

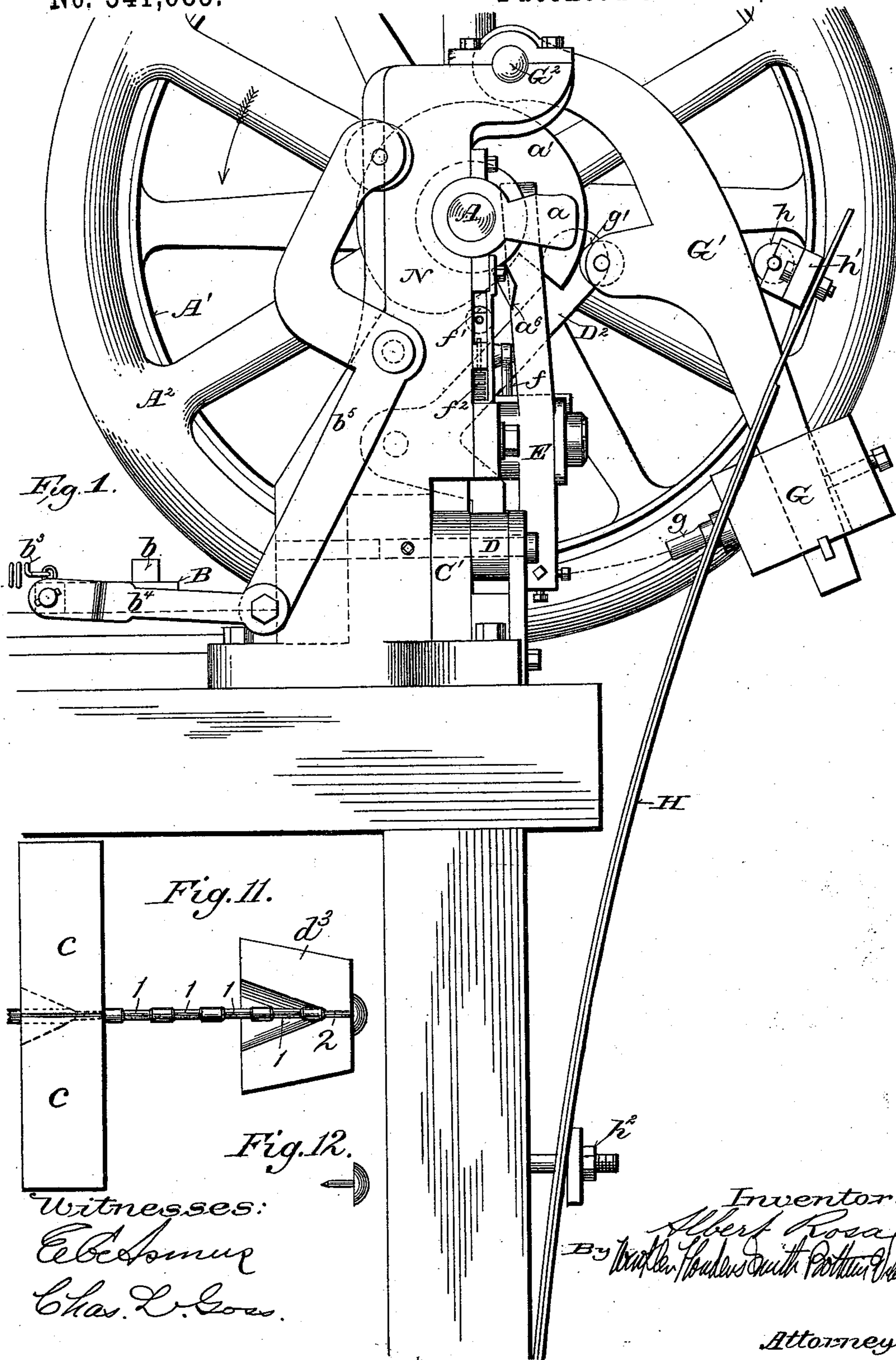
(No Model.)

