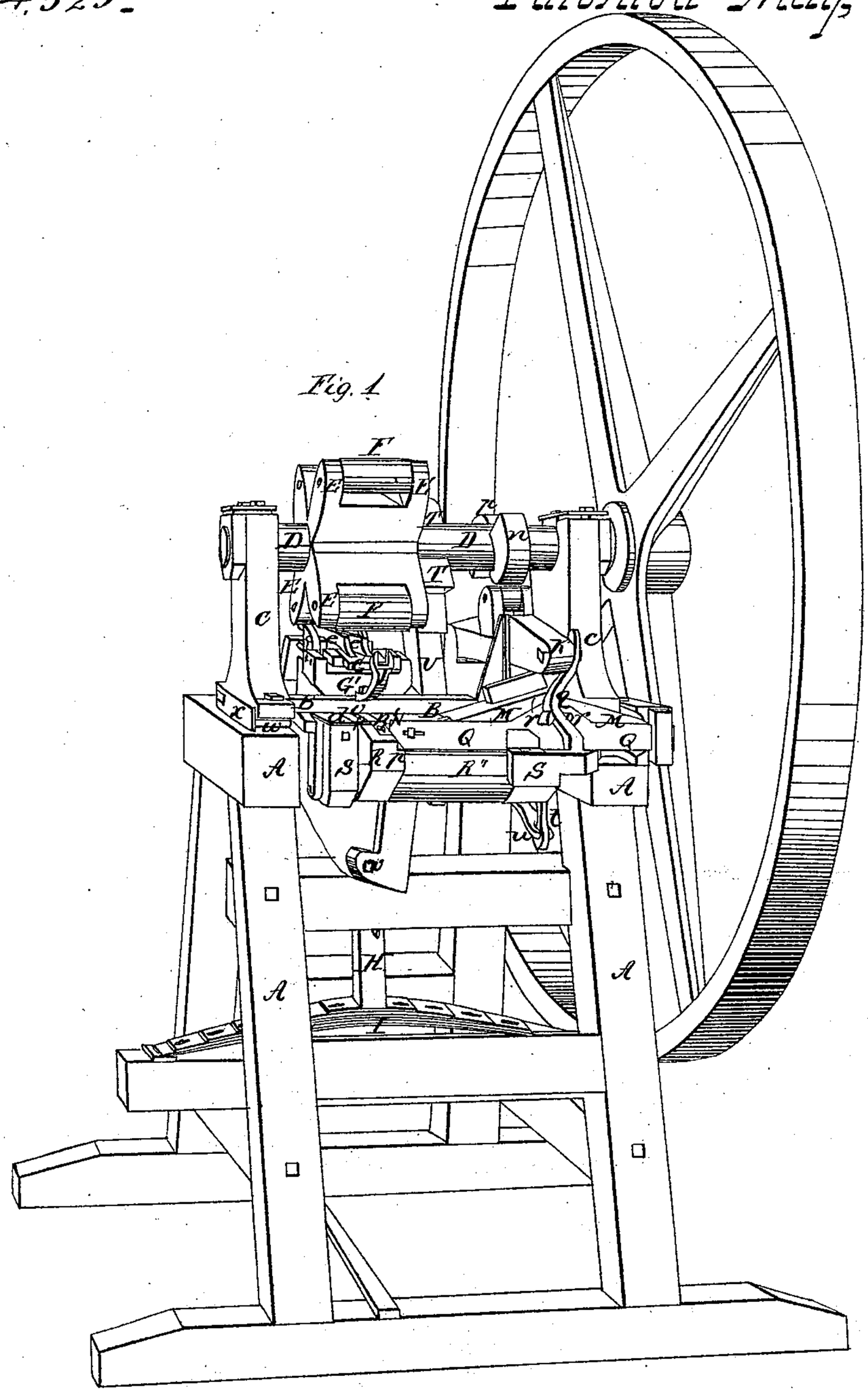
Sheet 1 - 2 Sheets.

A. W. Gray,

Making Cut Nails,

No. 4,525. Patented May 16, 1846.

Fig. 1.



