(No Model.)

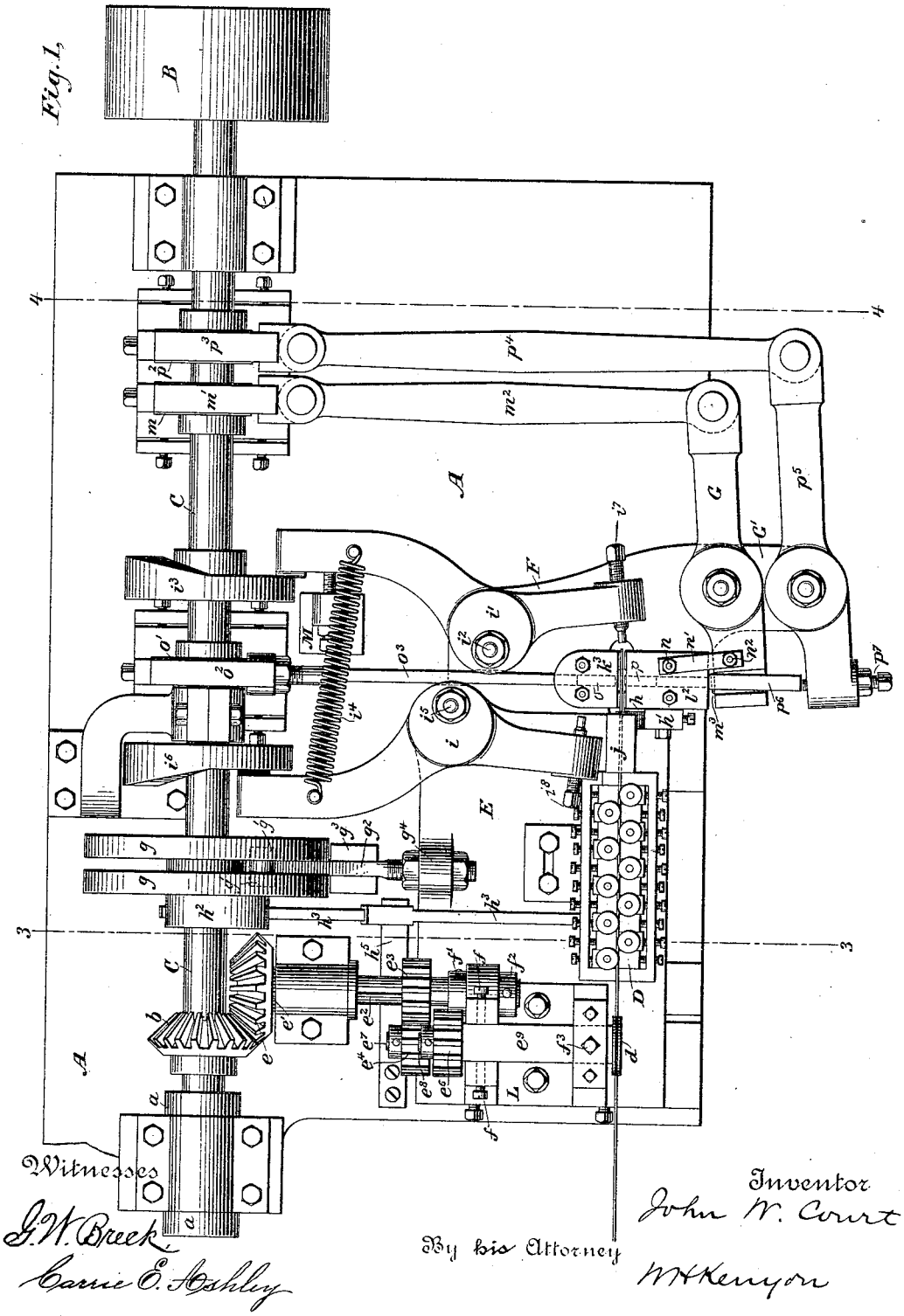
4 Sheets—Sheet 1.

J. W. COURT.

WIRE NAIL MACHINE.

No. 346,467. Patented Aug. 3, 1886.

Fig. 1.



