(Model.)

5 Sheets—Sheet 1.

# J. E. KIMBALL.

## WIRE NAIL MAKING MACHINE.

No. 395,062. Patented Dec. 25, 1888.

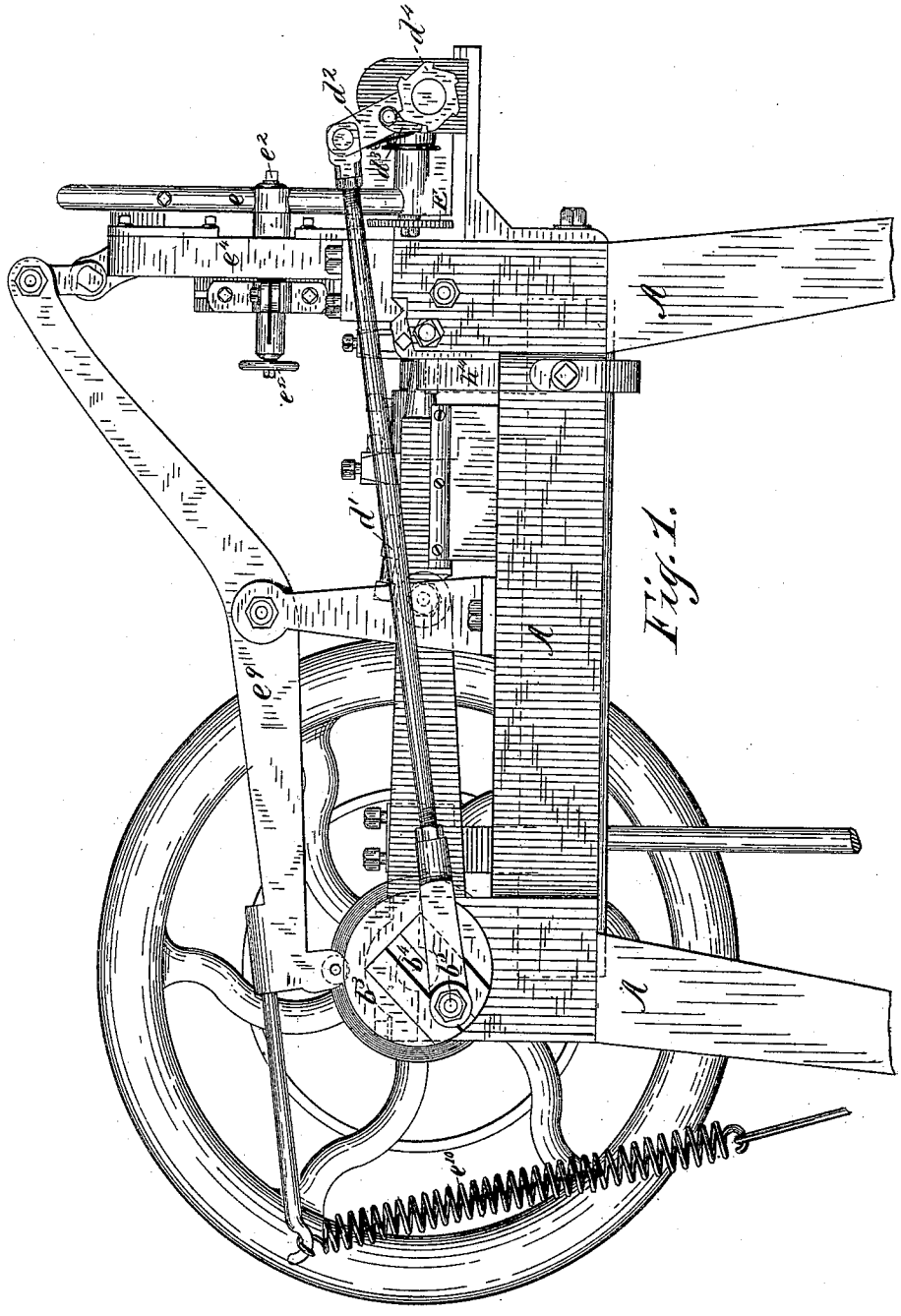

Fig. 1.

Witnesses,
W. Kew Fittel
John R. Snow.