Sheet 2 – 2 Sheets.

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Fig. 4.

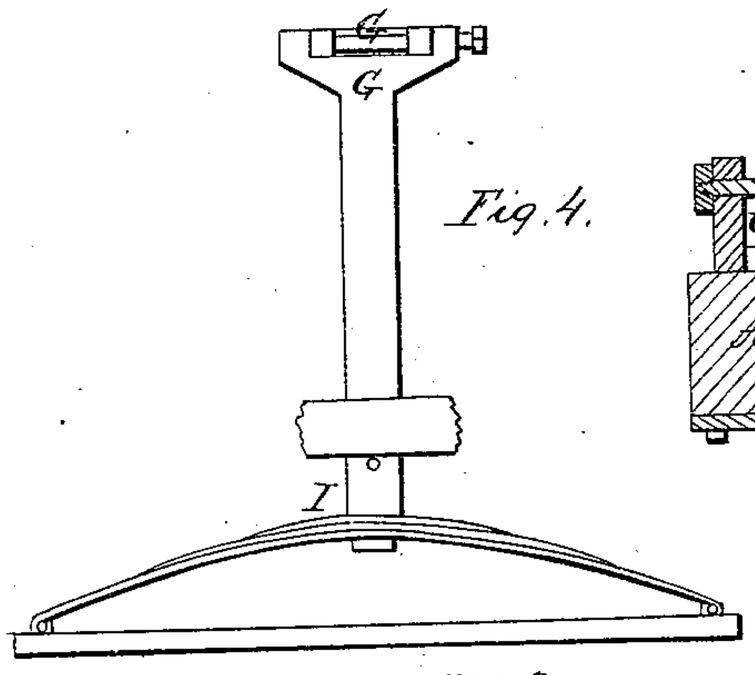

Fig. 5.

