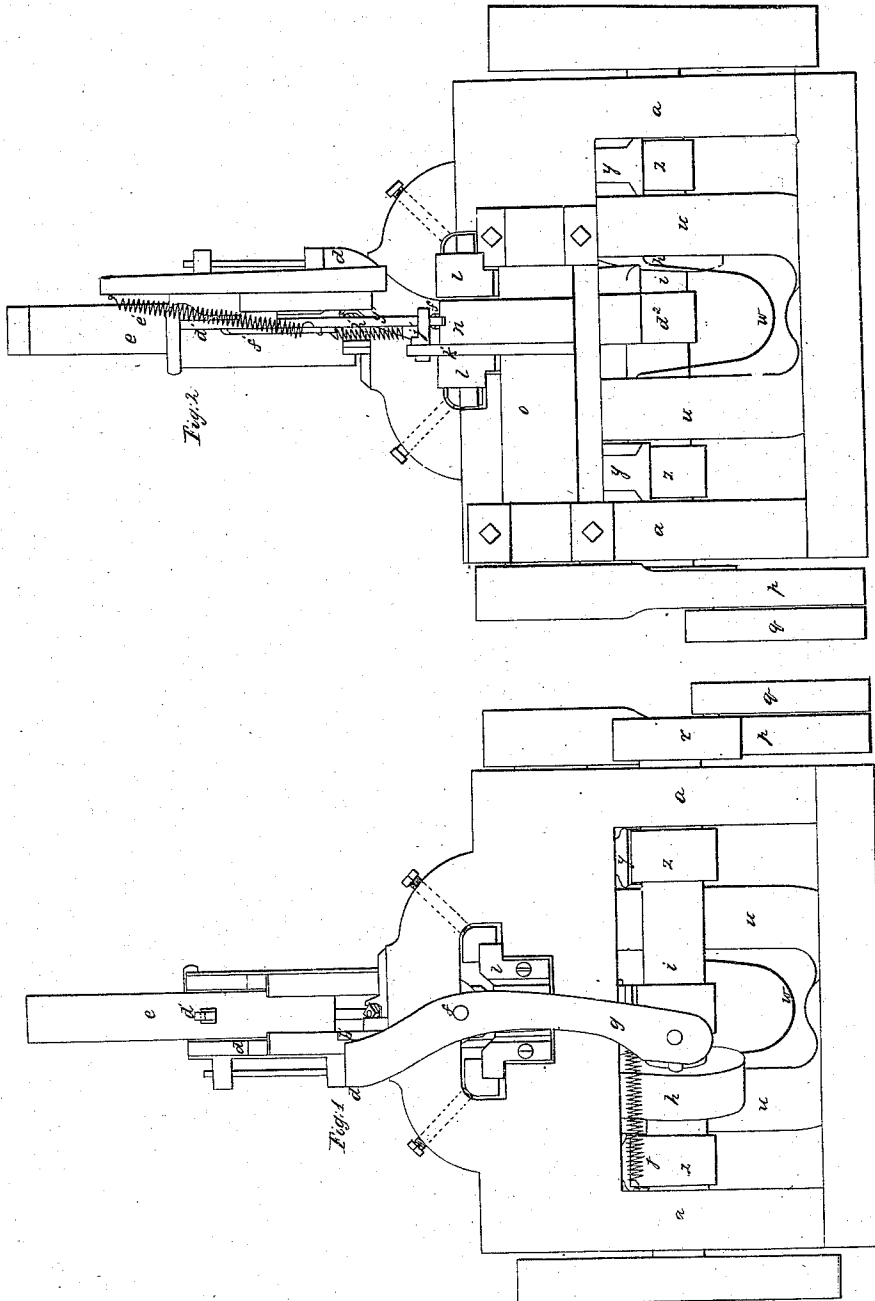


Sheet 1-3 Sheets.

