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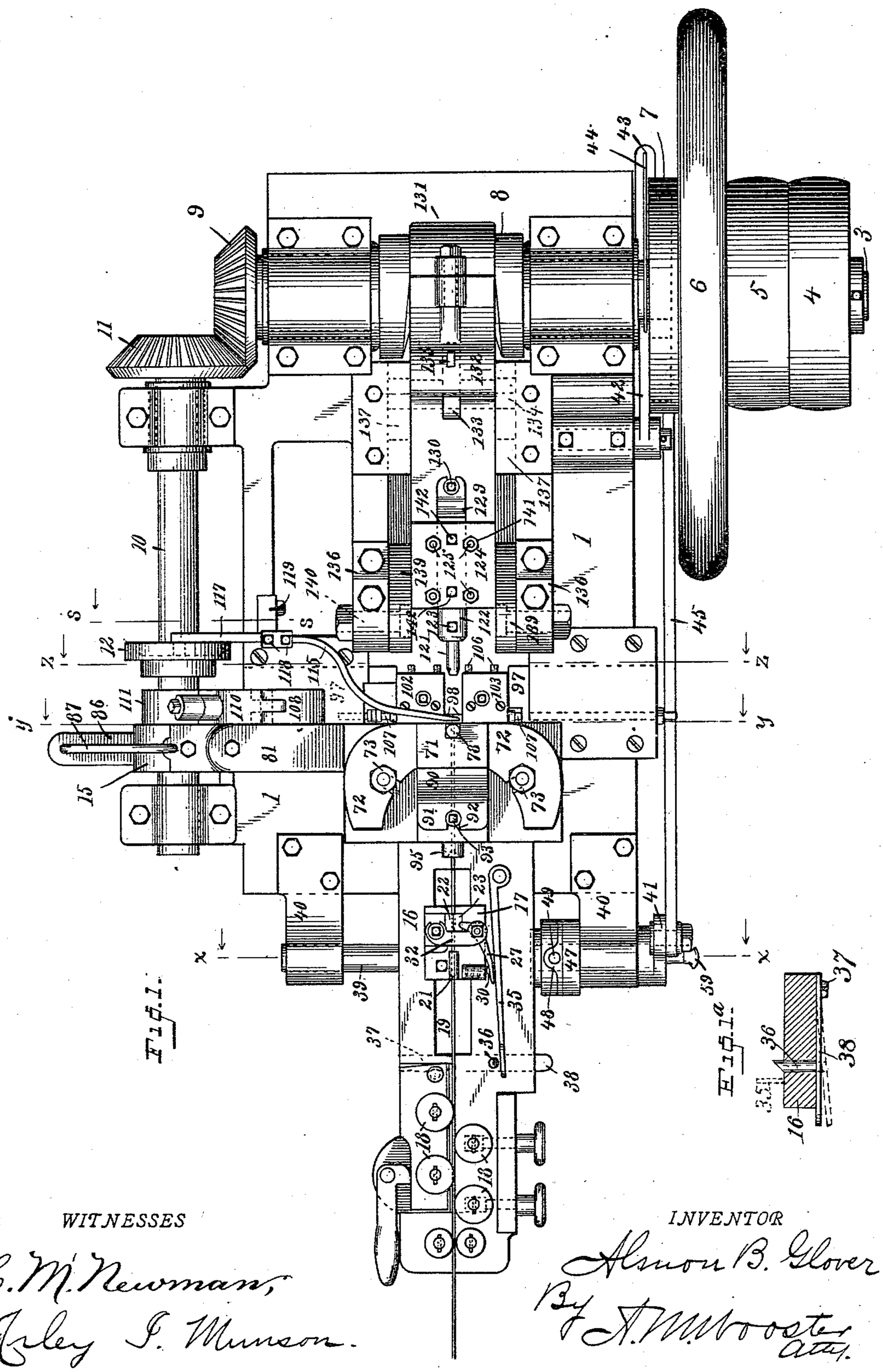
A. B. GLOVER.

WIRE NAIL MACHINE.

No. 458,391. Patented Aug. 25, 1891.



WITNESSES

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A. B. GLOVER.

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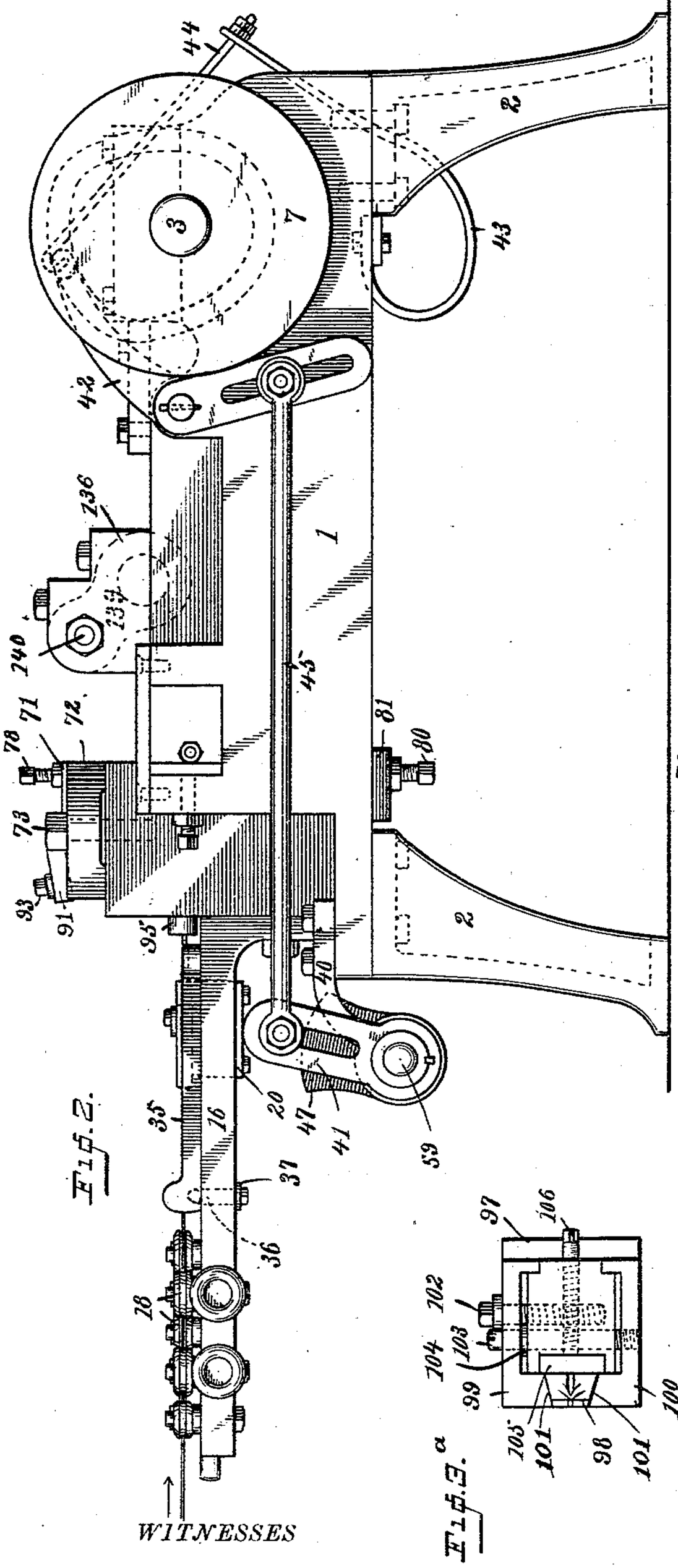

FIG. 2.

