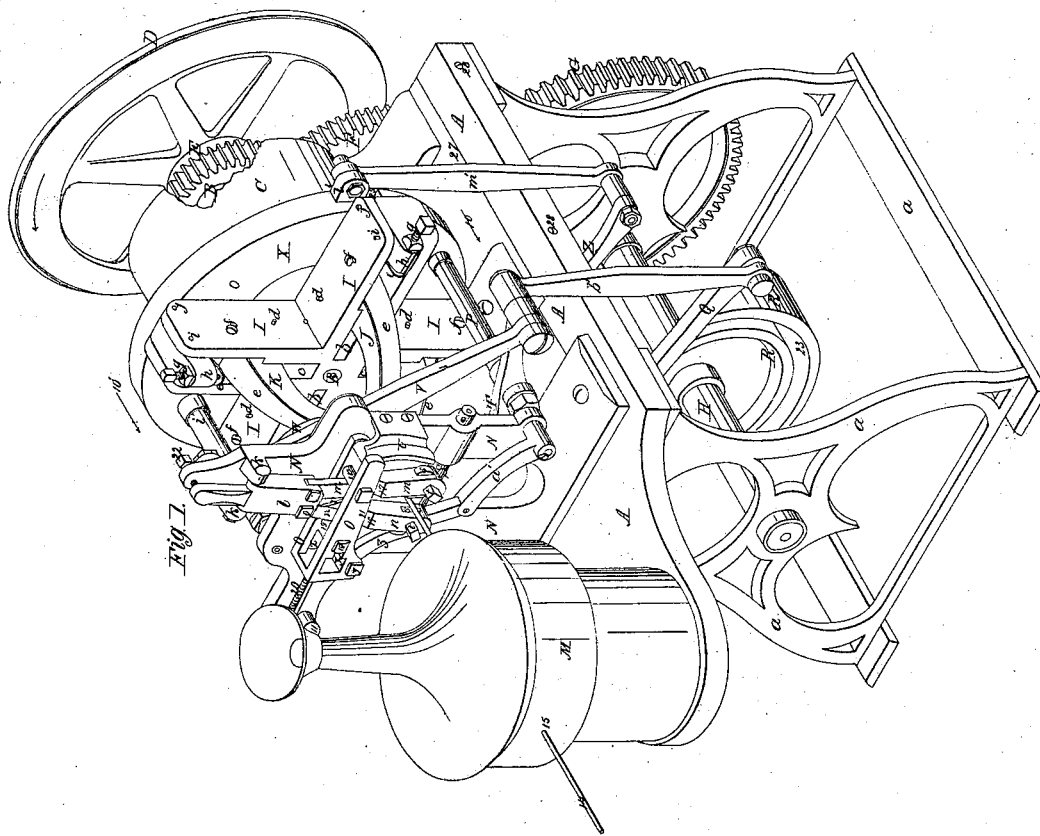
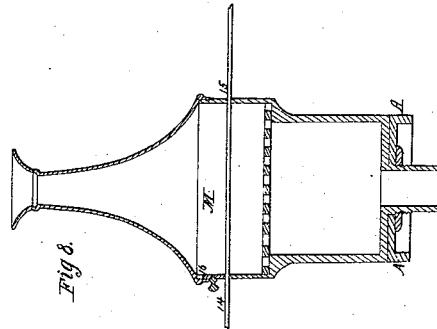
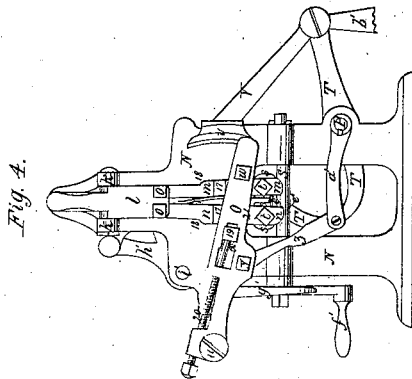


Putnam & Dwyer

Horseshoe-Nail Machine.

N^o 54, 256.

Patented Apr. 24, 1866.



