

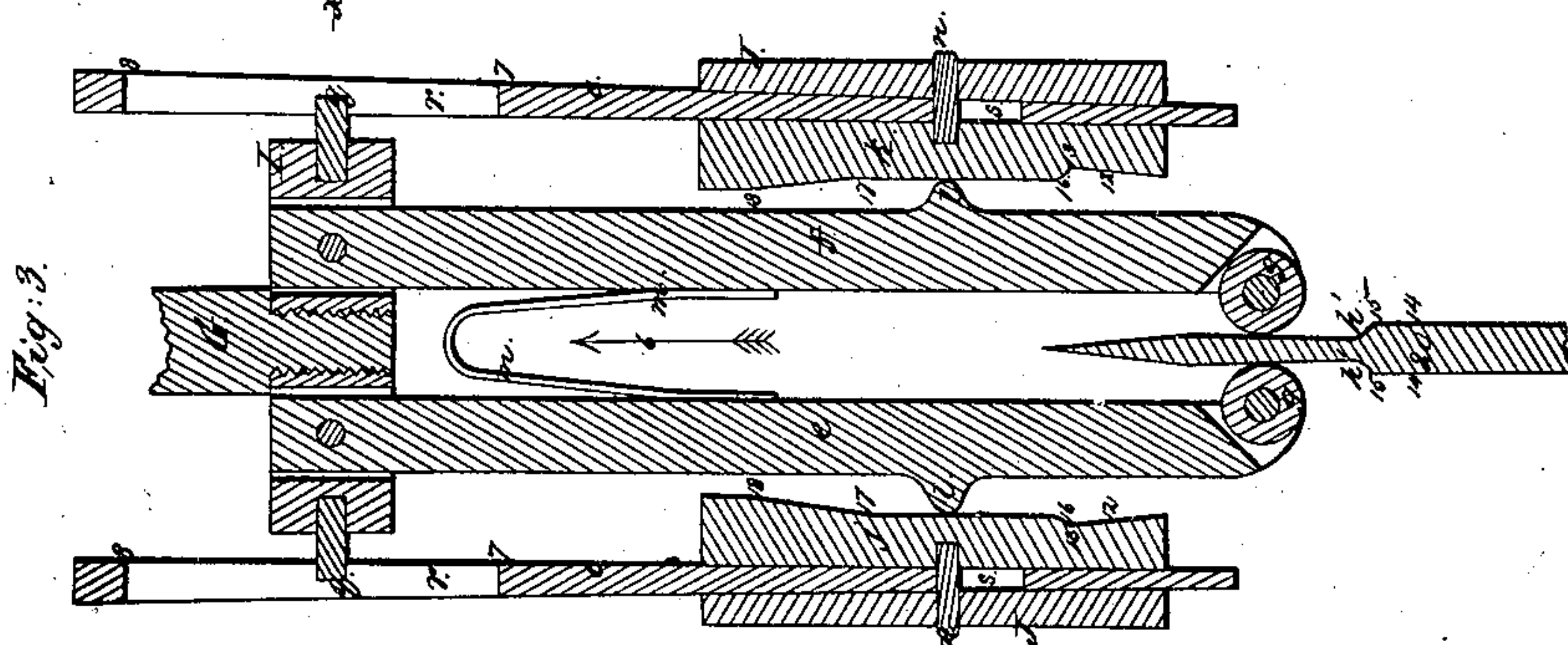
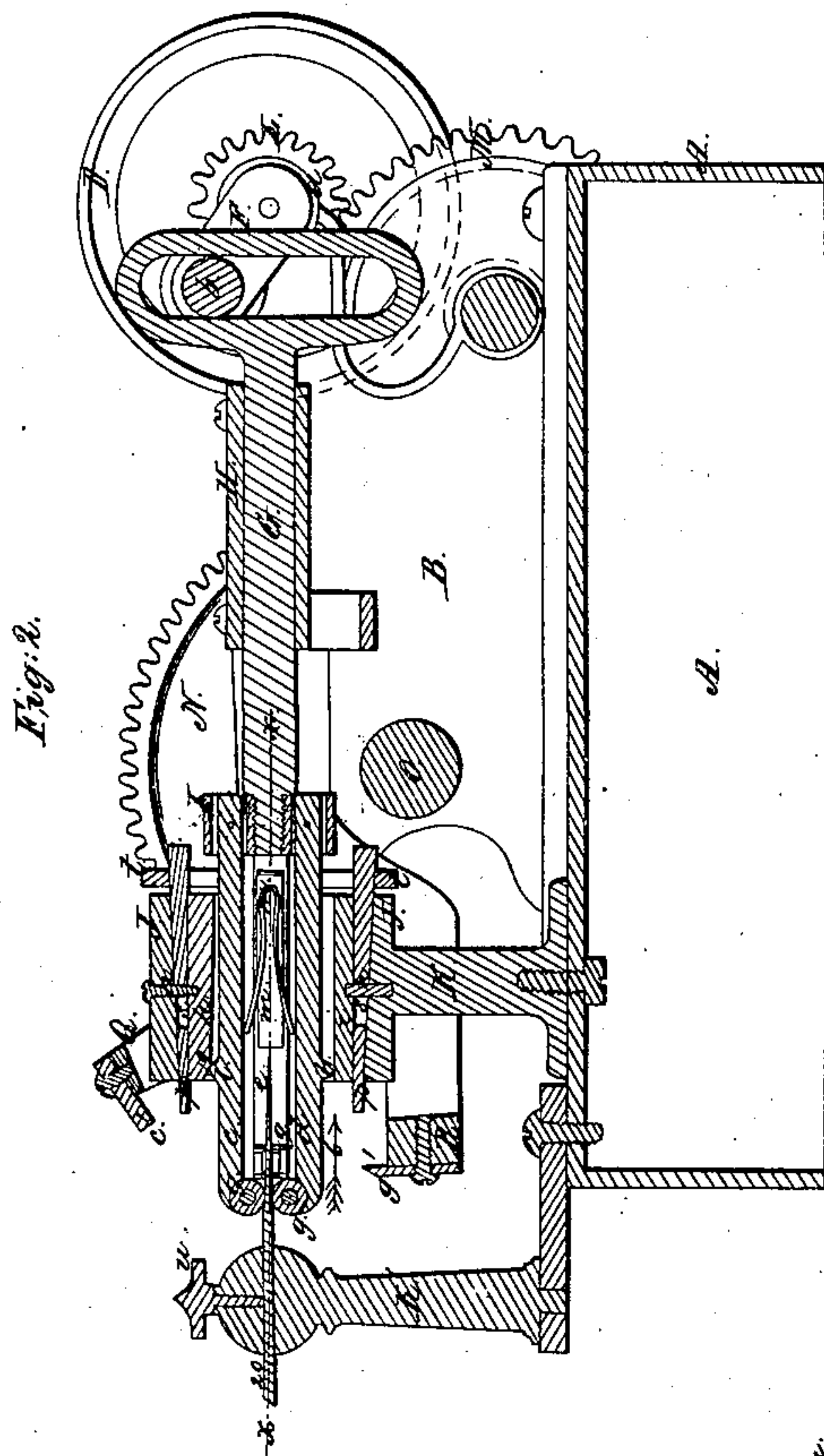
Sheet 2, 2 Sheets.