Inventor,
Joseph E. Kimball
by G. J. E. Maynadier
his Atty.

(Model.) 5 Sheets—Sheet 2.

# J. E. KIMBALL.

## WIRE NAIL MAKING MACHINE.

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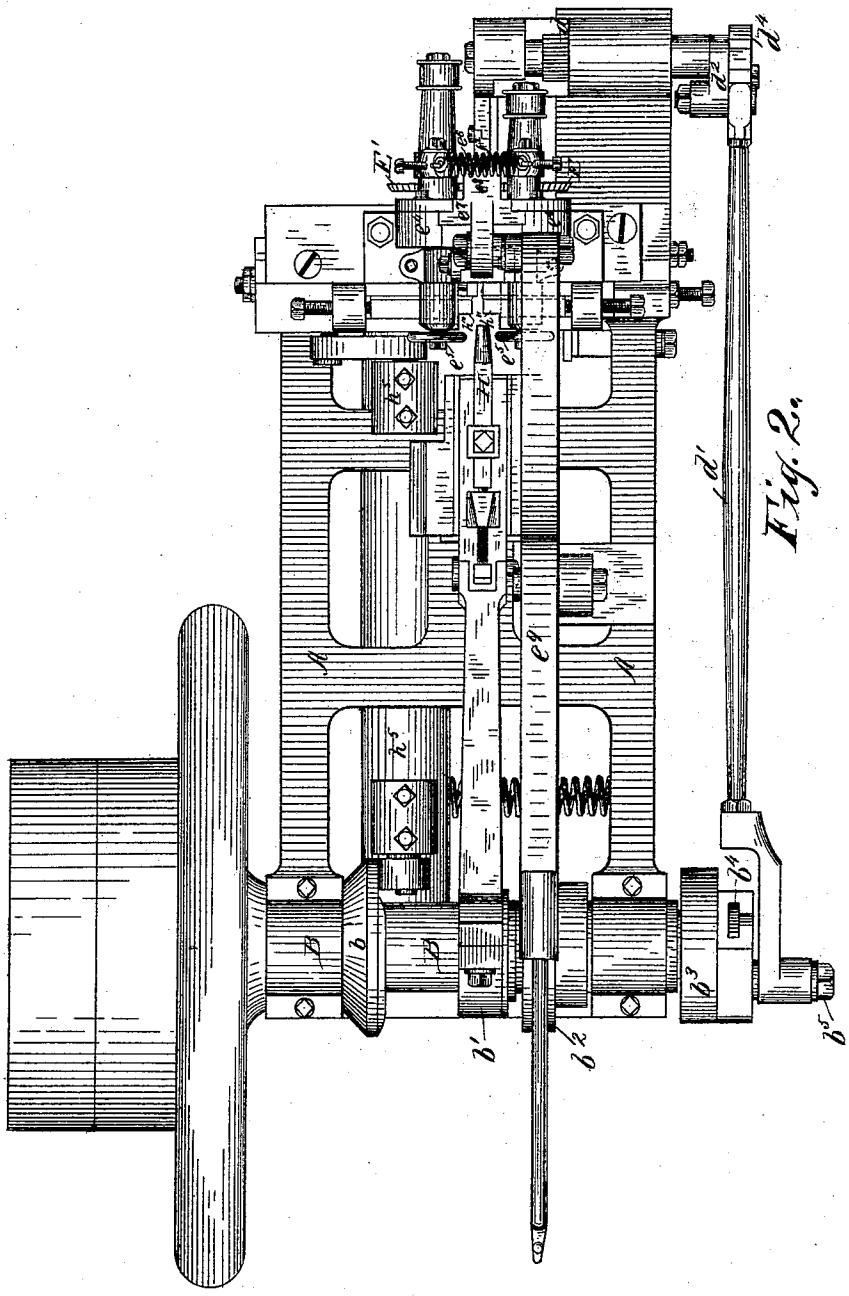

Fig. 2.

Witnesses.
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John R. Snow.

