J. ROY.

Machines for Forging Nails.

No. 169,045. Patented Oct. 19, 1875.

Fig. 1.

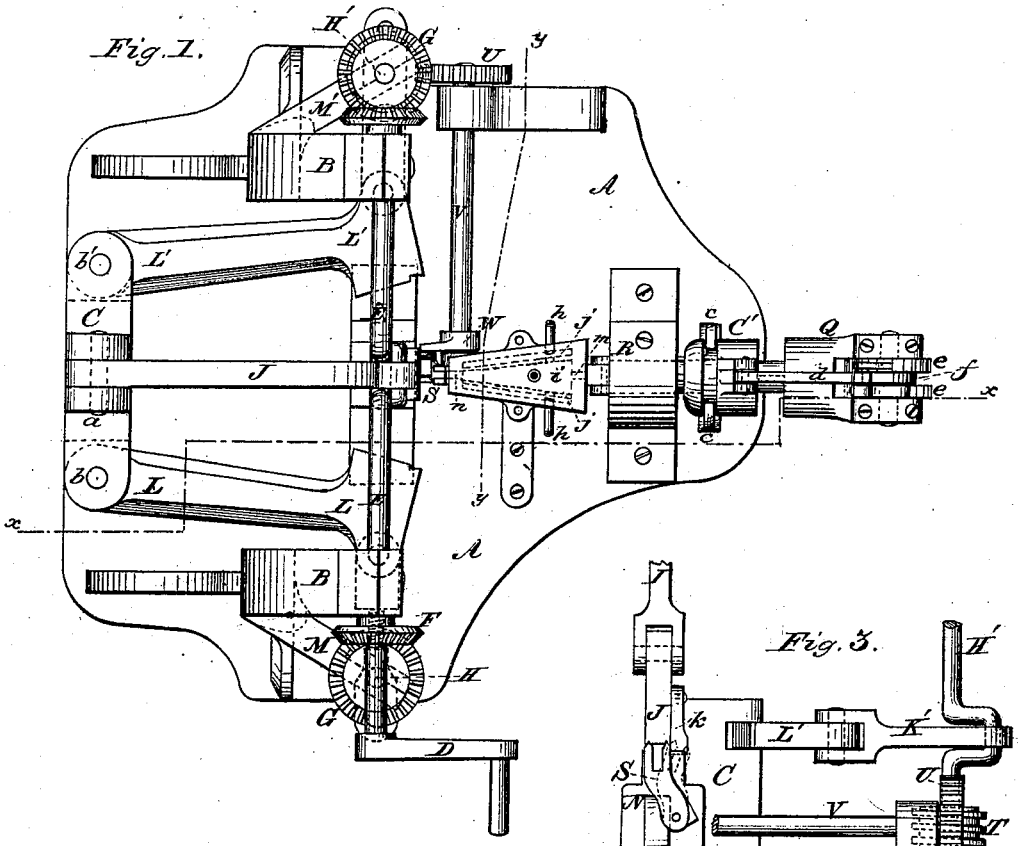


Fig. 3.