Putnam & Dwelley

Horseshoe-Nail Machine.

N^o 47,070.

Patented Mar. 28, 1865.



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MACHINE FOR MAKING NAILS FOR HORSESHOES.

Specification forming part of Letters Patent No. 47,070, dated March 28, 1865.

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 an Improved Machine for Making Horseshoe-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 longitudinal vertical section through the center of the same. Fig. 3 is a horizontal section through a portion of the machine, taken in the direction indicated by the line *xx*, Fig. 2. Fig. 4 is an elevation of one side of the jaws for cutting off the nail. Fig. 5 is a view of a horseshoe-nail.

Our invention relates to that class of machines in which the nail is made directly from the rod; and it consists in forming the nail by means of levers or jaws arranged in pairs at right angles to each other, the motion of these levers as they operate on the nail-rod being regulated by a pattern or "former" placed behind each lever, having a contour corresponding to one side of a finished nail, a suitable "cut-off" being provided to detach the finished nail from the rod.

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 a bed of the machine, which supports the frame-work B in suitable bearings, *a*, in which runs the shaft C. This shaft carries at one extremity the driving-pulley D, and at the opposite end the fly-wheel E. F is a crank on the driving-shaft C, the crank-pin *b* of which works in a vertical slot in the enlarged end of a bar, G, which slides back and forth in a suitable box, H, attached to the frame-work. To the opposite end of this bar G is attached the cross-head I, to which are pivoted the ends of four levers or jaws, *c d e f*, which slide back and forth in a suitable frame or box, J, supported on a post, K, rising from the bed A. These levers, which are of the form shown in Figs. 2 and 3, are arranged in pairs, and operate in planes at right angles to each other, being

provided at their outer ends with friction-rolls *g*, by which the nail is drawn down to the required form, as will be more particularly explained hereinafter. The ends of one pair of these levers, *c d*, extend a little beyond the ends of the other pair, *e f*, so as to allow the curved ends of the latter to project in between them, as seen in Figs. 1 and 2, and give them a "lead" in operating on the nail-rod 20. This lead causes the rolls *g* of the side levers to operate on the nail in advance of those of the levers *e f*, thus flattening and drawing it first in one direction and then in the other at each operation, in a similar manner to that in which an ordinary nail is drawn down by hand by hammering it alternately on opposite sides. The distance that these levers traverse longitudinally in either direction is greater than the length of the nail to be made, so as to allow the rolls *g* of both pairs of levers to operate on the whole length of the nail.

