

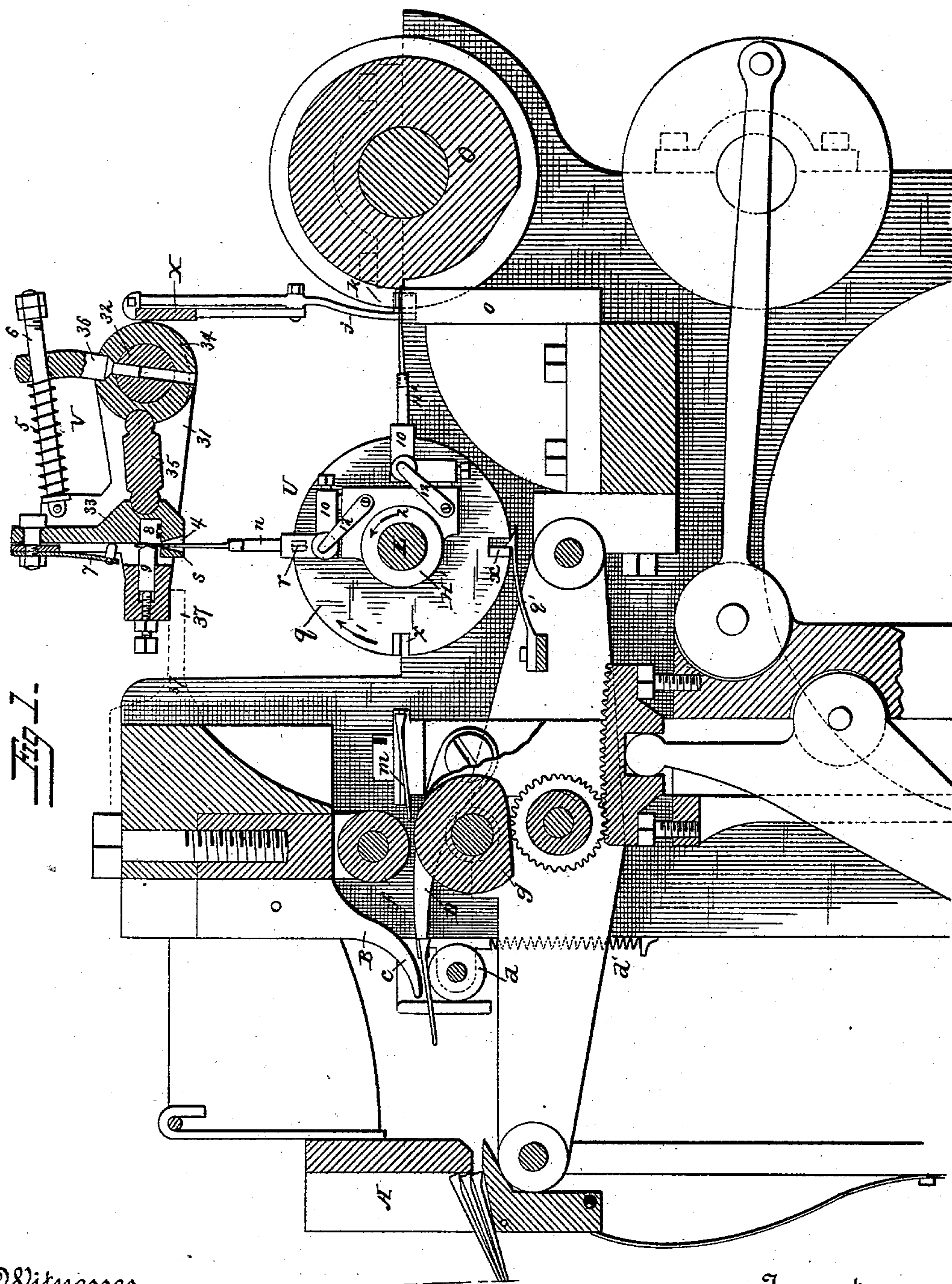
(No Model.)