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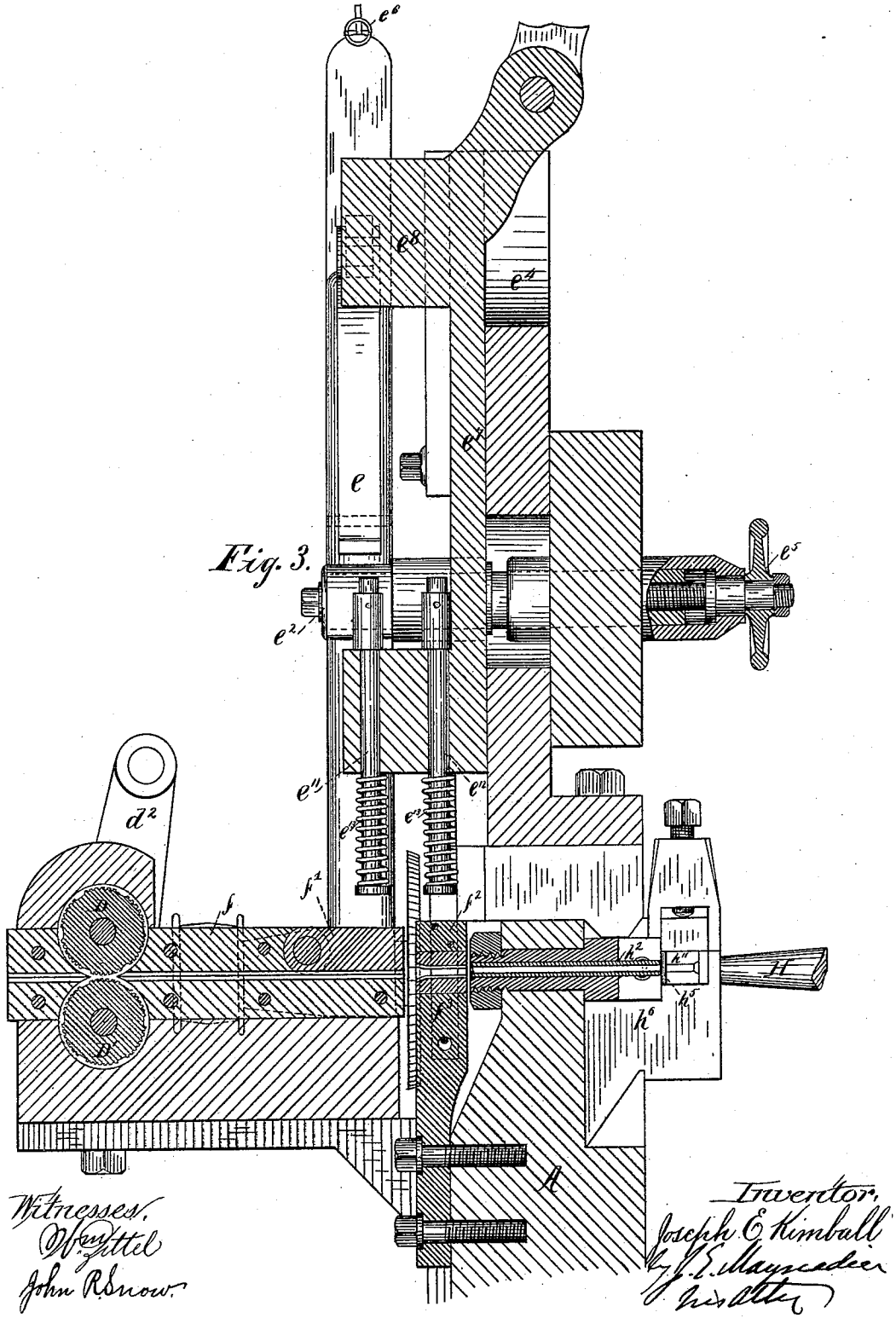
(Model.) 5 Sheets—Sheet 3.

# J. E. KIMBALL.

## WIRE NAIL MAKING MACHINE.

No. 395,062. Patented Dec. 25, 1888.

Fig. 3.




Witnesses.
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John R. Snow.

Inventor.
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(Model.) 5 Sheets—Sheet 4.

# J. E. KIMBALL.

## WIRE NAIL MAKING MACHINE.

No. 395,062. Patented Dec. 25, 1888.

