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L. GODDU.

MACHINE FOR MAKING CUT NAILS.

No. 370,135. Patented Sept. 20, 1887.

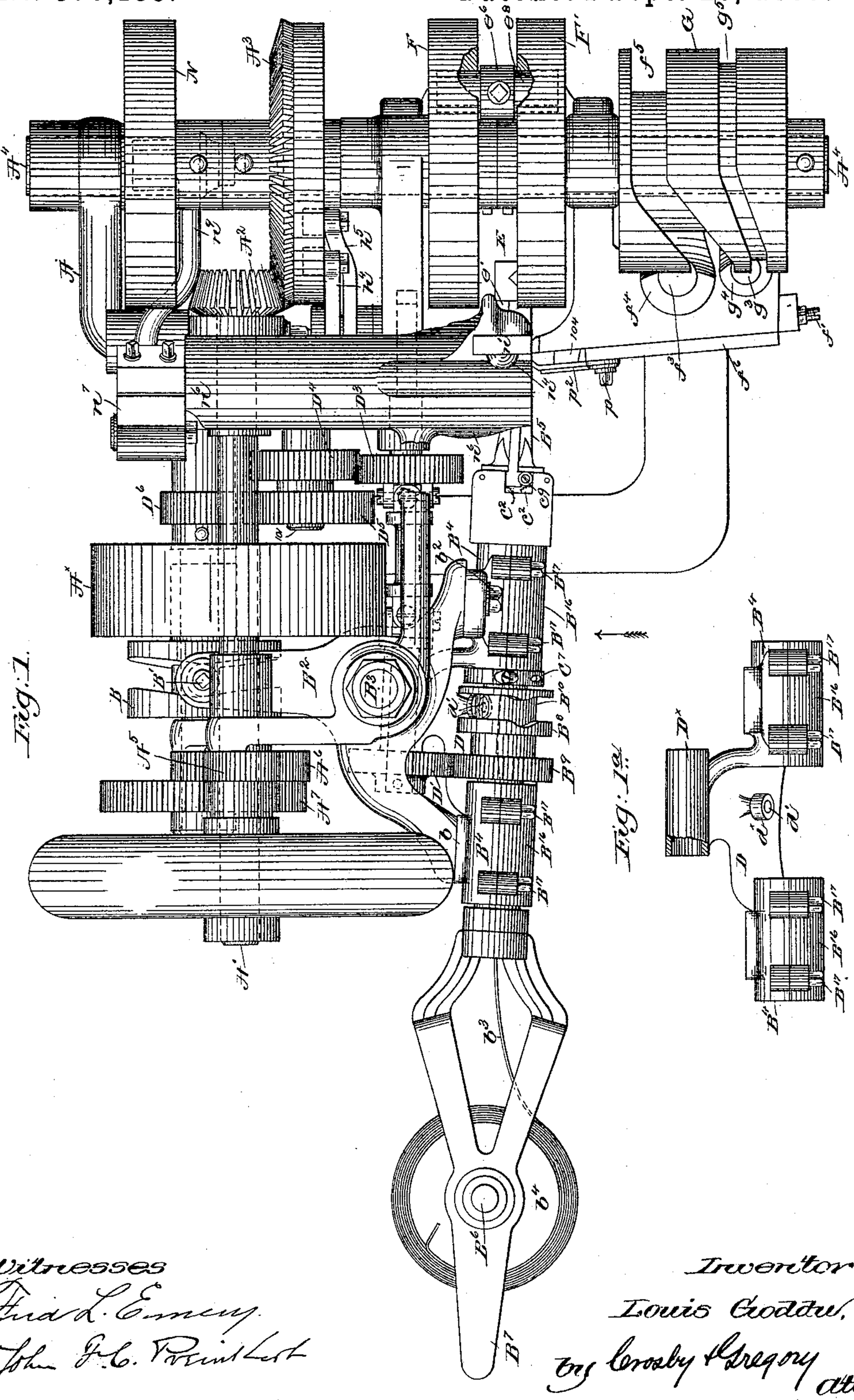

Fig. 1.

Fig. 1a.

Witnesses
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L. GODDU.

MACHINE FOR MAKING CUT NAILS.

No. 370,135. Patented Sept. 20, 1887.

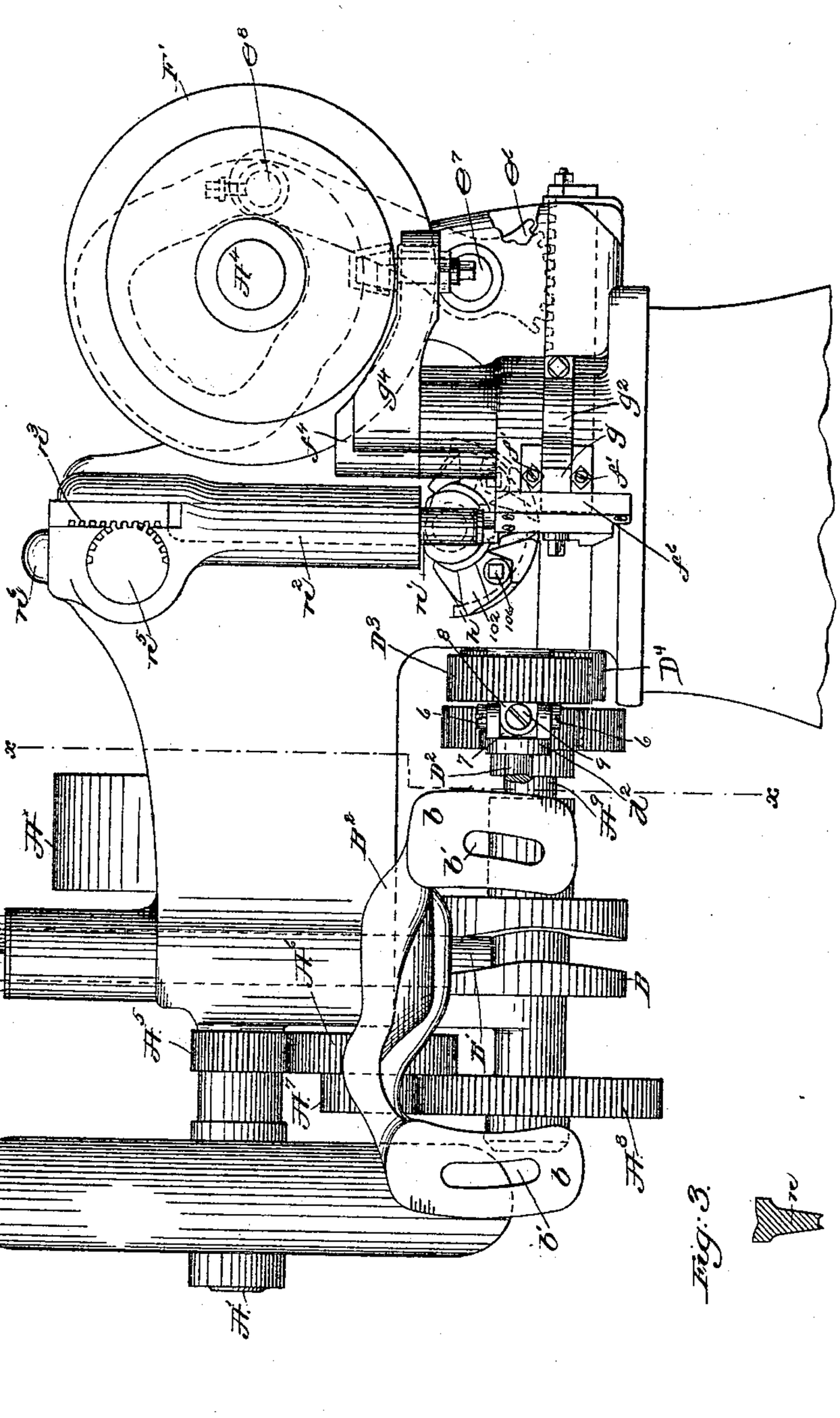

Fig. 2.