FIG. 3.ª

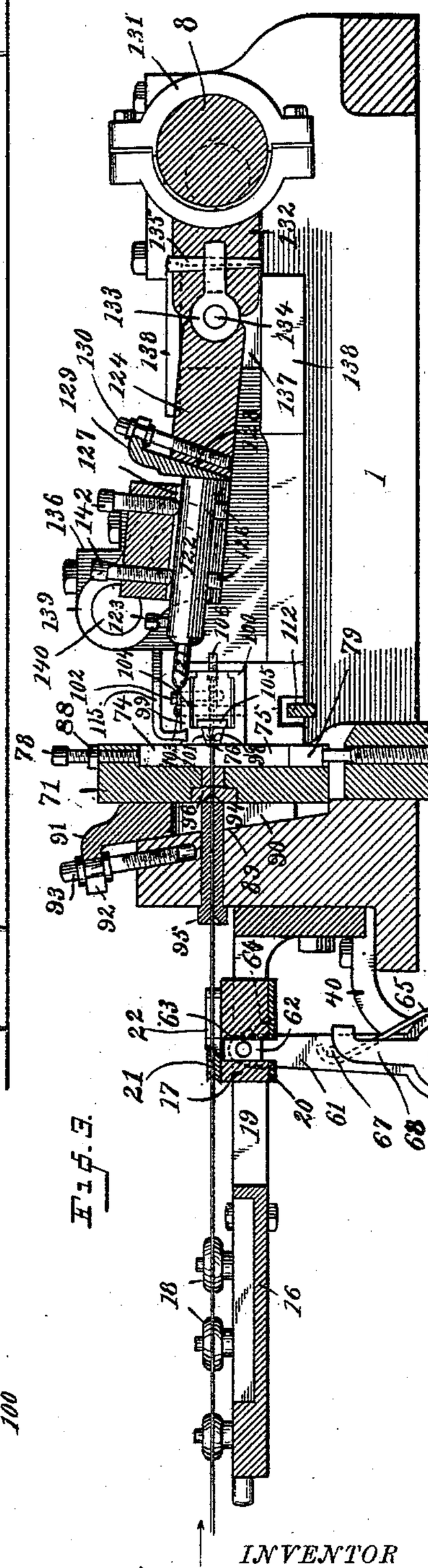

FIG. 3.

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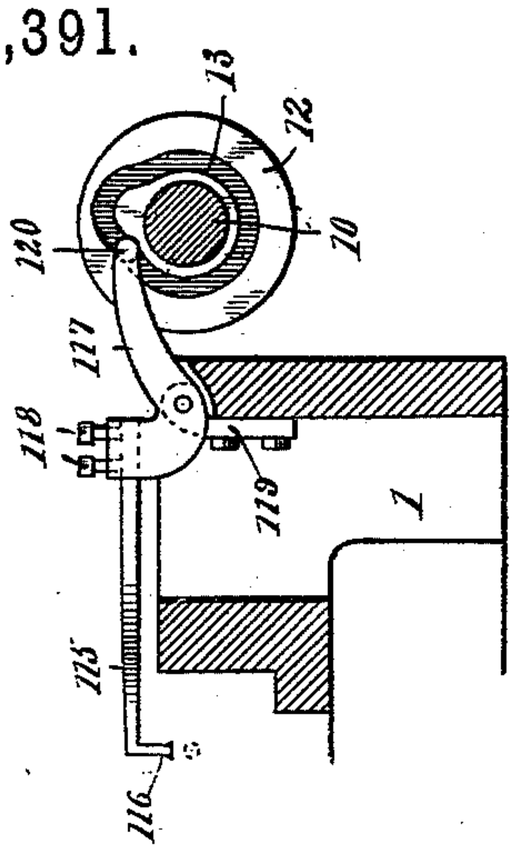

Fig. 7.

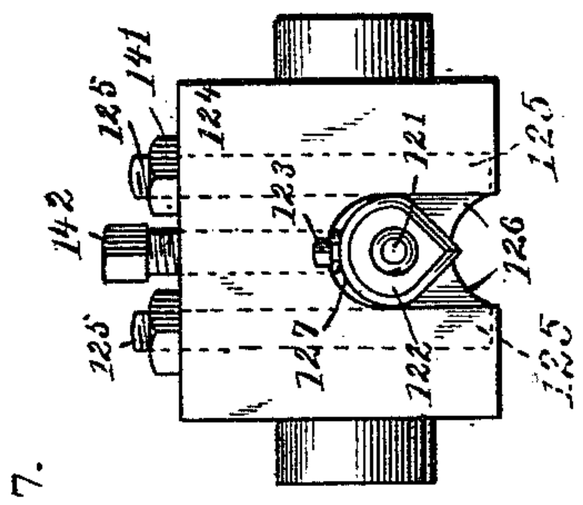

Fig. 6.