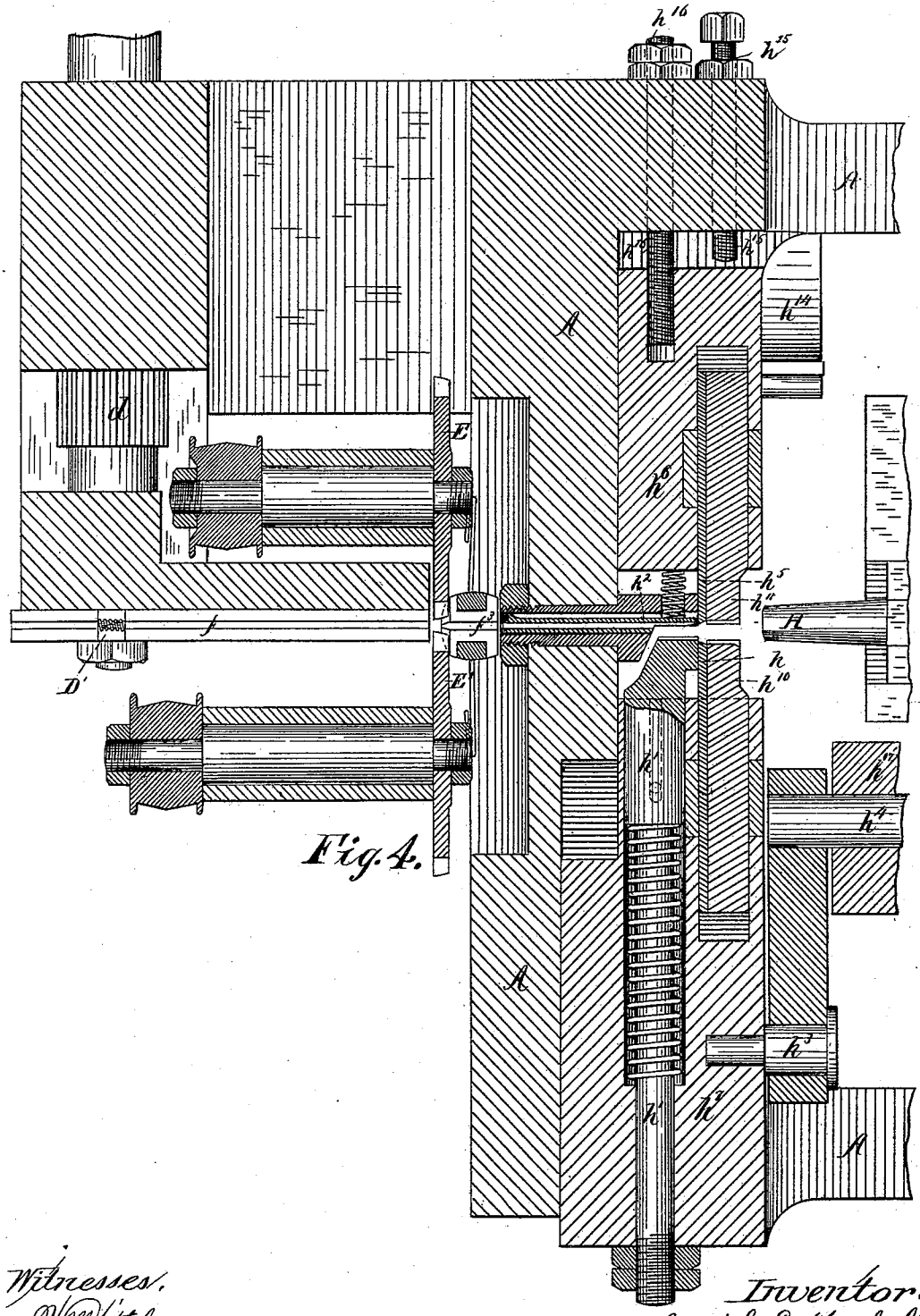


Fig. 4.

Witnesses.
Wm. Littel.
John R. Snow.

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(Model.) 5 Sheets—Sheet 5.

# J. E. KIMBALL.

## WIRE NAIL MAKING MACHINE.

No. 395,062. Patented Dec. 25, 1888.