Fig. 3.

Witnesses
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L. GODDU.

MACHINE FOR MAKING CUT NAILS.

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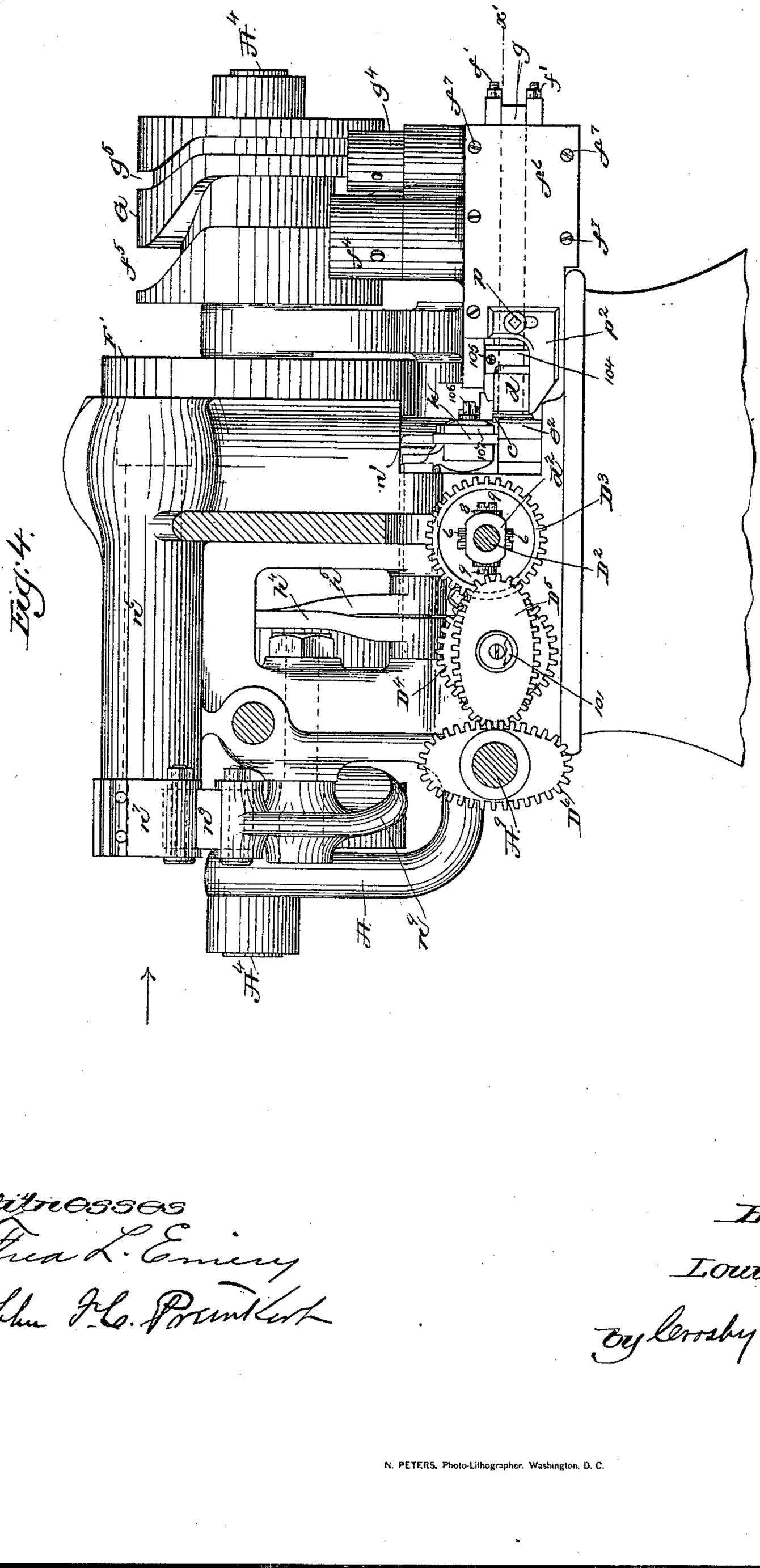

Witnesses
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(No Model.) 7 Sheets—Sheet 4.

L. GODDU.

MACHINE FOR MAKING CUT NAILS.

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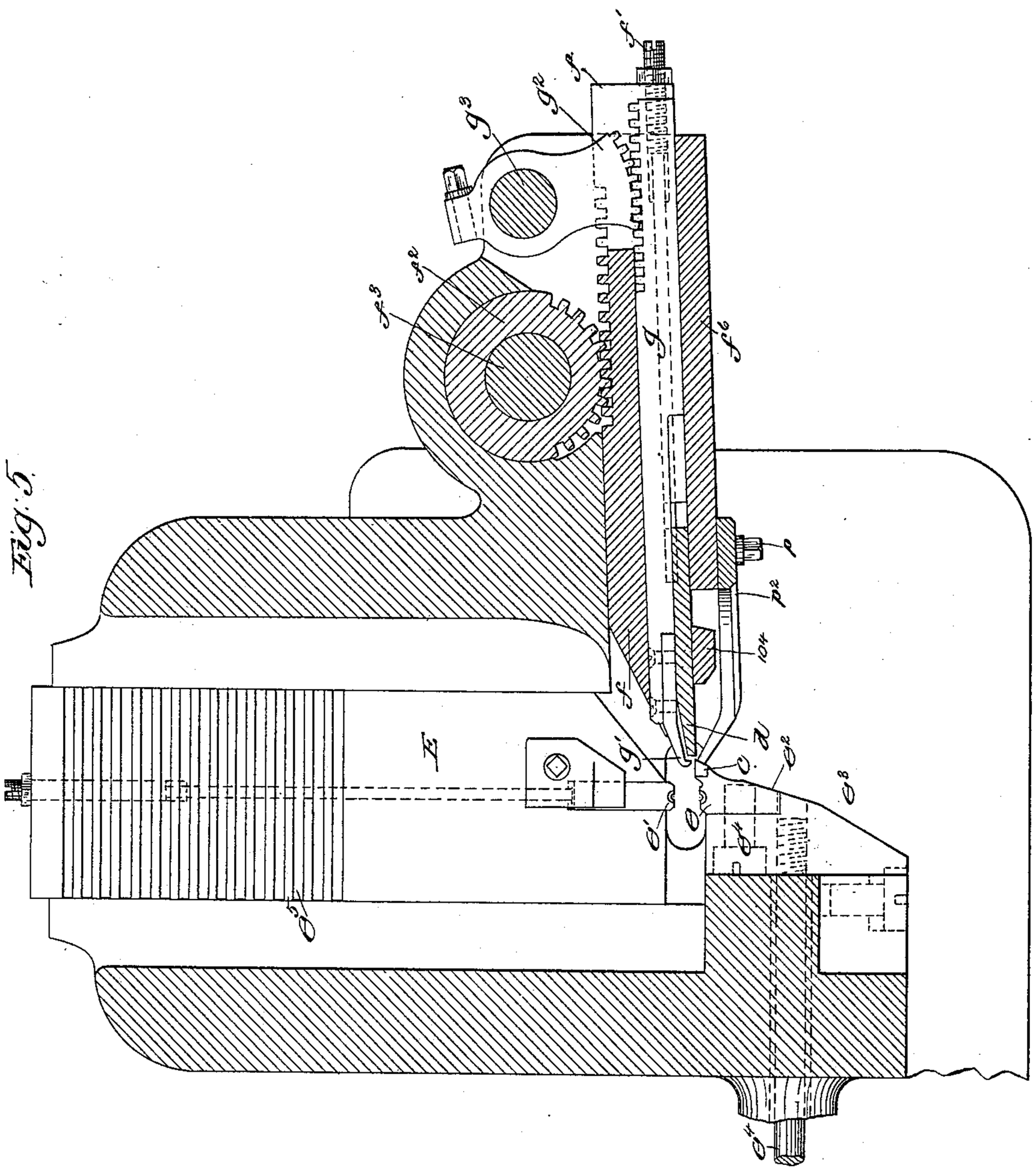
Fig. 5.



