(No Model.) 2 Sheets—Sheet 1.

E. FONTAINE.

WIRE NAIL MACHINE.

No. 390,015. Patented Sept. 25, 1888.

Fig. 1

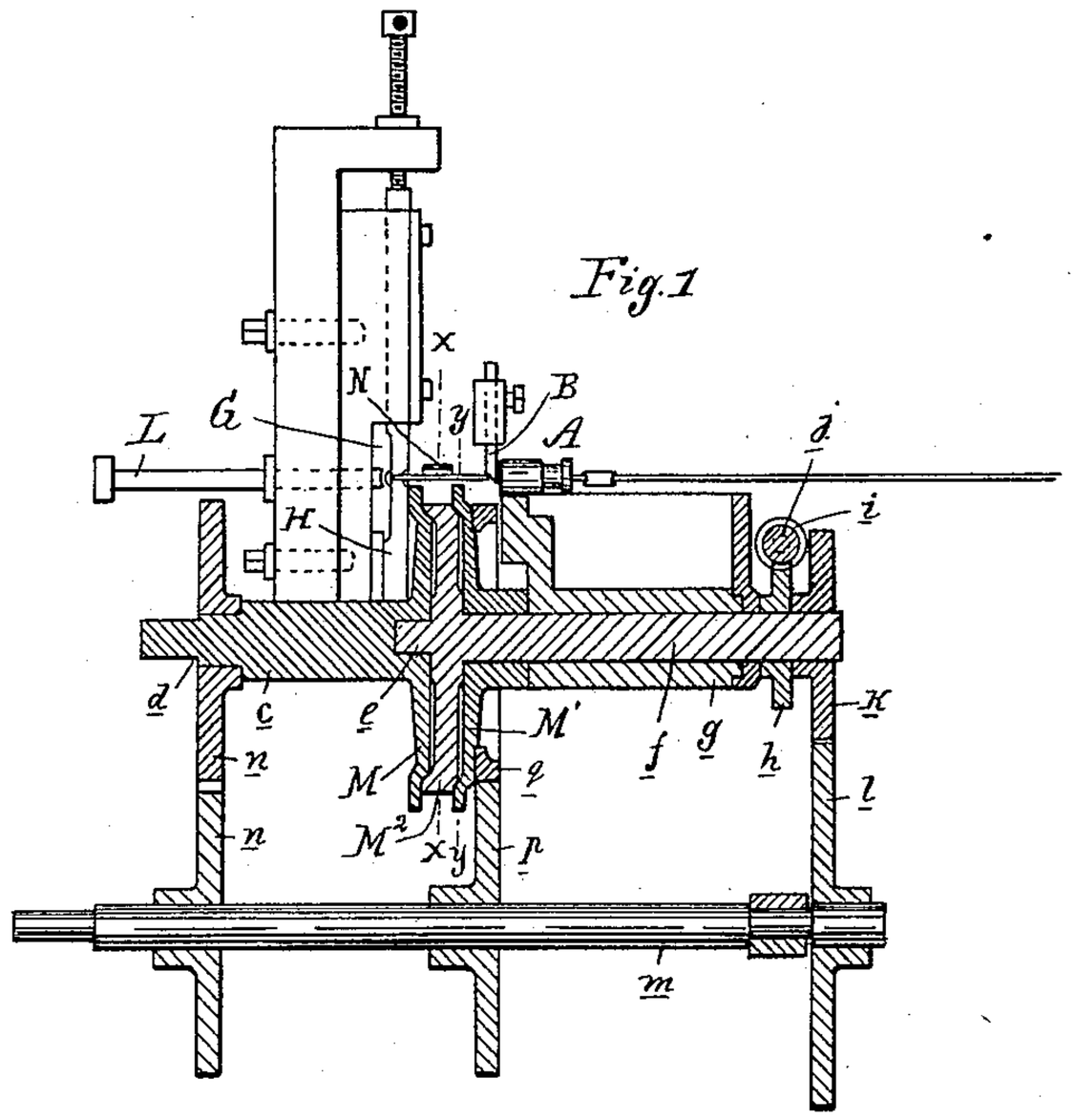
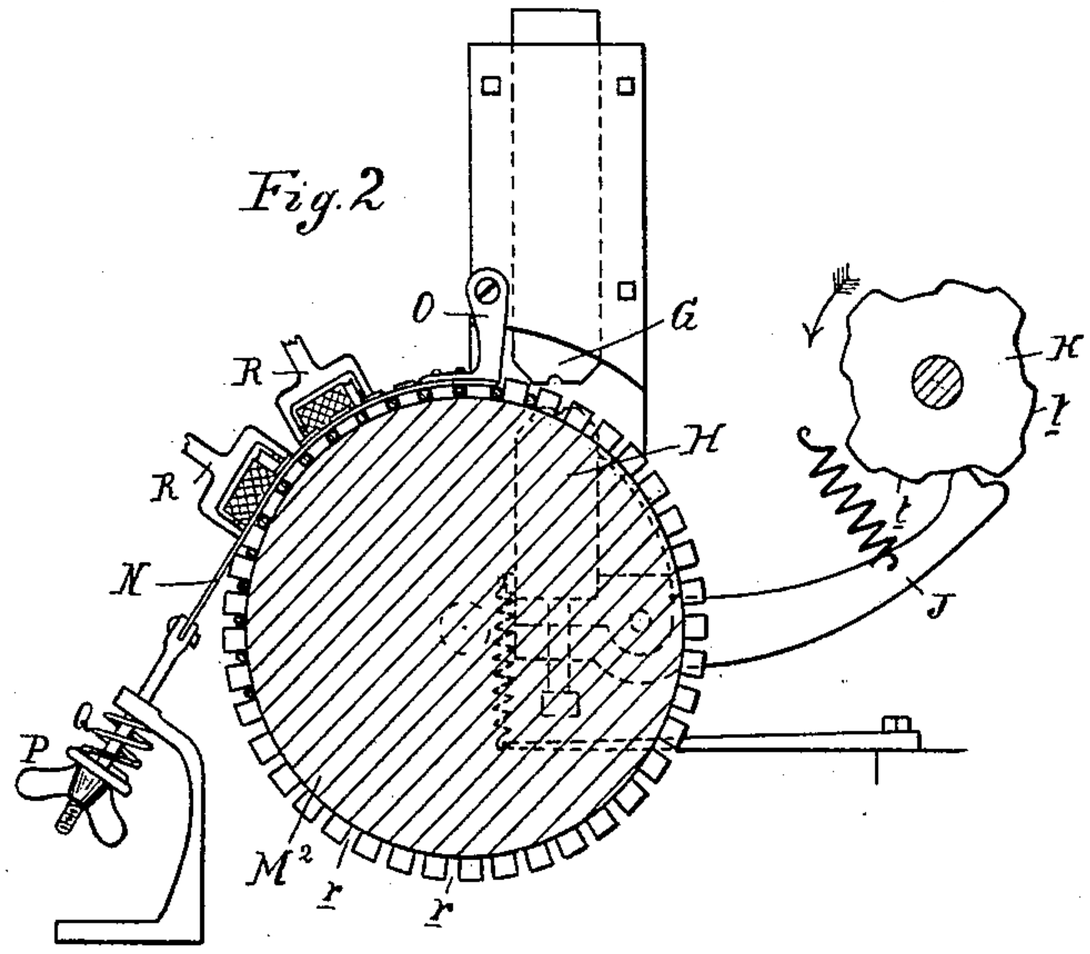


