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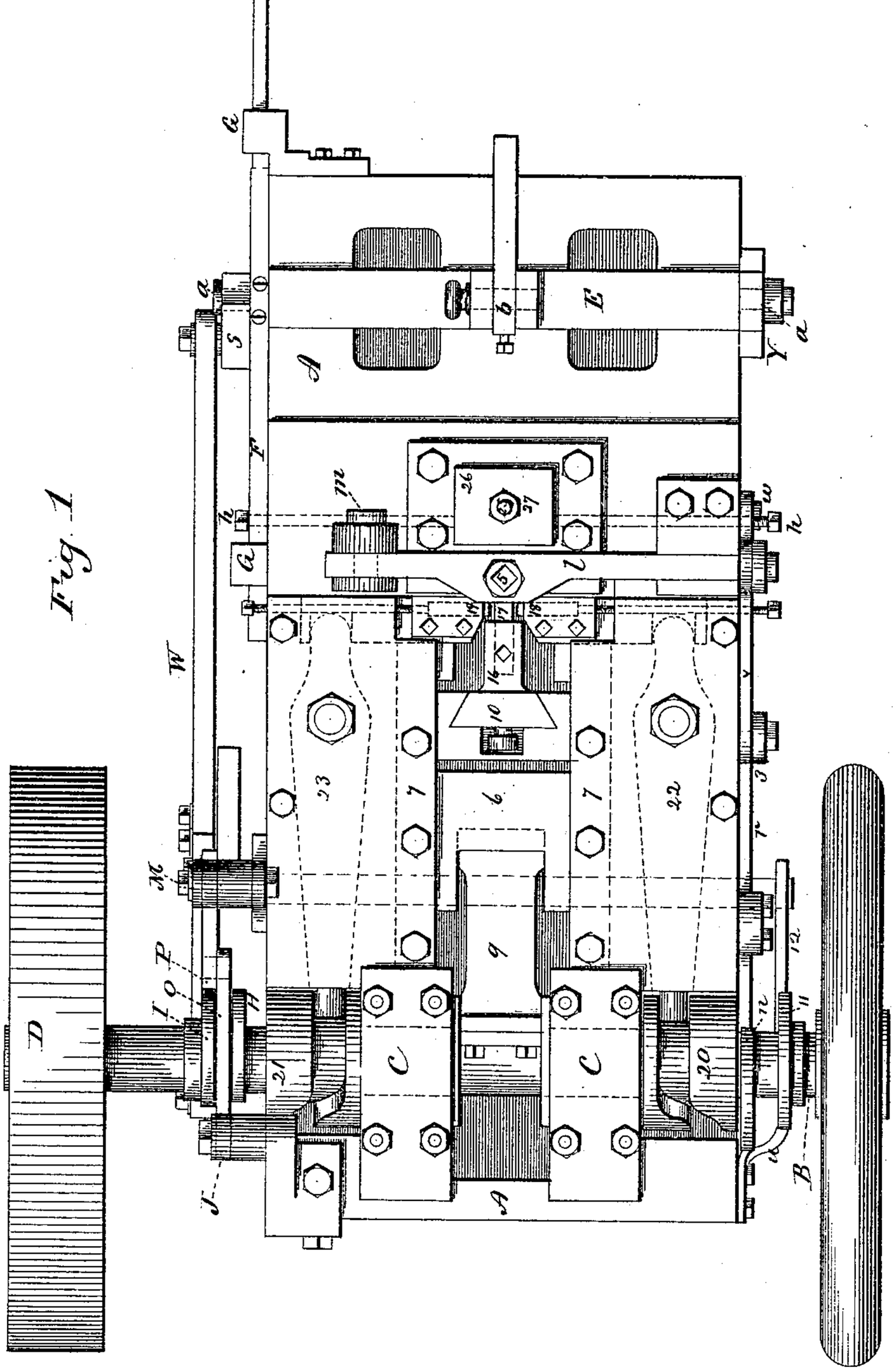
J. L. COREY.

WIRE NAIL MACHINE.

No. 377,238. Patented Jan. 31, 1888.