Witnesses
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MACHINE FOR MAKING CUT NAILS.

No. 370,135. Patented Sept. 20, 1887.

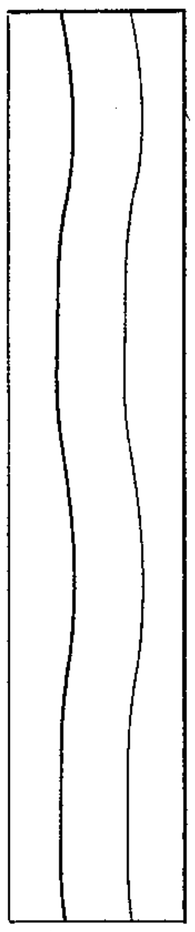

Fig. 9.

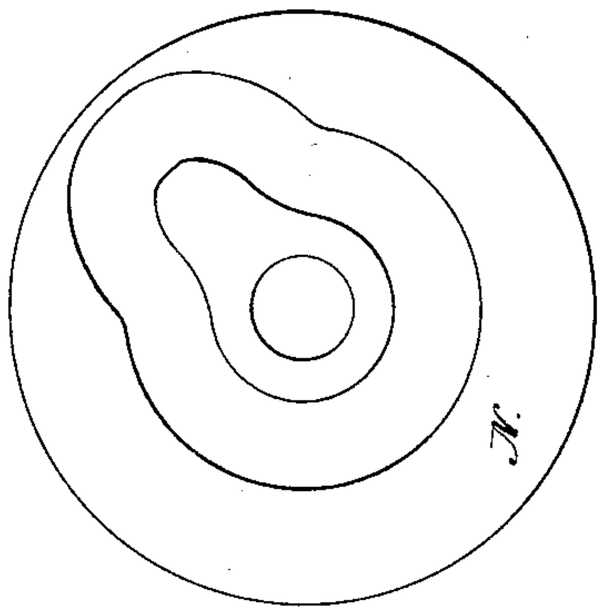

Fig. 7.

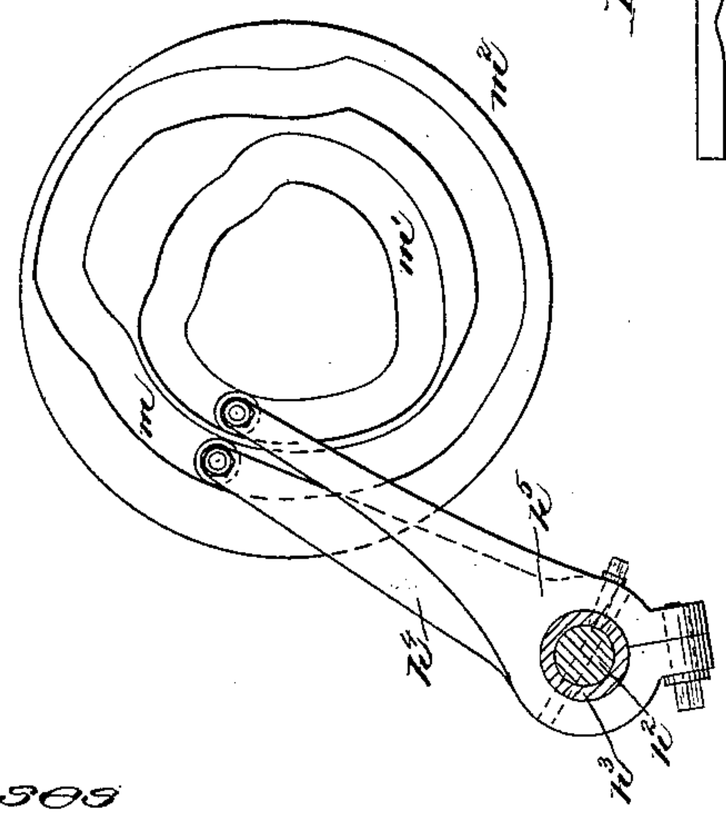

Fig. 6.

Fig. 8.

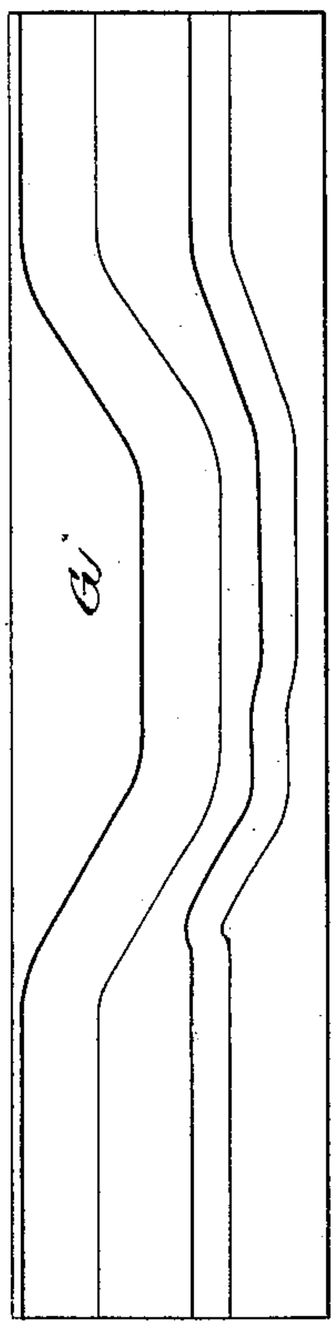

Fig. 10.

Witnesses
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L. GODDU.

MACHINE FOR MAKING CUT NAILS.

No. 370,135. Patented Sept. 20, 1887.

Fig. 11.

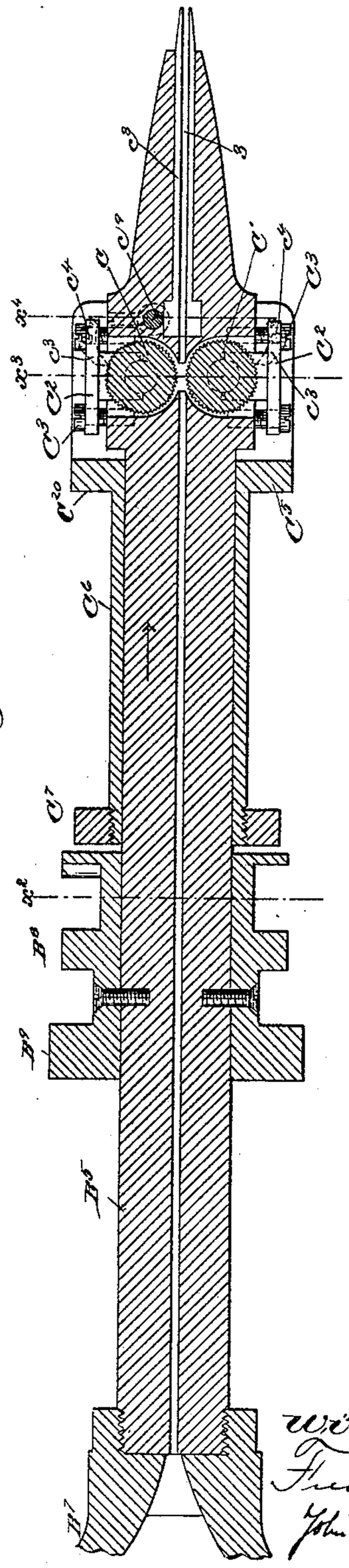


Fig. 12.

