(No Model.) 4 Sheets—Sheet 1.

H. B. HAPPE.

WIRE NAIL MACHINE.

No. 359,564. Patented Mar. 15, 1887.

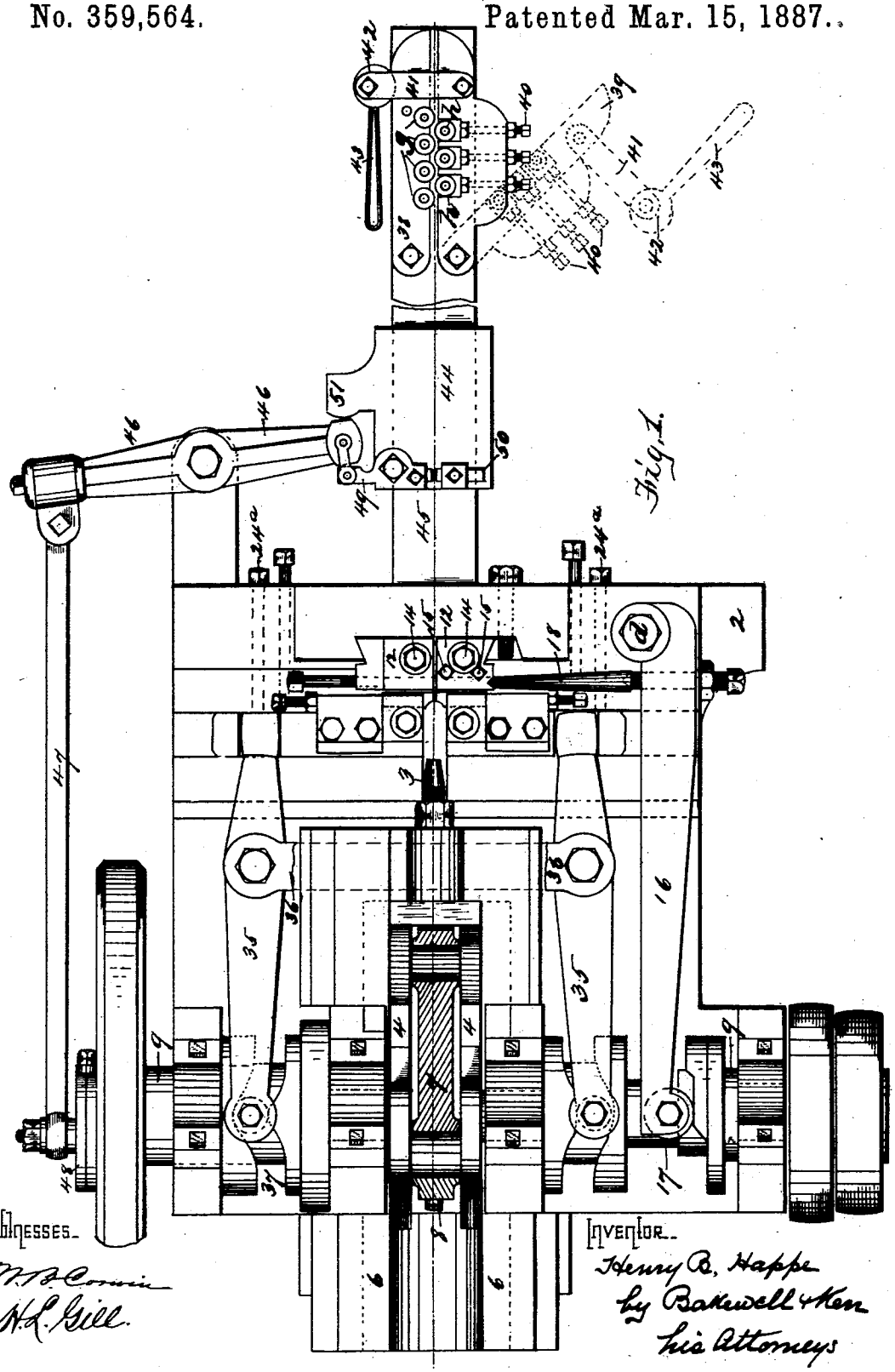


Fig. 1.

Witnesses.
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Inventor.
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(No Model.) 4 Sheets—Sheet 2.