Witnesses:

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Inventor:

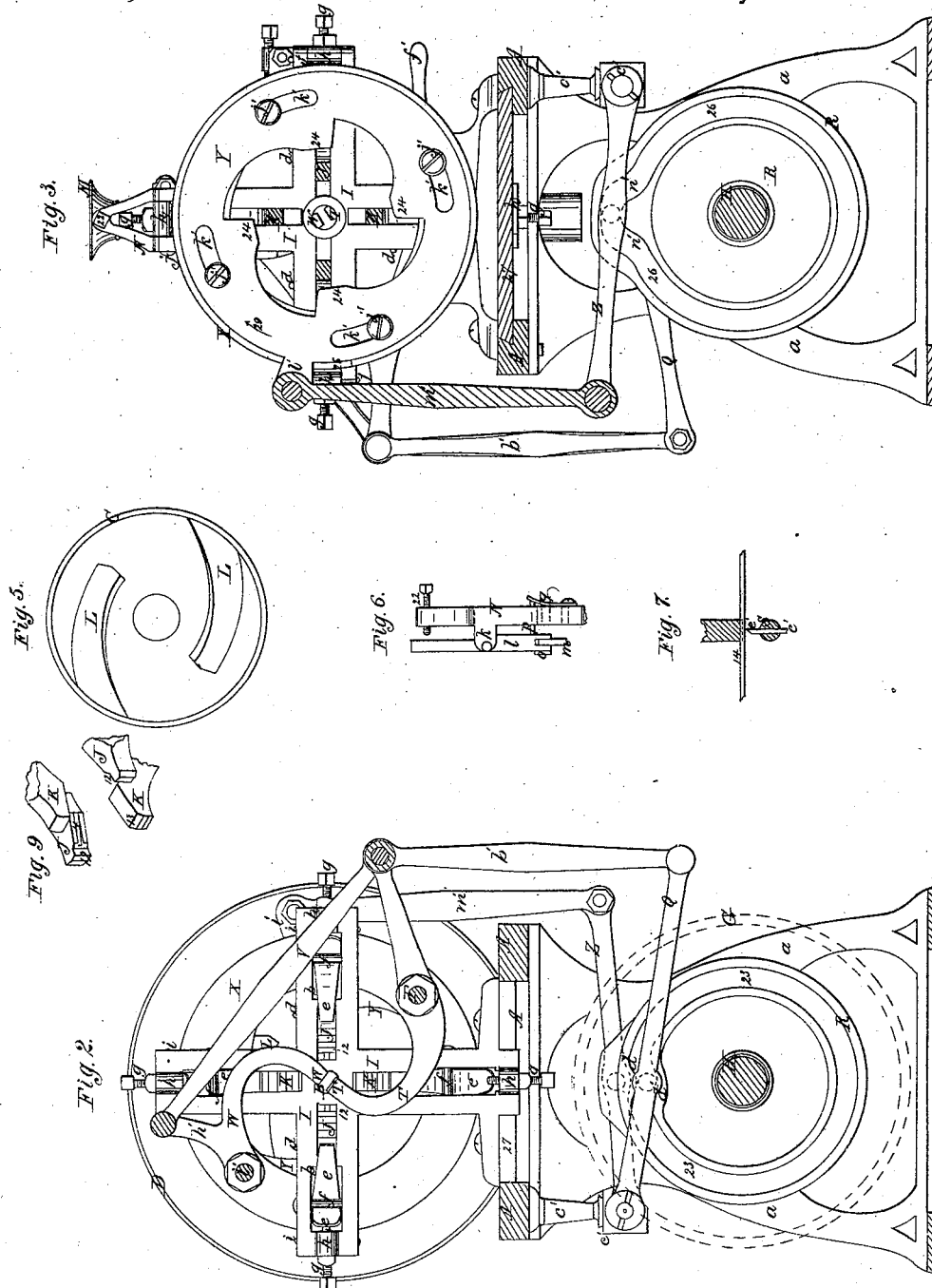
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Putnam & Dwelley.

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Witnesses:

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UNITED STATES PATENT OFFICE.

SILAS S. PUTNAM AND LUCIUS H. DWELLEY, OF DORCHESTER, MASSACHUSETTS, ASSIGNORS TO S. S. PUTNAM & CO., OF SAME PLACE.

IMPROVEMENT IN HORSESHOE-NAIL MACHINES.

Specification forming part of Letters Patent No. 54,256, dated April 24, 1866.

To all whom it may concern:

Be it known that we, SILAS S. PUTNAM and LUCIUS H. DWELLEY, of Dorchester, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Machines for Making Horseshoe and other Wrought 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 our improved machine. Fig. 2 is a transverse vertical section through the same, taken in a plane immediately in front of the cut-off, and looking toward the hammers. Fig. 3 is a transverse vertical section through the same, taken in a plane passing through the rear ends of the hammers, looking in the direction of the arrows 10, Fig. 1. Fig. 4 is an elevation of the feeding-nippers and standards to which they are attached. Fig. 5 is an elevation of one side of the cam-wheel which actuates the hammers; Figs. 6, 7, 8, and 9, details to be referred to hereinafter.