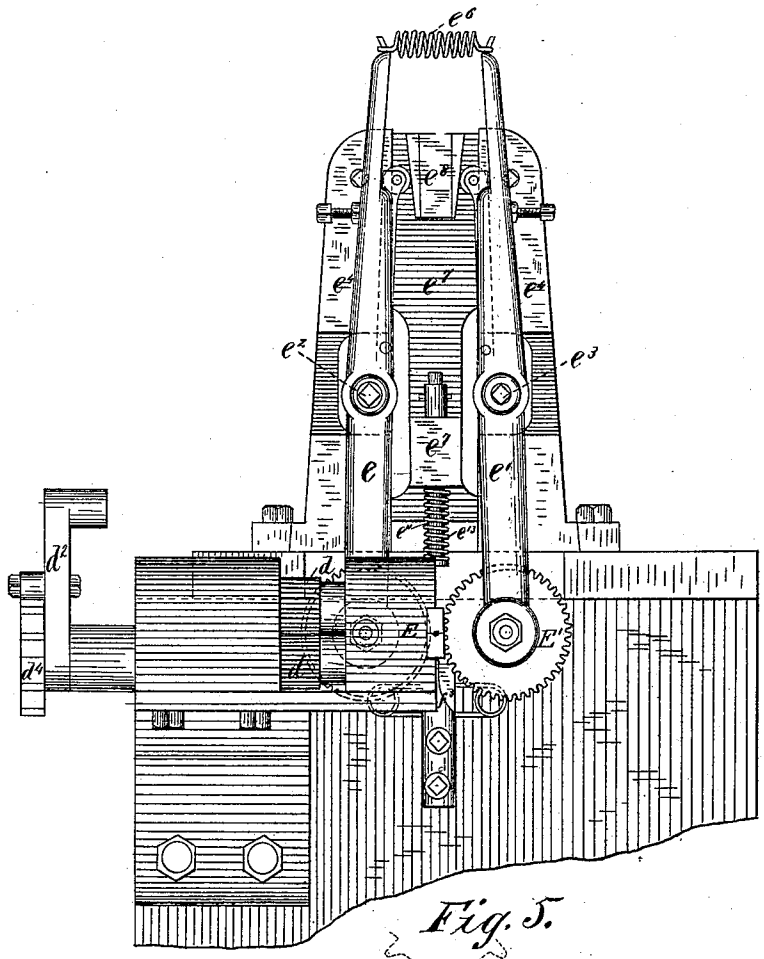

Fig. 5.

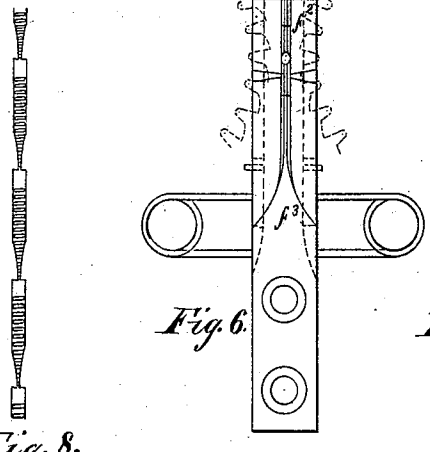

Fig. 6.

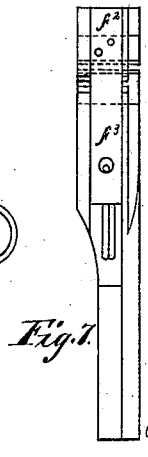

Fig. 7.



Fig. 8.

Witnesses.
W. Wittel
John R. Snow

Inventor.
Joseph E. Kimball
by J. E. Maynadier
his atty.

# UNITED STATES PATENT OFFICE.

JOSEPH E. KIMBALL, OF MILFORD, MASSACHUSETTS, ASSIGNOR TO HENRY S. JENKINS, TRUSTEE.

## WIRE-NAIL-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 395,062, dated December 25, 1888.

Application filed February 8, 1882. Serial No. 52,159. (Model.)

*To all whom it may concern:*

Be it known that I, JOSEPH E. KIMBALL, of Milford, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Wire-Nail-Making Machines, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, making a part hereof.

Nails with milled points have long been in the market under the name of "clinching-screws" and "headed clinching-screws." These nails are short pieces of wire, one end of which is milled to form a clinching-point, and are substantially alike, except that the headed clinching-screw has a head of greater diameter than the rest of the nail. In the manufacture of these nails or clinching-screws, as heretofore carried on a piece of wire of the proper length was cut off from the wire as it came from the reel, and this short piece was afterward milled or milled and headed. This mode of manufacture required means for presenting and holding these short pieces of wire each in its turn to the milling-wheels.