Fig. 1



Witnesses,
L. N. Shumway.
Fred C. Earle

James L. Corey.
Inventor,
By atty.
John C. Earle.

(No Model.) 5 Sheets—Sheet 2.

J. L. COREY.

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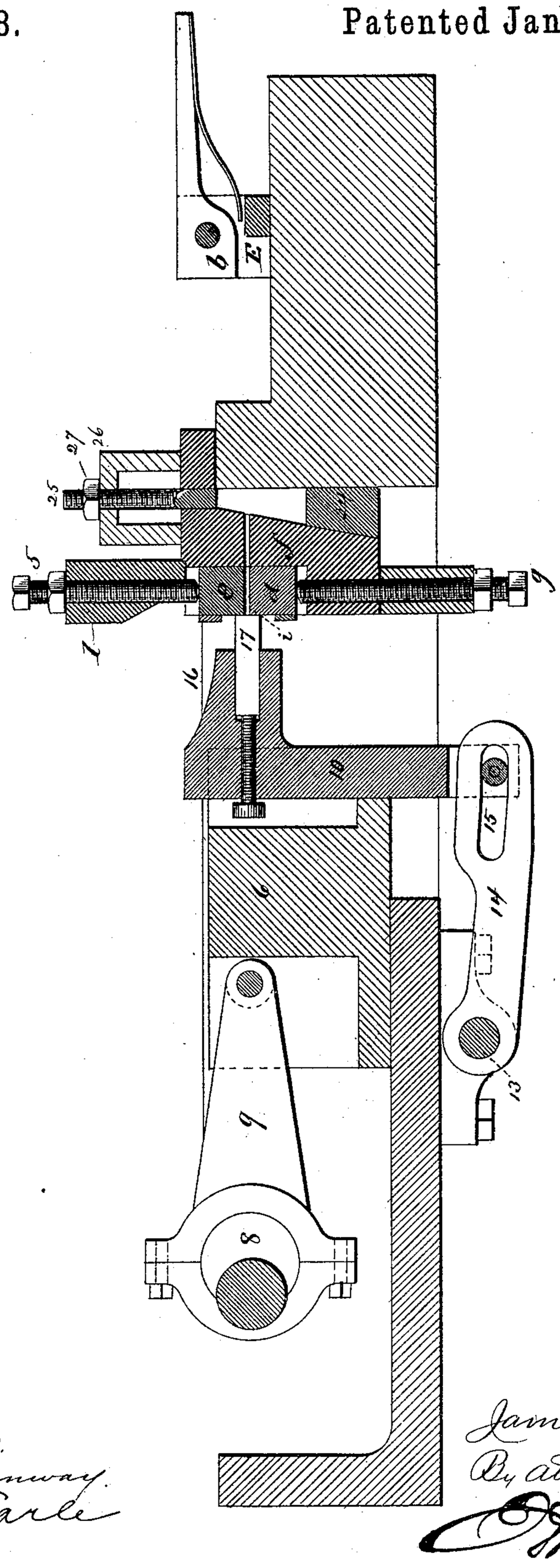

Fig. 2.

Witnesses.
J. H. Shumway.
Fred C. Earle

James L. Corey.
Inventor.
By atty.
Wm C. Earle.

(No Model.) 5 Sheets—Sheet 3.