Fig. 13.

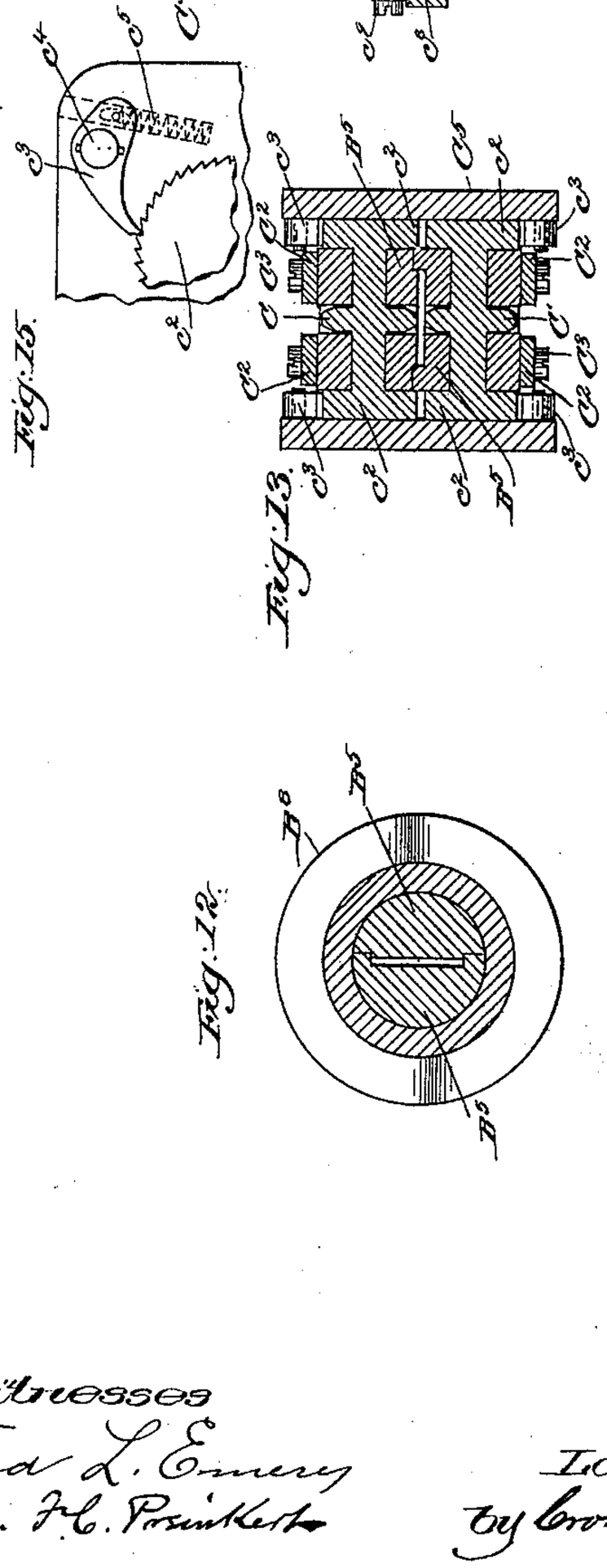
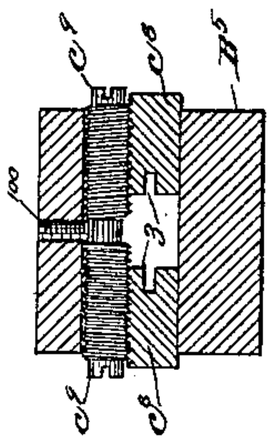


Fig. 14.



Witnesses
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John F. C. Poerinkert

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(No Model.) 7 Sheets—Sheet 7.

L. GODDU.

MACHINE FOR MAKING CUT NAILS.

No. 370,135. Patented Sept. 20, 1887.

Fig. 17.

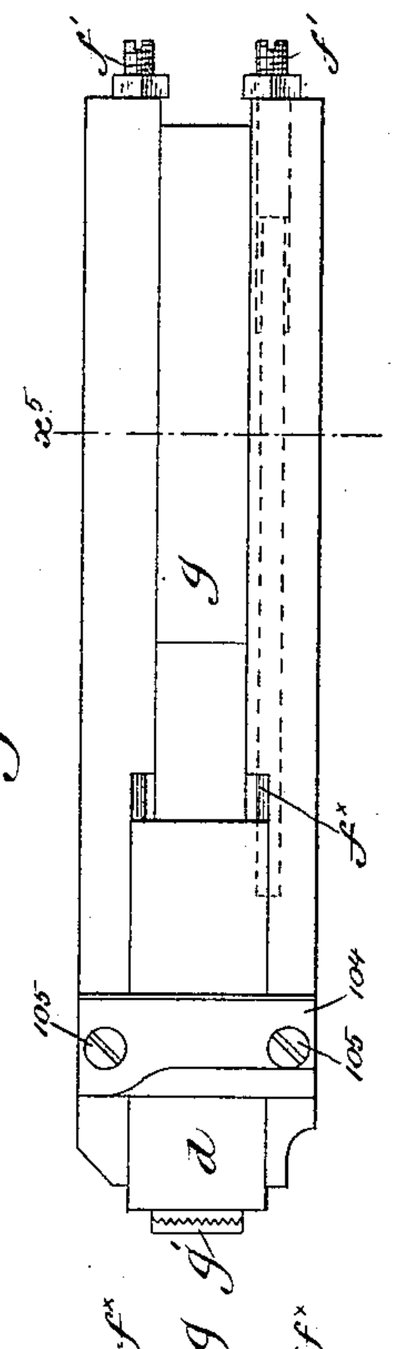

Fig. 18.

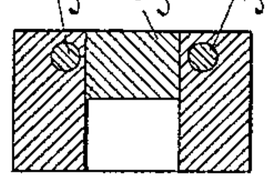

Fig. 16.

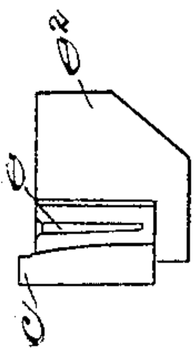

Fig. 19.