H. B. HAPPE.

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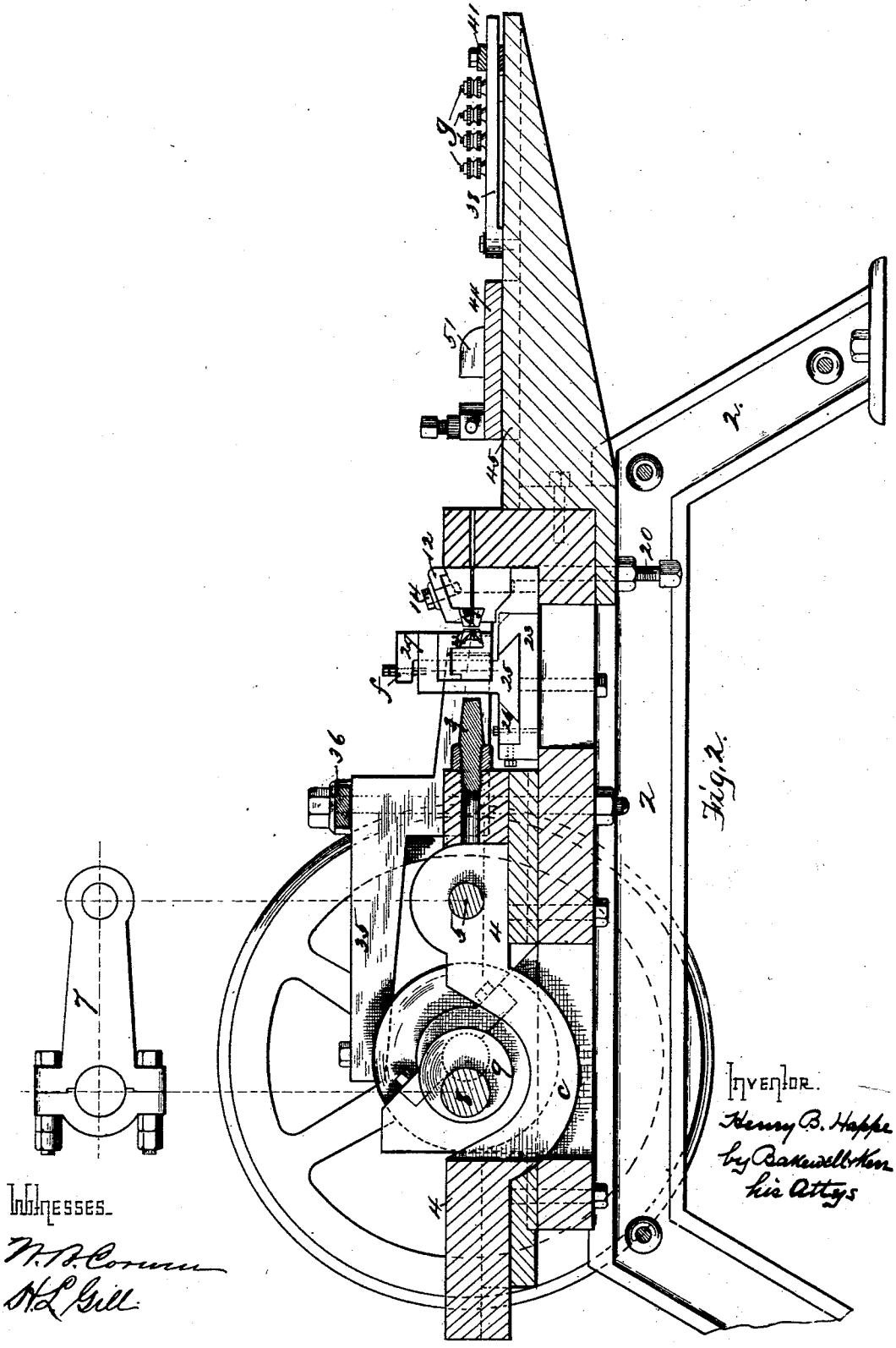


Fig. 2.