Witnesses
J. W. Breck
Carrie E. Ashley

Inventor
John W. Court
By his Attorney
W. H. Kenyon

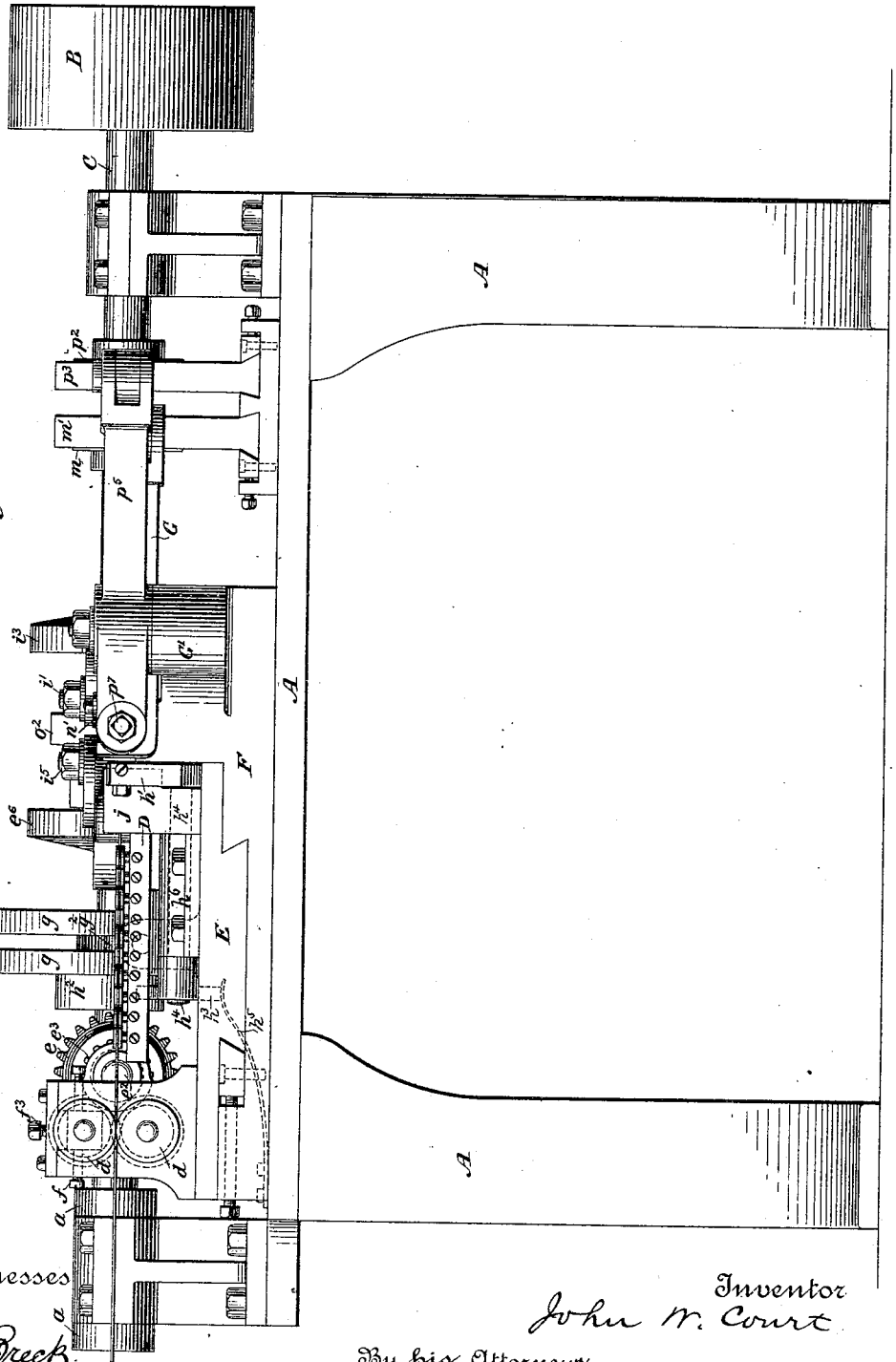
(No Model.) 4 Sheets—Sheet 2.

J. W. COURT.

WIRE NAIL MACHINE.

No. 346,467. Patented Aug. 3, 1886.

Fig. 2.



Witnesses

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(No Model.) 4 Sheets—Sheet 3.

J. W. COURT.

WIRE NAIL MACHINE.

No. 346,467. Patented Aug. 3, 1886.

Fig. 3.

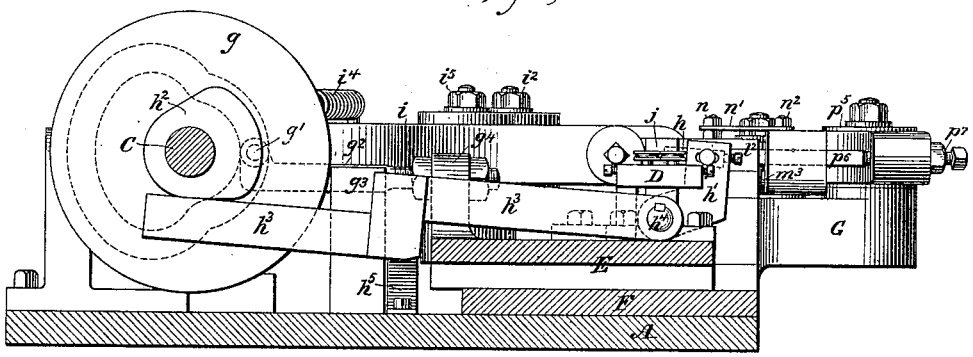


Fig. 4.

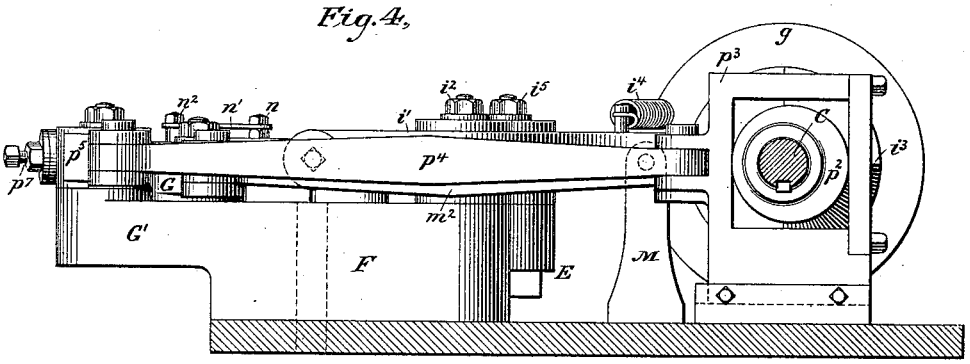


Fig. 5.