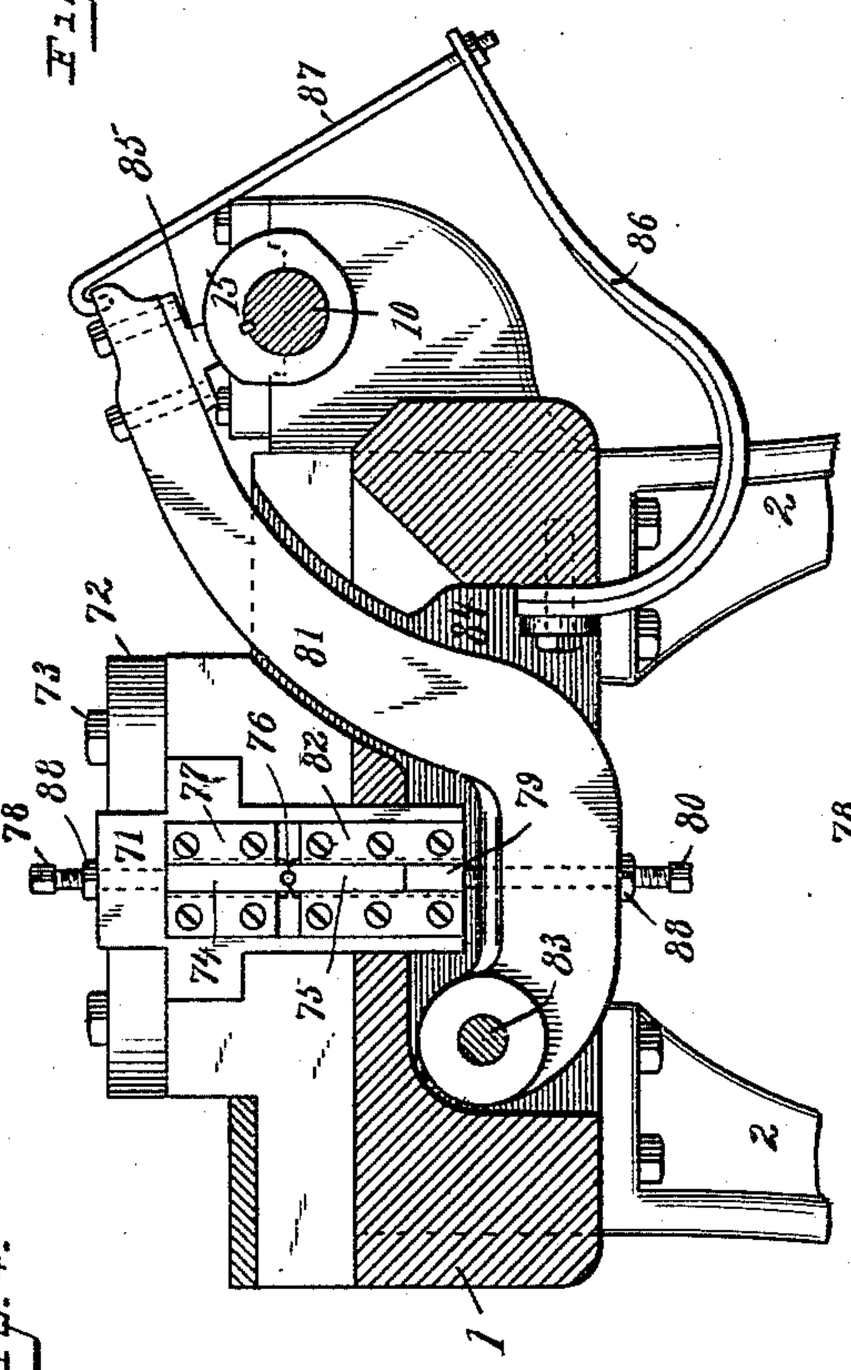

Fig. 5.

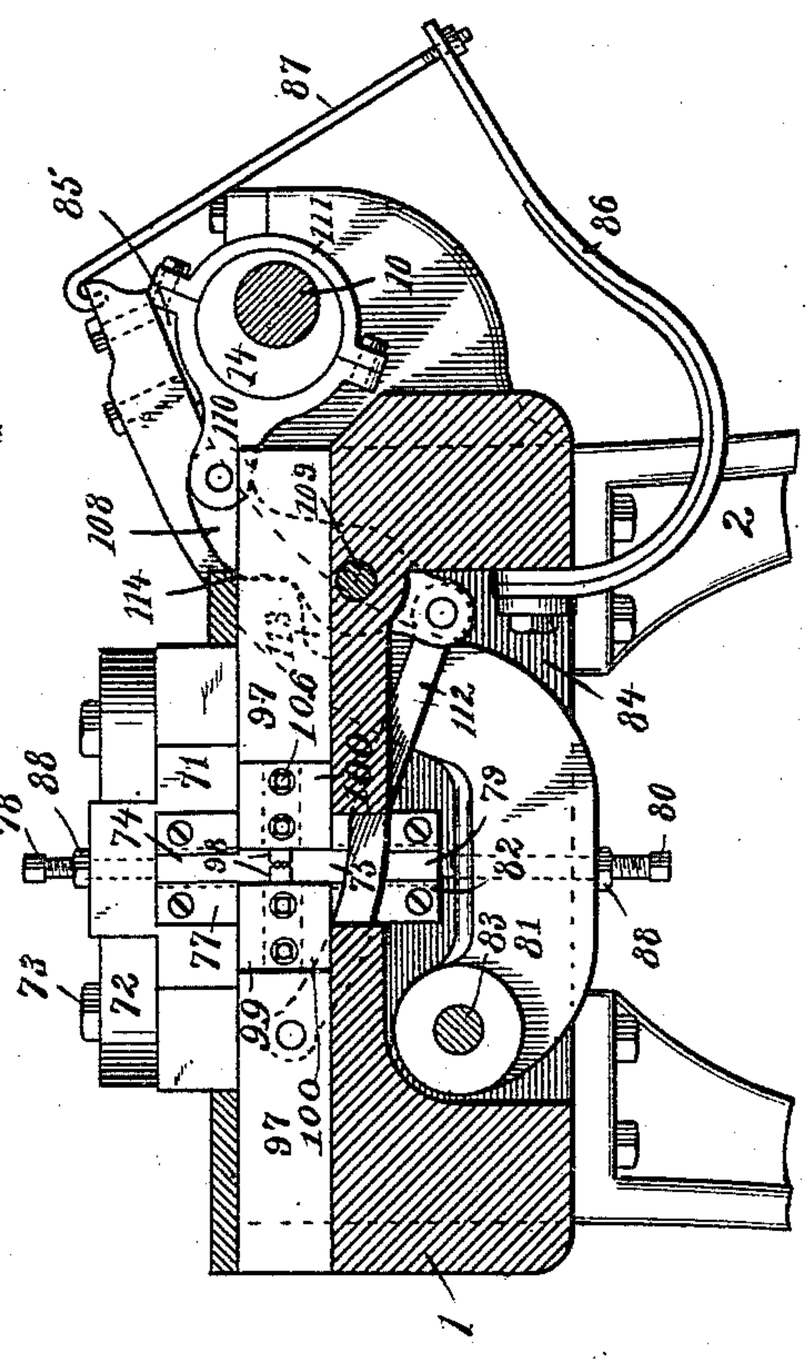

Fig. 4.

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A. B. GLOVER.

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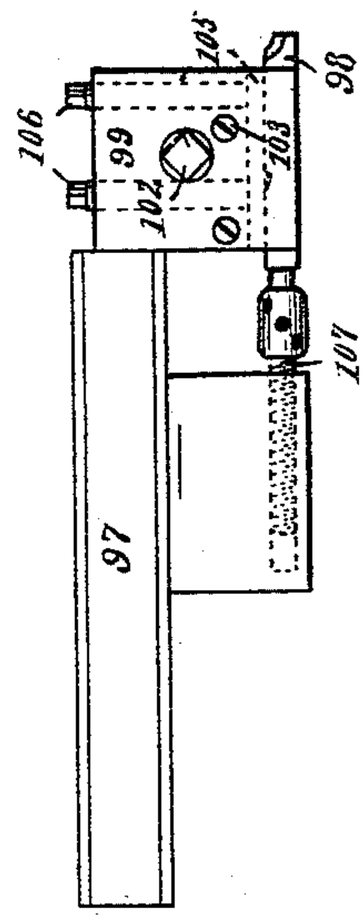


Fig. 10.

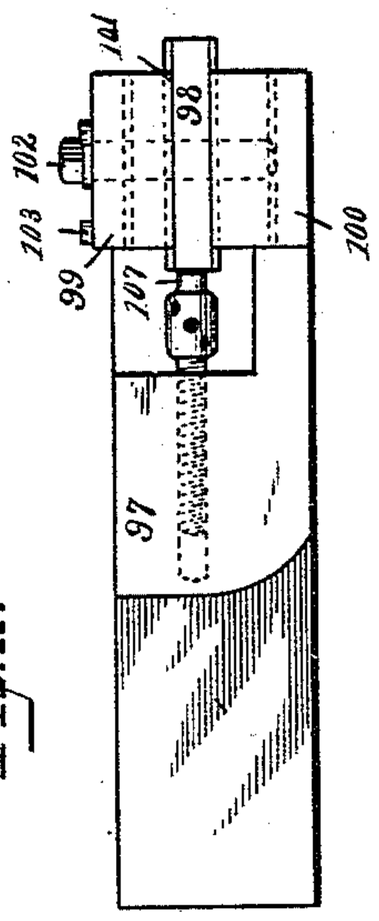


Fig. 11.