WITNESSES.
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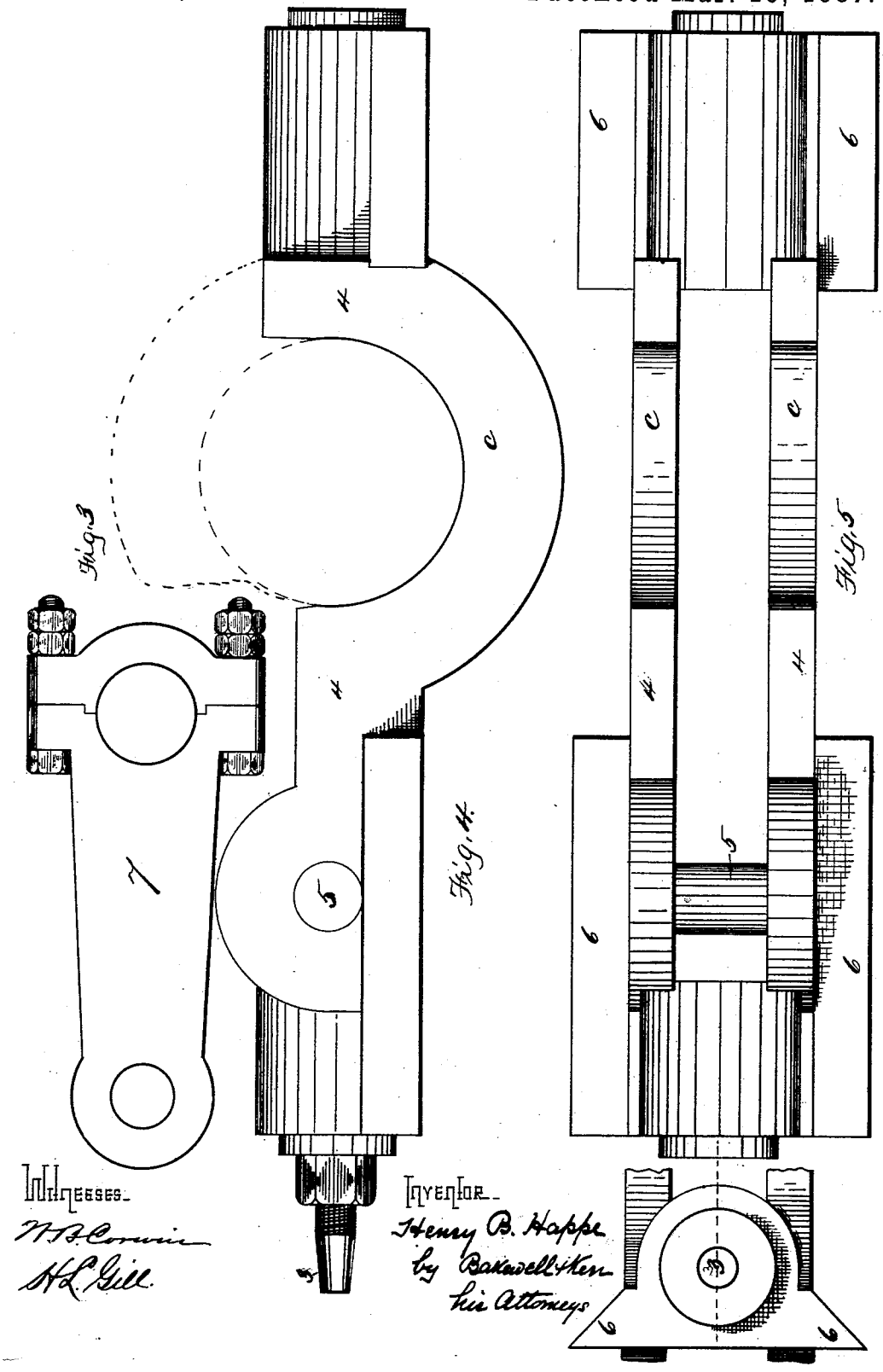
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H. B. HAPPE.

WIRE NAIL MACHINE.