2 Sheets—Sheet 1.

E. E. PIERCE.
NAIL FINISHING MACHINE.

No. 379,413.

Patented Mar. 13, 1888.



Witnesses
Jno. G. Hinkel Jr.
A. C. Farnham.

Inventor,
Erastus E. Pierce.
By his Attorneys
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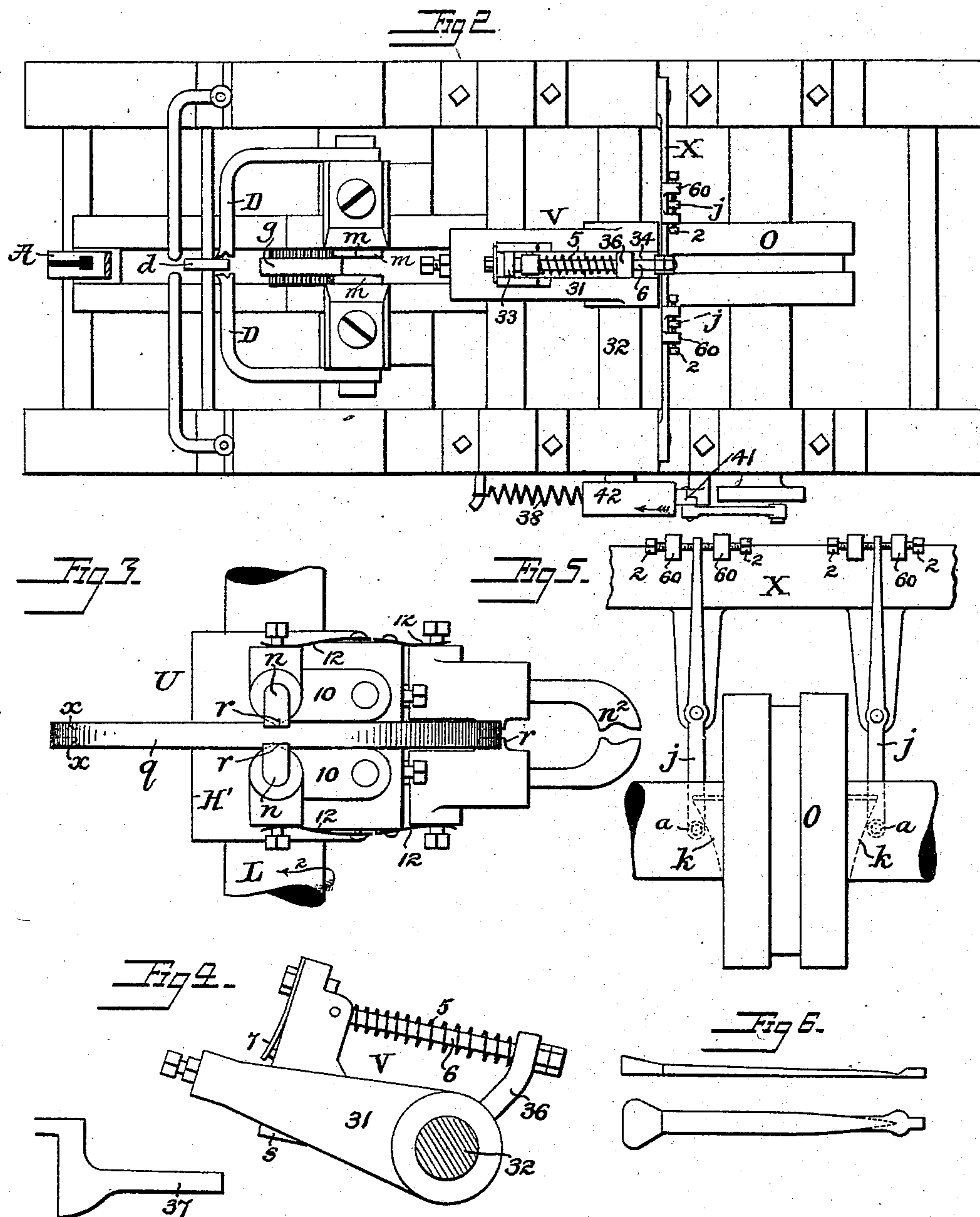
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UNITED STATES PATENT OFFICE.