The main feature of my invention is the milling of the points before the short piece of wire to form the nail is cut off.

Other features of my invention relate to the mechanism for forming these clinching-screws, whether headless or headed.

In the accompanying drawings, which illustrate a nail-making machine embodying all my improvements in the best form known to me, Figure 1 is a side elevation. Fig. 2 is a plan or top view. Fig. 3 is a transverse section on line $x\,x$, Fig. 2. Fig. 4 is a horizontal section on line $y\,y$, Fig. 1. Fig. 5 is a front elevation of the upper part of Fig. 1. Figs. 6 and 7 are a front and side view of the clamps for holding the wire while being milled. Fig. 8 shows the wire as it is after it has passed the feed-folls and milling-wheels.

A is the frame or base. The main shaft B is mounted on one end of the frame A. The feed-rolls D D′, grooved to conform to the desired configuration of the body of the nail, are mounted on the front end of the frame A and connected by gears $d$, so as to revolve together. They receive an intermittent rotary motion from the connecting-rod $d'$, attached at one end to the crank-pin $b^5$ and at its other end to a lever, $d^2$, which carries a pawl, $d^3$, that engages with a ratchet-wheel, $d^4$, on the shaft of the lower roll, D′. The teeth of this ratchet-wheel $d^4$ are proportioned to turn the rolls D D′ just enough to feed the length of a nail, and for different lengths of nails other ratchet and feed wheels are used and the throw of the crank adjusted to them by adjusting the crank-pin $b^5$ in the slot $b^4$—that is, nearer to or farther from the axis of the main shaft B.

Two milling-wheels, E E′, are mounted on shafts provided with pulleys to receive belts, by which they are rapidly revolved, and are hung on the lower extremities of two vibrating levers, $e\ e'$, which swing on the spindles $e^2\ e^3$. These spindles are mounted in boxes on the frame $e^1$, and are adjusted in and out by the hand-screws $e^5$, which work in a thread tapped in the spindles $e^2\ e^3$, for adjusting the levers $e\ e'$. When adjusted, the spindles are firmly clamped in their boxes. These vibrating levers $e\ e'$ are connected at their upper ends by the spring $e^6$, which keeps the milling-wheels away from each other to allow the passage of the wire. These wheels are brought against the wire and made to gradually approach each other while forming the point by the descent of the wedge $e^8$, carried by the cross-head $e^7$, forcing apart the upper ends of the levers $e\ e'$. The cross-head $e^7$ is caused to reciprocate intermittently in its ways in the frame $e^1$ by the bent lever $e^9$, pivoted to a standard on the frame A, and which is actuated in one direction by the cam $b^2$ on the main shaft B, and in the other direction by the spring $e^{10}$, as shown in Fig. 1.

The wire is clamped while being milled, and the clamps are closed by two presser-bars, $e^{11}\ e^{12}$, which move in guides in the cross-head $e^7$, and are elastically held down by the cross-head $e^7$ compressing a spring, $e^{13}$, on each. (See Fig. 3.) These presser-bars $e^{11}\ e^{12}$ actuate the clamps $f'\ f^2$, which may be considered as the upper portions of the wire-guideway on each side of the milling-wheels, these portions of the guideway being movable. The clamp $f'$ is hinged to the part $f$, as shown in Fig. 3, and the clamp $f^2$ is adapted

to move toward and away from the part $f^3$. The wire is held for the action of the cutter $h$ by the clamps $h'$ $h^2$ and for the operation of the header H by the gripping-dies $h^{10}$ $h^{11}$.

By reference to Fig. 4 the operations of the clamps, cutters, gripping-dies, and header will be clearly seen.