J. L. COREY.

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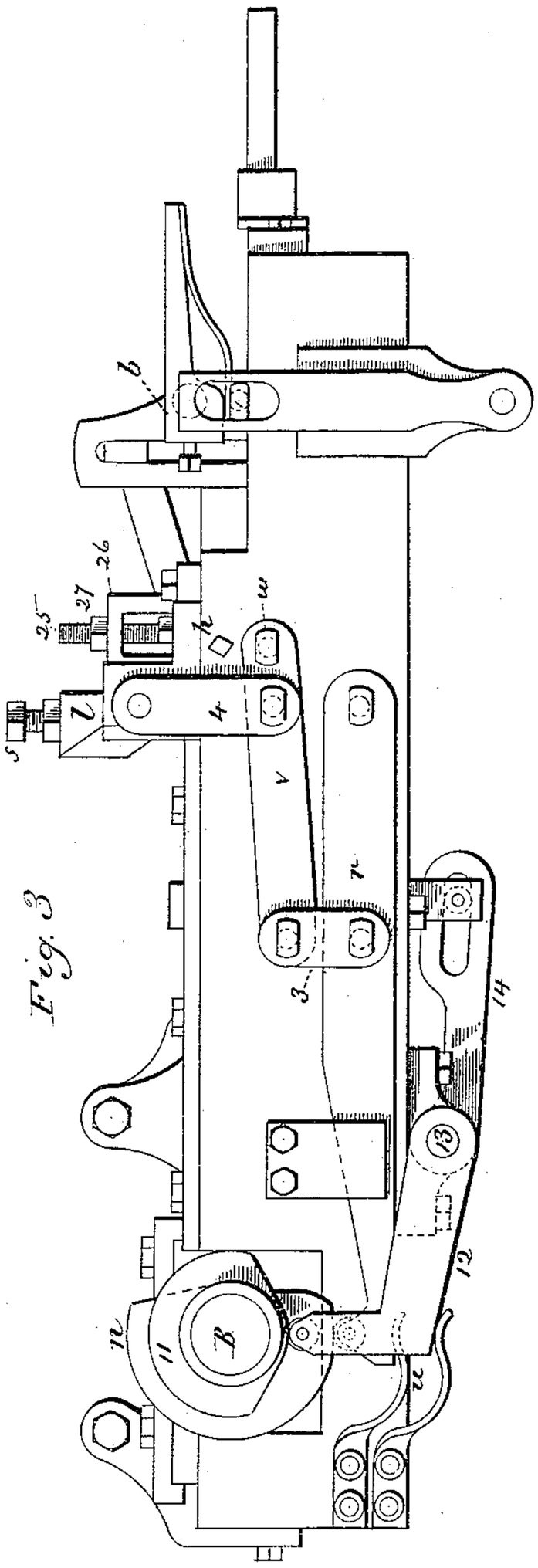