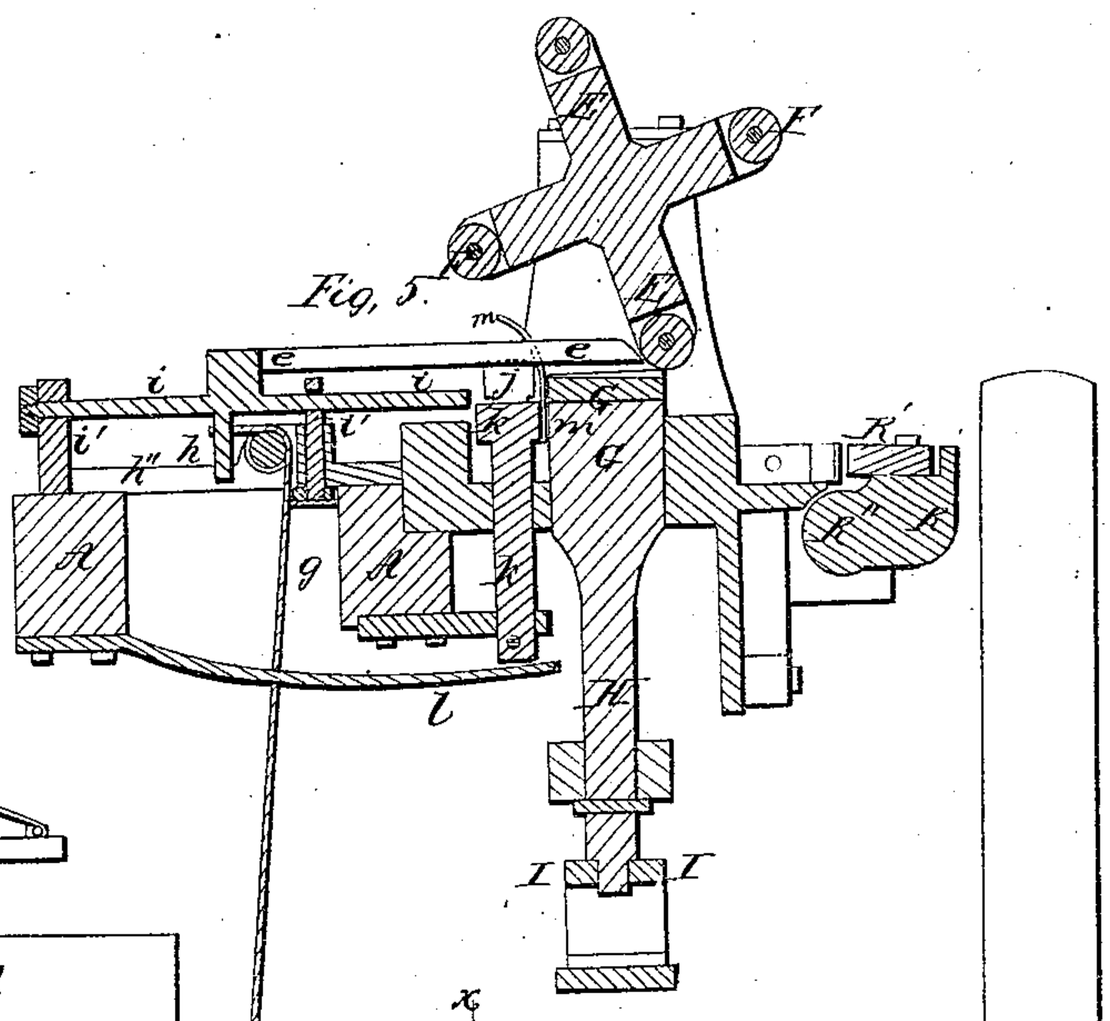

Fig. 3.

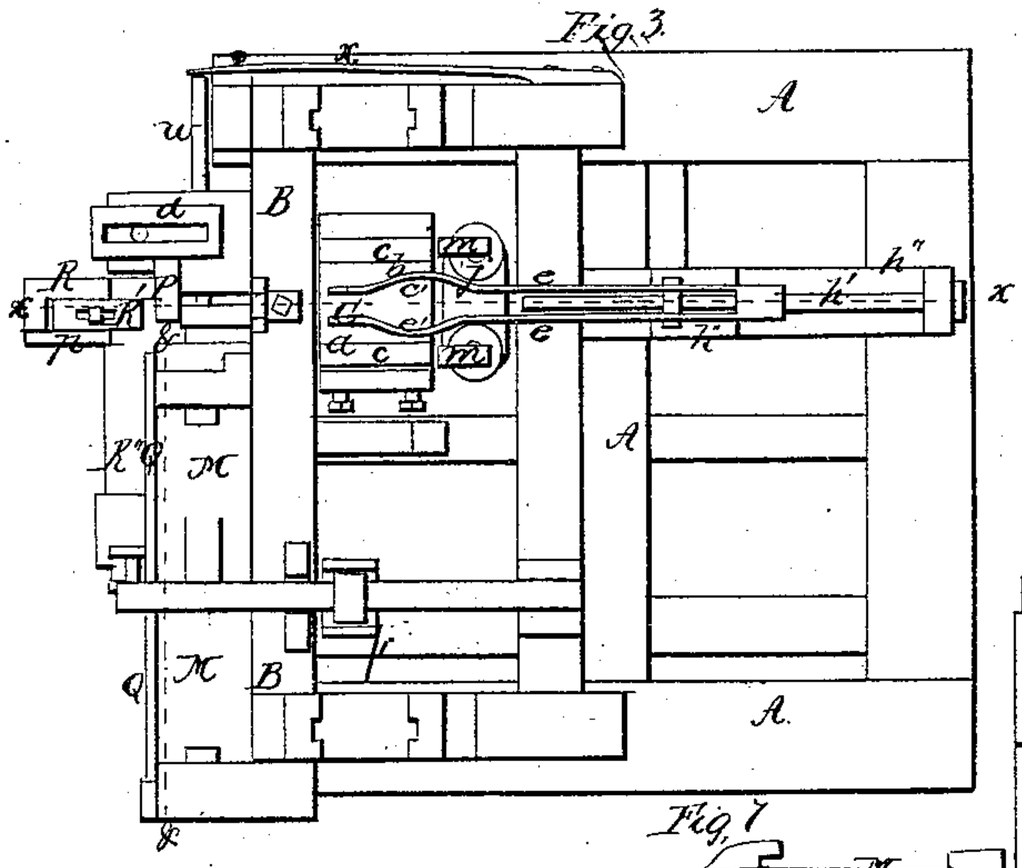

Fig. 2.