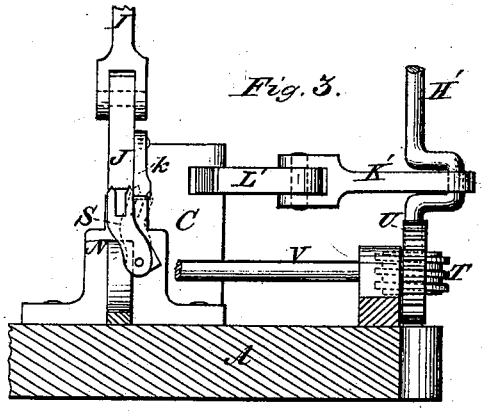
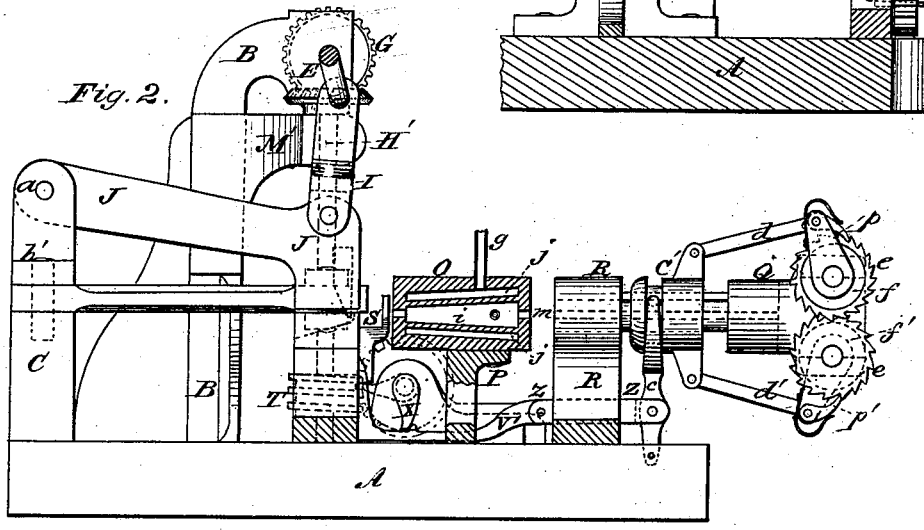


Fig. 2.



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UNITED STATES PATENT OFFICE.

JOSEPH ROY, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN MACHINES FOR FORGING NAILS.

Specification forming part of Letters Patent No. **169,045**, dated October 19, 1875; application filed April 20, 1875.

To all whom it may concern:

Be it known that I, JOSEPH ROY, of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Nail-Machines; and I do hereby declare the following to be a full and correct description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a top view or plan of the machine. Fig. 2 is a vertical section on line *x x* of Fig. 1. Fig. 3 is a detail elevation, partly in section, on line *y y* of Fig. 1.

The same letter of reference indicates the same part wherever it occurs in the drawings.

The nature of my invention consists in the peculiar construction of a nail-machine, in which the nail-rod is fed through a gas-furnace to an anvil, and subjected to the action of a number of die-faced hammers, which give it the proper form, and is then shifted laterally under a cutter attached to the side of the vertical hammer, which severs the completed nail from the rod, all in the manner hereinafter more particularly described.

In the accompanying drawings, A marks the bed-plate of the machine, from which rise the uprights B, B′, and C, which support the principal operative parts. The winch D indicates the point of application of the driving-power at the end of the main crank-shaft E. On the ends of shaft E are the bevel-gears F F′, which mesh, respectively, into similar gears G G′ on the ends of the upright crank-shafts H H′. In the middle of shaft E is a crank, connected by pitman I with the head of hammer J, which plays vertically on pivot *a*, by which it is attached to the standard C. The side shafts H H′ are supported in brackets M M′, and have cranks, which are connected, by means of links K K′, with the heads of the horizontally-operating hammers L L′. These hammers are hinged, respectively, at *b b′* to the standard C. The pitmen I K K′ I prefer to make adjustable in length, so as to compensate for wear of the faces of the hammers, and thus secure uniformity of work. N is the anvil upon which the nails are forced. It is provided with a lateral projection or lip, which co-operates with a cutter in severing the finished nail from the rod, as hereinafter described. O marks a gas-furnace of peculiar construction, through which the nail-rod passes to be heated to the proper temperature for forging before reaching the anvil on which the work is done. This furnace is seen in plan in Fig. 1, and in vertical central section in Fig. 2. It is supported by the bracket P, and provided with a middle chamber, *i*, surrounded by an outer chamber or air-jacket, *j*, as clearly shown in the drawing. The inflammable gas, whose combustion produces the heat by which the nail-rod is raised to the required temperature, is introduced by two lateral gas-pipes, *h h*, into the outer chamber *j*, opposite to openings leading from said chamber into the inner chamber *i*, as shown in Fig. 1. Atmospheric air is introduced into the jacket *j* through pipe *g*, entering at the top of the furnace. By its circulation in the outer chamber it prevents the inner shell from reaching a melting heat, and keeps the temperature of the outer shell below red heat. It also mingles with the burning gas flowing through the inner chamber and supports its combustion. The flame of the burning gas issues from the orifice *n* of the furnace, and envelops the nail-rod while upon the anvil, thus preventing almost entirely the loss from scale produced by oxidation, and greatly increasing the percentage of nails which can be made from a given weight of iron. Q marks the rod-guide and feeding device. It is supported at its inner end by the standard R, and carries on its outer end the feeding-rollers *f f*, and the pawls and ratchets by which they are operated. This guide has a bore from end to end, through which the nail-rod is fed to the furnace and anvil by the rotation of the rollers *f f*. These rollers have attached to them, respectively, the ratchet-wheels *e e*, and on the axis of each roller is an arm, *q*, to the outer end of which is pivoted a spring-pawl, *p*, which engages with the teeth of one of the ratchet-wheels *e*. The ends of the arms *q* are pivoted to rods *d d′*, which, at their opposite ends, are pivoted to lugs on the sliding collar C′, which reciprocates on a spline or feather on the top of the rod-guide. The reciprocating movement of this collar, produced as hereinafter described, operates the ratchet-wheels *e e* and the feed-rollers *f f*, attached to their inner faces. The peripheries of the rollers *f f* are