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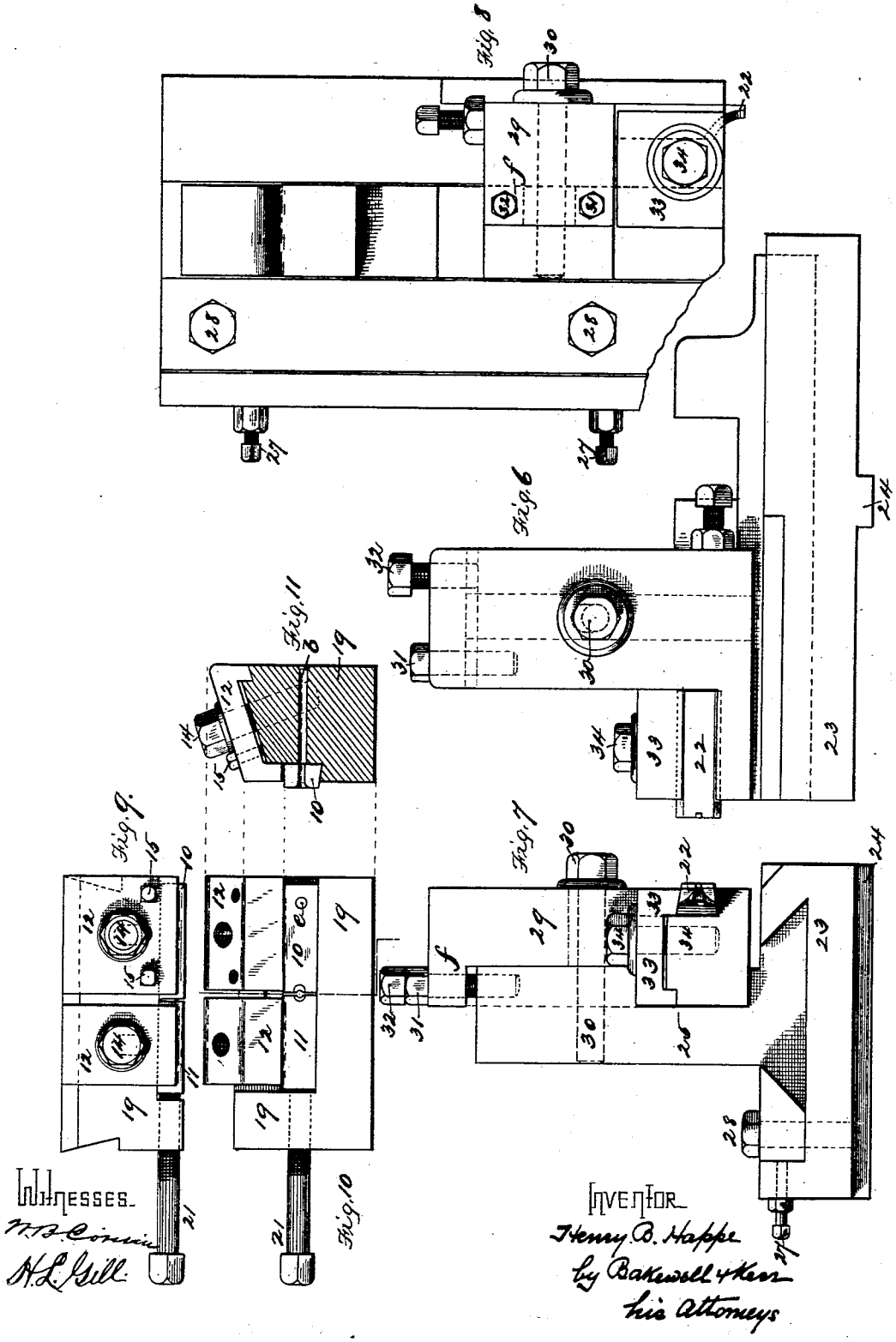
N. PETERS. Photo-Lithographer. Washington, D. C.

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H. B. HAPPE.

WIRE NAIL MACHINE.

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N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

HENRY B. HAPPE, OF BEAVER FALLS, PENNSYLVANIA, ASSIGNOR OF ONE-FOURTH TO CHARLES W. ROHRKASTE, OF SAME PLACE.

WIRE-NAIL MACHINE.

SPECIFICATION forming part of Letters Patent No. 359,564, dated March 15, 1887.

Application filed July 19, 1886. Serial No. 208,366. (No model.)

To all whom it may concern:

Be it known that I, HENRY B. HAPPE, of Beaver Falls, in the county of Beaver and State of Pennsylvania, have invented a new and useful Improvement in Wire-Nail Machines; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan view of the machine. Fig. 2 is a vertical longitudinal section on the line *x x* of Fig. 1. Figs. 3, 4, and 5 are enlarged views of the heading die or hammer and its connections. Fig. 6 is a side view of one of the cutters, its head, and slideways. Fig. 7 is an end view and Fig. 8 is a plan view thereof. Fig. 9 is a plan view of the gripping-dies. Fig. 10 is a front elevation thereof; and Fig. 11 is a vertical cross-section on the line *y y* of Fig. 10.