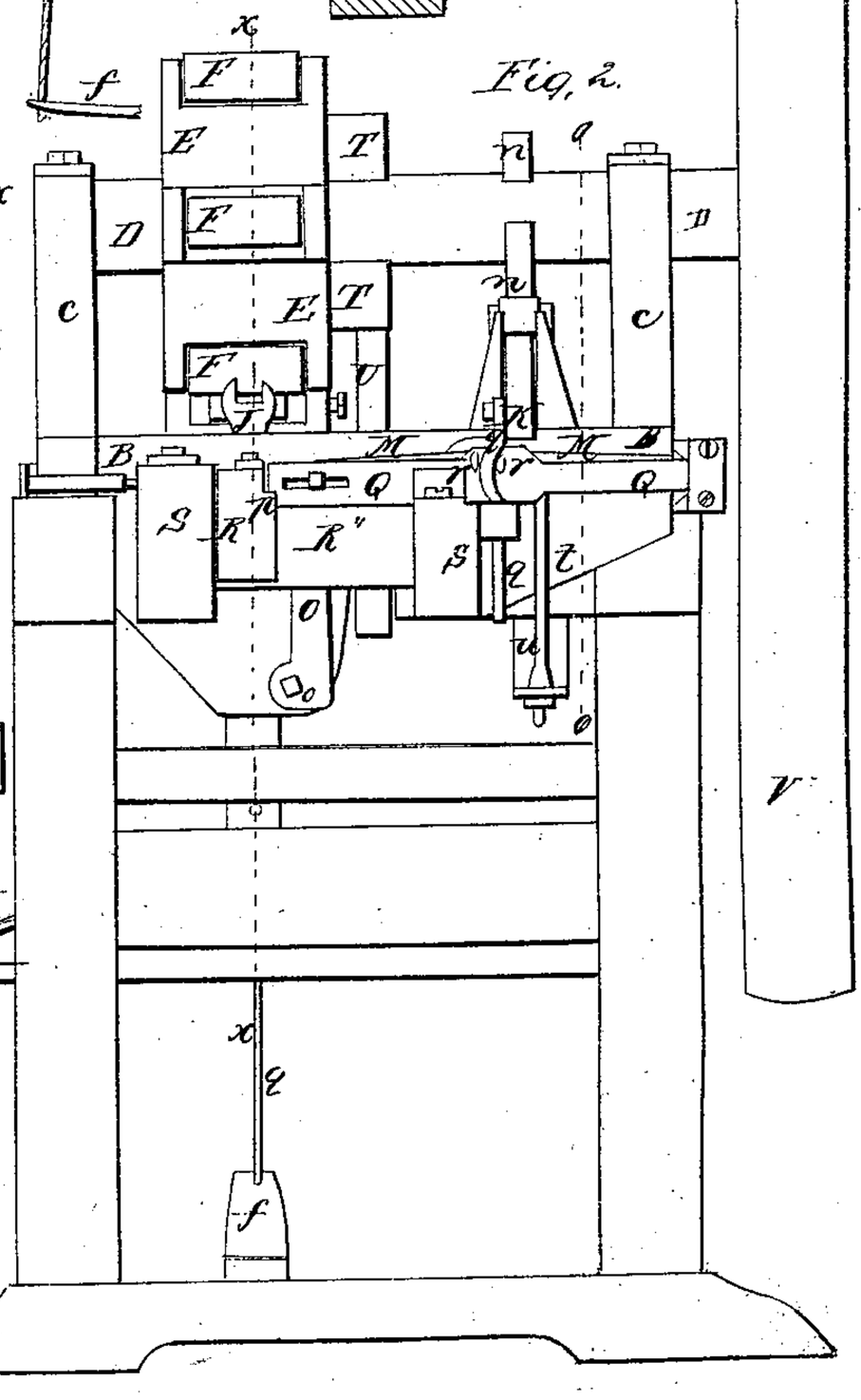

Fig. 7

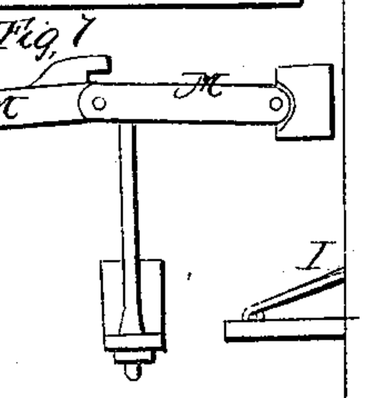

Fig. 6.

UNITED STATES PATENT OFFICE.

ALBERT W. GRAY, OF MIDDLETOWN, VERMONT.

WROUGHT-NAIL MACHINERY.

Specification of Letters Patent No. 4,525, dated May 16, 1846.

To all whom it may concern:

Be it known that I, ALBERT W. GRAY, of Middletown, in the county of Rutland and State of Vermont, have made a new and useful Improvement in the Manner of Constructing a Machine for the Manufacturing of Wrought Nails; and I do hereby declare that the following is a full and exact description thereof.

In the acompanying drawing, Figure 1 is a perspective view of the whole machine; the other figures show parts in detail to be presently explained; in each of the figures where the same parts are shown, they are designated by the same letters of reference. A A is a frame of wood upon which rests the cast iron bed B B of the machine; from the ends of this rise two heads or standards C C that sustain the main shaft D D. This shaft carries four or any other preferred number of arms E E having at their ends hardened steel rollers F F. The nails are to be made from heated nail rods which rest on a suitable bed or die, so situated as to allow the rollers F F to pass over and from that part which is to constitute the shank of the nail. The die upon which the nail rod rests is capable of yielding to the pressure of the rollers being sustained on an upright shaft the lower end of which rests upon a strong spring, a weighted lever or other apparatus which will allow the die to descend and will at the same time force it up with a power sufficient to cause the rollers to elongate the nail rod. G is the die or bed upon which the rod is to rest and G′ the die holder into which it is fitted; H is the vertical shaft that sustains the die and die holder, the lower end of which shaft is shown as resting on the elliptical spring I.

Fig. 2 is a front elevation of the whole machine.