ERASTUS E. PIERCE, OF NEW BRIGHTON, PENNSYLVANIA.

NAIL-FINISHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 379,413, dated March 13, 1888.

Application filed November 15, 1887. Serial No. 255,255. (No model.)

To all whom it may concern:

Be it known that I, ERASTUS E. PIERCE, a citizen of the United States, and a resident of New Brighton, Beaver county, Pennsylvania, have invented certain new and useful Improvements in Nail-Finishing Machines, of which the following is a specification.

This invention relates to that class of machines for finishing horseshoe-nail blanks of the character shown and described in United States Letters Patent No. 363,417, granted May 24, 1887; and the present invention consists in certain improvements upon the machine therein shown, to be hereinafter fully described and claimed.

The accompanying drawings illustrate so much of the said finishing-machine as will aid to a perfect understanding of the present improvements.

In said drawings, Figure 1 is a vertical central elevation of those parts of the improved finishing-machine which operate directly upon the nail-blanks. Fig. 2 is a plan view of the machine, some parts being omitted; Fig. 3, a detached plan view of the nail-transferring device enlarged. Fig. 4 is an elevation of the indenting mechanism detached from the machine, showing it in its raised position. Fig. 5 is an enlarged end elevation of the shearing device, illustrating the arms for centering the blank; and Fig. 6, illustrated by edge and plan views, the nail-blank indented prior to being sheared.

In the machine set forth in my said patent the nail-blanks are placed in a hopper or reservoir, A, from which the bottom blank is withdrawn by being seized between a pair of carrying-fingers, D, which carry it to a nail-holder, B, consisting of a narrow disk, *d*, and a narrow overhanging blade, *c*, toward which the disk is pressed by springs *d'* for clamping the nail-blank against the blade, when the fingers D separate prior to returning to a position to seize another blank from the hopper. Simultaneous with the seizure of another blank by the carrying-fingers, clamping side jaws, *m*, act to seize the blank clamped by the nail-holder B, and while the carrying-fingers are moved in the same direction with the second blank the jaws *m* carry the preceding blank from the holder between finishing-dies *f g*, which are of such contour as will operate to

reduce the blank to the desired taper and act upon the surfaces of the blank. The upper die, *f*, moves with the blank, while the lower one is driven positively at approximately the same speed that the blank is carried by the jaws *m m*. From these finishing-dies the jaws deliver the formed and planished nail-blank to the jaws *n* of a nail-transfer device, U, which jaws seize the head of the nail blank, and the transfer device with the jaws being partially rotated presents the blank upon an anvil, *o*, in position to be sheared by a cutter, O.

The construction of the devices just described, their operation, and the organized mechanism by which said operations are accomplished automatically are so fully illustrated and described in my aforesaid patent that no detailed description thereof need be given herein.

The nail-blank in the machine of my said patent in passing between the dies *f g* was indented at or about the portion ultimately forming the beveled point of the finished nail, and in this condition was transferred directly to and placed upon the anvil, as previously described.

It is sometimes desirable to impart the indentation to the nail-blank by devices other than the roller-dies, and to effect the forming and planishing operation of the dies and the indentation of the blank by separate devices. The present improvements are directed to effect this desideratum.

The roller-die *g*, instead of carrying an indenting projection, *t*, as shown in the patent referred to, is left plain, but in other respects is the same as previously described, and in lieu thereof there is provided an indenting mechanism, V, mounted over the transferring device in the path of the travel of the blank, as will hereinafter appear.