far enough apart to receive and grasp the nail-rod and feed a uniform length of it to the furnace at each throw of the ratchet. The roller-journals should rest on springs of suitable tension to compensate for inequalities in the size of the nail-rod. On the lower part of crank-shaft H′ is fixed a worm-wheel, T, (see Figs. 2 and 3,) which engages with the teeth of pinion U on shaft V. To the inner end of shaft V is attached a cam, X, which, at the proper intervals, imparts reciprocating motion to rod V′, which is pivoted to the sliding rod Z. Rod Z passes through standard R, and is pivoted at its outer end to the vibrating forked lever *c*, the forked end of which embraces and engages with the sliding collar C′. The lower end of lever *c* is pivoted to the bed-plate. It results from this construction that at each rotation of shaft V the nail-rod is fed in a distance equal to or dependent upon the length of the teeth of the ratchets *e e*. In front of the inner opening *n* of the furnace O is placed a shifting-lever, S, through the fork of which the nail-rod passes before reaching the anvil N. This shifter is operated by a cam, W, on shaft V, so timed as to give it the position shown by dotted lines in Fig. 3 at the instant that the forging of each nail is completed. When in this position the rod is removed from the face of the anvil, and is brought under the cutter *k*, attached to the side of the hammer J, and rests upon the lateral projection or lip of the anvil, so that when the hammer J descends the cutter severs the finished nail from the end of the rod. The succeeding blow of side hammer L′ carries the rod back onto the face of the anvil, ready for the forging of another nail.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The feeding device, consisting of the combination of the worm T, pinion U, shaft V, cam X, rod V′, slide Z, lever *c*, collar C′, arms *d d′*, pawls *p p′*, ratchets *e e*, feed-rollers *f f*, and guide Q, all constructed and operating substantially in the manner described.

2. The combination and arrangement of the main crank-shaft E, gears F F′ G G′, crank-shafts H H′, pitmen I K K′, and hammers J L L′, hung to standard C′, all constructed and operating substantially in the manner and for the purpose specified.

3. The nail-severing device, consisting of the combination of the cutter *k*, attached to the side of the hammer J, and a lip placed below it and projecting from the side of the anvil, as and for the purpose stated.

4. The gas-furnace O, constructed and located as described, having the end openings *m n*, and provided with inner chamber *i*, air-jacket *j*, gas-pipes *h h*, and air-tube *g*, all as and for the purposes set forth.

The above specification of my said invention signed and witnessed, at Washington, this 17th day of April, A. D. 1875.

JOSEPH ROY.

Witnesses:
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