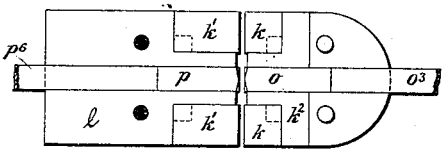


Fig. 6.

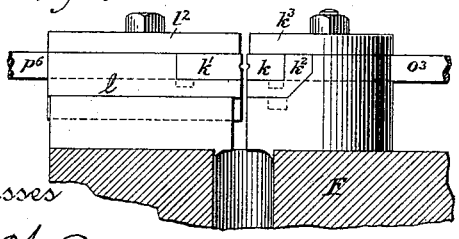


Fig. 9.

Fig. 7.

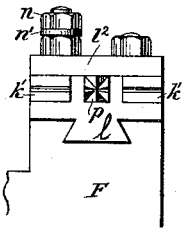
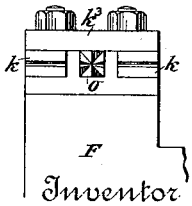


Fig. 8.



Witnesses

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(No Model.) 4 Sheets—Sheet 4.

J. W. COURT.

WIRE NAIL MACHINE.

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Fig. 10.

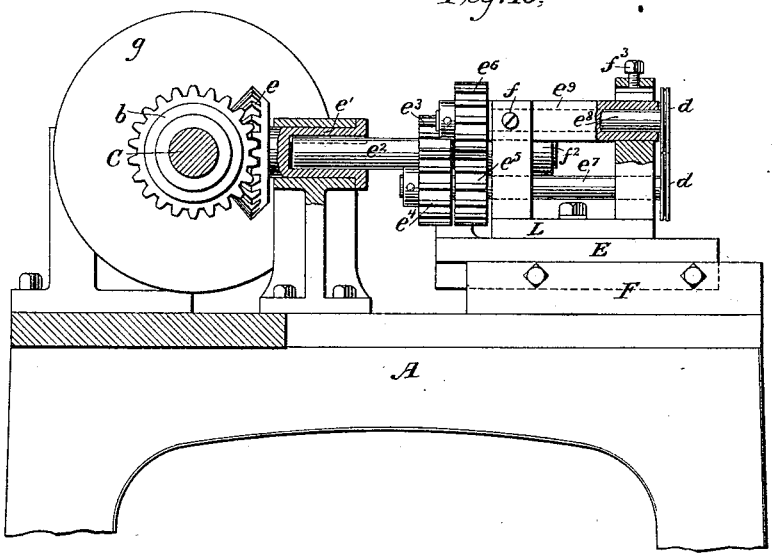


Fig. 11.

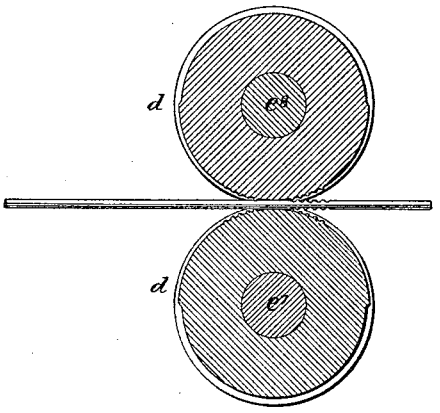
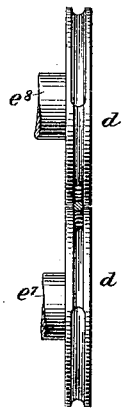


Fig. 12.



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UNITED STATES PATENT OFFICE.

JOHN W. COURT, OF BROOKLYN, NEW YORK.

WIRE-NAIL MACHINE.

SPECIFICATION forming part of Letters Patent No. 346,467, dated August 3, 1886.

Application filed November 16, 1885. Serial No. 182,912. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. COURT, a citizen of the United States, residing in Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Nail-Machines, of which the following is a full, clear, and exact description and specification, reference being had to the accompanying drawings, and the letters and figures marked thereon.

Hitherto nail-machines have been constructed in such a manner that at each blow of the cutter only enough wire to make a single nail was cut off from the supply-wire. This piece of wire, thus cut off, was then held firmly under great pressure, while one end of it was flattened into a head by the blow of a hammer. To hold the wire with sufficient firmness to prevent its being forced along between the jaws of the holding device by the blow of the hammer, instead of being flattened out at the end, as desired, required the use of very great force, which was necessarily an element of great expense in the working of the machine. Moreover, the machine had to make one complete operation for each nail. When the nails were to be notched or barbed, the barbing had to be done by a separate and independent operation. Before the wire was fed into the nail-machine proper it was passed between rollers which were so constructed as to produce the barbing all along the wire.

The principal objects of my invention are, first, to avoid the necessity of employing any great force to hold the wire while it is being headed, and thus to secure economy in the manufacture; secondly, to produce two nails instead of one with each complete operation of the machine, and thus to economize in time; and, thirdly, by a new and peculiar construction of the feeding mechanism to notch or barb the wire at the same time that it is being fed into the machine, and by the same means, either along its whole length or at intervals only, the effect being to produce a nail barbed along its whole length or only at a particular part or parts, as may be desired, and all this without the necessity of any separate operation. I attain my objects by the mechanisms illustrated in the accompanying drawings, in which—

Figure 1 is a plan or top view of the entire machine. Fig. 2 is a front elevation. Fig. 3 is a vertical section on the line 3 3 shown on Fig. 1. Fig. 4 is a similar vertical section on the line 4 4 shown on Fig. 1, but looking in the opposite direction. Figs. 5, 6, 7, 8, and 9 show different details of the machine. Fig. 10 is a side view of the feeding mechanism, with certain portions cut away, and Figs. 11 and 12 are enlarged views of the feeding-wheels.