Our invention is particularly applicable to that class of nail-machines in which the nail is formed by means of spring-hammers arranged and operating in pairs; and it consists in an improved arrangement of nippers for feeding the rod into the machine; and our invention also consists in automatically arresting the hammers at a point behind that at which they are pivoted and retaining them apart while the nail is being cut off; and our invention furthermore consists in certain details, which will be more fully described hereinafter.

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

In the said drawings, A is the bed of the machine, which is supported on the framework *a*, a portion of the bed A being made to slide in dovetail grooves, as will be more particularly described hereinafter.

B is the driving-shaft, which runs in suitable bearings rising from the bed A, and carries the driving-pulley and cam-wheel C, the fly-wheel D, and pinion E, which latter engages with the intermediate wheel, F, which gears into the cog-wheel G on a horizontal shaft, H, having its bearings in the framework *a*.

From the middle of the bed A rises a frame, I, made in the form of a cross, the center of which forms a bearing for the inner end of the driving-shaft B, while through its opposite sides are cut four slots, two horizontal ones, *b*, and two vertical ones, *c*, in each of which is placed the helve of one of the hammers J or K, which vibrate on pivots *d* passing through the frame I. These hammers are arranged in pairs and are operated by cams L on the wheel C, Fig. 5, being thrown together, when released, by flat springs *e*, which bear upon the hammers near their outer ends, and are bent around the screw-pins *f*, their inner ends resting against screws *g*, by turning which the force with which the springs are made to bear upon the hammers, and the consequent force of their blows, may be adjusted with a great degree of nicety.

The screws *g* pass through blocks *h*, which are secured in place by pins *i j*, and on removing the pins *i* the blocks *h* can be swung out on the pins *j* as centers, giving free access to the springs *e* and facilitating their insertion and removal.

In the face of each of the hammers J is formed a groove, 11, Fig. 9, of a form corresponding to one side of the shank of a finished nail, the head being formed in a groove, 12, 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 K are made, the lower one with its outer edge beveled, as at 13, and the upper one with a perfectly smooth face, so as to give the required form to the sides of the nail on which they operate.

M is a furnace, in which the nail-rod 14 is heated previous to its being fed into the machine. This furnace is so fastened to the bed A that when required it can be turned horizontally on its axis, and is placed close to the feeding-nippers, so that the nail-rod will be delivered to the hammers before becoming cooled, an aperture, 15, being made in one side of the furnace and a sliding door, 16, in the other side, for the nail-rod to pass through.

The manner in which the nail-rod is fed into the machine will now be described.

N is a standard rising from the bed A to lugs *k*, projecting from which is pivoted the shank *l* of the nippers *m n*, which are pivoted to it at *o*, the shank with its nippers being

forced out from the standard N by a pin, *p*, and spring *g*, Fig. 6, and the nippers being kept apart by a flat spring, *r*, between them. Blocks *s* are fitted into slots at the lower ends of the nippers, and are made adjustable and secured in position by means of set-screws *t*, so as to insure the gripping of the nail-rod without moving it to one side or the other. Each of the nippers *m n* is formed with an incline, 17, on its front face, and one, 18, on its outer side, for a purpose which will be presently explained.

O is a frame which embraces the nippers, and is pivoted to the standard N at *u*, its opposite end being steadied by a guide-piece, *v*, secured to the standard N. *w* is a pin which passes through the frame O, and against which the nipper *m* is pressed by the spring *r*, while the opposite nipper, *n*, bears against a block, 19, which slides back and forth in slots *x* in the frame O, and is adjusted by the set-screw 20, by which means the nippers can be adjusted with reference to the size of the nail-rod being operated upon, and thus as the frame O is drawn down through connections to be presently explained the pin *w* and block 19 strike against the inclines 18 on the outer side of the nippers, closing them upon the nail-rod and gripping it firmly. The lower edge of the front plate, 21, of the frame O then strikes the inclines 17 on the front face of the nippers, causing them to be carried inward toward the standard N against the resistance of the spring *g*, and feeding the nail-rod into the machine as required. On the frame O being raised above the inclines 17 and 18 the nippers will be opened by the spring *r* and carried forward by the spring *g* and pin *p* to take a fresh hold on the nail-rod. The distance which the nippers are carried forward to take a new hold and the consequent amount that the rod is fed, into the machine at each depression of the frame O, is regulated by means of a set-screw, 22, which passes through the standard N and bears against the top of the shank *l* of the nippers, as seen in Fig. 1. The more the point of the screw 22 is withdrawn from the front face of the standard N the greater the forward throw of the nippers to take a new hold and the greater the length of rod drawn into the machine for the next nail, and vice versa.