The transfer device U may be constructed in any suitable manner. As shown, it consists of a disk, *q*, mounted upon a shaft, L, so as to be rotated thereon in the direction of the arrow 1, Fig. 1, and prevented from rotating in the reverse direction by a friction or other pawl, *q'*, that may, if found desirable, enter suitable notches on the disk, as the shaft *h* intermittently carries the transferring-jaws to their proper positions.

Instead of a single pair of jaws, *n*, as in the

former machine, the hubs H' , secured to the shaft L , so as to turn therewith upon opposite sides of the disk q , carry two pairs of jaws, n and n^2 , arranged to extend at right angles to each other in such manner that while one pair of the jaws is in position to receive a formed and planished blank from the clamping side jaws, m , the other jaws will be in position to seize upon the preceding blank held by the indenting mechanism, and when the first-named jaws are in position to present a blank to the indenting mechanism the other jaws will present their blank upon the anvil, as will be readily understood.

Each of the jaws of each pair is mounted in an arm, 10, that is pivotally mounted upon the hub H' , the face of each arm adjacent to the disk q being provided with an inclined lug, r , (see Fig. 3,) adapted to engage with similar bevel faced or sided notches, x , formed in the opposite sides of the disk, as shown in Fig. 1. The jaws are pressed inward by flat springs 12, bearing upon the arms 10, so as to force the lugs r to enter the notches as they are brought opposite the same. The operations of the transferring device, as in my said patent, are such that in the position of the jaws n and n^2 in Fig. 1 the shaft L , being rocked in the direction of the arrow 2, the hubs H' , carrying the jaws, will be likewise turned, and as the disk q is prevented by the pawl q' from turning in this direction the lugs r of each arm 10 will be forced over the beveled faces of and out of engagement with the notches x . The jaws will thus be swung apart, so as to release their hold upon the heads of the nail-blanks. The arms will then move past the faces of the disk until the lugs r enter the other notches x , when the shaft and jaws will have been rotated a quarter-turn, thus closing the jaws upon the heads of other nail-blanks in position to be seized.

The indenting mechanism V may be of suitable construction. As shown, it consists of an anvil, 8, and pointed die, 9, the latter carried by a slotted or forked arm, 31, the hubs of which swing on a rock-shaft, 32, rocking in suitable bearings upon the side frames of the machine.

The anvil 8 is held in a tongue, 33, that depends from a cross-bar carried by the arm 31, and is pressed out of contact with the indenting die 9 by a spring, 7. The die 9 fits a socket in the end of the arm 31, and is provided with means for adjusting its position, so that the degree of indentation may be regulated. The tongue 33 has a projection, s , with a tapering socket, 4, to receive the end of a nail-blank. Between the hubs of the arm 31 there is mounted a collar, 34, in which is a socket for one end of a toggle, 35, its other end being seated in the rear of the tongue 33. The collar 34 is provided with a pin, 36, that enters a hole in the shaft 32, so that the shaft and collar turn together. The upper end of this pin 36 forms a support for one end of a rod, 6, pivoted between the projections of the arm 31

and bearing a spring, 5, which presses against said pin 36.

The shaft 32 is rocked from any moving part of the machine. As shown, it has at the end a crank-disk, 42, having a socket for the end of a toggle-lever, 41, which, when straightened, moves the disk and shaft in the direction of the arrow, a spring, 38, turning it in the opposite direction when the toggle is deflected.

The arm 31 is carried with the rock shaft by the pressure of the pin 36 on the spring 5, so that after said arm 31 takes its bearing on the bracket 37 the rock-shaft can continue its movement, the spring 5 being compressed to thereby straighten the toggle 35 and force inward the tongue 33.