*S. G. Reynolds,*  
*Making Wrought Nails,*  
*Patented Jan. 20, 1852.*

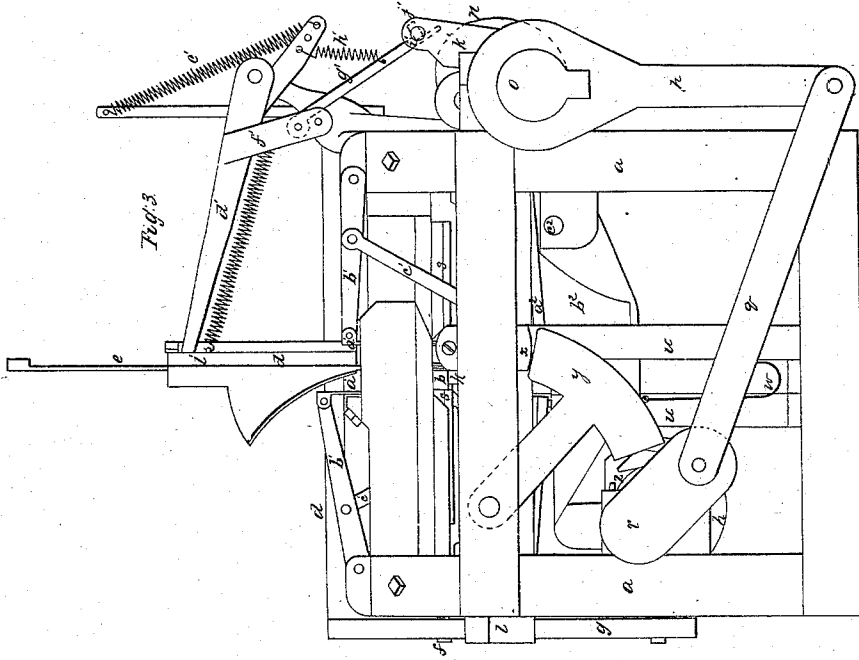
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Making Wrought Nails,  
Patented Jan. 20, 1852.*

*N<sup>o</sup> 8.677.*

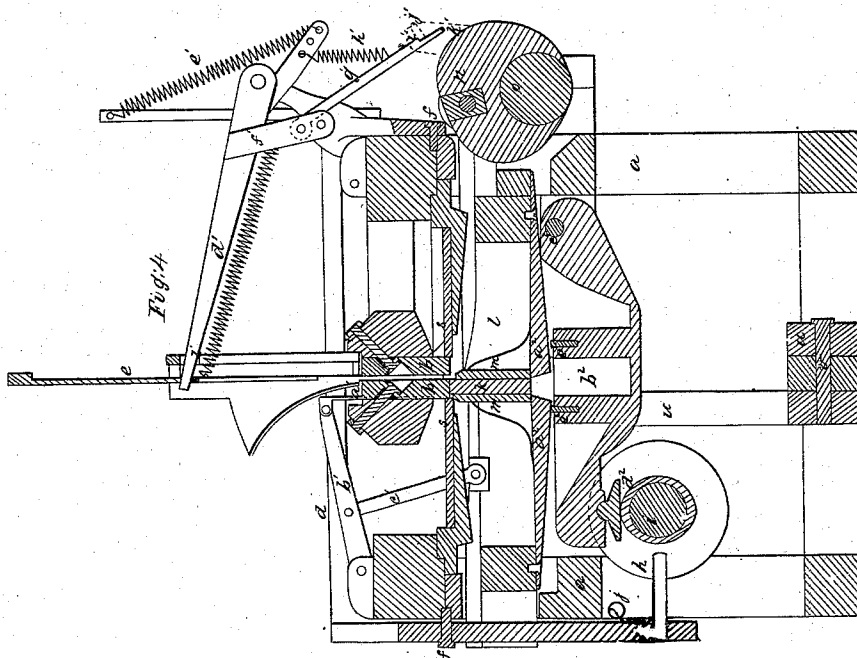
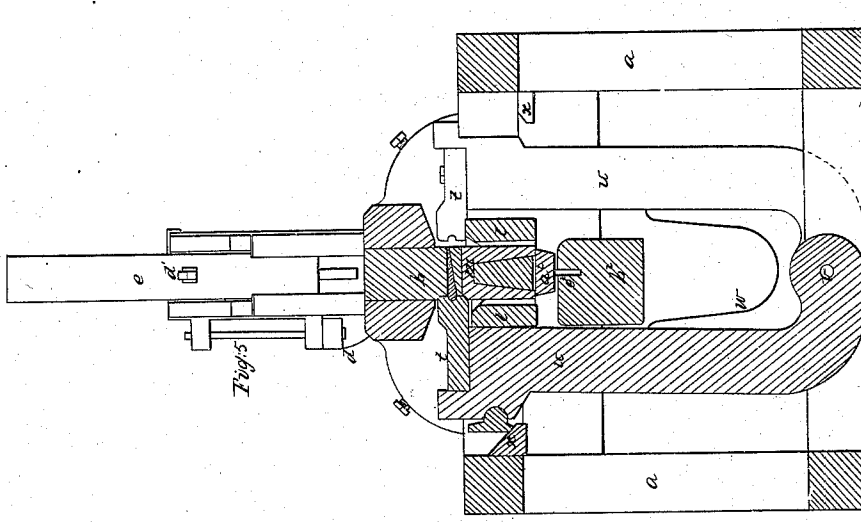


*S. G. Reynolds,*

*Making Wrought Nails,*

*Patented Jan. 20, 1852.*

N<sup>o</sup> 8.677-



# UNITED STATES PATENT OFFICE.

SAMUEL G. REYNOLDS, OF WORCESTER, MASSACHUSETTS.