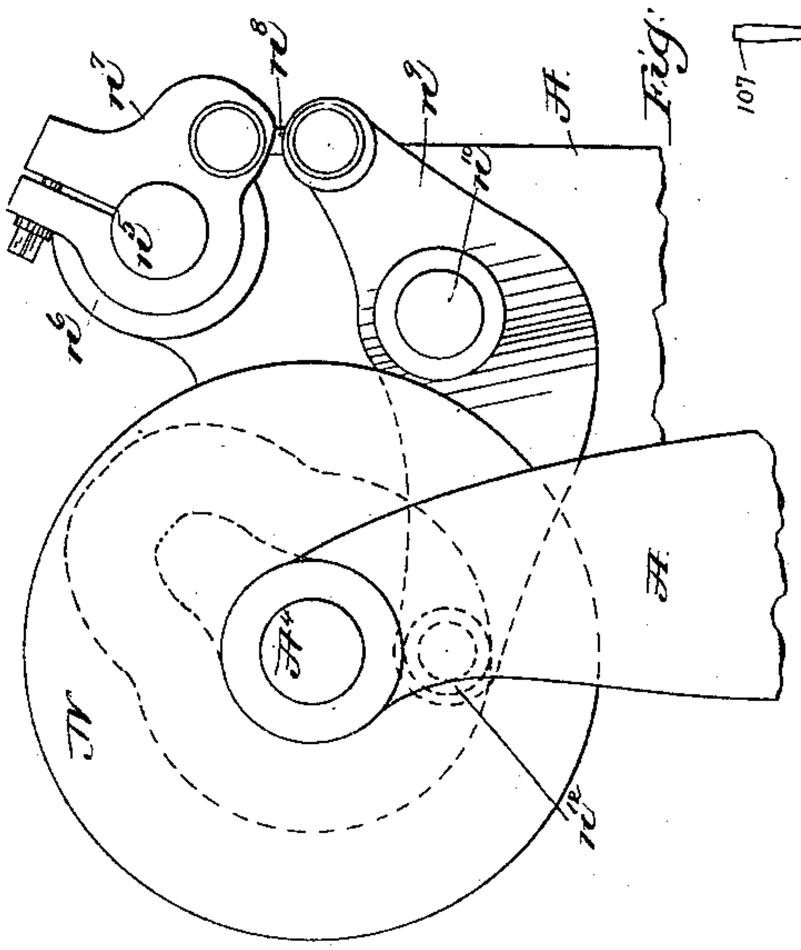

Fig. 23.

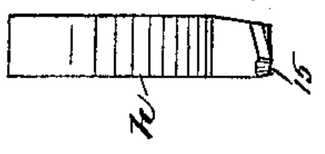

Fig. 22.

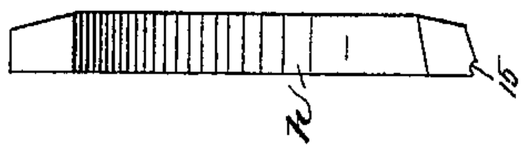

Fig. 20.

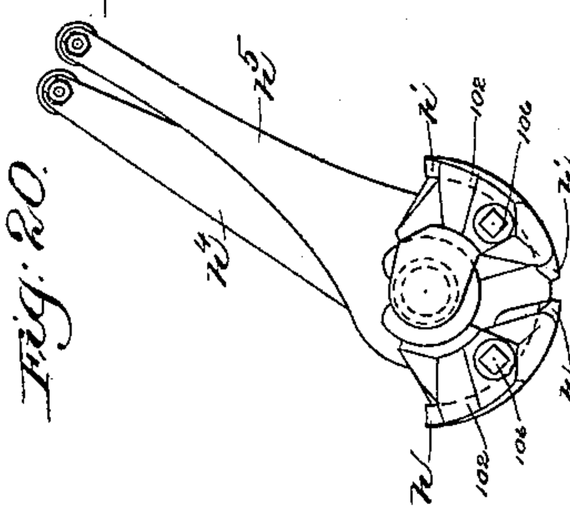

Fig. 21.

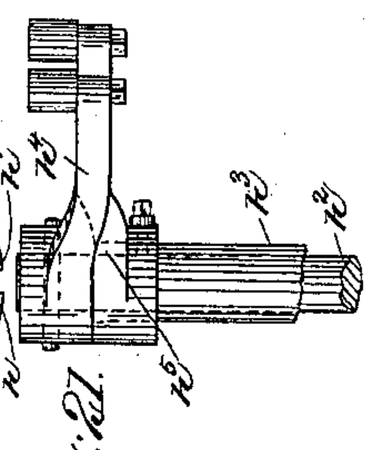

Fig. 25.

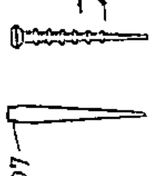

Fig. 24.

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attys.

UNITED STATES PATENT OFFICE.

LOUIS GODDU, OF WINCHESTER, ASSIGNOR TO JAMES W. BROOKS, TRUSTEE, OF CAMBRIDGE, MASSACHUSETTS.

MACHINE FOR MAKING CUT NAILS.

SPECIFICATION forming part of Letters Patent No. 370,135, dated September 20, 1887.

Application filed November 5, 1886. Serial No. 218,096. (No model.)

To all whom it may concern:

Be it known that I, LOUIS GODDU, of Winchester, county of Middlesex, and State of Massachusetts, have invented an Improvement in Nail-Making Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention has for its object to improve the construction of that class of nail-making machines wherein the nail is cut from across a nail strip or plate.

In my improved machine the strip or plate of material to be cut in the direction of its width to form nails tapering at their sides from point to head is held in a spindle, which, as herein shown, has imparted to it a varying rotary movement in the same direction, the spindle presenting the end of the strip to cutters which cut it transversely, the said spindle being provided with mechanism for feeding the nail strip or plate longitudinally. Besides its movement of rotation, the said spindle is vibrated toward and from the cutter. The center of the spindle is inclined with relation to the cutting-edges of the cutters, and the degree of taper of the body of the nail is determined by the angle of presentation of the nail strip or plate to the edge of the cutters. The speed of rotation of the spindle is automatically varied at each rotation to cause it to run fast when the spindle is swung laterally away from the stationary cutter, the slow speed being operative while the cutters are acting to cut the strip or plate. The end of the strip or plate just before it is to be cut off is grasped between a hook or clamp and the end of the movable cutter, the said hook moving longitudinally with the cutter, while the latter, co-operating with a stationary cutter located near the dies to shape the body of the nail, cuts the strip or plate to form a blank, the said hook and movable cutter member serving to grasp and hold the blank as cut from the strip until the said blank is placed in line with the dies, which are to be closed together about the said blank to shape its body and, it may be, its head. The head end of the blank, always uppermost, is grasped between a pair of jaws, which take it laterally from between the said hook and the end of the movable member of the cutter, the said hook being moved independently of the said cutter to release the said blank after the said jaws have caught it, and the jaws having taken the blank from between the hook and movable cutter member, the said hook and cutter member are moved backward into position ready to again receive the end of the strip or plate between them. These jaws carry the blank laterally into the stationary die, where it is caught by the movable die, and the body of the blank is shaped to form a nail, and preferably the said blank is headed by a header which descends between the jaws, which are opened just after the dies catch the blank. The blank having been shaped, the dies are separated to release the blank prior to its discharge from between the dies.

When the jaws are opened, as described, to release the head of the blank, as the body of the blank is grasped by the dies that one of the jaws nearest the movable die is moved back, but not as far as the movable die is thereafter to be retracted, and consequently as the movable die is subsequently retracted the head of the nail, should it happen to stick in the movable die, meets the end of that jaw and detaches the nail from the movable die. On the contrary, should the nail happen to stick in the stationary die, its head will be struck and dislodged by that member of the said jaws nearest it, as the two jaws previously opened are further oscillated in the same direction to bring them back into their normal open position to receive the head of the next blank. The dies are opened as soon as the header delivers its blow; but the open jaws are not returned, as described, to their normal position until after the header has been retracted.

Each of the jaws referred to is operated independently of the other in its opening and closing movement, and both jaws turn about the same center; but their movements are unlike in extent according to the requirements of the machine, the particular movement of each jaw with relation to the other and the dies and other devices being determined by two cams.