Fig. 3

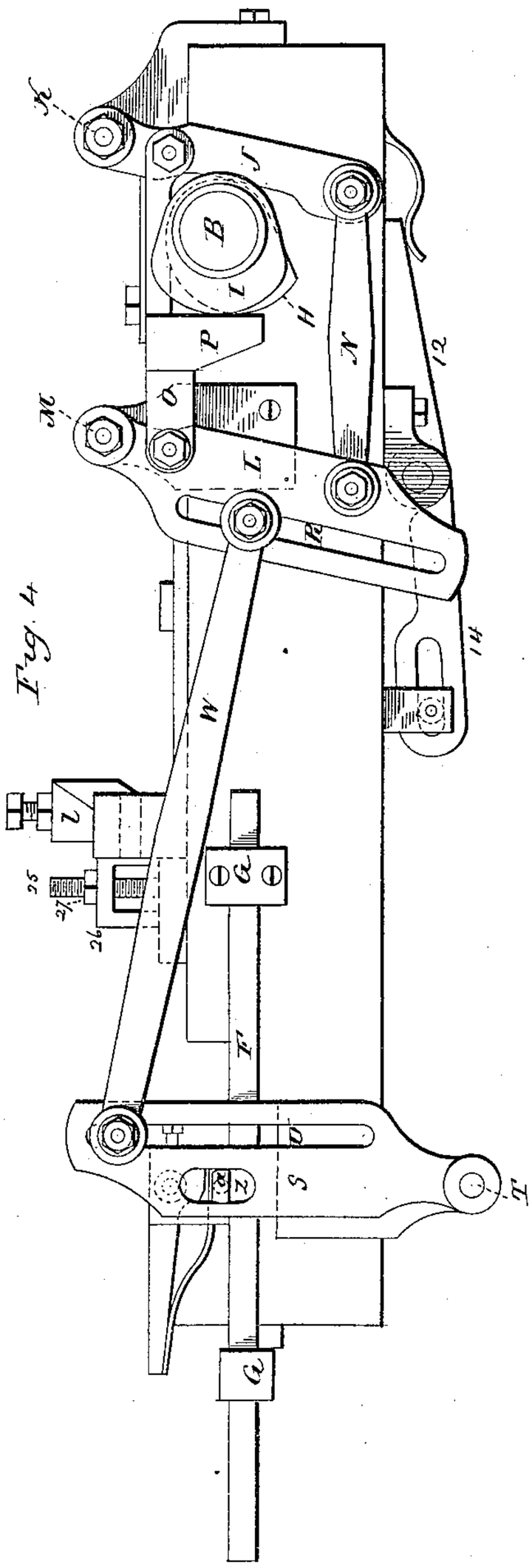

Fig. 4

Witnesses,
J. N. Shumway.
Fred C. Earle

James L. Corey.
Inventor.
By atty.
Wm. C. Earle.

(No Model.) 5 Sheets—Sheet 4.

J. L. COREY.

WIRE NAIL MACHINE.

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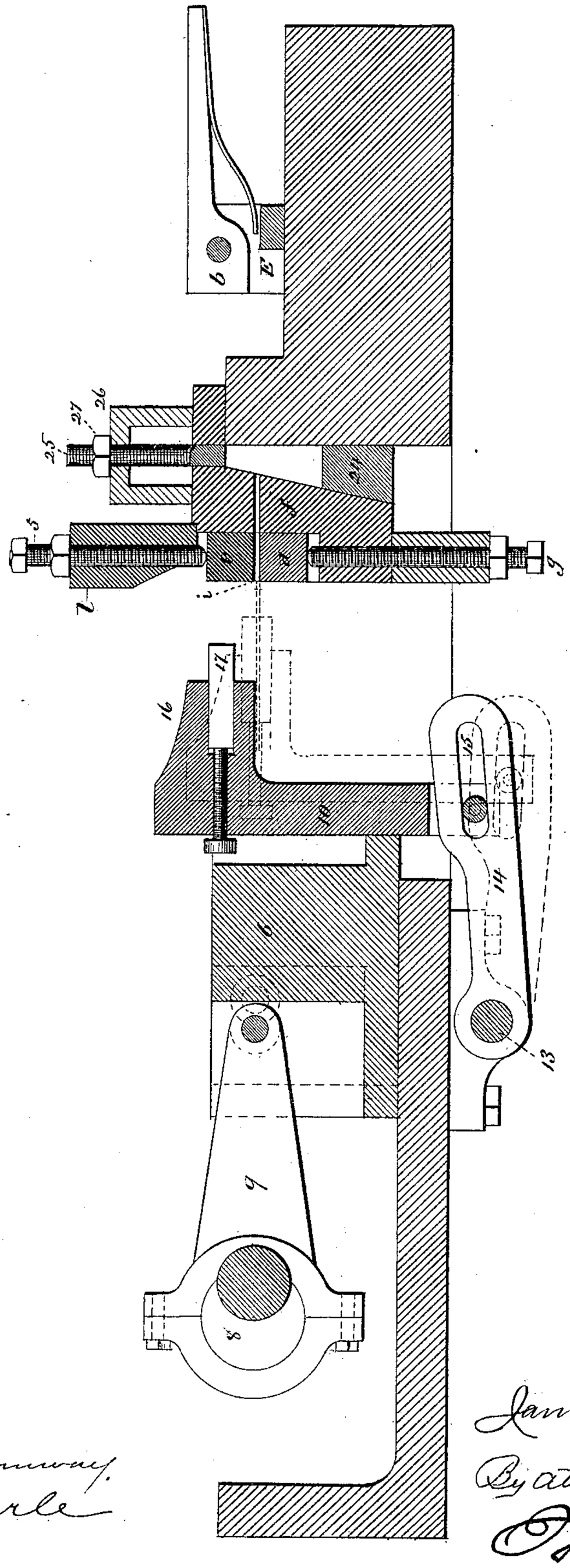
Fig. 5



Witnesses.
L. N. Shumway.
Fred C. Earle

James L. Corey,
Inventor,
By atty.
Thos. G. Ewing.

(No Model.) 5 Sheets—Sheet 5.

J. L. COREY.

WIRE NAIL MACHINE.