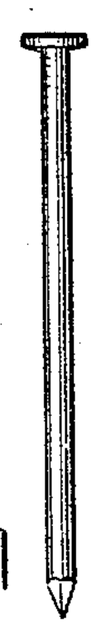


Fig. 14.

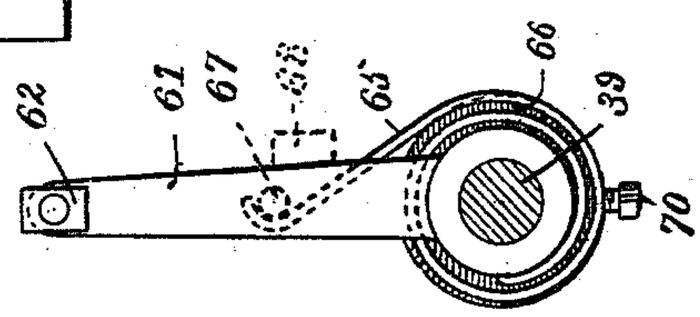
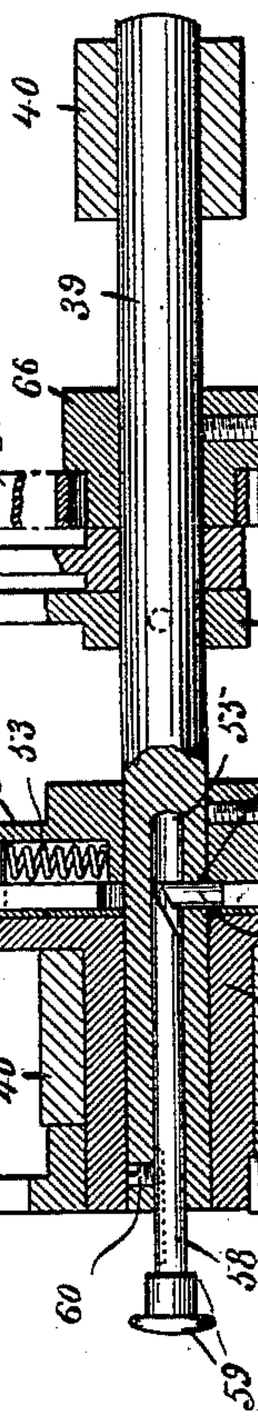


Fig. 13.



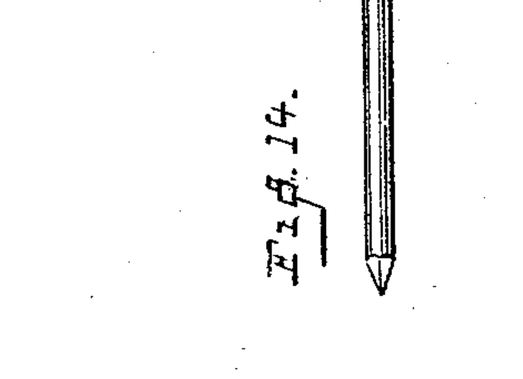


Fig. 12.

Fig. 8.

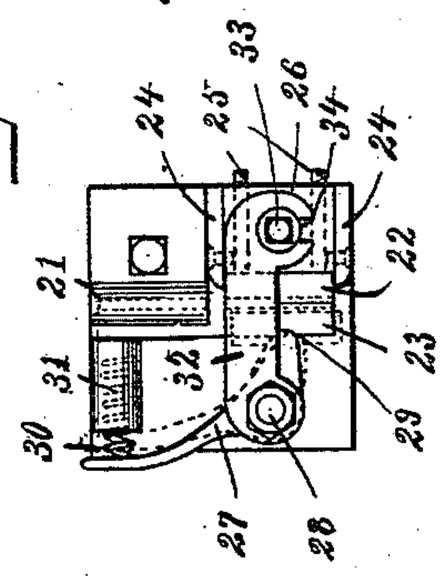


Fig. 9.

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UNITED STATES PATENT OFFICE.

ALMON B. GLOVER, OF BIRMINGHAM, CONNECTICUT.

WIRE-NAIL MACHINE.

SPECIFICATION forming part of Letters Patent No. 458,391, dated August 25, 1891.

Application filed November 15, 1890. Serial No. 371,588. (No model.)

To all whom it may concern:

Be it known that I, ALMON B. GLOVER, a citizen of the United States, residing at Birmingham, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Wire-Nail Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to simplify, strengthen, and to generally improve the operation of this class of machines with the special end in view of producing a machine adapted to the manufacture of all sizes of nails, but especially adapted to the manufacture of large-sized nails and capable of being run at a much higher speed and with less vibration than any machine that has heretofore been produced. With these ends in view I have devised the simple and novel construction of which the following description, in connection with the accompanying drawings, is a specification, numerals being used to denote the several parts.

Figure 1 is a plan view of the machine complete. Fig. 1ª is a detail sectional view illustrating a device for stopping the feed without stopping the movement of the parts; Fig. 2, a side elevation, the balance-wheel being omitted; Fig. 3, a central longitudinal section; Fig. 3ª, an enlarged detail view showing one of the slides, a cutting and pointing die, and the clamping-plates in elevation, the view corresponding with Fig. 3; Fig. 4, a transverse section on the line *y y* in Fig. 1, looking toward the left; Fig. 5, a transverse section on the line *z z* in Fig. 1, looking toward the left; Fig. 6, a detail sectional view on the line *s s* in Fig. 1, looking toward the left; Fig. 7, a front elevation of the heading-die, carrier, &c.; Fig. 8, a section on the line *x x* in Fig. 1, looking toward the left; Fig. 9, a detail plan view of the feed-slide and parts carried thereby; Fig. 10, a plan view, and Fig. 11 a side elevation, on an enlarged scale, of one of the cutting and pointing die-slides detached; Fig. 12, a detail view illustrating the construction of clutch mechanism which I preferably use in connection with the feeding mechanism, the rock-shaft being in section on the line *w w* in Fig. 8; Fig. 13, a detail view illustrating the construction of the safety feed-lever, and Fig. 14 is a view of the completed nail.

1 denotes the bed or frame of the machine; 2, legs by which it is supported; 3, the main shaft, to which power is applied by a belt (not shown) running over pulley 4. This shaft is provided with a loose belt-pulley 5, a balance-wheel 6, a disk 7, having in its inner face a cam-groove by which the feeding mechanism is operated, (see dotted lines Figs. 1 and 2,) an eccentric 8, (see Fig. 3 in connection with Fig. 1,) and at its opposite end a bevel-gear 9.

10 is a shaft lying longitudinally of the machine, which receives motion from the shaft 3 by means of a bevel-gear 11, which meshes with gear 9. Shaft 10 is provided with a disk 12, having in its face a cam-groove 13, which operates the clearer, as will presently be fully explained, an eccentric 14, (see Fig. 5,) which operates the cutting and pointing-dies, and a cam 15, which operates the gripping-dies.