My invention in nail-making machines consists, essentially, in the combination, with a spindle to carry a nail strip or plate and cut-

ters to sever the said strip or plate, of a hook or clamp co-operating with one of the cutter members preparatory to severing the strip or plate to form a blank, as will be described; also, in a nail-making machine, a spindle to receive a nail strip or plate and means to both rotate and oscillate it, combined with cutters to sever the said strip or plate, and with a hook or clamp to move with one of the cutters and aid in holding the blank after it has been cut from the said strip or plate; also, in a nail-making machine, a spindle to carry a nail strip or plate and means to rotate the said spindle at a variable speed, combined with cutters to sever the said strip or plate transversely; also, in a nail-making machine, a rotating spindle to carry a nail strip or plate, cutters to sever the said strip or plate, and a hook or clamp to co-operate with one of the members of the said cutters to hold the severed blank, combined with a pair of jaws to take the blank from the hook or clamp and cutter member, and with a pair of dies to shape the body of the blank.

Other features of my invention will be hereinafter described, and specified in the claims.

Figure 1 is a plan view of a machine embodying my invention. Fig. 1ª is a detail of the spindle-carrying frame detached. Fig. 2 is an elevation of Fig. 1, looking at it in the direction of the arrow thereon, the spindle being omitted; Fig. 3, a sectional detail of the end of the header. Fig. 4 is a section of Fig. 2 in the dotted line $x\,x$, looking toward the right. Fig. 5 is a partial horizontal section of Fig. 2 in the line x', chiefly to show the dies, cutters, and hook or clamp; Fig. 6, a detail of the cam-hub and part of the devices for moving the jaws, to be described. Fig. 7 is a side elevation of the cam for moving the head-forming tool. Figs. 8, 9, and 10 represent other developed cams, to be described. Fig. 11 is a longitudinal section of the spindle; Fig. 12, a section of Fig. 11 in the line x^2. Fig. 13 is a section of Fig. 11 in the line x^3. Fig. 14 is a section of Fig. 11 in the line x^4, looking toward the right. Fig. 14ª is a plan view of the spindle, looking down on Fig. 11. Fig. 15 is a detail of the pawl and ratchet of the feeding mechanism of the spindle. Fig. 16 is a detail of the stationary die and stationary cutter member. Fig. 17 is a detail of the movable cutter member and the hook or clamp co-operating with it. Fig. 18 is a section of Fig. 17 in the line x^5. Fig. 19 is a detail view of the lever and cam employed to move the rock-shaft that actuates the heading-tool or header; Fig. 20, a detail in front elevation of the jaws for transferring the blank into the stationary die. Fig. 21 a partial top view of Fig. 20. Fig. 22 is an under side view of one of the jaws detached from its carrier and enlarged; Fig. 23, a top view of Fig. 22. Fig. 24 is a detail of the blank as shaped between the jaws, and Fig. 25 shows a completed headed nail.

The frame-work A of the machine, of proper shape to sustain the working parts, has suitable bearings to support the main driving-shaft A′, provided with a belt-pulley, A×, and a balance-wheel, the said shaft having at one end a bevel-pinion, A^2, which engages a bevel-gear, A^3, fast on and rotating the cam-shaft A^4.

The shaft A′ is provided with a pinion, A^5, which engages a gear, A^6, having attached to it a pinion, A^7, which latter engages a gear, A^8, fast on and rotates the shaft A^9, the said pinion A^7 and gear A^6 being simply intermediate for the reduction of speed.

The shaft A^9 has fast on it a cam-hub, B, which receives in it a roller or other stud, B′, secured to one end of and so as to vibrate a three-armed lever or spindle-carrier, B^2, pivoted at B^3 to a part of the frame-work, the said lever having two ears, $b\ b$, (shown best in Fig. 2,) and slotted at $b'\ b'$, for the reception of suitable bolts, as b^2, but one bolt being shown (see Fig. 1) by which to adjustably attach to the said lever B^2 a yoke, D, (see Fig. 1ª,) it having one-half of each bearing B^4 for the spindle B.

The spindle B^5 is composed of two nearly semicircular parts (see Fig. 12) suitably grooved for the reception of a nail strip or plate, b^3, of metal, to be cut diagonally to form blanks for nails.

The slots b' enable the bearings B^4 for the spindle B^5 to be adjusted in such manner as to vary the inclination of the center of rotation of the said spindle with relation to the edge of the cutter c, to thus provide for variations in the taper of the blank to be cut; and so, also, the said bearings may be raised or lowered together to place the center of rotation of the spindle B^5 more or less distant from the upper corner of the stationary cutter c, to thus adapt the machine to strips of different width, and also to enable more or less of the blank to be left above the hook or clamp g' to insure more or less of a head. The caps B^{16}, co-operating with the bearing portions B^4, are held in place by bolts B^{17}.

The strip b^3 is herein shown as taken from a hub or spool, b^4, mounted to rotate on a stud or other suitable axis or shaft, B^6, mounted in a yoke-like extension, B^7, of the spindle.

The cam B in its rotation causes the lever B^2 to be vibrated about its pivot B^3, and carry with it the spindle B^5, so that the delivery end or nose of the said spindle is vibrated toward and from the stationary member c (see Figs. 5 and 16) of the cutting mechanism and toward and from the dies $e\ e'$, to be described. This spindle B^5 has fast upon it a hub, B^8, provided with a gear, B^9, and with a cam-groove, B^{10}. The spindle B^5, near its delivery end, is recessed for the reception of the feeding-rolls C C′, which are to feed the strip or plate b^3 longitudinally in the said spindle. The boxes which act upon the journals of the said feeding-rollers are held in place by caps C^2 and screws C^3. The journals or heads c^2 at the ends of the feed-rolls C C′ are toothed to constitute ratchet-wheels to be engaged by pawls c^3, pivoted each on a stud, c^4, attached to the

casing C^5, the said pawls being acted upon each by a spring, c^5. (Shown only in Fig. 15.)

The casing C^5 forms a connected part of a sleeve, C^6, which is extended through that one of the bearings B^4 nearest the delivery end of the spindle B^5, the sleeve C^6 constituting not only a pawl-holder, but also a lining for the said bearing.

The sleeve C^6 is screw-threaded at one end, (see Fig. 11,) and inserted through the bearing B^4 has applied to it a nut, C^7, the sleeve being enough shorter than the distance between the shoulder C^{20} of the spindle B^5 and the end of the cam-hub B^{10} to permit a slight longitudinal movement of the spindle B^5 within the said sleeve. The movement of the spindle in the direction of the arrow upon it in Fig. 11 causes the ratchet-toothed heads c^2 at the ends of the feed-rolls C C′ to engage the pawls c^3 and effect the positive rotation of the said feed-wheels, and the latter grasping the strip or plate b^3 between them feed the same longitudinally out from the end of the spindle. In the movement of the spindle B^5 in a direction opposite the arrow in Fig. 11, the teeth of the ratchet-wheels click under the pawls c^3 and are not rotated.

The delivery end of the two-part or divided spindle B^6 is provided with guides c^8 c^8, grooved, as at 3 3, (see Figs. 11 and 14,) to receive the edges of the strip or plate b^3, the said guides being made adjustable to different widths of strips by the adjusting-screw c^9, having a right and left thread, (see Fig. 14,) which engages a threaded portion of each guide c^8, the said screw having an annular groove, which is entered by a screw, 100, to prevent longitudinal movement of the said screw.

The acting edge of the cutter member c is vertical, and the bearings B^4 for the spindle B^5 are so adjusted as to place the center line of the spindle at an angle with relation to the edge of the said cutter, so that whenever the metal strip or plate, projected from the nose of the said spindle, is brought against the said cutter-member c, and the movable cutter-member d co-operates with it to sever the said strip or plate, the cut will be made diagonally across the said strip to form a tapered blank.