A is a frame or stand of iron or any suitable material, consisting of a plate or table with supporting-legs and with various upright projections suited to hold and support the different parts of the machine, as hereinafter explained, Figs. 1 and 2.

B is the driving-wheel, by which motion is imparted to the rest of the machine in any usual manner through and by means of the shaft C, upon one end of which the driving-wheel is mounted, Figs. 1 and 2. The shaft C is mounted in bearings attached to the frame A, and is prevented from slipping longitudinally in its bearings by the collars *a*, Fig. 1.

b is a cog-wheel mounted upon the shaft C, and serving to revolve the feeding-rolls *d d*, Fig. 1, through and by means of the bevel-gear *e*, the shafts e' and e^2, the cog-wheels e^3 e^4 e^5 e^6, and the shafts e^7 and e^8, upon the ends of which the feed-rolls *d d* are mounted, Figs. 1 and 10. The cog-wheel *e*, Fig. 10, is mounted upon the shafts e', which shaft is fixed in bearings firmly attached to the table of the frame A. The shaft e' has a circular hole bored through it, into which hole the shaft e^2 fits. The shaft e^2 moves longitudinally backward and forward in the shaft e', and revolves with it. This is accomplished in the manner and for the purpose hereinafter explained. The cog-wheel e^3 is mounted on the shaft e^2, and gears with the cog-wheel e^4, and thus serves to turn the shaft e^7, upon the end of which the lower feed-roll is mounted. The cog-wheel e^5 is also mounted upon the shaft e^7, and gears with the cog-wheel e^6, and thus serves to turn the shaft e^8 in an opposite direction to that of the shaft e^7. The shaft e^8 is fitted into and supported by an iron box, e^9, and has mounted upon the outer end of it the upper feed-roll, *d*. The box e^9 is fitted into a slot in the support L, projecting upward from the table of the frame A, and is attached to the support by pivots *f f*. The box e^9 moves slightly upon the pivots *f f*, and

thus gives the outer end of the shaft e^8 and the upper feed-roll a slight capacity of vertical motion, Figs. 1 and 10. The object of this is to enable the distance between the feeding-rolls to be properly adjusted to the size of the wire. This adjustment is made by means of the screw f^3, Fig. 10, which bears down upon the box e^9. By turning this screw the box e^9 can be depressed and the feed-rolls brought nearer to each other. A rubber pad may be placed between the screw and the box to enable the upper feed-roll to give a little without altering the position of the screw. The feeding-rolls d d are grooved around their whole circumference in such a way that when their edges come into contact a circular hole is formed at the point of contact suitable to receive, hold, and feed the wire along into the straightener, Figs. 11 and 12. Certain parts of these grooves are so deepened and widened that at those parts the feeding-rolls will not bear upon the wire at all, and consequently no wire will be fed in at such times, Fig. 11. By this means the feeding in of the wire is suspended, while the piece of wire just fed into the machine is being headed and pointed and cut, as afterward explained.

In making barbed nails if it is desired to barb the nail along its whole length, the grooves in the feeding-rolls are notched or indented at every part, except where they are widened and deepened, as before explained. If the nail is to be barbed only at some particular part or parts, the notches or indentations in the grooves are made in groups, these groups occurring at intervals, and being separated from each other by unnotched or smooth spaces along the grooves, or there may be only one group of notches or indentations in the grooves, the rest of the grooves being smooth. By this means the wire is barbed in some places and left smooth in others. The teeth between the notches are made to project a little beyond the level of the smooth surface of the grooves, so that when the wire is clasped between the feed-rolls the teeth are pressed into the wire and thus produce the barbing. The indentations and teeth may be cut at such positions upon the feed-rolls as to produce the barbing at any part of the completed nail. I prefer to so place them as to barb the nail only at and near its point. The feed-rolls feed the wire into the straightener D, which may be constructed in any usual manner, a common form being shown in Fig. 1. From the straightener the wire passes through a circular hole in the support j, Figs. 1 and 2, which is screwed to the sliding plate E, as hereinafter explained, and then between the dies k k and k' k'. These dies (shown in Figs. 5 and 6) are made of steel. The dies k k are supported by a steel plate, k^2, Figs. 5 and 6, and firmly fastened to that plate by downwardly-projecting arms that fit into slots in the plate k^2, as shown in Figs. 5 and 6. The plate k^2 is supported by the upward projection F from the table of the frame A, and fastened to it by a slot-connection. (Shown in Fig. 6.) The dies k k and the plate k^2 are held in their positions on the support F by the plate k^3, which is pressed down upon them and held in place by means of nuts and bolts, as shown in Figs. 1, 5, and 6. The dies k' k' are fitted by a similar slot-connection into a single sliding plate, l, Figs. 5, 6, and 7, which plate is fitted with dove-tailed sliding connection into the immovable upright projection F from the plate or table of the frame A, Figs. 6 and 7. The dies k' k' are held in position by the plate l^2, which is pressed down upon them and held in place by means of nuts and of bolts passing through the plate l^2 and screwing into the sliding plate l. The dies are grooved, Figs. 6, 7, and 8, so that when the dies k' k' are pressed against the dies k k a circular hole is formed between them into which the wire passes and by which it is held and supported, Figs. 6, 7, and 8. As shown in Fig. 5, the dies do not extend across the entire width of the plate k^2 or the sliding plate l. The sliding plate l is made to move backward and forward in the support F by the lever G, which is pivoted upon an arm, G', projecting upward and forward from the table of the frame A, this arm being solid with the support F, Figs. 1, 2, and 4. This lever G is moved and controlled by the cam m, mounted upon the shaft C, through and by means of the eccentric guide m', and the rod m^2, which has a pivoted connection with both guide and lever, Figs. 1, 2, and 4. The eccentric guide m' has a sliding dovetailed connection with a plate which is firmly attached to the table of the frame, Figs. 1 and 2. The cam m causes the eccentric guide m' to move backward and forward in the groove in this plate, and thus to operate the lever G, Figs. 1, 2, and 4. A screw-bolt, m^3, works through a threaded hole in the free end of the lever G, Figs. 1 and 3. The position of this bolt can be adjusted as desired by screwing it in or out. The lever G causes the bolt m^3 to strike the sliding plate l and force that plate forward. The plate l is drawn back by the backward movement of the same lever G, through and by means of the bolt n, the link n', and the bolt n^2, which is rigidly fastened into the lever G, Figs. 1, 3, and 7. When a sufficient length of wire has passed between the dies and has been firmly grasped by the inward movement of the sliding plate l, the wire is cut between the support j and the plate l by the cutting-tool h, Figs. 1 and 3. This cutting-tool is fitted into a slot in the arm h', and by means of the two screws shown in that arm can be moved backward or forward in the slot until its position is properly adjusted and then fastened firmly in such position. The cutter h is operated by the cam h^2, through and by means of the arm h^3, the rock-shaft h^4, the arm h', and the spring h^5, Figs. 1 and 2. When the cam h^2 forces the arm h^3 down, the spring h^5 is strained, the rock-shaft h^4 is turned, and the arm h' is moved inward and causes the tool h to cut the wire, as above stated. The rock-shaft h^4 has its