Fig. 2



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(No Model.) 2 Sheets—Sheet 2.

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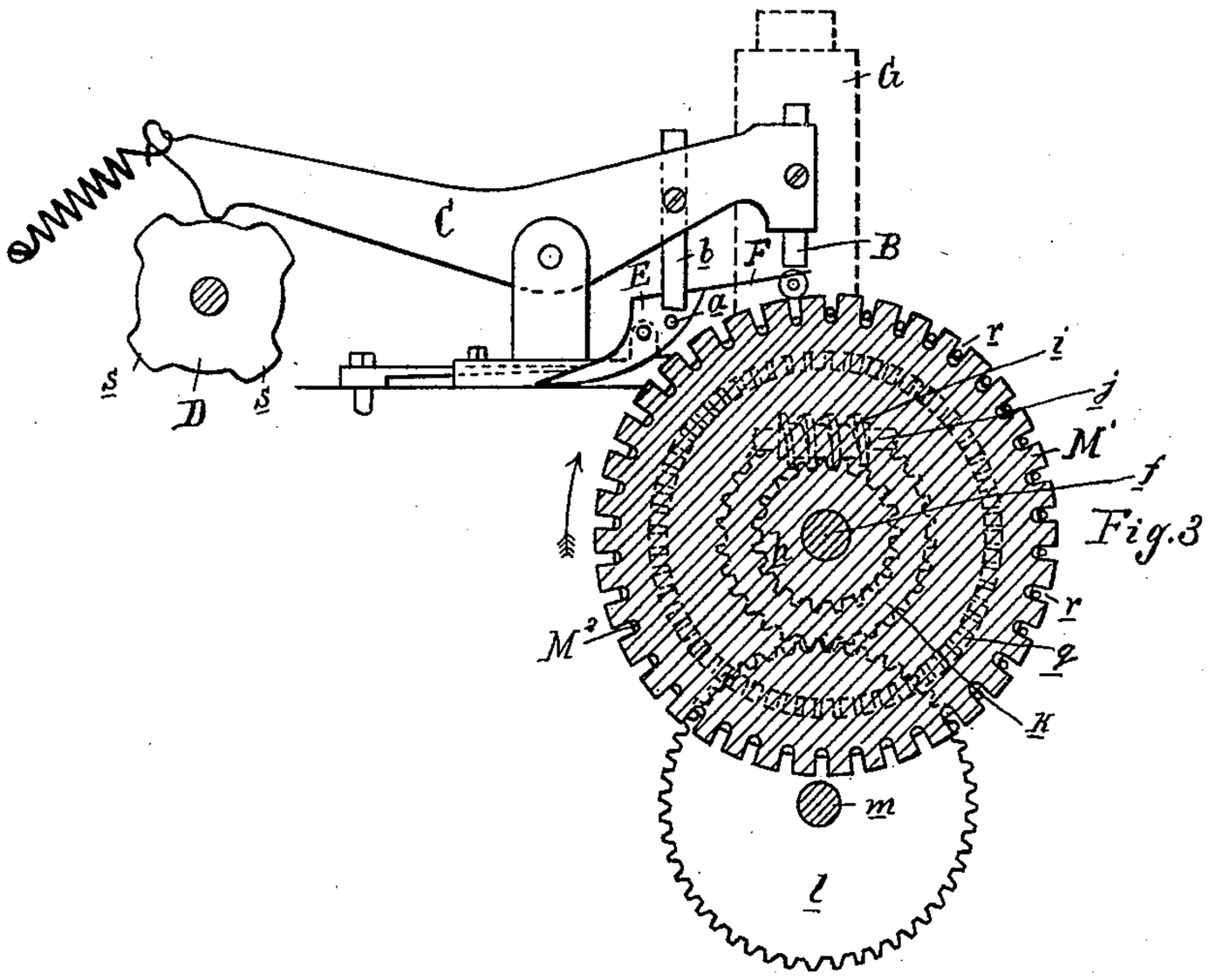