Like symbols of reference indicate like parts in each.

My invention relates to an improvement on that class of nail-machines in which the wire is passed through the machine from a coil, and after the proper amount of wire has been fed beyond the gripping-dies to form a nail it is seized by the dies and cut. A heading-die then advances and upsets the projecting end of the wire to form a head for the next nail, the dies are retracted, and another portion of the wire is fed, which is in turn cut. This operation is repeated continuously.

In the drawings, Figs. 1 and 2, 2 represents the frame of the machine. 3 is the heading-die, which is attached to the end of a reciprocating plunger, 4. (Shown in detail in the figures on the third sheet of the drawings.) This plunger is made with two separated slide-bars connected near their front ends by a link-pin, 5, and has lateral flanges 6, on which it slides on the frame of the machine. A link, 7, encircles an eccentric wrist-pin, 8, on the main shaft 9, and connects it with the pin 5 of the plunger. The plunger and die will thus be reciprocated once during each revolution of the main shaft, and as the flanges 6 of the plunger have their bearings both in the rear and front of the main shaft, the motions of the plunger will be even and will have a straight and more direct course to the gripping-dies than if the bearing of the head were at one side only of the main shaft.

It is desirable that the center of the shaft 9, driving the plunger which heads the nails, should be substantially in a line with the wire. Therefore, in order to clear the shaft 9, I curve the plunger, as at *c*, so that it may bridge the shaft either above or below it, as shown in Fig. 1. The part *c* connects the rear and front flanges, 6. I am aware that in "blow-nail machines," whose heading-dies are actuated by springs, it has been customary to provide the plunger with bearing-surfaces both back of and in front of the actuating-shaft; but this arrangement has never been had with press-machines of the class to which the machine shown in the drawings belongs, nor with machines wherein the axis of the shaft driving the plunger is in substantially the same horizontal line with the wire of which the nails are formed.

The gripping-dies 10 and 11 are shown in Figs. 1 and 2 and in detail in Figs. 9, 10, and 11. The dies are mounted end to end in a beveled slide seat formed in the side of a bed or slide-block, 19, which has a central bore, *b*, for the wire to pass through. The dies 10 and 11 are held on their slideways by cap-pieces or clamps 12, which are provided with angled flanges or feet at the front and back, which feet rest on the upper sides of the dies and on sunken seats or shoulders at the rear of the blocks 19. The shoulders at the rear of the blocks keep the caps from slipping. These caps are made distinct in order to leave an open space through which the operation of the dies may be easily seen from above, and by which access may be had to clean them. They are adjusted by bolts 14, traversing slots in the caps and entering the block 19, which permits the caps to be adjusted backward or forward, and by screws 15, which rest on the surface of the block and by enabling it to be tilted regulate the degree of pressure of the forward flanges in the dies. Since the die 11 is not movable otherwise than for purpose of adjustment, its cap is set so as to clamp it tightly against its seat on the block 19, and the screws 15 are omitted; but, as the die 10 must be capable of reciprocation toward and away from the ends of its companion, its cap

is set by the screws 15 so that the forward flange shall rest on but shall not clamp the die.

The die 10 is actuated by a lever, 16, of the second class, which is fulcrumed at *d*, and at the other end is provided with a friction-roller which works in a groove in a cam, 17, on the main shaft. This lever is connected with the die 10 by an adjustable pusher-link, 18, which bears on the end of the die, as shown in Fig. 1, and is further attached thereto by means of a hook or pin (not shown) which engages a hole, *e*, in the side of the die, Fig. 10. By these means the die 10 is actuated so as to approach and recede from the stationary die 11 at regular intervals. The dies are vertically adjustable into alignment with the wire by means of a set bolt or bolts, 20, Fig. 2, which pass through the bed of the machine and engage the bottom of the block 19, thus enabling it to be raised or lowered. The die 11 is longitudinally adjustable to and from its companion die by a set-bolt, 21, the arrangement of which is clearly shown in Figs. 9 and 10.

The cutters 22, which sever the nail after it has been headed, are shown in Figs. 1 and 2 and in detail in Figs. 6, 7, and 8. Each of these cutters is fixed to a moving head, which is made in separate parts for the purpose of adjustment.