Turning now to Figs. 1, 2, and 3, 16 denotes an extension bolted rigidly to the bed of the machine and extending forward therefrom. This extension carries the feed-slide (denoted by 17) and the straightening-rollers, (denoted by 18.) The faces of the straightening-rollers are grooved in the usual manner, and they may be adjusted in any ordinary or preferred manner to adapt them to different sizes of wire. The feed-slide rests upon extension 16, and a portion thereof extends downward through a slot 19 in said extension, the slide being held in position by a plate 20, bolted to the under side thereof, as is clearly shown in Fig. 8. (See also Fig. 3.) The wire as it enters the machine is straightened by rollers 18 in the usual manner and then passes through a guide 21 on the feed-slide. Just in front of this guide are the stationary and movable feed-jaws 22 and 23. Jaw 22 is held firmly in position by end pieces 24, and is capable of adjustment by means of screws 25, passing through block 26 on the feed-slide. Both jaws are provided with grooves in their faces which receive and partially encircle the wire so as to give sufficient hold upon the wire,

but without the slightest danger of marring the surface. The movable jaw (denoted by 23) is held in the clamping position and released therefrom by means of a bell-crank lever 27, pivoted on a stud 28. The end of the short arm of this lever is rounded and engages a rounded groove 29 in the movable jaw. The long arm of bell-crank lever 27 extends backward and is engaged by a spring 30, which bears against said arm, forcing it outward, throwing the short arm inward and retaining the fixed jaw in its normal—*i. e.*, the gripping—position. In the present instance I have shown a coil-spring for controlling the lever, which is partially inclosed in a socket 31. The jaws, bell-crank lever, &c., are held in position upon the feed-slide by means of a swinging plate 32, which is pivoted to stud 28 and engages a screw-stud 33, which passes downward through block 26 and secures the latter to the feed-slide. The swinging plate is provided with a slot 34, which engages screw-stud 33, and is locked in position by turning in the stud or by a nut, if preferred. It will of course be understood that at each actuation of the machine the feed-slide must move forward a distance equal to the length of wire that is required to form a nail. The bearing-point of the short arm of the lever on the movable jaw is placed forward of the pivotal point of said lever, the adjustment being such as to cause the jaws to grip the wire the instant the forward movement of the feed-slide commences, holding it firmly, drawing it through the straightening-rollers, and forcing sufficient wire to form a nail forward into the machine. When the backward movement of the feed-slide takes place, the movable jaw releases its hold upon the wire, assuming approximately the position indicated by dotted lines in Fig. 9, the long arm of the lever moving inward slightly against the power of spring 30. This permits the jaws to slide back freely over the surface of the wire. The instant, however, that the backward movement ceases spring 30 will act to return the movable jaw to its normal position, so that when the forward movement commences it will again grip the wire firmly and feed it forward, as before.

In order to provide a simple and convenient way of stopping the feed of the wire without stopping any of the moving parts of the machine, I provide a lever 35, pivoted to extension 16, which is adapted to throw the long arm of the bell-crank lever inward against the power of spring 30, the action being to throw the movable jaw forward to the position shown in dotted lines in Fig. 9, so that while the movement of the feeding mechanism will continue as before the jaws will move freely backward and forward over the surface of the wire, but without gripping it. In order to lock the parts in this position I provide a spring-actuated pin 36, the upper end of which is beveled on its outer side and extends slightly above the surface of extension 16, so as to be pushed downward by lever 35 when the latter is moved inward, and then spring up and prevent the backward movement of the lever until the pin is pushed down again. I have shown this pin as carried by a spring 37, one end of which is rigidly secured to the under side of the extension, the other end projecting outward slightly, as at 38 in Fig. 1, to form a convenient finger-piece for pushing the pin down and releasing lever 35. It will be seen that spring 30, which bears against bell-crank lever 27, will also act to throw lever 35 to its normal position as soon as the latter is released. If at any time it is desirable to stop the feeding action of the machine without stopping its operation, it is simply necessary to move lever 35 inward, so that it will be engaged and held by pin 36.

Reciprocatory movement is imparted to the feed slide in the manner which I will now describe. 39 is a rock-shaft mounted in brackets 40 at the forward end of the machine. Loosely secured at one end of this rock-shaft is a slotted arm 41. 42 is a bell-crank lever pivoted at the opposite end of the machine, one arm of said lever being provided with a roller which engages a groove in the inner face of cam-disk 7 on the main shaft. (See dotted lines, Figs. 1 and 2.) In order to insure perfect smoothness of movement of the roller in the groove, I provide a strong curved spring 43, rigidly secured to the under side of the bed, the outer end of which is connected to bell-crank lever 42 by means of a rod 44. The other arm of the bell-crank lever is provided with a slot. 45 is a connecting-rod, one end of which is secured in the slot in the bell-crank lever, the other end being secured in the slot in arm 41. Both ends of the connecting-rod are adjustable in the slots, thus giving the utmost nicety of adjustment of the throw of the rock-shaft and, through intermediate mechanism, of the reciprocation of the feed-slide, as will presently be fully explained.

Turning now to Fig. 8, it will be seen that slotted arm 41 is rigidly secured to a sleeve 46 on the rock-shaft. (In the present instance by a key.) This sleeve is free to oscillate on the shaft and is provided at its inner end with an arm 47, said arm having on its inner face an arc-shaped flange 48, having a notch 49. Arm 47, with its notched flange, constitutes one member of a clutch, by which the rock-shaft and feed-slide are connected or disconnected.

50 denotes a part rigidly secured to the rock-shaft, which constitutes the other member of the clutch. This part is provided on its inner face with a recess 51, which receives a sliding dog 52, the dog being so formed as to partially encircle the shaft. (See Fig. 12.) The dog is held at its thrown position—*i. e.*, its position in engagement with the notch in flange 48—by means of a spring 53, recessed

in part 50, which bears against the pin 54, projecting outward from the dog.

55 denotes a longitudinal recess in rock-shaft 39, and 56 a transverse recess communicating therewith.

57 denotes a pin or other suitable projection, which forms part of the dog and extends into transverse recess 56, the end of said pin toward the outer end of the longitudinal recess being beveled, as shown in Fig. 8. In the longitudinal recess is a push-rod 58, the inner end of which is beveled, as shown, to engage the bevel of pin 57, the outer end thereof being provided with a finger-piece 59 for convenience in operation. The push-rod is provided with a slot in one side, (see dotted lines, Fig. 8,) which is engaged by a set-screw 60. This set-screw engages the groove with sufficient friction to prevent free movement of the push-rod, holds said rod against rotation, and at the same time permits ample longitudinal movement of the push-pin in connecting and disconnecting the clutch members.

The operation of this portion of the machine is as follows: Should the operator at any time desire to stop the feeding mechanism entirely without stopping the entire machine, he forces the push-rod inward, the beveled end of which engages the bevel upon pin 57 and draws the dog inward against the power of spring 53. The movement of the dog is amply sufficient to disengage it from the notch in flange 48, so that slotted arm 41, the sleeve, and arm 47 are left free to oscillate without imparting movement to the rock-shaft. The push-rod in practice is forced in past pin 57 and acts to hold the dog in the retracted position as long as may be required. The instant the push-rod is drawn out spring 53 acts to return the dog to its normal position—*i. e.*, in engagement with the notch in flange 48—so that the oscillatory movement of arm 47 is communicated to part 50 and to the rock-shaft.