bearings in the iron box h^6, Fig. 2, which box is screwed to the sliding plate E, and forms one solid piece with the upright j. The cam h^2 holds the arm h^3 depressed for some length of time, during which the cutter h is consequently held over the mouth of the circular hole in the upright j, and thus prevents the introduction of any more wire during the time that the piece of wire just fed into the dies is being operated upon. When the cam h^2 releases the arm h^3 from downward pressure, the arm is forced up again by the spring h^5, Figs. 1 and 2. Any usual form of spring can be employed. When the arm h^3 is thus forced up, the cutting-tool h is drawn back from the wire. The box h^6, inclosing the rock-shaft h^4, is screwed to the sliding plate E, the screws passing through slots in said box in any ordinary way, so that the box, together with the upright support j, which is solid with it, and also the rock-shaft h^4, and the arm h', can be adjusted toward or away from the plate l, and there screwed fast, and thus the distance between the cutter h and the plate l can be regulated, and the amount of wire left between the cutter h and the plate l to form the head of the nail made more or less, as desired. The piece of wire thus cut off projects for a sufficient distance on each side of the plate l and the dies, to enable a head to be formed at each end, the amount of wire left projecting at the end nearest the cutter being regulated as above explained, and the amount of wire projecting to form the head at the other end being regulated by the screw-bolt i^7 in the head of the hammer i', Fig. 1, which bolt prevents the introduction of any more wire than is desired. This bolt can be made to admit more or less wire by being screwed forward or backward in the head of the hammer. The wire is headed at both ends by the hammers i and i', which deliver simultaneous blows at both ends of the wire, and thus flatten the ends out to form the heads. The hammer i' turns upon the pivot i^2, Fig. 1, which pivot is firmly fastened into projection F from the table A, Fig. 4. The hammer i' is moved by means of the cam i^3, mounted upon the shaft C, and the spring i^4, connecting the two hammers i and i', Fig. 1. The cam i^3 forces the back end of the hammer i' outward, and thus causes the forward end of the hammer to move inward and strike one end of the wire that is held between the dies. When the cam i^3 releases the back end of the hammer i', the spring i^4 acts to draw that end inward, and thus causes the forward end of the hammer i' to move away from the wire after the head has been formed. The hammer i, Fig. 1, is made to move upon the pivot i^5, which is firmly fastened into the sliding plate E by means of the cam i^6 and the spring i^4, the operation being similar to the operation of the hammer i. The cutter h and the hammer i are brought into their proper positions for cutting and heading the wire, alternately, by means of the sliding plate E, Figs. 1, 2, and 10. This plate is attached to the table A by a sliding dovetailed connection. (Shown in Fig. 2.)

Upon the plate E are firmly fastened the upright L, which supports the feeding mechanism, the straightener D, the box h^6, inclosing the rock-shaft h^4, which supports the arms h' and h^3 of the cutting apparatus, and lastly the upright j. The hammer i, as above stated, is also connected with the plate E by the pivot i^5. The plate E is moved forward and backward by the double cam g, Figs. 1 and 3, through and by means of the friction-wheels g' g', and the bar g^2, which works in a slot in the upright g^3, projecting from the table A, and which bar is connected to the plate E in any ordinary way, such as is shown at g^4 in Fig. 1. When the wire has been cut by the tool h, the double cam g causes the sliding plate E to move forward in such a way that when the cam i^6 causes the hammer i to strike its blow the hammer is in position to deliver its blow upon the end of the wire held between the dies. When the hammer i has delivered its blow, the plate E is moved back again in such a way as to bring the cutter h and the feeding and straightening mechanisms into place to again feed in and cut off another piece of wire.