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Fig. 6

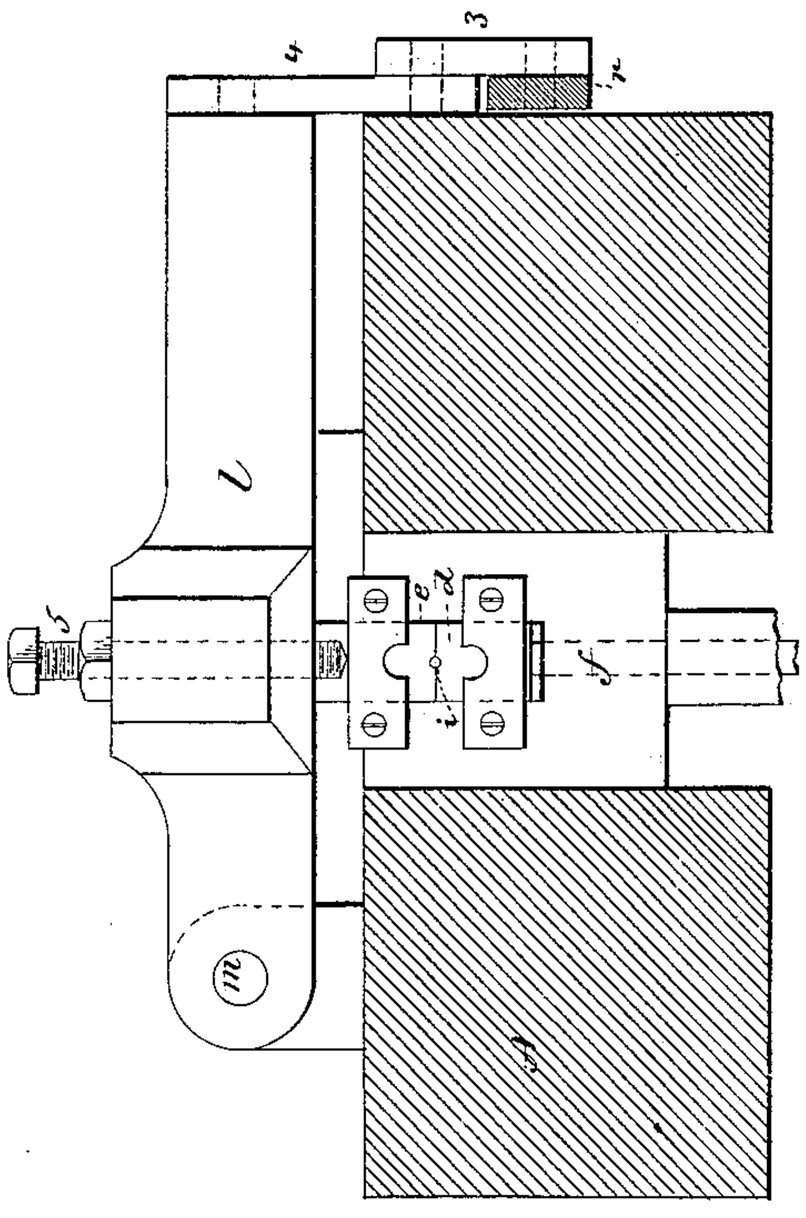
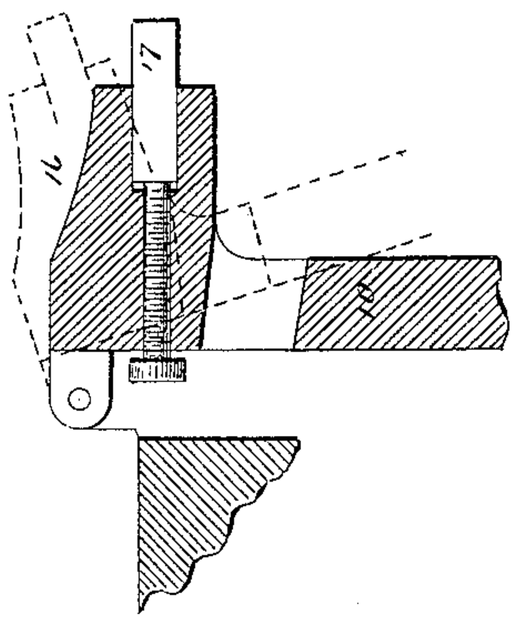


Fig. 7



Witnesses
J. H. Shumway.
Fred C. Earle

James L. Corey.
Inventor
By atty.
Fred C. Earle.