## NAIL-MACHINE.

Specification of Letters Patent No. 8,677, dated January 20, 1852.

*To all whom it may concern:*

Be it known that I, SAMUEL G. REYNOLDS, of Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in the Method of Making Wrought-Iron Nails and in the Machinery Therefor, and that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a front, Fig. 2 a back, and Fig. 3 a side elevation, Fig. 4 a longitudinal section, and Fig. 5 a cross vertical section.

The same letters indicate like parts in all the figures.

The modes of procedure heretofore essayed for making wrought nails have been, first, to draw out the form of a nail from a rod and in the direction of the length thereof. Secondly, to cut the pieces from the breadth of a plate, the cuts being made all parallel and then rolling out these pieces on all four sides, and third, to cut by dies the required form for two faces from a plate so rolled as to give the form required to the other two faces. The first of these modes has never answered a practical purpose; the second is objectionable for the reason that the piece after it has been cut from the plate must be rolled on all four sides, which renders the operation too costly, if not objectionable on other grounds. And the third is objectionable for the reason that after the plate has been rolled of the required form for two faces to give the required form to the other two faces by cutting, requires two cuts producing the taper alternately from opposite sides, and so proportioned that the cross section taken at any part of the shank shall have the same, or nearly the same amount of metal after the cut, as when the nails are completed when this is combined with gripping or molding dies which receive the cut pieces from the cutters by some suitable conveying means, and which mold them by causing the metal to spread instead of elongating, and retain the same or nearly the same amount of metal in any and all parts of the length. In this way I am enabled to make wrought nails with economy, and of a good quality, having if desired the taper on all four faces and, if

necessary, as in the case of horse shoe nails, with a slight swell near the head.

In the said machine invented by me for making wrought nails according to my method, the rod or plate of heated metal is fed in through a space between two stationary cutters below which vibrate a double edged cutter by which a piece to form a nail is cut off at each motion, the rod or plate being vibrated after each cut so as to give the taper alternately on opposite sides. With each of the stationary cutters is combined a gripping die, and with the movable cutter are combined two dies, one on each side and inclined to the cutting edges in opposite directions, so that as the movable cutter moves in one direction a piece is cut off from the rod or plate, carried along and finally gripped on two faces, between one face of the movable cutter and one of those attached to one of the stationary cutters, and on the other two faces between the under face of the stationary cutter and one of the dies attached to the movable cutter and there compressed so as to give the required form to the shank. The head is then formed on the thick end by a punch the moment the gripping takes place. On the return motion of the movable cutter the nail is discharged and another nail is formed in the same way on the other side, the rod or plate of iron having been vibrated in the meantime to make the taper on the opposite side.

In the accompanying drawings *a* represents the frame adapted to the purpose, but which may be varied at pleasure, and *b, b*, two stationary cutters placed vertically and at such a distance apart in the frame as to admit of the free passage of the rod or plate or iron, from which the nails are to be cut, and similar to the rods or plates from which cut nails are made. Just above these cutters is arranged a vibrating frame *d*, formed with ways in which slides the rod which is forced downward by a spring follower *e*, to feed forward the rod as the nails are in succession cut from it. This frame is attached to two arms which turn on fulcrum pins at *f, f*. One of the said arms is extended below the fulcrum as at *g*, where it is acted upon by a cam *h*, on the cam shaft *i*, so that the said feeding frame is vibrated back and forth to give the taper in cutting off the nails alternately from opposite sides,

a spring  $j$ , being employed to keep the said arm against the cam. Below the stationary cutters there is a movable cutter  $k$ , attached to a carriage  $l$ , formed of two bars, adapted to slide in the frame.