Fig. 3 is a top view of the machine with the main shaft D D and the parts attached to it removed showing the die, the die holder and various other parts of the apparatus. The bed part G of the die, forms an inclined plane its front part *a* being sunk an eighth of an inch more or less below its rear part *b* toward which it rises, regularly tapering off to nothing, there being checks *c c* at its sides, with which the rollers F E, Fig. 1, will come into contact when the nail shank is reduced to its proper size. Fig. 4 is a detached front view of the die its holder and shaft and the spring by which it is sustained. Fig. 5 is a vertical section of the machine from front to back in the line *x x* of Figs. 2 and 3.

The nail rod is to be fed in on the die G, through a rest J, Figs. 1 and 2 in front of it. The tongs that holds the nail rod is stopped against the rest J, so as to feed in the rod to the proper length; to cause the tongs to seize the rod in the right place it may be laid upon an adjustable plate *d* Figs. 1 and 3 its end bearing against the bed B of the machine. The plate is shown as attached to that portion of the machine which is concerned in the heading of the nails which I think it proper to describe, as it is, in practice attached to the part for drawing them out.

When the nail is being drawn out by the rollers it is to be turned one quarter round by hand, as in forging, this being readily done in the interval between the contact of the rollers; but as this drawing out flattens the rod it would be liable to twist when turned edgewise were not provision made to prevent this: The provision which I have made for this purpose is as follows: *e*, *e* (shown most distinctly in Fig. 3) are spring tongs that slide back and forth, their fore ends resting on the die G; these may be forced forward by means of a spiral spring or in any other convenient mode. In Fig. 5 they are shown as drawn forward by a spring *f* attached to one end of a cord *g*, said cord passing over a pulley and having its other end attached to a rod *h* descending from the rear end of the spring tongs; *i*, *i* being a sliding finger that guides the tongs; the said rod passes through holes in *i′ i′*; the lower end of the finger *h* enters a slot *h′* in a plate *h″* to prevent the tongs from turning.