In order that the relative positions of the cog-wheels e^3 and e^4, Figs. 1 and 10, may not be altered when the sliding plate E moves forward and backward, the shaft e', as before explained, upon which is mounted the cog-wheel e, has a circular hole bored through it, into which hole the shaft e^2 is made to fit in such a manner that it can move forward and backward longitudinally in the shaft e', Fig. 10. The shafts e' and e^2 are made to constantly revolve with each other by means of a slot in the shaft e^2, and a key projecting from the inner side of the shaft e' and fitting into the slot in the shaft e^2. As the shaft e^2 moves forward and backward in the shaft e', the key projecting from the shaft e' moves forward and backward in the slot, and at the same time causes the shaft e^2 to revolve with the shaft e'. The shaft e^2, at its forward end, has bearings in a projecting arm of the upright L and is made to move forward and backward with this arm and with the plate E, by means of the collars f' f^2, Fig. 1, which are fastened to the shaft e^2. The forward ends of the hammers i and i' are fitted with screw-bolts i^7 i^8, as shown in Fig. 1, the inner ends of which bolts are the striking-surfaces. By means of the screw the position of these striking-surfaces can be properly adjusted.

The device shown at M, Fig. 1, is used to limit the backward stroke of the hammer i', and thus to determine the amount of wire that shall be left to form the head of the nail on the side of the plate l farthest from the cutter h. This device consists merely of an upward projection from the plate A, through the top of which a screw-bolt works. By moving this screw in one direction the inward stroke of the back end of the ham-

mer, caused by the contraction of the spring i^4, is shortened and the head of the hammer i' is kept nearer the plate l and the dies, so that less wire is admitted to form the head of the nail on the side of the dies away from the cutter h. By turning the screw-bolt at M in the other direction more wire is admitted by the hammer i'. The screw-bolt i^7 in the head of the hammer i' also aids, as before explained, in regulating the amount of wire admitted on that side to form the head. As the hammers i and i' strike the opposite ends of the wire at the same moment, it is impossible for the wire, when thus struck, to give or slip in either direction, and thus there is a saving in my machine of all the force heretofore necessary in other nail-machines to prevent the wire from slipping between the jaws or parts of the gripping or holding device when the blow was struck. In this way great economy is secured in my machine. The dies hold the wire snugly enough during the greater part of its length to prevent any lateral giving of the wire. Moreover, in my machine the heading hammers move only through a short space, whereas in other nail-machines the hammers are made to move through much greater distances, and hence require much greater force to move them. When the wire has been headed in the above manner at both ends, it is cut in the middle, and the points of the two nails are formed at the same time by the co-operating tools o and p, Figs. 5, 7, and 8. The tool o is moved forward and backward by the cam o', Fig. 1, mounted upon the shaft C, through and by means of the eccentric guide o^2 and the tool rod or arm o^3. The tool-arm o^3 is screwed into the eccentric guide in any common way, as in Fig. 1. The eccentric guide o^2 has a dovetailed sliding connection with a plate attached to the table A, Fig. 1. The tool is fitted into the tool-arm in any ordinary way, as by a slot-connection. The tool o and the arm o^3 are made to slide in a slot in the plate k^2, Fig. 5, and the upright support F. The tool p, Figs. 1 and 5, is made to move in upon the wire by means of the cam p^2 through and by means of the eccentric guide p^3, the bar p^4, the lever p^5, and the tool-arm p^6. The bar p^4 has pivoted connection with both the eccentric guide p^3 and the lever p^5, as shown in Fig. 1. The cam p^2 is mounted on the shaft C, and the eccentric guide p^3 has a sliding dovetailed connection with a plate attached to the table A, Fig. 1. Through the end of the lever p^5 a circular threaded hole is bored through which the screw-bolt p^7 works, the bolt p^7 bearing upon the head of the tool-arm p^6, Fig. 1. The bolt p^7 may be properly adjusted by being screwed in or out. When the cam p^2 pushes the bar p^4 forward, the motion of the lever p^5 causes the bolt p^7 to drive the tool-arm p^6 and the tool p in upon the wire. The tool p is fastened into the tool-arm p^6 in any usual manner, as by a slot-connection. The tool-arm p^6 can be drawn back by connecting it in any ordinary manner with the lever p^5, or the tool-arm can be made with two shoulders, one on each side, as shown in Fig. 1, so that when the sliding plate l is drawn back by the lever G the plate l will strike against these shoulders and thus force the tool-arm back. The tools o and p are shaped at their points in any desired manner, one form being shown in Figs. 7 and 8, by which the wire is cut in the middle by the vertical edge of the tools, and at the same time each point is rounded so as to produce two nails, such as are shown in Fig. 9. When the wire has been thus cut and pointed in the middle, the sliding plate l is drawn forward, as before explained, and the two completed nails drop down through the opening in the table A. (Shown in Fig. 1.)

What I claim as new, and desire to secure by Letters Patent, is—

1. In combination with the cutting-tools o and p, a double set of holding-dies, $k\,k'$ and $k\,k'$, and reversed heading-hammers $i\,i'$, and shaft C, having tool-driving cams o' and p^2, and hammer-driving cams i^3 and i^6, and mechanism for connecting said parts, whereby the wire is headed at both ends by a simultaneous stroke of the hammers and cut at or near the middle, forming two nails, substantially as and for the purposes set forth.

2. In combination with the cutting-tools o and p, a double set of holding-dies, $k\,k'$ and $k\,k'$, the sliding plate $l\,l^2$, carrying the half-dies $k'\,k'$, and reversed heading-hammers $i\,i'$, and the shaft C, having tool-driving cams o' p^2, and hammer-driving cams i^3 and i^6, and cam m, sliding the die-holding plate $l\,l^2$, and mechanism for connecting said parts, substantially as and for the purposes set forth.