Figs. 6, 7, and 8 show one of the cutters and its head, both cutters and heads being identical in construction.

23 is the bed or slide-block in which the cutter-head travels. It is set transversely of the machine, but is provided with a tongue, 24, which fits in a groove in the bed of the machine, and enables the slide-block to be moved by screws 24ª lengthwise of the machine for the purpose of securing relative alignment of the cutters with each other.

25 is the vertical post or carriage-piece of the cutter-head. It has a dovetailed lower end or foot, which fits in a mortised slideway in the slide-block 23, and is held therein by a beveled key or grip, 26, which is adjustable by set-screws 27 and 28, of which the screws 27 bear against the side of the key, and the screws 28 pass through slots therein into the bed 23.

It will be noticed that the carriage 25 is arranged on the slide-block 23 at the rear of the gripping-dies. This enables the cutters to be made adjustable toward and away from the dies by motion of the slide-block for the purpose of varying the size of the nail-heads without need of cutting or recessing the cutter-head to afford clearance thereof. The cutters can therefore be set very solidly in their heads.

Projecting at right angles from the side of the carriage 25 is the cutter-head proper, 29, which is secured to the side of the carriage by a bolt, 30, which passes through a vertical slot in the head. A flange, *f*, of the head projects over the top of the carriage 25, and is provided with two set-screws, 31 and 32. The screw 31 enters the body of the carriage, and is used for screwing down or depressing the cutter-head, and the screw 32 bears on the top of the carriage and is used for raising and fixing it. When the head has thus been properly adjusted it is clamped to the carriage by the bolt 30. At the base of the cutter-head it has a horizontal angular projection or chair, whose outer side has a shelf or recess on which the cutter-blade 22 rests. The cutter is clamped in place by means of a cap, 33, and bolt 34, constructed and arranged similarly to the cap 12 and bolt 14 of the gripping-die 11, before described.

The cutters are reciprocated toward each other to sever the wire by means of levers 35, Figs. 1 and 2, which are fulcrumed to a cross bar or brace, 36, and have at their front ends rollers which are in the grooves of cams 37 on the main shaft of the machine, and at their other ends fit in forks in the sliding carriages 25. These levers are oscillated by rotation of the shaft and cause the cutters to approach and recede at regular intervals.

I will now describe the feeding mechanism of the machine. The wire is fed from a coil (not shown) and passes between a parallel series of straightening-rollers, *g* and *h*. These rollers are journaled on the surfaces of bars 38 and 39, which are pivoted at their inner ends, and are adapted to be swung thereon toward and away from each other. The journals of the rolls *g* are fixed, but the bearings of the rolls *h* are movable and adjustable by set-bolts 40. Near the outer end of the bar 39 is pivoted a link, 41, to the free end of which is pivoted a cam, 42, having a hand-lever, 43.

In inserting the wire between the rolls the bars 38 and 39 are first opened, as indicated by dotted lines in Fig. 1, the wire is placed, and after the bars 38 and 39 have been closed, so as to confine the wire between the rollers, the bars are locked by throwing the link 41 over the bar 38 and turning the cam-lever, as shown by full lines in Fig. 1. This arrangement enables easy access to be had to the rollers for cleaning them, and when the rollers have once been adjusted by the bolts 40 for any given size of wire the adjustment need not be disturbed when a new coil of the same gage is inserted.

44 is the feed-carriage, which reciprocates on a track or slideway, 45, and is actuated by a lever, 46, which is connected by a pitman, 47, to an adjustable eccentric, 48, on the main shaft 9. The lever 46 is pivotally attached to a pivoted dog or catch, 49, on the carriage 44, which has a companion dog, 50, fixed on the carriage opposite to it. The wire lies between these dogs, and, as the free end of the lever 46 moves back, it will first move the dog 49 to separate it from the part 50 and to disengage the wire until the lever strikes a lug, 51, on the carriage, when the further motion of the lever will draw back the carriage. On the forward motion of the lever the dog 49 will first be moved toward the dog 50, so as to clamp the wire between their ends, and then the lever will advance the carriage to feed the

wire to the machine. The operation is thus repeated, the carriage slipping freely past the wire in its back strokes and feeding it in the forward strokes. The feeding action is thus made very certain and regular.

