D' is raised after the latch f' has been tripped by the projection 48, the square corner 49 of the pawl 45 strikes against a projection, 50, which throws it out of contact with the teeth of the plate m' , in which position it is held by the spring 47.

o' is a horizontal slide, which, when the rear end of the lever E' is depressed by the cam l' , bears against one side of the slide D', so as to produce sufficient friction to prevent it from being thrown up too far by the pawl 41. This slide o' is operated by a lever, p' , pivoted at 51 to the frame-work, and this lever is pressed either in the direction of the arrow 52, or in a direction contrary thereto, by a spring, 53, the upper end of which is secured to a projection, 54, on the lever E', while its lower end passes between two pins, 55 and 56, projecting from the lever p' , the position of the lever E' determining the direction in which pressure is applied to the slide o' . As soon as the slide D' is raised so that its lower end will clear the upper corner of the slide o' , (which takes place immediately after the latch f' has been tripped,) the latter is shot by the spring 53, before described, into a slot in the guide k' ,

(seen dotted in Fig. 5,) causing a pin, 57, projecting from it to strike the tail of the pawl 41, throwing it out of contact with the teeth of the slide D', in which position it is held by its spring 46. The point of the cam l' now passes off the pin 44, when the rear end of the lever E' is raised by the spring 43, causing the spring 53 to press against the pin 56 and withdraw the slide o' from the slot in the guide k' , when the slide D' will descend by its own gravity until arrested by striking an adjustable slide or stop, q' , which may be moved vertically on the guide k' . This slide is held at the desired height, for a purpose to be presently explained, by a pawl, r' , which engages with the teeth of the plate m' , and is furnished with an arm, 58, having a weight, 59, at its outer end, which serves to retain the pawl in contact with the teeth. On the descent of the slide D' the pawl 45 strikes a roll, 60, on the slide q' , which throws it again into contact with the toothed plate m' , and at the same time a roll, 61, on the slide D' strikes the inclined face 62 of a lever, s' , pivoted to the slide q' , forcing it against a lever, 63, pivoted to the frame-work, and causing the upper end of this lever 63 to strike the tail of the pawl 41 and throw it into contact with the teeth of the slide D'. The lever s' is prevented from being thrown out of its proper position by a pin, 64, projecting from the slide q' .

It will thus be seen that each revolution of the driving-shaft B, through the connections described, will cause the slide D' to be raised a distance equal to that between the teeth or notches on its side, until the projection 48 has tripped the latch f' ; when the slide will descend, as above described, the distance which it falls being regulated by the height of the slide q' ; and thus, when it is desired to submit the nail a less number of times to the action of the hammers, the slide q' is raised and held at the required point by the pawl r' , thus requiring a less number of revolutions of the shaft B to bring the projection 48 into contact with the pin n' to trip the latch f' ; and it will be seen that when it is desired to diminish or increase the number of blows, it is merely necessary to raise or lower the slide q' without stopping the machine.

This arrangement is of great utility, as it avoids the delay heretofore occasioned in stopping the machine for the purpose of removing gears or pulleys and substituting others of a different size, in order to vary the number of blows.

The nail-rod may be fed into the machine by hand, or by means of any suitable automatic feed, as may be preferred.

Claims.

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

1. The combination, in a machine for forging nails, of the laterally-vibrating pair of hammers with the laterally-vibrating pair of cutters, substantially as described.

2. The combination of the laterally-vibrating pair of hammers, for operating on two sides of the blank, with the pair of hammers for operating on the other two sides, and with the laterally-vibrating pair of cutters, substantially as described.

3. The combination of the laterally-vibrating pair of hammers, mechanism for arresting the blows of said hammers, and the laterally-vibrating pair of cutters, substantially as described.

4. The combination of the laterally-vibrating pair of hammers, for operating on two sides of the blank, with the pair of hammers for operating on the other two sides, mechanism for arresting the blows of the hammers, and the laterally-vibrating pair of cutters, substantially as described.

5. The combination of the laterally-vibrat-

ing pair of hammers, mechanism for varying the number of blows to be given, and the laterally-vibrating pair of cutters, substantially as described.

6. The combination of the laterally-vibrating pair of hammers, mechanism for arresting and for varying the number of blows, and the laterally-vibrating pair of cutters, substantially as described.

7. The combination of one or two pairs of hammers, the cutters, the mechanism for varying the number of the blows of the hammers, and the mechanism for arresting said blows, substantially as described.

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Witnesses:

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