The arm 31 being in the inclined position shown in Fig. 4, the operation of the indenting mechanism thus constructed is such that when the jaws n are moved with a nail-blank into the position shown in Fig. 1 the shaft 32 will be rocked, so that the arm 31 is lowered, and the tapered mouth 4 of the tongue 33 will pass over the end of the nail, centering the latter, until the arm arrives in the position shown in Fig. 1, the further motion being stopped by the bracket 37, provided for that purpose. At the time the arm 31 is lowered the dies 9 and 8 are separated sufficiently to permit the end of the nail-blank to project above the indenting end of the die 9, when the shaft 32, continuing its vibration, will then turn the collar 34, pressing the toggle against the rear of the tongue 33, and thus press its anvil 8 and the blank end against the indenting-die 9 and indent the blank, as in Fig. 6. During the indentation of the blank, and while it is held by the die 9, the machine is so timed that the shaft L will be rocked backward in the direction of the arrow 2, thus causing the jaws n to release their hold upon the nail-blank, so as to leave it suspended from the indenting jaws, and when the shaft L has reached the limit of its movement the other jaws, n^2 , will be in position to seize the head of the suspended blank, so that when the shaft 32 returns to its other position, through the action of the spring 38, the jaws n and n^2 will be free to be rotated in the reverse direction. As the shaft 32 rocks back, the first action, while the spring 5 is compressed, is to loosen the toggle and withdraw the tongue and release the blank; the next, as the pin 36 bears on the rod 6, is to lift the arm 31 to its elevated position. Simultaneous with the seizure of the blank by the jaws n^2 the other jaws, n , will have also seized another blank, advanced in position by the side clamping-jaws, m . The transferring device will now be rotated so that the jaws n^2 will carry the nail-blank in position upon the anvil 8, as seen in Fig. 1, the other jaws carrying a blank into position to be indented by the indenting mechanism, when the operations before described will be repeated. Thus the action of the transferring device is such that the nail-blank

presented thereto with one face uppermost is reversed so that its other face—its beveled face—is presented uppermost upon the anvil *o*. The blank when presented upon the anvil is centered thereon, so as to be properly sheared by the cutter *o*, by spring-blades *k*, carried by the cutter-head, as in the machine before described, that are brought against opposite sides of the blank after the transfer-jaws *n*² have come to rest. In the machine described in the aforesaid patent these blades were moved toward each other as the cutter-head rotated in passing between fixed arms *j*.

It has been found desirable, in order to lessen friction and permit of accurate adjustment, to mount these arms *j* in the manner shown in Fig. 5. These arms are pivoted to brackets depending from a cross-bar, *X*, of the machine located just in rear of the shaft 32, so that the rolls *a* at the end of the arms are in position to operate on the blades *k* as the cutter-head rotates. Adjustment of the operative position of the arms *j* is obtained by extending them between set-screws 2, mounted in lugs 60, as shown in Figs. 2 and 5.

It is to be understood that I do not limit myself to the specific constructions shown, as it is evident that they may be changed in many respects by intelligent mechanics.

No claim is herein made for the method of finishing horseshoe-nails herein described, neither for any combinations of devices shown herein that are embodied in my aforesaid patent, and therein claimed.

What I claim is—

1. The combination, with finishing-dies, of a transferring device provided with grasping-jaws and indenting-dies adapted to indent the nail-blank presented by the transferring device, substantially as described.

2. The combination, with finishing and indenting dies adapted to finish and indent the nail-blank, and a shearing device, of a transferring device provided with grasping-jaws for taking the nail after it has passed between the roller-dies and presenting it to the indenting-dies, and from thence taking and presenting it to the shearing device, substantially as described.

3. The combination, with a nail-indenting device and a transferring device to feed successive nail-blanks to said indenting device, of a second transfer device and jaws adapted to seize and remove the blank after it has been indented, substantially as described.

4. The combination, with a nail-indenting device and a transferring device provided with jaws adapted to feed successive nail-blanks to said indenting device, of a second set of jaws adapted to seize and remove the blank after it has been indented, substantially as described.