UNITED STATES PATENT OFFICE.

JAMES L. COREY, OF TAUNTON, MASSACHUSETTS, ASSIGNOR TO THE BIRMINGHAM IRON FOUNDRY, OF BIRMINGHAM, CONNECTICUT.

WIRE-NAIL MACHINE.

SPECIFICATION forming part of Letters Patent No. 377,238, dated January 31, 1888.

Application filed March 24, 1887. Serial No. 232,241. (No model.)

To all whom it may concern:

Be it known that I, JAMES L. COREY, of Taunton, in the county of Bristol and State of Massachusetts, have invented a new Improvement in Machines for Making Wire Nails; and I do hereby declare the following, when taken in connection with accompanying five sheets of drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a top or plan view of the machine complete; Fig. 2, a vertical longitudinal central section enlarged, showing the heading-punch in the advanced or heading position; Figs. 3 and 4, opposite side views of the machine; Fig. 5, a longitudinal central section showing the heading-punch in its extreme rear position; Fig. 6, a transverse section cutting in front of the holding-dies, showing the clamping-lever; Fig. 7, a modification.

This invention relates to an improvement in machines for making the class of nails commonly called "wire nails"—that is to say, nails which are made from a piece of wire, pointed at one end, and the head produced by upsetting the metal at the opposite end—the object of the invention being an easy and ready adjustment of the holding-dies, and at the same time to insure a firmness to the dies desirable in this class of machines, and also to construct a machine generally which shall be firm and strong in its action.

A represents the bed of the machine, upon which the operative mechanism is arranged; B, the driving-shaft, arranged in suitable bearings, C C, and to which power is applied through a pulley, D, or otherwise, to impart revolution to the driving-shaft.

E is a feed-bar arranged transversely across the machine at the end opposite to and parallel with the driving-shaft. At one side the bar E is made fast to a longitudinal slide, F, which works through bearings G G, so that the bar may receive a reciprocating motion at right angles to the axis of the driving-shaft. This reciprocating movement is imparted by means of two cams, H and I, on the driving-shaft. The one cam H works against a lever, J, hung to the bed on a fulcrum, K, above, and so as to vibrate in a vertical plane. Parallel with the lever J is a second lever, L, hung upon a fulcrum, M, and so as to swing in substantially the same plane as the lever J. The two levers J and L are connected by a pair of parallel rods, N and O, as seen in Fig. 4, the one above and the other below the driving-shaft. From the upper connecting-rod, O, an arm, P, extends downward into the path of the cam H, and so that the two cams work between the lever J at the rear on one side and the downwardly-projecting arm P on the opposite side of the driving-shaft, the one cam H working against the inner side of the lever J and the other cam, I, working against the corresponding face of the arm; hence at each revolution of the driving-shaft a full vibratory movement is imparted to both the levers J and L. The lever L is constructed with a vertical slot, R.

S represents a third lever hung upon a fulcrum, T, below the feed-bar, and in substantially the same plane as the lever L. This lever S is constructed with a vertical slot, U, like the slot R in the lever L. The levers L and S are joined by a connecting-rod, W, one end adjustably hung in the slot R of the lever L and the other end adjustably hung in the slot U of the lever S, so that vibratory movement of the lever J is through the lever L imparted to the lever S.

On the opposite side of the machine to the lever S is a similar lever, Y, and into a vertical slot, Z, in the levers a projection, *a*, from the feed-bar extends, so that both ends of the feed-bar are held by the levers S and Y.