In order to prevent the possibility of damage to any part of the feeding mechanism should any obstruction occur while the feed-jaws are gripping the wire, I provide a safety—*i. e.*, a yielding—connection between the rock-shaft and feed-slide, which I will now describe.

61 is the feed-lever, which is mounted on the rock-shaft, but is not secured thereto, so that movement of the rock-shaft is not necessarily imparted to the feed-lever. At the outer end of the feed-lever is pivoted a block 62, which is free to move vertically in a mortise 63 in the feed-slide. At the side of the mortise (see dotted lines, Figs. 3 and 8) is a slot 64, which gives ample room for the oscillation of the feed-lever. The forward movement of the feed-lever, which carries the feed-slide with it, is caused by a strong spring 65, the inner end of which is secured to a hub 66, which in turn is locked to the rock-shaft by a set-screw 70. The other end of the spring extends upward and is curved to engage a pin 67, which extends outward from the feed-lever. The backward movement of the feed-lever, which is positive at all times, is caused by an angle-arm 68, extending outward from a hub 69, which is rigidly secured to the rock-shaft. Any desired amount of tension of the spring may be obtained by loosening set-screw 70 and turning hub 66 either forward or backward on the rock-shaft, as may be required, to increase or diminish the tension.

In operation, should anything happen to obstruct the free passage of the wire into the machine, spring 65 will yield and allow the rock-shaft to oscillate without moving the feed-lever, thereby preventing the possibility of any breakage of parts or damage whatever to the feeding mechanism. As the jaws are not gripping the wire when the backward movement of the feed-slide takes place, there is no requirement whatever for a yielding movement. This movement, therefore, is made positive by angle-arm 67, the lateral extension of which engages the feed-lever and forces it backward, carrying the feed-slide with it at each backward movement of the rock-shaft.

Turning now to Figs. 3 and 4, 71 is a die-block which fits in a correspondingly-shaped recess in the bed or frame of the machine and is provided with a recess to receive the gripping-dies. It is held rigidly in place in the frame by means of binding-plates 72, which engage projections or lugs upon opposite sides of the die-block and are secured firmly in place by bolts 73 engaging the frame. By loosening the nuts on these bolts at any time, the binding-plates may be removed or swung around so as to allow the die-block to be readily removed from the machine, should it be desired to change the dies or for any purpose whatever.

74 and 75 denote, respectively, the upper and lower gripping-dies, which hold the wire firmly while each nail is being pointed and cut off, and while the head of the next nail is being formed, said dies being ordinarily provided with slight recesses, as at 76, in which the head of the nail is formed. These recesses may or may not be used, depending entirely upon the size and style of the head desired and the quality of wire that is being used. The formation of the head will presently be fully described. The upper die is held firmly in place by means of plates 77, which are secured by screws to the die-block.

78 is an adjusting-screw in the die-block, by means of which the upper die may be adjusted. Under the lower die and within the die-block is a follower 79, which rests upon an adjusting-screw 80 in gripping-lever 81. The lower gripping-die and the follower are held in place in the die-block by plates 82, which are secured by screws to the die-block. It should be noted that plates 77 hold the upper die firmly in place; but plates 82 serve simply to hold the lower die and the follower in place, but permit both of said parts to move freely in the vertical plane. Gripping-

lever 81 is made quite heavy, and has its fulcrum on a stud or pin 83 at one side of the gripping-dies. (See Fig. 4.) This lever lies in a recess 84 in the frame of the machine, and passes transversely under the gripping-dies and upward through the frame, the outer end of said lever being provided with a shoe 85, made of suitable anti-friction metal. This shoe rests upon cam 15 on shaft 10, and is raised and lowered by said cam as it revolves with the shaft.

86 is a strong spring, the inner end of which is bolted firmly to the bed of the machine, the outer end being curved upward and connected by a rod 87 to the outer end of lever 81, thereby insuring perfect contact of the shoe at all times with the cam. It will be seen that each time the shoe is raised by the higher portion of the periphery of the cam, the lever and adjusting-screw 80 must act to raise the follower and the lower gripping-die, so that the wire will be gripped firmly between said dies at the instant the nail is headed, as will presently be fully described. The strength of the grip upon the wire may be regulated by adjustment of screws 78 and 80. These screws are both provided with check-nuts 88, whereby they are locked in position after adjustment.

In order to provide a convenient adjustment for the gripping-dies so as to change their position relatively to the cutting and pointing dies, presently to be explained, and give more or less stock from which to form the head of the nail, I form an incline 89 upon the frame of the machine and place between said incline and the die-block a wedge 90. The upper end of this wedge is provided with an arm 91, having a slot 92 to receive an adjusting-screw 93, said screw being provided with collars engaging the opposite sides of the arm and its lower end being threaded to engage the frame. It will be seen that rotation of this screw will act to raise or lower the wedge, thereby forcing the die-block farther forward or permitting it to be set backward slightly, so as to regulate the amount of stock allowed for the head of the nail. The lower end of the wedge is provided with a slot 94 to allow it to embrace a bushing 95, which serves as a guide for the wire in passing through the frame of the machine to the gripping-dies. The hole through the bushing is of just sufficient size to permit the wire to pass through it freely. In case the size of the wire to be operated upon is changed the bushing is taken out and a new one having a hole of suitable size to receive the wire freely is put in its place. The special function of this bushing is to enable the operator to use up each coil of wire completely and to put a new coil in the machine without loss of time.

The operation is as follows: Suppose that a coil of wire has been used up as far as the feed-jaws will carry it, the bushing is withdrawn far enough so that while still inclosing the end of the old coil it will also inclose the end of the new coil, which is abutted against the end of the old coil, after having been passed through the straightener and the feed-jaws. This operation hardly takes as much time as is required to describe it, and does not require stoppage of the machine, but simply of the feeding mechanism. As soon as the end of the new coil has been abutted against the end of the old coil within the movable bushing, the feeding mechanism also is started in the manner already described. As soon as the end of the new coil has passed into the gripping-dies, the bushing is returned to its normal position. Slot 94 in the wedge permits the end of the bushing to come in contact with the die-block.

96 denotes a hardened bushing, which may be made in one or more parts, which I preferably place in the die-block to serve as a guide for the wire while passing through it.

Turning now to Fig. 5, in connection with Figs. 3, 3ª, 10, and 11, I will describe the construction and operation of the cutting and pointing mechanism.

97 denotes transverse slides adapted to move from opposite directions toward the center of the machine, at the forward ends of which are secured cutting and pointing dies 98. These dies cut off the completed nail, the cutting-edges being beveled in the usual manner, so that in addition to severing the nail from the wire in the machine the nail is pointed at the same operation, as is indicated in Fig. 14. The dies are held in place by pairs of clamping-plates, the upper and lower plates of each pair being indicated, respectively, by 99 and 100. It will be noticed in Fig. 3ª that one end of each clamping-plate engages the slide itself, the other end being beveled, as at 101, and engaging a corresponding bevel upon the die. The upper clamping-plates are adjusted and locked in position by means of screws 102, which pass freely through said plates and engage the slides. The lower clamping-plates are adjusted and locked in position by means of screws 103, which pass loosely through the upper clamping-plates and the slide and engage the lower clamping-plates, these screws being provided with collars 104, which lie between the upper clamping-plate and the slide, so that rotation of said screws will act to raise or lower the lower clamping-plate, as may be required. (See Fig. 3ª.)