The gear B^9, fast to the spindle B^5, is engaged and rotated by a gear, D′, fast on a shaft, D^2, having its bearings in the extension $D^\times$ of the yoke D, referred to as containing portions of the bearings B^4, and shown separately in Fig. 1^a. The yoke D has a stud, d', erected on it, which is provided with a roller, $d^\times$, that enters the cam-groove B^{10}, the rotation of the cam B^{10} vibrating the yoke D and the spindle B^5.

The inner end of the shaft D^2 is provided (see Fig. 2) with a forked head, d^2, which is loosely connected by screws 6 6 to a block, 7, in turn connected loosely by screws 9 to a forked head or ear, 8, extended from one side of a gear, D^3, attached to a long stud (shown by dotted lines, Fig. 1) inserted in a hole in the frame-work A. The gear D^3 is engaged by the gear D^4, having fast to it an elliptic gear, D^5, mounted on a stud, 101, the said elliptic gear being engaged and driven by an elliptic gear, D^6, fast on the shaft A^9, before described.

The elliptical gears and the train of gearing described driven by them cause the spindle B^5 to be rotated, as herein shown, at a fast and slow or variable speed during each rotation, and the spindle holding the nail strip or plate rotates the latter in unison with it.

The spindle is rotated at its fastest speed when the lever B^2 is turned to move the delivery end of the spindle away from the cutter member c and dies e e', and slowest as the cutter members act to cut the strip or plate transversely, and in the rotation of the spindle the cam B^{10}, acting against the roller-stud d', causes the spindle B^5 to be moved longitudinally in the sleeve C^6 to effect the turning of the feed-rolls and the feeding of the strip or plate b^3 from the spindle.

Referring to the dies e e', between which the body of the blank is shaped, it will be seen (see Fig. 5) that the die e is stationary and the die e' is movable. The die e is cut into a block, e^2, which is attached to a block, e^3, by a screw, e^4, (shown by dotted lines,) the said block e^3 being fastened to the frame-work by a long bolt, e^4, extended therethrough from the rear side of the machine. The die e has attached to or made as a part of it the stationary cutter member c. The movable die e' is secured to a slide-plate, E, toothed at e^5, to be engaged by a toothed sector, forming part of a lever, e^6, (see Fig. 2,) pivoted at e^7, and having a roller or other stud extended through its upper end, (see Fig. 1,) the said stud entering like grooves in the two cam-hubs F F′, the said two cams giving a powerful movement to the said slide and its attached die e'.

The movable member d of the cutter mechanism is composed of a steel plate fitted into guides of a slide, f, the said cutter at its rear end having two rods, $f^\times$ $f^\times$, which at their outer ends are acted upon by screws f' f', which enable the member d to be adjusted longitudinally in the said slide f to provide for wear in sharpening it. This slide f, at its rear side, is toothed, as best shown in Fig. 5, to be engaged and reciprocated by a partial gear, f^2, fast on the rock-shaft f^3, having an arm, f^4, provided with a roller or other stud, which enters the cam-groove f^5 in the hub G, fast on the shaft A^4. The teeth of the slide f are held in engagement with the partial gear f^2 by means of a cap, f^6, the latter receiving through it the screws f^7.

The cutter member d is kept in the guide f by a plate, 104, held in place by screws 105. The slide f is slotted longitudinally for the reception of a bar, g, to one end of which is suitably attached a hook or clamp, g', the end of which extends across the end of the movable cutter member d. This hook or clamp g' co-operates with the end of the cutter d to receive between them from the delivery end of the spindle B^5 the free end of the nail strip or plate

b^3 just as the latter is fed forward through the spindle preparatory to cutting off a blank.

The nail-strip b^3 having been fed into position between the hook or clamp g' and the cutter member d, the clamp g' is drawn slightly backward by the sector g^2, fast to the rock-shaft g^3, it having an attached arm, g^4, provided with a roller or other stud, which enters the cam-groove g^5 in the cam-hub G. The cams f^5 and g^5 are of such shape as to first insure the entrance of the nail strip or plate b^3 between the hook g' and the end of the cutter member d, then to clamp the strip closely, and thereafter the cutter d and hook or clamp are moved forward in unison, and both act to hold firmly the end of the nail strip or plate b^3, while the cutter member d, co-operating with the cutter c, severs the said strip diagonally to form a blank. The clamp and cutter d, the blank having been severed from the strip, hold the blank firmly between them, and continue to move until the larger upper end of the tapering blank is brought in position between jaws $h\,h'$ and in line between the cavities of dies $e\,e'$.

The jaws $h\,h'$, both alike in shape, are composed, as best shown in Figs. 20, 22, and 23, of segmental or curved blocks, held by bolts 106 between cheek-pieces 102, extended at right angles from two shafts, h^2 h^3, the shaft h^3 passing through the shaft h^2, which is tubular, the shaft h^2 being the shorter. The shaft h^2 has attached to it an arm, h^4, and the shaft h^3 has attached to it an arm, h^5, each of the said arms having roller or other studs, the stud of the arm h^4 entering the groove m, and the stud of the arm h^5 the groove m', both of the said grooves being made, as herein shown, in the same side of a cam-hub, m^2. The blank having been carried into the position stated, the jaws $h\,h'$, preferably grooved at their ends, as at 15, as shown in Figs. 22 and 23, are closed upon the upper end of the said blank, and, preferably, with such force as to partially round the said blank, as shown at 107 in Fig. 24, where it is grasped to thus aid in the formation of a more perfect head. The jaws having been closed firmly upon the head of the blank, the clamp g' is moved sufficiently to release the blank, and then the two jaws are rocked or moved together in the same direction until the blank is moved laterally from between the clamp and cutter member, and is placed into the groove of the stationary die e, and thereafter the clamp g' and cutter member d are withdrawn and left slightly separated, ready to again receive the end of the said nail-strip or plate b^3. The blank having been placed in the groove of the die e, the movable-die e' is moved up to the stationary die e, and the body of the blank is shaped in the said die-grooves.

The die-grooves may be either plain or corrugated, and they may be so cut out or shaped as to form heads, either round or of any desired shape.

Co-operating with the dies $e\,e'$ is a header, n, (shown partially in longitudinal section in Fig. 3,) it being attached to or forming part of a rod or bar, n', fitted into a sleeve or guide, n^2, and provided at its upper end with rack-teeth, as at n^3, which teeth are engaged by a toothed portion, as n^4, of a gear, or it may be a part of a rock-shaft, n^5, extended through a long bearing, n^6, forming, it may be, a part of the frame-work of the machine. The rock-shaft, n^5, has fast to its other end an arm, n^7, which, by a link, n^8, is jointed to a lever, n^9, pivoted at n^{10}, the said lever having a roller or other stud, n^{12}, (see Fig. 19 in dotted lines,) which enters a cam-groove (see dotted lines, Fig. 19) in a cam, N, fast on the shaft A^4, the rotation of the cam through the mechanism described actuating the header positively to strike the nail-blank while held between the dies $e\,e'$ to form a head, the shape of the head being determined by the shape of the die-groove.

Fig. 25 shows a finished nail.

I am aware that it is not new to oscillate a spindle carrying a nail-strip; but prior to my invention I am not aware that a spindle carrying a nail-strip has been rotated with relation to the cutters, and I am not aware that a spindle carrying a nail-strip has ever been rotated at a varying speed.

My improved machine may be run at a very fast speed, and the nail-strip may be of as long length as can be cut or rolled, it being wound upon a hub or spindle, and hence the production of nails is very rapid.

I do not desire or intend to limit my invention to the exact construction of the devices herein shown, as it will be obvious to a mechanic that the form of the parts might be somewhat modified without departing from my invention—as, for instance, other well-known devices for varying the speed of two shafts might be used.