Fig. 3

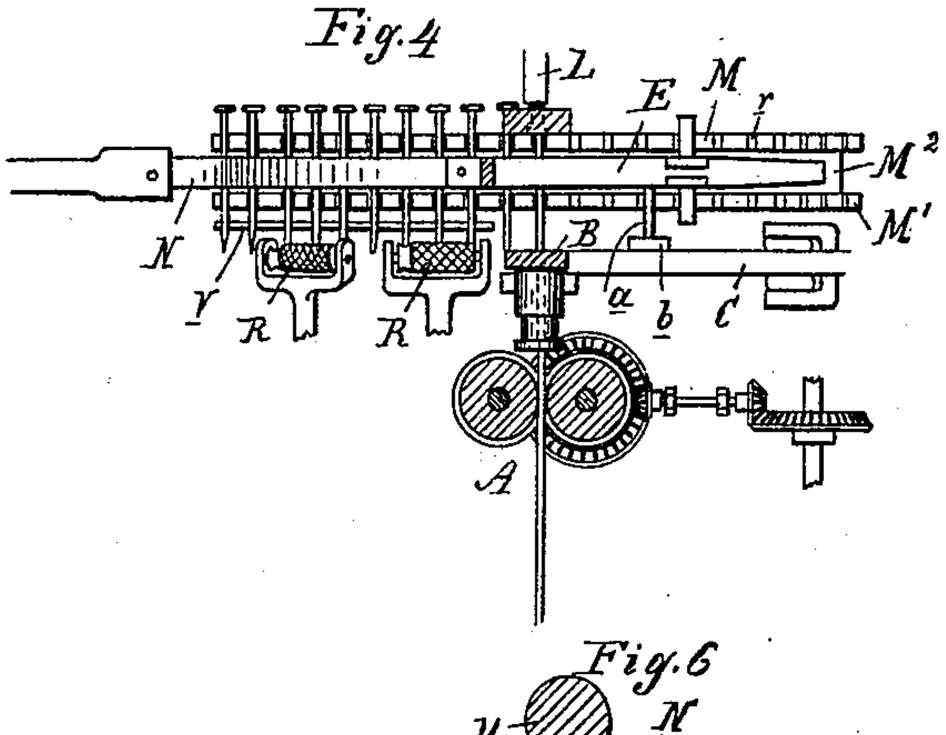

Fig. 4

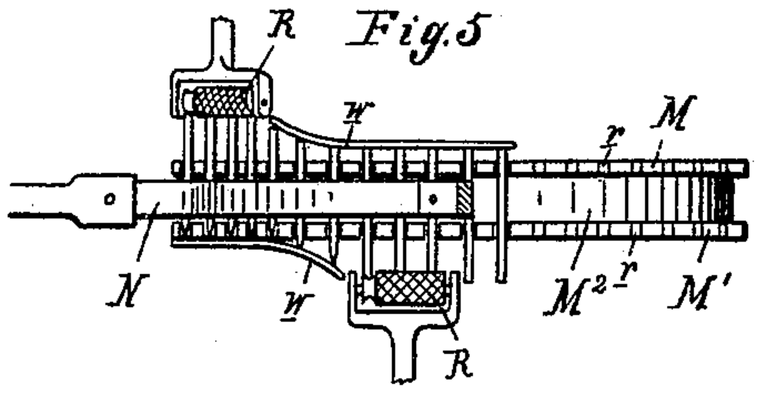

Fig. 5

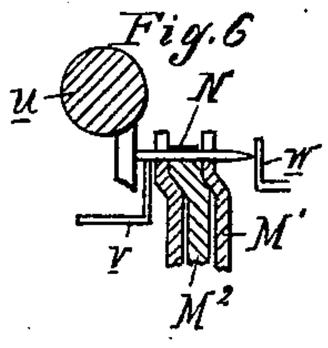

Fig. 6

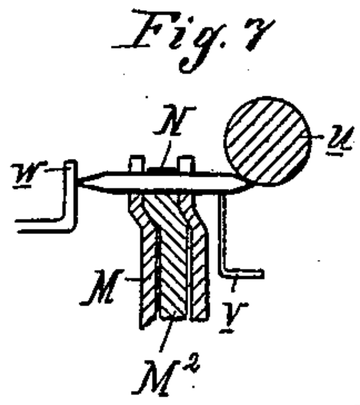

Fig. 7

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UNITED STATES PATENT OFFICE.

EUGENE FONTAINE, OF AUBURNDALE, OHIO.

WIRE-NAIL MACHINE.

SPECIFICATION forming part of Letters Patent No. 390,015, dated September 25, 1888.

Application filed February 14, 1888. Serial No. 264,008. (No model.)