We will now proceed to describe the manner in which the motions of these levers to and from each other are controlled and regulated to give the required form to the nail.

h i j k are patterns or formers, against which the projections *l* of the levers are made constantly to bear by means of the springs *m*, which tend to force them apart, as seen in Figs. 2 and 3. Each of these patterns has a contour corresponding to the required form of one side of the nail, and thus as the levers are moved, by means of the connections already explained, in the direction of the arrow, Figs. 2 and 3, the projections *l* will pass over the surfaces of the patterns and give the required motions to the levers to produce a nail of the desired shape, the patterns being prevented from moving longitudinally by means of pins *n*, which are passed through the outside of the box J.

As the levers are only intended to operate on the nail-rod when moving in the direction of the arrow 6 to draw down the nail, they are allowed to spring apart sufficiently to clear the rod on their return motion, which is effected by the following device: *o p* are inclined pieces or wedges, which are placed between the patterns and the sides of the box J, and are moved back and forth a short distance intermittently in the following manner: *q* are pins projecting from opposite sides of the

cross head I, which project into slots *r* in the wedges *o*, the length of these slots being a little less than the distance traversed by the cross head I, so as to cause the pins *q* to strike alternately against the opposite ends 7 and 8 of the slots *r*, and thus move the wedges *o* backward and forward, as required, the pins *n* passing through slots *s*, provided for the purpose. These wedges *o* are secured to a frame, *t*, to which are attached the ends of the wedges *p* of the upper and lower patterns, *h i*, and the motion of the one is thus communicated to the other, the operation of both pairs of wedges being similar. It will thus be seen that as the cross-head I is traversed in the direction of the arrow the pins *q* will strike the ends 8 of the slots *r* in the wedges *o* and withdraw them, together with the wedges *p*, thus allowing the springs *m* to force the ends of the levers *c d e f* a sufficient distance apart to permit the rolls *g* to clear the nail-rod on the return motion of the levers. Just before these levers have reached the end of their traverse in the direction contrary to the arrow the pins *q* strike against the ends 7 of the slots *r* and throw forward the wedges *o p*, thus forcing the patterns in toward each other and closing the rolls *g* upon the nail rod, as seen in Figs. 2 and 3, so as to draw it down still farther on the next movement of the levers in the direction of the arrow.

K' is a post or standard rising from an arm projecting from the base A, through an aperture in which the nail-rod 20 is fed into the machine in a line axial with the center of the space between the levers *c d e f*, a screw-clamp, *u*, or other suitable device being employed to hold the rod firmly while it is being operated upon by the levers. The cut-off or cutters for separating the finished nail from the rod will now be described, their motions being so timed and regulated as to allow of the nail being submitted four times to the action of the rolls *g* before it is detached.

L is a pinion on the driving-shaft C, which gives motion, through the intermediate gear, M, to the gear N on the shaft O, which runs in suitable bearings in the frame-work and carries at its opposite end the cam-wheel P, in the inner face of which is formed the cam-groove *v*, which is concentric with the periphery of the wheel P, with the exception of the double incline *w*, Fig. 1. In this groove *v* works the roll *y*, which is attached to the bent arm *a'* of the upper jaw, Q, which is pivoted to the frame-work at *b'*, and carries the square-edged cutter *c'*. At the opposite end of the bent arm *a'* is a roll, *d'*, which works in an inclined slot, *e'*, in the lower jaw, R, which is pivoted to the frame-work at *f*, and carries the cutter *g'*, which is provided with a knife-edge, as seen in Figs. 1, 2, and 4, and thus as the roll *y* passes from 9 to 10 in the incline *w*, as the wheel P is revolved, the bent arm *a'* will be depressed, and, through the connections explained, cause the jaws Q R to close together and sever a nail from the rod, the jaws being

again opened as the roll *y* passes from 10 to 11 in the incline, and retained in that position during the time the roll is passing through the concentric portion of the groove *v*. The nail is thus cut off without moving the nail-rod from its original position, and this operation is performed while the ends of the levers are drawn back to the point of the nail, which falls out of the machine when its point is relieved by the drawing levers, and the cut-off has completed its movement, after which the rod is immediately fed forward for the next nail, so as to be in readiness to be operated upon by the levers on their next traverse in the direction of the arrow, Figs. 2 and 3, thus avoiding all loss of time in operating the machine; and by thus making both jaws of the cut-off movable and drawing back the levers simultaneously the levers are prevented from interfering with the operation of the cut-off. By changing the relative size of the gears by which motion is communicated from the driving-shaft C to the cam-wheel P the number of times that the nail is submitted to the action of the drawing levers before it is cut-off can be varied as desired.