The course of the wire is from the coil, between the straightening-rolls, between the feed-dogs 49 and 50, and between the gripping-dies and cutters, and the operation of the machine is as follows: Suppose the cutters to be separated and the gripping-dies to hold the wire, the end of which projects slightly toward the heading-die. The latter then advances, and engaging the projecting end of the wire flattens it and forms a head on it for the nail, acting on the dies as an anvil. Then, as the heading-die recedes, the gripping-dies separate, and the feed-carriage moves forward to advance the wire a distance equal to the length of a single nail. Then the cutters approach and sever the wire, giving a point to the nail, which is cut off. The gripping-dies then seize the wire, the cutters recede, and the operation is repeated, as just described. The relative periods of motion of the several parts are adjusted by timing of their primary cams and eccentrics on the main shaft.

The advantages of my machine consist, principally, in the time and labor saved by the ease in adjusting the several parts, particularly the gripping-dies, the cutters, and the feeding and straightening mechanism.

In the following claims numbered 6, 7, and 8 I use the word "die" generically to include either the gripping-die or the cutting-die.

I claim—

1. In a wire-nail machine, the combination of a heading die or hammer, its reciprocating plunger or stock, a shaft whose axis is in substantially the same line with the wire of which the nails are formed, and devices, substantially as described, connected with the shaft and arranged to impart a reciprocating movement in both directions to the plunger, the said plunger bridging the shaft, as at *c*, and having bearings on both sides of the shaft, substantially as and for the purposes described.

2. In a wire-nail machine, the combination of a sliding carriage, a cutter-head mounted on the carriage, a cutter on the cutter-head, a bolt, 31, connecting the head and carriage and arranged to move the cutter-head vertically, and a set-bolt, 32, on the cutter-head and bearing on the carriage for fixing the cutter-head, substantially as and for the purposes described.

3. In a wire-nail machine, the combination of a sliding carriage, a cutter-head mounted on the carriage, a cutter on the cutter-head, a bolt, 31, connecting the head and carriage and arranged to move the cutter-head vertically, a set-bolt, 32, on the cutter-head and bearing on the carriage for fixing the cutter-head, and a locking-bolt, 30, connecting the head and carriage, substantially as and for the purposes described.

4. The combination of the horizontally and transversely sliding carriage 25, the vertical cutter-head 29, adjustably fixed to the sliding carriage and provided with a horizontal shelf or recess arranged to receive the cutter, and the cutter fixed to the cutter-head on said shelf or recess, substantially as and for the purposes described.

5. The combination of the horizontally and transversely sliding carriage or cutter-head and a cutter set on the face thereof, the horizontal slide-block 23 whereon it travels, and the gripping-dies, said carriage or cutter-head being arranged in the rear of the gripping-dies, and said slide-block being movable and adjustable horizontally lengthwise of the machine to advance or retract the cutter toward or from the dies, substantially as and for the purposes described.

6. In combination with the die of a wire-nail machine, a block supporting the die and a cap having flanges or feet which bear on the die and on the block, substantially as and for the purposes described.

7. In combination with the die of a wire-nail machine, a block supporting the die and a cap having flanges or feet which bear on the die and on a shoulder on the block, substantially as and for the purposes described.

8. In combination with the die of a wire-nail machine, a block supporting the die, a cap having flanges which bear on the die and on the block, and bolts 14 and 15 for adjusting the cap, substantially as and for the purposes described.

9. In a wire-nail machine, the combination of a reciprocating feeding-carriage, a pivoted dog on the carriage arranged to be moved to engage the wire, and a lever which actuates the carriage, said lever bearing on the dog and exerting thereon the power which moves the carriage, whereby the forward motions of the lever move the carriage forward, and also move the dog to clamp the wire and to feed it, substantially as and for the purposes described.

10. In a wire-nail machine, the combination of two series of straightening-rollers, one of which series is mounted on a bar or frame which is separable from the other series, and set-screws which engage the bearings of the rolls of one of said series for the purpose of adjusting them, substantially as and for the purposes described.

11. In a wire-nail machine, the combination of two series of straightening-rollers, one of which series is mounted on a bar or frame which is separable from the other series, and a link and eccentric, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 7th day of July, A. D. 1886.

HENRY B. HAPPE.

Witnesses:
THOMAS W. BAKEWELL,
JNO. K. SMITH.