The cap or plate f^6 has adjustably attached to it, by the screw or bolt p, a rest, p^2, against which bears the lowermost edge of the strip or plate b^3, as the latter in the rotation of the spindle is brought against the edge of the cutter c to be cut, the said rest by its adjustment being adapted to strips or plates of different width.

The cam-grooves in the cam m^2, directly controlling the movement of the jaws $h\,h'$, are of such shape with relation to each other as to cause the said jaws, when they first grasp the head of the blank, to take it from between the cutter member d and the hook or clamp g, to compress or shape the head of the blank in the grooves 15 of the jaws—one groove in each jaw—and thus partially round the blank near its end, thus better adapting it to fit the usual head-forming concavity cut in the dies $e\,e'$. This preliminary shaping of the blank near its head end preparatory to placing the blank in the dies to be upset by the header insures a more uniform and perfect head than when the header and dies alone are depended upon to shape the nail just at and below the head.

Prior to my invention I am not aware that

a nail-blank has ever been partially rounded at or near its head end prior to the upsetting of the head in the dies.

A part of Fig. 24 shows the head of a blank as left by the action of the jaws, the cosners being somewhat rounded.

I might rotate the spindle at a uniform speed by employing usual circular gearing instead of the elliptical gears; but I prefer to use the latter.

I claim—

1. In a nail-making machine, a spindle to carry a metal strip or plate to be cut into nail-blanks, combined with cutters to sever the said strip or plate and the clamp g', co-operating with one of the said cutters to clamp the end of the strip or plate in the direction of its thickness, or from side to side, and hold it while the cutters operate to sever a blank from the strip or plate, substantially as described.

2. A rotating spindle to carry a metal strip or plate, the cutters to sever the strip or plate to form blanks, and a hook or clamp co-operating with one of the said cutters to hold the blank, as described, combined with the jaws to take the blank from the cutter and hook or clamp holding it, substantially as described.

3. A rotating spindle to carry a metal strip or plate, the cutters to sever the strip or plate to form blanks, and a hook or clamp co-operating with one of the said cutters to hold the blank, as described, combined with the jaws to take the blank from the cutter and hook or clamp holding it, and with dies e e', into the grooves of which the blank is delivered, substantially as described.

4. A rotating spindle to carry a metal strip or plate, the cutters to sever the strip or plate to form blanks, and a hook or clamp co-operating with one of the said cutters to hold the blank, as described, combined with the jaws to take the blank from the cutters and hook or clamp holding it, and with dies e e', into the grooves of which the blank is delivered, and with a header to strike and upset the head of the said blank, substantially as described.

5. In a nail-making machine, a spindle to carry a metal strip or plate to be cut to form blanks, and cutters to sever the said strip, combined with means, substantially as described, to rotate the said spindle continuously, but at a varying speed during each rotation, substantially as described.

6. In a nail-making machine, the continuously-rotating spindle to carry a metal strip or plate, the feed-rolls carried by it to feed the strip or plate from the said spindle, a pivoted lever or carrier to support the bearings for the said spindle, and means, substantially as described, to vibrate the said lever or carrier and rotate the spindle in its bearings, combined with cutters to cut the said strip or plate, substantially as described.

7. In a nail-making machine, two cutters to sever a strip or plate, and the hook-shaped clamp co-operating with the movable member of the cutters to hold the end of the strip or plate at its opposite sides while it is being cut and to hold the blank, combined with the rotating spindle, and feeding mechanism carried by the spindle to move the strip or plate in the spindle, substantially as described.

8. In a nail-making machine, two cutters to sever a strip or plate, and a clamp co-operating with the movable member of the cutters to hold the end of the strip or plate while it is being cut and to hold the blank, combined with a spindle, a vibrating lever to carry the bearings for the spindle, and feeding mechanism, and mechanism to rotate the spindle and vibrate the yoke, substantially as described.

9. The spindle to rotate the nail strip or plate, the cutter member c, and the movable cutter member d, combined with a hook or clamp, and means, substantially as described, to reciprocate the cutter member d and hook or clamp, and to also move the said hook or clamp longitudinally with relation to the cutter member d to grasp the end of the strip or plate and to thereafter release the blank, substantially as described.

10. The rotating spindle, its extension B^7, to hold the metal strip or plate in reel form, suitable bearings for the said spindle, the feed-rolls having attached ratchet-wheels c^2, carried by the spindle, and the cam-hub B^8, attached thereto, and means co-operating with the said cam-hub to move the spindle longitudinally as it is being rotated, combined with the sleeve C^6 and frame and pawls to rotate the feed-rolls, substantially as described.

11. The rotating spindle, its attached gear B^9, the vibrating lever B^2, and the yoke D, attached to the said lever, and the shaft D^2 and gear D', combined with the gear D^3, the universal-joint mechanism between the shaft D^2 and the said gear D^3, and a gear, D^4, to rotate the gear D^3, and mechanism to vibrate the lever B^2, all substantially as described.

12. In a nail-making machine, the cutter member c, the cutter member d, and the hook or clamp co-operating with it to hold the nail-blank, means to move the said cutter member and hook or clamp, and jaws to grasp the head of the blank held between the cutter member d and the hook or clamp, combined with the die e, into the groove of which the jaws carry the said blank, and a die, e', co-operating with the die e, and means, substantially as described, for operating the said jaws independently, whereby the jaws release the head of the blank after the blank has been caught between the dies, and whereby one of the jaws, the dies having been separated, is rotated, substantially as described.

13. In a nail-making machine, the cutter member d, the clamp g', the cutter member c, and two dies, e e', to shape the blank, combined with a pair of jaws, h h', to grasp the blank near its head-forming end and place the body of the blank in position in the stationary die

e, and a header and means to operate it to upset the blank to form a head, substantially as described.

14. In a nail-making machine, two dies, e e', to shape the blank, and a header, combined with a pair of jaws to grasp the blank near its head end and place the body of the blank in position in the stationary die, the said jaws having cavities 15, to partly round the end of the blank preparatory to placing the said blank in the said die, substantially as described.

15. In a nail-making machine, the cutter member d, the clamp g', the cutter member c, and two dies, e e', to shape the blank, combined with a pair of jaws, h h', to grasp the blank near its head-forming end and place the body of the said blank in position in the stationary die e, and means, substantially as described, to move the said jaws, each independently of the other, to grasp or relieve the blank at the proper time, substantially as set forth.

16. In a nail-making machine, dies to hold the blank to be headed, combined with the header, its toothed carrying-bar n', the rock-shaft toothed at n^4, the arm n^7, link n^8, lever n^9, and cam to move it, substantially as described.

17. The die e' and the toothed slide E, to which it is attached, combined with the sector-lever e^6, provided with a pin or stud, e^8, extended each side of it, and with two cams to operate the said sector-lever, substantially as described.

18. In a nail-making machine, the combination, with cutters, of a spindle provided with an extension to secure and sustain a spool or reel containing a flat metal strip or plate wound thereon, and feeding mechanism to feed the said strip or plate longitudinally to the said spindle, substantially as described.

19. In a nail-making machine, two cutters to sever a strip or plate, and a clamp co-operating with the movable member of the cutters to hold the end of the strip or plate while it is being cut and to hold the blank, combined with a spindle having its axis of rotation placed diagonally to the edges of the cutters, a vibrating lever to carry the bearings for the spindle, and feeding mechanism, and mechanism to rotate the spindle and vibrate the yoke, substantially as described.

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

LOUIS GODDU.

Witnesses:
C. M. CONE,
F. CUTTER.