The fulcrum T may be a rock-shaft connecting the two levers, so that movement imparted to one will be imparted to the other. On the feed-bar E a grip, *b*, is arranged, adapted to grasp the wire as the bar E moves inward, but to escape as the bar E moves outward. This grip is a common and well-known device not necessary to be described, and for it may be substituted any of the automatic grasping devices which will grasp, and as the feed-bar advances will cause the wire to advance with it, and which will release the wire as the feed-bar retreats. A great range of movement is required for the feed-bar to adapt it for the various sizes of nails, and this great

range is attained through the slots R U in the respective levers L S by sliding the pivots of the connecting-rod up or down in the levers—that is to say, as the pivot of the connecting-rod W is moved nearer to or farther from the fulcrum of the lever L the extent of movement imparted to the lever S is decreased or increased accordingly, and so with the slot U, if the pivot be moved accordingly, the two slots permit a great range of adjustment.

d (see Fig. 2) represents the lower fixed holding-die, and *e* the upper or removable holding-die. These two dies are arranged in a die-block, *f*. The lower die is made adjustable by means of a vertical adjusting-screw, *g*, from below, and the die-block *f* is adjustable transversely by lateral adjusting-screws *h h* (see Fig. 1) in the usual manner for this class of dies. The upper die is loose vertically in the die-block *f*, so that it may be free to move up or down. The opening *i* through the dies is in the path of the wire and corresponds to the diameter of the wire, it being understood that for different diameters different dies are to be introduced, and so that the dies may set closely together around the wire and firmly clamp it for heading in the usual manner for this class of heading-machines.

In order to securely hold the wire, a firm clamp is necessary. To accomplish this I arrange a lever, *l*, transversely over the die-block, hung at one end upon a fulcrum, *m*, the other end being free to rise and fall in a vertical plane. (See Fig. 6.) The vertical movement is imparted to the lever *l* by means of a cam, *n*, on the driving-shaft B through a lever, *r*. (See Fig. 3.) One end of this lever is hung upon a fulcrum, *t*. The other end works against the cam *n* and is supported in that position by a spring, *u*, so that the cam will impart a downward movement to the lever *r* and the spring *u* will return it. Between the lever *r* and the lever *l* is a lever, *v*, hung by one end to a fulcrum, *w*, and connected by the other end to the lever *r* forward of its fulcrum, as at 3. A connecting-rod, 4, is hung by one end to the free end of the lever *l* and by the other end to the lever *v*, near its fulcrum, so that the system of levers *r* and *v*, under the action of the cam, impart a great force or pressure through the lever *l* to the upper die, *e*. The lever *l* is caused to bear upon the die *e* by means of a screw, 5, so that an adjustment may be made to bring the dies into their proper relation to each other to clamp the wire. The face of these dies is adapted to serve as an anvil upon which the wire may be upset in the usual manner for heading purposes.

6 represents a slide, which is arranged between longitudinal guides 7 7, (see Fig. 1,) and to which reciprocating movement is imparted by an eccentric, 8, on the driving-shaft through a connecting-rod, 9, as seen in Fig. 2, and so that the slide moves toward and from the heading-dies in the usual manner.

In the forward face of the slide 6 and in vertical guides is a vertical slide, 10. (See Figs. 1 and 2.) This slide partakes of the longitudinal reciprocating movement of the slide 6; but to it is imparted, also, a vertical reciprocating movement, and this latter movement is produced by means of a cam, 11, on the driving-shaft B through a lever, 12, which works a rock-shaft, 13, and from which rock-shaft an arm, 14, extends beneath the vertical slide 10, as seen in Figs. 2 and 5.

The slide 10 is connected to the arm 14 by means of a slot, 15, and so that the up-and-down vibratory movement of the arm 14 will impart corresponding vertical reciprocating movement to the slide 10, as from the position in Fig. 2 to that in Fig. 5 and return. At the same time the slot 15 in the arm 14 permits the longitudinal reciprocating movement of the slide 6 to be imparted to the slide 10, as from the position in Fig. 5 to that in Fig. 2 and return. The time of the cam of the eccentric operating the arm 14 and the eccentric operating the slide 6 is such with relation to each other that the descent of the slide 10 is produced during the first part of the advance movement of the slide 6.