On each side of the cutter  $k$ , is formed or secured a die  $m$ , whose upper face is laterally inclined to the edge of the stationary cutters and the two inclined in opposite directions. When the rod or plate of iron is forced down by the follower its lower edge comes in contact with and rests on the upper surface of one of the dies  $m$ , so that the space between the face of each die  $m$ , and the under face of the corresponding stationary cutter determines the form to be given to the two cut faces of the intended rail. The carriage  $l$ , is jointed at one end to an arm  $n$ , of a rock shaft  $o$ , which receives its rocking motion to vibrate the cutter by an arm  $p$ , on the end having a connecting rod  $q$ , which takes hold of a crank  $r$ , on the outer end of the cam shaft  $i$ . As the cutter moves in one direction it cuts off that portion of the rod or plate of iron below the cutting edge of one of the stationary cutters, and the piece thus cut off lies between the under face of the stationary cutter and the upper face of one of the dies  $m$ , and by the continued motion of the cutter it is carried along until it is gripped between the face of the movable cutter and one of two stationary gripping dies  $s$ ,  $s$ , the other die  $s$ , being on the other side, arranged in the same manner and in the same form, but reversed. At the end of the motion of the cutter the space between its face and the die is such that the nail is squeezed into the shape required. Simultaneously with the gripping of the nail between one face of the movable cutter and one of the dies  $s$ , it is gripped on the other two faces in the following manner. The under face of the carriage  $l$ , is formed of two inclined planes  $a^2$ ,  $a^2$ , reversed, and below there is a lever  $b^2$ , that turns at one end on a fulcrum pin  $c^2$ , the other end resting on a cam  $d^2$ , on the cam shaft  $i$ . The upper part of this lever is provided with two projecting pieces  $e^2$ ,  $e^2$ , so that when the carriage is moved in one direction to cut one nail, the prominent part of one of its inclined planes is brought just over one of the projecting pieces  $e^2$ , of the lever so that the cam shall elevate it to grip the two cut faces of the nail. On the return motion of the carriage another nail is cut with the taper in the reversed direction, and then the other inclined plane of the carriage is acted upon by the lever  $b^2$  and the same operations are performed in like manner. So soon as the nail has been gripped and thereby tapered, the head is formed on the large end by means of a header  $t$ , attached to the upper end of a lever  $u$ , that turns on a fulcrum pin at  $v$ .

It is pushed outward by a spring  $w$ , and pushed inward to strike up the head by a wedge piece  $x$ , forced up by a lever  $y$ , acted upon at the proper time by a cam  $z$ , on the cam shaft  $i$ . As soon as the cam has passed, the header is pushed back by the spring, the nail is liberated by the back motion of the carriage and discharged by a punch  $a'$  joined to an arm  $b'$  which receives the required motion from the carriage of the movable cutter by a joint link  $c'$ . As there is a similar arrangement of dies, header and discharge punch with their connections, and both sets are alike, it is deemed unnecessary to describe both sets, as they are both represented and indicated by duplicate letters. When the cutter moves back it will be seen that the operations above described are repeated, to cut, form, and head another nail, and so on from side to side, at each time the rod or plate of heated iron being fed to the required distance and vibrated to give the taper alternately on opposite sides.

The follower which feeds the rod or plate of iron is operated by a lever  $d'$ , which by a spring  $e'$ , causes the said follower to make pressure on the rod to insure its descent. To the arm  $f'$  of this lever is jointed another lever  $g'$  kept out to the extent of its motion by a spring  $h'$ . The outer end of this lever has a lip  $i'$  which, when the lever is carried out to the full extent of its motion, is caught by a spur  $j'$ , on an arm  $k'$  of the rock shaft that operates the carriage of the movable cutter, so that as this spur vibrates it lifts up the lever  $d'$ , and with it the follower until it is locked by a spring catch  $l'$ , and there held until the attendant has introduced another heated rod or plate. The attendant then liberates the spring catch and the feed motion proceeds.

The rods or plates from which the nails are to be made should not be too long, as it is important that the heat should be retained until each rod or plate is cut up.

Having thus described my improved method or process of making wrought nails and the machinery for the same as I have essayed it, I wish it to be distinctly understood that it is susceptible of modifications, as far instance, instead of making an active pressure on all four faces of the blank, to give the required form, the same thing may be accomplished, although not so well, by making active pressure on two faces and simply presenting resistance to the other two faces.

What I claim as my invention and desire to secure by Letters Patent in the making of wrought nails is—

1. The employment of the cutters for cutting wedge formed pieces from a previously rolled plate of equal or nearly equal thickness, substantially as described, preparatory to, and in combination with the molding dies which receive the cut pieces by suitable con-

veying apparatus from the cutters and mold them to the required form by pressure, substantially as specified, so as to give the form by spreading the metal between the dies instead of by elongation as heretofore practiced when making nails from cut blanks.

2. I also claim the vibrating cutter and the faces or dies for confining and compressing the nails arranged on both sides of

the said cutter, substantially as described, 10 when this is combined with the two stationary cutters, having a space between the two through which the rod or plate of iron is fed, substantially as described.

S. G. REYNOLDS.

Witnesses:

ALEX. PORTER BROWNE,

WM. TALLMAN.