Operation: The parts being in the position represented in Fig. 1, and the machine being set in operation, the nail-rod 20, properly heated, is fed in a sufficient distance to form a nail through the aperture in the standard K', when it is clamped tightly in place by means of the screw-clamp *u*. The levers *c d e f*, through the connections explained, now commence to travel back in the direction of the arrow, Figs. 2 and 3, causing the projections *l* to pass over the surfaces of the patterns, by which the motion of the rolls *g* is controlled to give a form to the nail corresponding with the contour of the patterns employed. As the projections *l* of the side levers, *e f*, pass over the patterns *j k* from 12 to 13, the rolls *g* will pass from 14 to 15 on the rod 20, Fig. 3, to form the sides of the head of the nail, and on striking the rounded portions 16 the levers will be forced suddenly nearer together, forming the shoulder *h'* under the head of the nail, and on passing from the points 17 to the points 18 the inclined surfaces of the patterns will cause the rolls *g* to gradually approach each other to form the point of the nail. The upper pattern, *h*, has an incline, 19, which forms the inclined portion *i'*, Fig. 5, of the head of the nail, and the lower pattern is made horizontal or slightly inclined to form the back of the nail. When the levers have arrived at nearly the end of their traverse in the direction of the arrow, the pins *q* on the cross-head I strike against the ends 8 of the slots *r* in the wedges *o*, which are thus drawn back, together with the wedges *p*, connected therewith, by the frame *t* a distance equal to the remaining traverse of the cross-head I, the slots *s* allowing of this motion of the wedges. This withdrawal of the wedges *o p* allows the patterns to be forced farther apart by means of the springs *m*, and permits the rolls *g* to be sepa-

rated sufficiently to clear the nail-rod as the levers are traversed forward in a direction contrary to the arrow, during which time the pins *q* pass through the slots *r* in the wedges *o* until the levers have arrived at nearly the end of their traverse in this direction, when they strike against the ends *7* of the slots *r*, when the wedges *o p* are carried forward into the position represented in Figs. 1, 2, and 3, forcing the patterns in toward each other, and causing the rolls *g* to press firmly against the nail-rod, when the levers are again traversed and the operation continues as before, the nail being alternately flattened on opposite sides at each operation of the levers, thus gradually lengthening and drawing it down until it is completely finished with a square and perfect point by the last traverse of the levers. The distance that the levers traverse in either direction is sufficient to enable the levers *c d* to operate on the point and the levers *e f* on the head of the nail, both sets of levers being thus allowed to operate on the whole length of the nail. The operation of levers on the nail-rod is repeated four times, when, by the revolution of the cam-wheel *P*, the incline *w* is caused to strike the roll *y*, and, through the connections explained, the cutters closed to sever the nail from the rod, and again immediately opened, when the operation continues as before, a nail being cut off at each complete revolution of the wheel *P*.

It will thus be seen that any desired form can be given to the nail by varying the form of the patterns employed, and that each side of the nail may be made alike or of a different shape, as may be desired.

In the above-described machine the nail-rod is fed in by hand and clamped while being

operated upon; but an automatic or mechanical feed may be employed without influencing the operation of the machine.

It is obvious that the mechanism employed for the purpose of reciprocating the levers *c d e f*, as well as that for operating the cut-off, may be varied to a considerable extent without departing from the spirit of our invention.

Instead of the patterns *h i j k* being moved toward and from the nail-rod by the wedges *o p* and springs *m*, they may be moved by other mechanical devices, such as cams.

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

1. The drawing-levers *c d e f*, in combination with the movable patterns *h i j k*, operating substantially as set forth.

2. The levers or jaws *c d e f*, arranged in pairs, the patterns *h i j k*, the motion of which toward or from the nail-rod is controlled by the wedges *o p* and springs *m*, or other suitable mechanical device, in combination with the cut-off *Q R*, or its equivalent, operating substantially as set forth.

3. Placing the ends of one pair of levers in advance of the ends of the other pair, and drawing them all simultaneously over the iron, substantially as set forth, for the purpose specified.

4. In horseshoe-nail machines the use of movable patterns or formers, operating, substantially as set forth, for the purpose described.

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