5. The combination, with finishing-dies and a shearing device, of intermediate indenting-dies and a transfer device arranged and operating to carry the blank from the finishing to the indenting dies and then to the shearing de-

vice in a reversed position, substantially as described.

6. The combination, in a device for feeding successive blanks, of a rotating notched disk, *g*, a detent, and two sets of jaws mounted adjacent to said disk and means for rocking said jaws, one of said sets of jaws adapted to feed the blank part of the distance and the other set adapted to take said blank and feed it the remainder of the distance, substantially as described.

7. The combination, with finishing-dies and a shearing device, of a nail-blank-feeding device and an indenting device consisting of a pair of dies between which the blank is presented by the feeding device, substantially as described.

8. The combination, with a nail-blank-feeding device, of an indenting device consisting of a stationary die and a movable die or anvil, and means, substantially as described, for moving the latter against the stationary die.

9. The combination, with the blank-feeding device, of an arm carrying indenting-dies and adjustably supported to bring said dies to operate on the end of the blank after the latter is presented in position by the feeding device, substantially as described.

10. The combination, with a nail-blank-feeding device for feeding and holding the blanks to be indented, of a carrier movable to and from the end of the blank and an indenting device carried by said carrier, substantially as described.

11. The combination, with a nail-blank-feeding device for feeding blanks to be indented, of an indenting device carried by a vibrating carrier, whereby to first embrace the blank held by the feeding device and then to indent it, substantially as described.

12. The combination, with a movable carrier for a nail-blank, of indenting-dies and die-operating mechanism and a carrier for said dies, reciprocating to and from the blank-carrier to carry the dies into position to operate on the blank and then out of the path of the blank prior to its further movement by the blank-carrier, substantially as described.

13. The combination of a carrier, a supporting-shaft, indenting-dies supported by said carrier, a toggle-arm for operating one of the dies, and a rocking sleeve on said shaft, having a socket for said toggle-arm, substantially as described.

14. The combination of a rock-shaft, a carrier hung thereon and carrying a stationary and a movable indenting-die, a support for the movable die, and a toggle-arm connected therewith and seated in a socket in the shaft, and a connection having a limited play between the shaft and the carrier, substantially as described.

15. The combination, with an arm provided with an indenting-die, as 9, of a pivoted tongue carried by said arm, and having an anvil cooperating with said die and a device bringing

the said anvil and the indenting-die together, substantially as described.

16. The combination, with a rocking arm carrying an indenting-die, as 9, of a tongue
5 carried by said arm and having an anvil co-operating with said die, and a device for rocking said arm, substantially as described.

17. The combination, with an oscillating shaft and an arm mounted thereon, of a tongue
10 carried by said arm, an anvil and die carried by the tongue and arm, and a toggle whereby to press the die and anvil toward each other, substantially as described.

18. The combination, with an arm carrying
15 an indenting-die, as 9, of a tongue carried by said arm and having an anvil for co-operation with said die, and provided with a tapering mouth for centering the blank between the die and anvil, substantially as described.

20 19. The combination, with a disk rotating in one direction, of two pairs of jaws, the jaws of each pair mounted upon opposite sides of said disk, adapted to rotate both with and in an opposite direction to the disk, substantially as
25 described.

20. The combination, with an anvil, of a revolving head carrying a guiding device and cutters for centering and shearing the blank upon the anvil, and adjustable arms, as *j*, for
30 operating the guiding device, substantially as described.

21. The combination, in a shearing device, of an anvil, a revolving head carrying cutters arranged to shear against the edges of the anvil, a guiding device for centering the blanks
35 upon the anvil, and adjustable arms, as *j*, for operating the guiding device, substantially as described.

22. The combination, with the arms *j* and anvil, of adjusting-screws 2, substantially as
40 described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ERASTUS E. PIERCE.

Witnesses:

S. F. JACKSON,

E. W. KEYSER.