105 denotes a gib let into each slide back of the die.

106 denotes screws which pass horizontally through the slides and abut against the gibs, by means of which I am enabled to adjust the dies in or out relatively to the gripping-dies already described. It will thus be seen that by means of adjusting-screws 102 and 103 I am enabled to raise or lower the cutting and pointing dies, as may be required, and by means of screws 106 I am enabled to move them toward or from the gripping-dies.

107 denotes screws which engage the slides and abut against the rear ends of the dies, by means of which the dies are adjustable in or out transversely, as may be required. (See Figs. 1 and 11.) The in and out movement of the cutting and pointing dies is produced in the manner which I will now explain.

108 is a lever lying in a suitable recess in the bed or frame of the machine having its fulcrum on a stud 109. The upper end of this lever is pivoted to an arm 110, which is formed integral with or rigidly secured to the strap 111, which encircles eccentric 14 on shaft 10.

112 denotes a link, one end of which is pivoted to the lower end of lever 108 and the other to the slide 97 on the opposite side of the machine from said lever. The other slide is operated by direct contact of the lever itself, which passes through an opening 113 in said slide. The front of said lever is provided with an engaging-surface 114, which engages a corresponding surface on the slide, (see dotted lines, Fig. 5,) this engaging surface by which one slide is operated being the same distance from the fulcrum of lever 108 as the pivotal point of link 112 to said fulcrum, so that when oscillatory movement is communicated to the lever by means of shaft 10 the eccentric and arm, the two slides 97, carrying the cutting and pointing dies, are made to travel toward and from each other in unison, each slide moving exactly the same distance, thereby bringing the pointing-dies together at the center and cutting off and pointing the already headed nail. The backward movement of the slide to which the link is pivoted is also communicated by said link, the backward movement of the other slide being imparted by the engagement of the lever itself with the opposite—*i. e.*, the outer—side of opening 113, this opening appearing only in dotted lines in Fig. 5. After the cutting and pointing dies have acted the completed nail is knocked out of the way quickly by a clearer 115, so that there is no possibility of its being caught by the advancing heading-die should it fail to drop the instant it is severed from the piece of wire. This clearer consists of a rod, the forward end of which is bent down, as at 116, so that its normal position is just above the nail, but wholly out of the way of the cutting and pointing dies. The rear end of this rod is secured to a lever 117 by set-screws 118. The lever is pivoted to a bracket 119 on the frame or bed of the machine. At the opposite end of lever 117 is a pin or roller 120, which engages groove 13 in disk 12 on shaft 10. The parts are so timed that a quick downward movement of the clearer is caused to take place the instant that the cutting and pointing dies have completed their work. An instant later the heading-die moves forward and forms the head of the next nail from the metal extending beyond the gripping-dies.

In order to enable me to greatly increase the speed of the machine in making large nails, I have devised the novel heading mechanism which I will now describe: 121 denotes a heading-die and 122 a holder therefor, in which the die is secured by a set-screw 123. 124 is a carrier having a recess 127, in which the die-holder is adjusted by means of bolts 125, having nuts 141, (see Fig. 3,) said bolts being provided at their lower ends with lugs 126, which engage the under side of the holder. The holder is locked in position by set-screws 142, which pass through the carrier and engage the top of the holder. At the rear end of recess 127 is an incline 128. 129 is a wedge engaging the rear end of the holder and the incline. This wedge is adjusted in or out to adjust the heading-die nearer to or farther from the cutting and pointing dies by means of a screw 130, threaded to engage the carrier, the upper end of which engages a slot in an arm at the upper end of the wedge, the screw being provided with collars engaging the opposite sides of said arm. 131 denotes a strap encircling eccentric 8 on shaft 3. This strap is made in two parts, which are locked together by bolts in the usual manner. 132 is a heavy arm, which is preferably made integral with one part of the eccentric-strap. To this arm the rear end of the carrier is hinged in any suitable manner. In the drawings I have shown said parts as connected together by an eye-piece 133, through which a pin 134 passes, said pin also engaging guide-blocks 137, which slide in guideways 138. (See Fig. 3.) The eye-piece is locked to arm 132 by means of a pin 135. 136 denotes brackets or standards on opposite sides of the bed or frame of the machine, these brackets being bolted rigidly thereto. 139 denotes links, the upper ends of which turn on lugs or trunnions 140 on brackets 136, the lower ends thereof turning on similar trunnions on opposite sides of the carrier. (See Figs. 1 and 3.) The position of these links relatively to the brackets and the carrier is such that when the carrier, die-holder, and die are moved forward by the forward throw of the eccentric, the links swing down to a vertical position, which brings the carrier, die-holder, and die to a horizontal position, the heading-die being in line with and close to the end of the piece of wire projecting from the cutting and pointing dies—that is, the wire that is to be upset to form the head of the next nail. A slight continuation of the forward movement of the heading-die heads the nail which at this instant is held by the gripping-dies. The return movement swings the heading-die, holder, and carrier backward and also raises said parts to the position shown in Fig. 3. At this instant the gripping-dies release their hold upon the wire, and the feeding movement takes place, the newly-headed nail passing under the heading-die, as shown in dotted lines in Fig. 3. As soon as the feeding movement is completed the cutting and pointing dies act to point the new nail and sever it from the

piece of wire. The clearer then knocks it out of the way. The instant the clearer has acted the heading-die again swings downward and forward and heads the next nail, this operation being repeated continuously and at a very high rate of speed.

I claim—

1. The combination, with the feed-slide and the stationary and movable jaws, of a bell-crank lever, one arm of which engages the movable jaw forward of the pivotal point of said lever to the slide and the rear arm of which is engaged by a spring, whereby the movable jaw is held at the clamping position during the forward movement of the slide and released therefrom against the power of the spring during the backward movement.

2. The feed-slide having stationary and movable jaws, in combination with a bell-crank lever pivoted on a stud 28, the short arm engaging the movable jaw forward of the pivotal point and the rear arm being engaged by a spring to hold the jaw in the clamping position, and a swinging plate pivoted to stud 28 and engaging another stud, whereby the parts are held in operative position.

3. The combination, with the feed-slide and rock-shaft 39, of a feed-lever loosely mounted on said shaft, a spring 65, secured to the rock-shaft and bearing against the feed-lever, and an angle-arm 68, also secured to the rock-shaft and bearing against the front of the feed-lever, so that a positive backward movement is caused by the angle-arm and a yielding forward movement by the spring.

4. The feed-slide, the rock-shaft, and feed-lever 61, loose on said shaft and engaging the feed-slide, in combination with a spring 65, the inner end of which is secured to the rock-shaft, the outer end engaging the feed-lever and moving it forward with the rock-shaft, said spring being adapted to yield should any obstruction occur to the forward movement of the feed-slide.