In a projection, 16, in the forward face of the slide 10 the heading-punch 17 is fixed, and it projects to such an extent that when in the advanced position, as seen in Fig. 2, the heading-punch may come to its proper position with relation to the holding-dies *d e*. The slide 10 in its extreme forward position, as in Fig. 2, is distant from the holding-dies *e d* at least equal to the longest nail to be produced by the machine. The heading-punch extends forward from this face toward the heading-dies, and so that the reciprocating movement of the slide 6 may impart to the punch 17 a sufficient movement to produce the heading, this movement being but a fraction of the length of the longest nail.

The wire being fed to the machine and through the holding-dies to such an extent as to present sufficient metal to form the head, as indicated in broken lines, Fig. 5, and there clamped by the holding-dies *e d*, as before described, the slide 6 advances, and in the first part of its advance the slide 10 descends to bring the heading-punch 17 into line with the wire, as indicated in broken lines, Fig. 5. From that point the slide advances as if the heading-punch were rigidly fixed to it, and into the position seen in Fig. 2, when the heading is complete. This done, the slide 6 retreats, taking with it the slide 10 and the heading-punch, and as the slide 6 returns the slide 10 rises to the position seen in Fig. 5, and so as to take the heading-punch out of the line of the headed wire. Then the wire is advanced, and because the punch is out of its line the wire may pass beneath the punch and toward the slide 10, as indicated in broken lines, Fig. 5. As the heading-punch retreats the cutting and pointing dies 18 and 19, arranged, respectively, each side of the heading-punch and in trans-

verse guides, advance, so as to receive transverse reciprocating movement toward and from each other, which reciprocating movement is imparted by cams 20 and 21 through levers 22 and 23, as seen in Fig. 1, and in the usual manner for this class of machines. It is unnecessary to describe these cutting and pointing dies further than to say that they cut the point and sever the headed nail from the wire in the usual manner, and so that the complete nail may drop from the machine.

By giving to the heading-punch, after it has produced the head upon the wire, a movement out of the path of the advancing wire the wire is free to be moved inward to a point considerably to the rear of the front face of the heading-punch, so that the movement of the heading-punch may be substantially the minimum extent for a maximum length of nail, and thereby the same machine is adapted to make nails from the minimum to maximum length without variation of the extent of movement of the heading-die, and the extent of movement is only that necessary for the heading of minimum length of nail. The result of such arrangement of the slide carrying the heading-punch is that the machine may run much more rapidly than it could do were the movement of the heading-punch required to be equal to the longest nail produced, and not only is the machine permitted to run more rapidly and greatly increase the product, but the wear and tear of the machine, because of such short reciprocating movement of the heading-slide, is very much reduced.

It is often desirable to vary the size of the head or amount of metal in the head of the nail, and as the cutting-dies are in substantially a fixed position with relation to the wire, I make the holding-dies *d e* adjustable longitudinally—that is, in the direction of the line of wire—and this I do by introducing a wedge, 24, back of the die-block, making the adjacent faces of the wedge and die-block to correspond. The wedge 24 is provided with a vertical screw-threaded spindle, 25, which extends up through a bridge, 26, above the die-block, and is provided with a nut, 27, by which the wedge may be drawn up or forced downward. If, therefore, a greater amount of metal is required, the wedge is dropped, so as to permit the die-block and the holding-dies to recede from the cutters, or if a less amount of metal is required the wedge is drawn upward to force the die-block and the holding-dies forward or toward the cutters.

While I prefer to make the movement of the slide carrying the heading-punch vertical, as I have described, it will be understood that it may be otherwise moved, it only being necessary to the invention that it shall be thrown transversely out of the path of the advancing wire. As an illustration of such other transverse movement see Fig. 7, in which the punch-holding device is made to swing vertically—that is, at right angles to the path of the wire, and so as to be turned into or out of the path of the wire, as seen in that figure.

I claim—

In a machine for making wire nails, the combination of a feed-bar, E, carrying the grasping device to engage the wire, two levers, J L, hung, respectively, upon opposite sides of the driving-shaft, parallel connections O and N between said levers J and L, the connection O provided with an arm, P, cams I H on the driving-shaft between said lever J and the arm P, a lever, S, in connection with said feed-bar, and an adjustable connection, W, between said levers S and L, substantially as described.

JAMES L. COREY.

Witnesses:
E. D. GODFREY,
E. L. CROSSMAN.