To all whom it may concern:

Be it known that I, EUGENE FONTAINE, a citizen of the United States, residing at Auburndale, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Wire-Nail Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in the construction of wire-nail machines; and the invention consists in the novel construction, arrangement, and operation of different parts, whereby the capacity of the machine is greatly enlarged, all as more fully hereinafter described.

In the drawings which accompany this specification, Figure 1 is a vertical central section of the operating parts of my machine. Fig. 2 is a cross section thereof on line *x x* of Fig. 1, looking to the left. Fig. 3 is a similar cross-section on line *y y*, looking to the right. Fig. 4 is a plan; also Fig. 5. Figs. 6 and 7 are detail cross-sections.

A represents the wire-feeding device, which may be of usual or any other suitable description.

B is the movable shear of the wire-cutting device, which, as in the usual manner, is adjustably mounted on the free end of a power-lever, C, operated by a revolving cam, D. Below this lever is pivotally secured in bearings a lever, E, the rear end of which is depressed into the normal position shown in Fig. 3 by a suitable spring, while to the forward end is secured the finger F, preferably of spring metal. A pin, *a*, is secured to the lever E in such relative position to a vertical arm, *b*, which is adjustably secured to the lever C, as to depress the finger whenever the wire is cut off by the shear.

G is a stationary die, and H is a movable die acting in connection therewith, both being adjustably secured in the usual manner of securing such dies. The adjustable die H is mounted on the free end of the power-lever J, actuated by the revolving cam K. Each of the dies is grooved upon its face, and their relative position to each other and to the wire is such as to firmly clamp the free end of the wire at certain intervals of the operation of the machine.

L is a plunger-die slidingly secured in axial line with the wire, and this plunger-die is suitably actuated at proper intervals of time to deliver a blow against the ends of the wire, while the latter is held by the dies, to form a head, as in the usual manner.

M, M′, and M² are three rotating disks, which jointly form a rotary carrier. The disk M is mounted on the end of a shaft, *c*, journaled at *d* in the frame of the machine and provided with a bearing, *e*, into which is journaled the inner end of the shaft *f*. The shaft *f* revolves in stationary bearings *g*, and has a disk, M², secured upon it, while the disk M′ is loosely mounted upon it. All the disks revolve in the direction of the arrow. The outer disks, M M′, revolve at perfectly equal speed, while the central disk revolves at a greater speed than the outer disks—preferably twice as fast. To this end a screw gear-wheel, *h*, is secured upon the shaft *f*, which receives motion from the screw *i* upon the drive-shaft *j*, thereby communicating motion to the disk M². The gear-wheel *k* upon the shaft *f* transmits motion to the gear-wheel *l* on the counter-shaft *m*, from which it is conveyed to the disk M through the medium of the gear-wheels *n*, and to the disk M′ through the medium of the gear-wheel *p*, which engages with the gear *q*, formed on the disk M′. The outer disks, M M′, are of a little larger diameter than the central disk, M², and have formed around their peripheries the radial pockets *r*, correspondingly arranged in both disks.

N is a flexible tension strap, preferably of metal, one end of which is attached to the arm O near the top of the carrier, while the other end is secured to a tightener, P, preferably provided with a tension-spring, Q. This tension-strap bears upon the periphery of the wheel M² between the wheels M M′ for a certain distance around the periphery of said wheel.

R are rotary cutters or emery-wheels placed in proximity to the carrier.

The parts being constructed and arranged as described, they are intended to operate as follows: As soon as the wire-feed has delivered the necessary length of wires the dies G and H clamp the face end thereof firmly between them, while the plunger-die or hammer strikes a blow which forms the head. At or

nearly at the same time the shear B cuts off the wire at the length required. The finger F, being simultaneously actuated with the shear, then passes the severed piece of wire, which is now provided with a head and released from the dies, into the rim of the cam-wheel, where it drops into the first set of pockets brought underneath, the finger continuing to hold it down into the rim of the central wheel, M^2, until the rotation of the carrier-wheel introduces it underneath the strap. Thus the pockets are one by one filled with the nail-blanks and carried underneath the strap, where they are compelled to rotate upon their axis, owing to the greater speed of the central wheel, M^2, and while thus rotating the point is formed on the nail-blanks by the action of the rotary cutters, which are secured in proper proximity to the carrier-wheel. As soon as the nail-blanks are freed from the confining-strap they drop out of the pockets as finished wire nails.