3. In a nail-machine, the sliding die-holding plate $l\,l^2$, in combination with cam m, eccentric guide m', connecting-rod m^2, lever G, connecting-link n', and adjustable screw or buffer m^3, substantially as and for the purposes set forth.

4. In a nail-machine, the combination of the cutting-tool o, arm o^3, eccentric guide o^2, and driving-cam o', the cutting-tool p, arm p^6, lever p^5, rod p^4, eccentric guide p^3, and cam p^2, a double set of holding-dies, $k\,k'\,k\,k'$, heading-hammers $i\,i'$, spring i^4, and driving-cams i^3 and i^6, substantially as and for the purposes set forth.

5. In a nail-machine, the combination of the cutting-tool o, arm o^3, eccentric guide o^2, and driving-cam o', the cutting-tool p, arm p^6, adjusting-screw p^7, lever p^5, rod p^4, eccentric guide p^3, and cam p^2, a double set of holding-dies, $k\,k'\,k\,k'$, heading-hammers $i\,i'$, spring i^4, and driving-cams i^3 and i^6, substantially as and for the purposes set forth.

6. In a nail-machine, the combination of the cutting-tool o, arm o^3, eccentric guide o^2, and driving-cam o', the cutting-tool p, arm p^6, lever p^5, rod p^4, eccentric guide p^3, and cam p^2, a double set of holding-dies, $k\,k'\,k\,k'$, fixed die-holding plate $k^2\,k^3$, sliding die-holding plate $l\,l^2$, link n', lever G, rod m^2, eccentric

guide m', cam m, heading-hammers $i\,i'$, spring i^4, and driving-cams i^3 and i^6, substantially as and for the purposes set forth.

7. In combination with the cutting-tools o and p, a double set of holding-dies, $k\,k'$ and $k\,k'$, and reversed heading-hammers $i\,i'$, the hammers having head-adjusting screws i^7 i^8, and shaft C, having tool-driving cams o' and p^2, and hammer-driving cams i^3 and i^6, and mechanism for connecting said parts, substantially as and for the purposes set forth.

8. In combination with the cutting-tools o and p, a double set of holding-dies, $k\,k'$ and $k\,k'$, and reversed heading-hammers $i\,i'$, the hammer i' having adjusting set-screw M, and shaft C, having tool-driving cams o' and p^2, and hammer-driving cams i^3 and i^6, and mechanism for connecting said parts, substantially as and for the purposes set forth.

9. In combination with the cutting and pointing tools o and p, a double set of holding-dies, $k\,k'$ and $k\,k'$, and reversed heading-hammers $i\,i'$, and shaft C, having tool-driving cams o' and p^2, and hammer-driving cams i^3 and i^6, and mechanism for connecting said parts, substantially as and for the purposes set forth.

10. In a nail-machine, the combination of the cutting-tool o, arm o^3, eccentric guide o^2, and driving-cam o', the cutting-tool p, shouldered arm p^6, lever p^5, rod p^4, eccentric guide p^3, and cam p^2, a double set of holding-dies, $k\,k'\,k\,k'$, fixed die-holding plate k^2 k^5, sliding die-holding plate $l\,l^2$, link n', lever G, rod m^2, eccentric guide m', cam m, heading-hammers $i\,i'$, spring i^4, and driving-cams i^3 and i^6, substantially as and for the purposes set forth.

11. In a nail-machine, the combination, with suitable holding-dies, of a heading-hammer having an adjusting set-screw, M, and a head-adjusting screw and a driving-cam, i^7, substantially as and for the purposes set forth.

12. In combination with the cutting-tools o and p, a double set of holding-dies, $k\,k'$ and $k\,k'$, and reversed heading-hammers $i\,i'$, the sliding plate E, carrying hammer i, and shaft C, having tool-driving cams o' and p^2, and hammer-driving cams i^3 and i^6, and double cam $g\,g$, reciprocating the plate E, and mechanism for connecting said parts, substantially as and for the purposes set forth.

13. In a nail-machine, a wire-cutting device consisting of the cam h^2, the cutting-tool h, and the connecting rock-shaft and lever-arms $h^4\,h^3$ h', substantially as and for the purposes set forth.

14. In a nail-machine, a wire-cutting device consisting of the cam h^2, the cutting-tool h, and the connecting rock-shaft and lever-arms $h^4\,h^3$ h', in combination with the sliding plate E and its driving-cam $g\,g$ and connecting parts, substantially as and for the purposes set forth.

15. In a nail-machine, a wire-cutting device consisting of the cam h^2, the cutting-tool h, and the connecting rock-shaft and lever-arms $h^4\,h^3$ h', in combination with the longitudinally-adjustable box h^6, carrying the rock-shaft h^4, whereby the cutting device may be adjusted toward or from the holding devices of the nail-machine, substantially as and for the purposes set forth.

16. In a nail-machine, a wire-cutting device consisting of the cam h^2, the cutting-tool h, and the connecting rock-shaft and lever-arms $h^4\,h^3$ h', and the perforated support j, substantially as and for the purposes set forth.