5. The combination, with the bed, feed-slide, stationary and movable jaws, and a spring-actuated lever adapted to hold the movable jaw, of a lever 35, pivoted to the bed and adapted to engage the spring-actuated lever to hold the latter out of operative position, and a beveled spring-actuated pin adapted to lock lever 35 in position to retain the spring-actuated lever out of operative position, so that while the feeding movement may continue the jaws do not grip the wire.

6. The combination, with the feed-slide, the stationary and movable jaws, and a spring-actuated bell-crank lever engaging the movable jaw, substantially as described, of lever 35, adapted to engage the bell-crank lever and hold the movable jaw out of operative position, and pin 36, which holds the parts in said position.

7. The combination, with the feed-slide, of the stationary and movable jaws, a set-screw for adjusting the stationary jaw, a bell-crank lever engaging the movable jaw forward of its pivotal point, a spring engaging the bell-crank lever to hold the movable jaw in gripping position, and a guide 21, which conducts the wire to the jaws.

8. The combination, with the feed-slide, the feed-lever, and the rock-shaft and intermediate connections, substantially as described and shown, of a clutch member 50, rigidly secured to the rock-shaft and carrying a spring-actuated dog 52, having a beveled pin 57, a sleeve 46, loose on the rock-shaft and having a flange adapted to be engaged by the dog, a slotted arm, through which power is applied, and a push-rod 58, lying in a recess in the rock-shaft, which is adapted to engage pin 57 to disconnect the clutch members, so that the rock-shaft may be disconnected from the sleeve and slotted arm and the feeding mechanism stopped without stoppage of the machine.

9. The rock-shaft having a longitudinal recess 55 and a clutch member 50, carrying a spring-actuated dog provided with a beveled pin 57, in combination with a sleeve 46, loose on the rock-shaft and having a flanged arm adapted to be engaged by the dog and a slotted arm through which power is applied, and a push-rod 58, the forward end of which is beveled to engage pin 57, whereby the dog may be retracted and held out of operative position, thereby disconnecting the rock-shaft and clutch member 50 from sleeve 46.

10. In combination, the feed-slide having stationary and movable feed-jaws, a spring-actuated bell-crank lever engaging the movable jaw forward of its pivotal point to hold it in gripping position during the forward movement of the slide, a lever 35, adapted to engage the bell-crank lever, and a spring-actuated beveled pin 36, adapted to be engaged by lever 35 to hold the bell-crank lever and movable jaw out of gripping position.

11. The combination, with the feed-slide, feed-lever, and rock-shaft carrying clutch member 50, having a spring-actuated dog 52, of sleeve 46, loose on the rock-shaft and having a flanged arm adapted to be engaged by the dog to connect said sleeve and rock-shaft, a slotted arm on said sleeve through which power is applied to oscillate said sleeve, and a push-rod recessed in the rock-shaft and adapted to engage the dog, whereby said sleeve and rock-shaft are disconnected, as and for the purpose set forth.

12. The combination, with the frame, of a die-block 71, engaging a recess therein and having lateral projections, upper and lower gripping-dies recessed in the die-block, plates by which the gripping-dies are held in place, and binding-plates 72, which engage the die-block at its sides and above said projections to retain it in position.

13. The combination, in a nail-machine, of the gripping-dies, the heading-die, and cutters, a transverse power-shaft connected with the heading-die, a longitudinal shaft 10, geared

with said transverse shaft, mechanism for operating the cutters connected with said shaft 10, and a transverse lever 81, passing beneath and adapted to directly operate the gripping-die and connected with said longitudinal shaft, substantially as set forth.

14. The combination, with die-block 71 and upper and lower gripping-dies recessed therein, of gripping-lever 81, fulcrumed at one side of the lower die and extending transversely under said dies and upward through the frame of the machine, and a longitudinal side shaft 10 and cam whereby said lever is oscillated to move the lower die into gripping position.

15. The combination, with the transverse power-shaft 3, gearing 9 and 11, and the longitudinal shaft 10, having a cam 15, of die-block 71, upper and lower gripping-dies recessed therein, and lever 81, fulcrumed at one side of the dies and extending transversely under them and up through the frame into position to be engaged by said cam to raise the lower die.

16. The combination, with the slides, the cutting and pointing dies, and upper and lower adjustable clamping-plates, one end of each plate engaging the slide, the other being beveled to correspond with the die, of screws 102, which pass through the upper plates and engage the slides, and screws 103, provided with collars 104 and passing loosely through the upper clamping-plates and the slide and engaging the lower clamping-plates, substantially as described and shown.

17. The combination, with the slides, the cutting and pointing dies, the upper and lower adjustable clamping-plates, and gibs 105, of screws 102, 103, and 106, whereby said dies are adjusted vertically and laterally.

18. The combination, with the slides and the cutting and pointing dies, of die-block 71, carrying the gripping-dies, wedge 90, whereby the gripping-dies may be adjusted relatively to the cutting and pointing dies to regulate the amount of stock in the nail-head, and a screw parallel with that face of the wedge which bears against the frame, mounted and rotary in a bearing on the wedge and engaging a fixed threaded seat in the frame.

19. The combination, with the frame and movable bushing 95 in said frame, of die-block 71, the gripping-dies, wedge 90, slotted to receive the bushing and having an arm 91, and a screw 93, engaging said arm and also the frame, whereby the wedge is moved in or out to adjust the die-block and gripping-dies.

20. The combination, with the main shaft, eccentric 8, and an eccentric-strap having an arm 132, of the heading-die extending in line with said arm and in the direction of reciprocation of the latter, a holder and carrier, a pivotal connection between said carrier and arm, brackets 136, and links pivoted to said brackets and to the carriers, whereby each rotation of the shaft places the heading-die in heading position, and then swings it upward out of the way, so that the completed nail passes under it when the feeding mechanism operates.

21. The combination, with a heading-die, holder and carrier, and operating mechanism, substantially as described and shown, of brackets 136 and links pivoted to said brackets and to the carrier, said die and carrier being in line with the shaft and operating mechanism, and said links being at right angles to the die at the time when the parts are in their heading position, substantially as described.

22. In a machine of the class described, the combination, with suitable feeding mechanism, gripping-dies, and cutting and pointing dies, of a heading-die, a carrier therefor pivoted to swing in vertical planes and having a reciprocating curvilinear movement, and links extending in said planes and transversely to the carrier, by which the latter is supported, so that in making the return movement the heading-die is swung upward instead of directly backward.

23. The combination, with suitable feeding mechanism, the gripping-dies, the heading and pointing dies, and the clearer, of a horizontal heading-die, a carrier therefor, brackets 136, and links pivoted to said brackets and to the forward end of the carrier and which are vertical at the time of the heading operation, so that after the heading operation the heading-die and carrier are swung upward, the feeding movement carrying the completed nail under the heading-die, from which position it is removed by the clearer.

24. The combination, with shaft 3, having eccentric 8, and strap 131, having arm 132, of the heading-die, a carrier therefor, brackets 136, links pivoted to said brackets and to the forward end of the carrier, guide-blocks 137, eye-piece 133, and pin 134, engaging the eye-piece and the guide-blocks, whereby the carrier is connected with the arm, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ALMON B. GLOVER.

Witnesses:

JOHN H. BARLOW,

GEO. S. WEBSTER.