Instead of both of the nippers *m n* being pivoted as at *o*, one only, if preferred, may be pivoted, and the other made in one piece with the shank.

To the frame O is pivoted at *y* a rod, *z*, which is jointed to an arm, *a'*, attached to a rock-shaft, P, from which projects an arm, to the outer end of which is pivoted the connecting-rod *b'*, the lower end of which is jointed to a lever, Q, which is pivoted to a hanger, *c'*, on the under side of the bed A, and carries a roll, (seen dotted in Fig. 2,) which works in a cam-groove, 23, in the wheel R on the shaft H. This groove is concentric with the periphery of the wheel R, with the exception of the portion *d'*, which is inclined toward the center, as

seen in Fig. 2, and thus as the inclined portion *d'* strikes the roll the lever Q is depressed and raised, raising and lowering the frame O through the connections explained and operating the nippers as described.

The nail-rod 14 is held stationary while the nail is being cut off and prevented from being drawn back by the feeding-nippers by means of a dog, *e'*, Fig. 7, on the shaft S, which has its bearings in the standard N, and is operated by a crank, *f'*, a spring, *g'*, bearing against the crank, so as to cause the dog to hold the rod firmly in a groove in the standard, the edge of the dog being so placed as to allow the rod to be fed forward, but not withdrawn except by raising the crank *f'* against the resistance of the spring *g'*.

I will now proceed to describe the manner in which the finished nail is cut off after being operated upon by the hammers, which, in the machine here shown, are so arranged and timed with respect to the cut-off as to give fifteen blows previous to the nail being detached from the rod.

T is a cutter, the shank of which is attached to the rock-shaft P, and is vibrated by the connecting-rod *b'*, which is pivoted to the lever Q and operated by the cam-wheel R, as before described.

To the outer extremity of the shank of the cutter T is pivoted a connecting-rod, V, the opposite end of which is pivoted to an arm, *h'*, projecting up from the shank of another cutter, W, Fig. 2, which is attached to a rock-shaft, *i'*, and works in connection with the cutter T, and thus as the lever Q is vibrated by the cam-wheel R the cutters T and W, through the connections explained, are brought together to sever the finished nail from the rod, passing in between the hammers, which are at that moment held apart, as seen in Fig. 2, by a device to be presently described, and cutting off the nail without moving the rod from its normal position.

The device by which the hammers are arrested and held apart while the finished nail is being cut off and the rod is being fed forward for the next nail will now be described.

X is a circular frame or ring, which is secured to the frame I, and is provided with a groove, in which is fitted a ring, Y, which is secured in place by means of screws *j'*, which pass through slots *k'* in the ring Y into the frame I.

The ring Y is furnished with projections, twenty-four on its inner edge, of the form shown in Fig. 3, which, when the ring is moved into the position shown in Fig. 3, extend into the path of the rear ends of the hammer-helves, locking them and retaining the hammers open until the ring Y is turned so as to withdraw the projections 24 out of the path of the hammer-helves, when they are again free to be thrown by the spring *e* after being released by the cams L on the wheel C.

l' is a projection on the ring Y, which passes through an opening, 25, in the flange of the

frame X, and is pivoted to a connecting-rod, *m'*, the lower end of which is pivoted to a lever, Z, which is pivoted to the hanger *c'*, and carries a roll, (seen dotted in Fig. 3,) which works in a cam-groove, 26, in the wheel R. This groove is concentric with the periphery of the wheel R with the exception of the portion *n'*, the form of which is such that the lever Z is raised and held in that position for a short time and then depressed to give the required motions to the ring Y to lock and retain the hammers open while the nail is being cut off and the nail-rod fed into the machine.

It will be seen that the hammers are arrested or locked automatically after a given number of blows at a point behind their pivots, and the frames I and X being interposed between the point where the nail is formed and the bearing-surfaces of the ring Y and cam-wheel C, they are effectually protected from the scale which flies from the nail-rod while being operated upon, which soon cuts and destroys any bearing-surfaces with which it comes in contact.