17. In combination with the cutting-tools o and p, a double set of holding-dies, $k\,k'$ and $k\,k'$, and reversed heading-hammers $i\,i'$, the sliding plate E, carrying hammer i, and wire-cutting tool h, and shaft C, having tool-driving cams o' and p^2, and hammer-driving cams i^3 and i^6, and double cam $g\,g$, reciprocating the plate E, and cam h^2, rocking the cutting-tool h, and mechanism for connecting said parts, substantially as and for the purposes set forth.

18. In combination with the cutting-tools o and p, a double set of holding-dies, $k\,k'$ and $k\,k'$, and reversed heading-hammers $i\,i'$, the sliding plate E, carrying hammer i, and adjustable wire-cutting device, consisting of tool h, rock-shaft and lever-arms $h^4\,h^3\,h'$, and longitudinally-adjustable box h^6, carrying the rock-shaft h^4, and shaft C, having tool-driving cams o' and p^2, and hammer-driving cams i^3 and i^6, and double cam $g\,g$, reciprocating the plate E, and cam h^2, rocking the cutting-tool h, and mechanism for connecting said parts, substantially as and for the purposes set forth.

19. In combination with the cutting-tools o and p, a double set of holding-dies, $k\,k'$ and $k\,k'$, and reversed heading-hammers $i\,i'$, the sliding plate E, carrying hammer i, and adjustable wire-cutting device, consisting of tool h, rock-shaft and lever-arms $h^4\,h^3\,h'$, perforated support j, and longitudinally-adjustable box h^6, carrying the rock-shaft h^4 and shaft C, having tool-driving cams o' and p^2, and hammer-driving cams i^3 and i^6, and double cam $g\,g$, reciprocating the plate E, and cam h^2, rocking the cutting-tool h, and mechanism for connecting said parts, substantially as and for the purposes set forth.

20. In a nail-machine, the straightener D and perforated support j, in combination with the cutting device, consisting of the tool h, the cam h^2, and intervening rock-shaft and lever-arm connections, substantially as shown and described.

21. In combination with the holding-dies of a nail-machine, the straightener D, perforated support j, wire-cutting device $h\,h^2$, with intervening rock-shaft and lever-arm connections, and the reciprocating plate E, with driving-cam $g\,g$ and intervening connections, and heading-hammer i, and suitable driving-cam i^6, substantially as and for the purposes set forth.

22. In a nail-machine, the combination of the feed-rolls $d\,d$, the shafts on which said rolls are mounted, pinions for connecting these roll-shafts, and the shaft e^2, the shaft e^2 having a

sliding connection with the hollow shaft e', and mechanism for imparting motion to the shaft e', substantially as and for the purposes set forth.

23. In a nail-machine, a feeding device consisting of the correspondingly-grooved rolls d d, shafts e^7 e^8, and suitable driving mechanism, the box e^9, carrying shaft e^8 and pivoted at f f, and the adjusting-screw f^3, whereby the distance of the rolls apart may be adjusted, substantially as and for the purposes set forth.

24. In a nail-machine, the combination, with the reciprocating plate E and means for reciprocating it, the straightener D, the perforated support j, wire-cutting mechanism h h^2, and connecting parts, and heading-hammer i and its driving-cam i^6, of a feeding device consisting of the correspondingly-grooved rolls d d, sliding shaft e^2, and connecting mechanism, and shaft e', and beveled cogs e and b, substantially as and for the purposes set forth.

25. In a nail-machine, the combination, with the cutting-tools o and p, a double set of holding-dies, k k' and k k', reversed heading-hammers i i', sliding plate E carrying hammer i, and wire-cutting tool h, of a feeding device consisting of the correspondingly-grooved rolls d d, having a portion of their periphery slightly grooved and the remaining portion deeply grooved, and a common shaft, C, having tool-driving cams o' and p^2, hammer-driving cams i^3 and i^6, double cam g g, reciprocating the plate E, cam h^2, rocking the cutting-tool h, and beveled cog-wheel b, driving the feeding-rolls d d, and suitable connecting parts, substantially as and for the purposes set forth.

26. In a nail-machine, the combination, with the cutting-tools o and p, a double set of holding-dies, k k' and k k', reversed heading-hammers i i', sliding plate E, carrying hammer i, and wire-cutting tool h, and straightener D, and perforated support j, of a feeding device consisting of the correspondingly-grooved rolls d d, having a portion of their periphery slightly grooved and the remaining portion deeply grooved, and a common shaft, C, having tool-driving cams o' and p^2, hammer-driving cams i^3 and i^6, double cam g g, reciprocating the plate E, cam h^2, rocking the cutting-tool h, and beveled cog-wheel b, driving the feeding-rolls d d, and mechanism for connecting said parts, substantially as and for the purposes set forth.

27. In a nail-machine, a feeding and barbing device consisting of the correspondingly grooved and toothed rolls d d, and suitable driving mechanism, the rolls having a portion of their periphery slightly grooved and the remaining portion deeply grooved, the portion slightly grooved being in part notched or toothed, whereby the wire is gripped between the rolls at successive intervals fed into the machine in definite lengths, and barbed along definite portions of those lengths, substantially as and for the purposes set forth.

28. In a nail-machine, the combination of cutting and heading devices with a sliding plate on which the cutting and heading devices are mounted, and mechanism for moving said plate so as to bring the heading device into position, substantially as and for the purposes set forth.

29. In a nail-machine, the combination of a sliding plate on which are mounted feeding, cutting, and heading devices, with gripping-jaws and mechanism for reciprocating said plate so as to bring the heading-tool opposite the gripping-jaws, substantially as and for the purposes set forth.

JOHN W. COURT.

Witnesses:
DANIEL H. DRISCOLL,
EDWIN SEGER.