The stud $h^3$ is linked to wrist-pin $h^4$ on one arm of the rock-shaft $h^{17}$, which thereby operates the slide $h^7$, in which is mounted the spring-clamp $h'$, the cutter $h$, and one of the gripping-dies, $h^{10}$. The blade $h^5$ and the gripping-die $h^{11}$ are mounted on slide $h^6$. The slide $h^7$, being moved by the stud $h^3$, carries with it the spring-clamp $h'$, the cutter $h$, and the die $h^{10}$ until the body of one nail is firmly clamped between the clamps $h'$ and $h^2$. The continued motion of slide $h^7$ moves clamp $h^2$ against its spring, the clamps $h'$ and $h^2$ moving together, carrying with them the nail clamped between them, and also carrying one side of the milled point of the nail projecting from them up against blade $h^5$. The farther motion of slide $h^7$ compresses the spring of clamp $h'$, and also carries blade $h$ up to the other side of the milled point of the nail projecting from the clamp $h'$ $h^2$ and closes the gripping-dies $h^{10}$ $h^{11}$ around the body of that nail, and during the latter part of the forward motion of slide $h^7$ the blades $h$ and $h^5$ and the gripping-dies and the slide $h^6$ all move together, carrying with them the nail, which is severed by the motion of the blade $h$. This completes the nail in the manufacture of the headless clinching-screws; but if headed screws are to be made the motion of the slides $h^6$ $h^7$ is so regulated and the screw-stop $h^{15}$ so adjusted that slide $h^6$ will be stopped by stop $h^{15}$ in time to cause the nail to be firmly gripped between the dies $h^{10}$ $h^{11}$, and held in proper position for the action of the header H, which is then thrown forward, upsetting the body of the headless nail projecting from the dies $h^{10}$ $h^{11}$ and forming the head. When headless nails are made, these gripping-dies $h^{10}$ $h^{11}$ are not essential, but they are desirable, as the body of the nail is held by them when the blade $h$ acts to sever it from the nail held by the clamps $h'$ $h^2$. The blade $h^5$ also is not essential, as will be obvious; but the machine works better with it than without it, and it serves to enable the gripping-dies $h^{10}$ $h^{11}$ to hold the nail more firmly under the blow of the header. The header H is actuated by the jointed connecting-rod attached to the eccentric $b'$ on the main shaft B, and is of course not used when headless nails are manufactured. On the back-stroke of wrist-pin $h^4$ the slides $h^6$ $h^7$ move together, the spring $h^{14}$ insuring the motion of slide $h^6$ until slide $h^6$ is stopped by the screw-stop $h^{16}$, but slide $h^7$ continues its motion, thereby separating die $h^{10}$ from die $h^{11}$, and releasing the finished nail, which drops out, and also separating clamp $h'$ from clamp $h^2$, and thereby allowing clamp $h^2$ to reassume its first position, so that the wire can be fed forward the length of the next nail without obstruction from clamps $h'$ $h^2$ or from blade $h^5$. The wire is fed by the feed-rolls the proper length for one nail, and corrugated, if desired, by the feed-rolls in a well-known way. When the feed-rolls are at rest, the wire is clamped near the place where the milling-wheels are to operate upon it and the milling-wheels are brought into operation to form the milled point and then withdrawn. The wire is then unclamped and fed forward, as before, then clamped again and milled as before, and so on, leaving the wire ready to be made into headless clinching-screws by simply severing it at the junction of the milled point of one screw with the butt of another. To do this with rapidity and without bending or otherwise injuring the points, it is desirable to have both screws clamped before the cutter operates.

I am aware of Elliott's patent, No. 163,059, of 1875, and disclaim all that is shown in it, Elliott's method differing wholly from mine in that the point is completed on the projecting end of a wire while my point is first partially formed by removing portions of the wire and finished by the severing-cutters.

What I claim as my invention is—

1. In combination, wire-feeding mechanism, cutters for partially forming the point, clamping mechanism, and cutters which sever the wire, all arranged and operating to partially form the point by removing the surplus metal and to complete the point by severing the wire, substantially as described.

2. In combination, wire-feeding mechanism, milling-cutters E E′, mechanism for clamping the wire while the point is milled, cutter $h$, and mechanism for clamping the wire while the cutter acts, substantially as and for the purpose set forth.

3. In combination, clamps $h'$ and $h^2$, blade $h$, and gripping-dies $h^{10}$ and $h^{11}$, substantially as and for the purpose set forth.

JOSEPH E. KIMBALL.

Witnesses:
J. E. MAYNADIER,
E. L. WIRES.