When the nail rod is fed in it passes between the fore ends of the spring tongs and as the arms E E revolve, the rollers F each in succession, forces the spring tongs back; these tongs are widened, or bowed out as shown at *e′ e′* Fig. 3 and as they retreat they pass between two friction rollers *j j* which cause them to grip the sides of the rod and thus prevent its twisting, the fore end of the tongs sliding upon the sides of the nail until the rollers cease to press upon the tongs, which are then again forced forward by the means above indicated. To allow the tongs to be forced forward it is necessary to remove the rollers *j j* out of the way and they are made to descend in the

following manner. These rollers are sustained upon the head *k* of a vertical sliding rod *k'*, Fig. 5, which is borne up by a spring *l*. To the head *k* are attached two strips of metal *m*, there being one on each side of it, curved back as represented and over these the rollers F pass as they leave the die G and consequently depress the rollers *j j* leaving the tongs *e* free to be again drawn forward.

With the above described apparatus for drawing out the shank, I combine that for cutting it off and for heading it; the parts concerned in this process are represented in Figs. 1, 2, 3, 5, 6, and 7; Fig. 6 being a vertical section through a part of the machine in the line *o o* of Fig. 2. K is a lever that is depressed alternately by two cams *n n* on the shaft D; this lever has its fulcrum at L, Fig. 6. M M are progressive levers usually known under the name of a toggle joint which serve to advance the movable gripping die N. In Fig. 7 the toggle joint M M acting against the gripping die lever O, is shown as detached in a vertical sectional view in the line *v v* of Fig. 3; this lever works on a joint-pin at *o*. The drawn out nail shank is passed in between the gripping dies on the rest *p* and is gripped against the stationary die P; it is then cut off by the sliding cutter Q Q which is advanced for that purpose by the descent of the lever K that carries on its outer end a bent finger *q* which slides up and down between two pins *r r* attached to the sliding cutter; this causes said cutter to advance and retreat at the proper time. R, Figs. 1, 2, 3, and 5, is the heading block and R' the heading die the part R'' is in one piece with the heading block, and this part has strong gudgeons that are received within the pieces *s s* attached to the bed of the machine. On the shaft D there are two wipers T T that operate against an arm V attached to the heading block and borne up by the spring *s s;* this arrangement is shown most distinctly in Fig. 6. In this figure the means by which the toggle joint may be raised when the lever K rises is also shown *t* being a rod the upper end of which bears against the toggle joint M while its lower end is acted on by a spring *u*, *u*, forcing it upward. After the heading die has performed its office and as the movable gripping die retreats the nail is forced off by the piece *v*, Fig. 3, against which a rod *w* acts that is forced forward by a spring *x*; this arrangement is in part shown in Fig. 1. V is a fly wheel for regulating the motion of the machine.

Having thus fully described the respective parts of my machine for making wrought nails what I claim as new therein, and desire to secure by Letters Patent is—

1. The manner herein set forth of drawing out the nail rods by means of a series of rollers on the ends of arms attached to a revolving shaft, which rollers operate on the rod as it lies on a yielding die constructed and operating substantially in the manner herein made known.

2. I also claim the employment of the spring tongs which are made alternately to open and close, so as to grip and liberate the nail rod, and to slide back and forth in the manner and for the purpose described, and these I claim whether the respective parts thereof be formed and operated precisely in the manner described or in any other in which the same ends are attained by means substantially the same.

There are some points of novelty in the heading apparatus used by me, but in its general features it is like some other machines used for the same purpose and its parts may admit of several different modifications. I do not thing it necessary for me therefore to make any claim to this particular instrument, but I have described it particularly as making a component part of the general machine so arranged and combined as to coöperate therewith in a very advantageous and convenient way.

A. W. GRAY.

Witnesses:
THOS. P. JONES,
GUY C. HUMPHRIES.