In order to adjust the machine to make nails of different sizes, all the parts are provided with the necessary adjustments for that purpose.

The operating parts of the machine are all so arranged that the blank is never arrested for any purpose whatever until the nail is completed. The formation of the head and the cutting off the blank being accomplished at an instant, and simultaneously or nearly so, and the removal of the blank from the path of the wire being accomplished almost at the same time, it is evident that I can use a continuous feed and run the machine at a comparatively high speed, and thus make a larger quantity of nails than has been accomplished heretofore. To give time for the blank to be moved out of the path of the wire, however, the cam D is constructed to keep the shear B depressed long enough while traveling over the delay-face *s* to allow the blank to move out of the path of the wire, the friction feed of the wire allowing this to be done. To guide the end of the wire while being fed, I preferably provide the cam K with the flange *t*, which partially raises the die H high enough before clamping to guide the end of the wire and keep it off the face of the carrier.

The spirit of my invention is thus principally embodied in the construction and arrangement of the rotary carrier and its combination with the cutter for pointing the blank in transit, in the combination of the shear with the finger for removing the blank out of the path of the wire, and in the combination of the finger with the rotary carrier. One great advantage of the carrier is that the machine is thereby made capable to make any kind of nail in commercial use—for instance, such as shown in Fig. 6, where the head is beveled by means of a suitably-placed cutter, *u*, or as in Fig. 7, which shows a so-called "blind wire nail," which is sharpened at both ends by using cutters on both sides of the carrier. Suitable guide-rails, *w*, are used to prevent lateral displacement while sharpening or to effect lateral displacement to shove the blanks endwise to bring them into proper contact with the cutters, and, if necessary, as shown in Fig. 5, and if the blanks are liable to bend under the action of the cutters a suitable rest, *v*, as shown in Fig. 4, is furnished to support the free end thereof.

What I claim as my invention is—

1. In a wire-nail machine, the combination of the movable shear, the finger actuated thereby, and the rotary carrier to receive the blanks, substantially as described.

2. In a wire-nail machine, the combination, with the continuous feed, of the sliding plunger or hammer, the clamping-dies, the shears, and the finger, the parts being arranged to coact substantially as described.

3. In a wire-nail machine, the combination, with the rotary cutters, of the rotary carrier consisting of the outer disks provided with peripheral pockets and running at equal speed, the central disk, of smaller diameter, running at higher speed or in the opposite direction, the friction-strap over the central disk, and the rotary pointing-cutters, substantially as described.

4. In a wire-nail machine, the combination, in a rotary carrier, of the outer rotary disks, M M′, the central rotary disk, M^2, of lesser diameter, the peripheral pockets *r*, formed in the outer disks, the friction-strap N on the central disk, and the tightener P, having the spring-tension Q, substantially as described.

5. In a wire-nail machine, the combination, with the rotary carrier, of the power-lever C, carrying the movable shears, the lever E, pivotally secured below said power-lever and carrying the spring-finger F and pin *a*, and the arm *b* on the power-lever, the parts being constructed to operate substantially as described.

6. In a wire-nail machine, substantially as described, the combination, with the wire-feed tube, of the movable die, the lever operating said die, and the cam K and the flange *t* on said cam.

7. In a wire-nail machine, the combination, with the rotary carrier, of the rotary cutters R and the guide-rails *w*, substantially as described.

8. The combination, with the rotary carrier, of the power-lever C, carrying the shear B, and the arm *b* of the lever E, carrying the finger F, and of the cam D, having the delay-face *s*, substantially as described.

In testimony whereof I affix my signature, in presence of two witnesses, this 23d day of January, 1888.

EUGENE FONTAINE.

Witnesses:

P. M. HULBERT,

JOHN SCHUMAN.