By changing the relative size of the gears by which motion is communicated from the driving-shaft B to the shaft H, which carries the cam-wheel R, the number of times that the nail is submitted to the action of the hammers before being cut off may be varied as desired, and the motions of the feeding-nippers are so timed with respect to the cut-off that the nippers will not commence to carry the rod forward until after the finished nail has been detached.

That portion 27 of the bed A which supports the hammer-frame I and bearings of the driving-shaft B is made to slide in dovetailed grooves, as seen in Fig. 3, and is secured in place by screws 28. It may, however, be moved back and forth by means of a rack and pinion, screws, or other suitable device, and the hammers and other moving parts attached to the sliding portion of the bed A may thus be readily reached for repairs, &c.

Operation: The hammers being open and locked, as seen in Fig. 2, and the nippers being open, as shown in Fig. 1, the end of the nail-rod 14 is passed through the aperture 15, Fig. 1, into the furnace M, where it is heated, and then passed through the sliding door 16, between the nippers *m n*, to the edge of the hammers, the furnace being secured to the bed A in such a manner, as before described, as to allow of its being turned horizontally on its axis by the operator to facilitate the withdrawal of the nail-rod in case it should become bent or obstructed in its passage through the furnace. The frame O is now carried down through the connections described, causing the pin *w* and block 19 to bear against the inclines 18 on the outer edges of the nippers and closing them firmly onto the rod. The lower edge of the front plate, 21, of the frame O now strikes the inclines 17 on the front faces of the nippers, carrying them with the nail-rod in toward the hammers against the resistance of

the spring *q*, the dog *e'* allowing the nail-rod to be fed in and holding it tightly in place. The lever Z is now depressed by the cam-wheel R, drawing down the rod *m'* and turning the ring Y, so as to withdraw the projections 24 from the path of the rear ends of the hammers, which are now free to be operated by the cams L and springs *e*. The end of the nail-rod is now operated upon by the hammers J K a sufficient number of times to form a finished nail, the hammers in the machine here represented being arranged to give fifteen blows previous to the finished nail being detached from the rod, which causes the nail to be very gradually drawn down to a point, preventing the grain of the iron from being injured and rendering the nail tough, as required. As soon as the portion *n'* of the groove 26 strikes the roll on the lever Z the rod *m'* is raised, turning the ring Y in the direction of the arrow 29 into the position seen in Fig. 3, and causing the projections 24 to lock the hammers, which are at that moment in the required position to allow of this being done. The portion *d'* of the groove 23 now strikes the roll on the lever Q, drawing down the rod *b'*, and, through the connections described, causing the cutters T W to pass in between the open hammers and sever the finished nail from the rod without moving it from its normal position, the connecting-rod *b'* at the same time rocking the shaft P, which, through the arm *a'* and connecting-rod *z*, raises the frame O, allowing the nippers to be forced apart by the spring *r* to release their gripe on the nail-rod. As the frame O continues to rise the lower edge of the front plate, 21, is lifted above the inclines 17, which permits the nippers to be thrown forward by the spring *q* and pin *p* to take a new hold until the top of the shank *l* strikes against the set-screw 22, by which the throw of the nippers and the consequent amount of stock fed into the machine for each nail is regulated as required. The cutters T W are now withdrawn, the frame O is carried down to close the nippers and feed the rod forward, and the ring Y is turned to unlock the hammers, when the operation continues as before.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The adjustable feeding-nippers *m n*, operated by a mechanism substantially as described, so as to carry the nail-rod into the machine, as set forth.

2. In combination with the above, the dog *e'* on the shaft S, operating substantially as set forth.

3. In machines for forging horseshoe and other wrought nails, cutting off the finished nail without moving the rod from its normal position by a mechanism substantially as described.

4. Arresting the hammers automatically after a certain number of blows and retaining them open while the nail is being cut off and the rod fed into the machine by mechanism substantially as described.

5. The blocks *h*, so hinged as to swing out on the pins *j* as centers, in combination with the set-screws *g* and springs *e*, substantially as set forth.

6. The furnace *M*, in combination with the feeding-nippers *m n* and hammers *J K*, operating substantially as set forth.

7. The cutters *T W*, in combination with the connecting-rods *b'* and *V*, the lever *Q*, and cam-wheel *R*, operating substantially as described.

8. The ring *Y*, in combination with the ham-

mers *J K*, frame *X*, connecting-rod *m'*, lever *Z*, and cam-wheel *R*, operating substantially as set forth.

9. Adjusting the nippers *m n* to the size of the rod being operated upon by means of the set-screw 20 and block 19, substantially as described.

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