3 Sheets—Sheet 1.

A. ROSA.  
WIRE NAIL MACHINE.

No. 541,685.

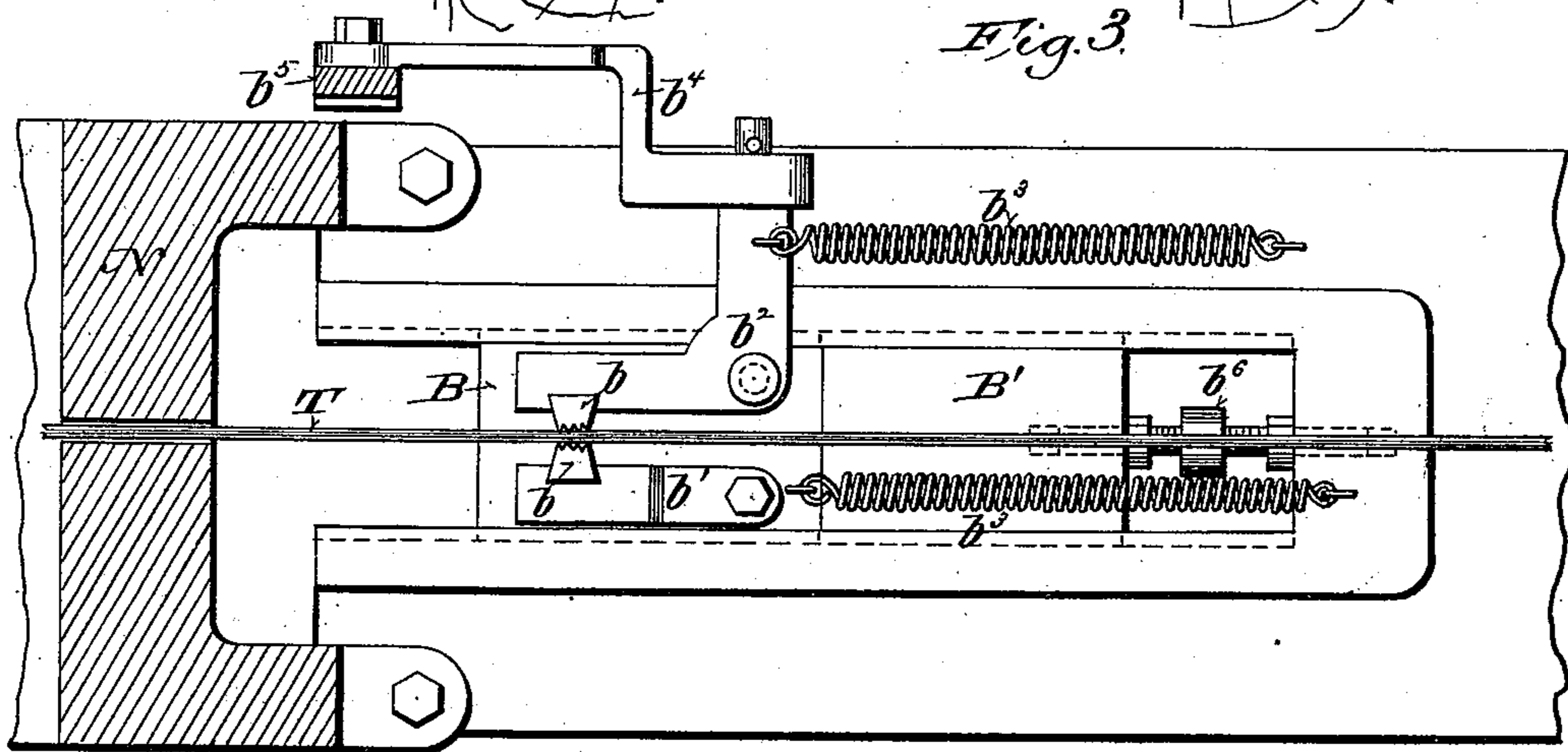
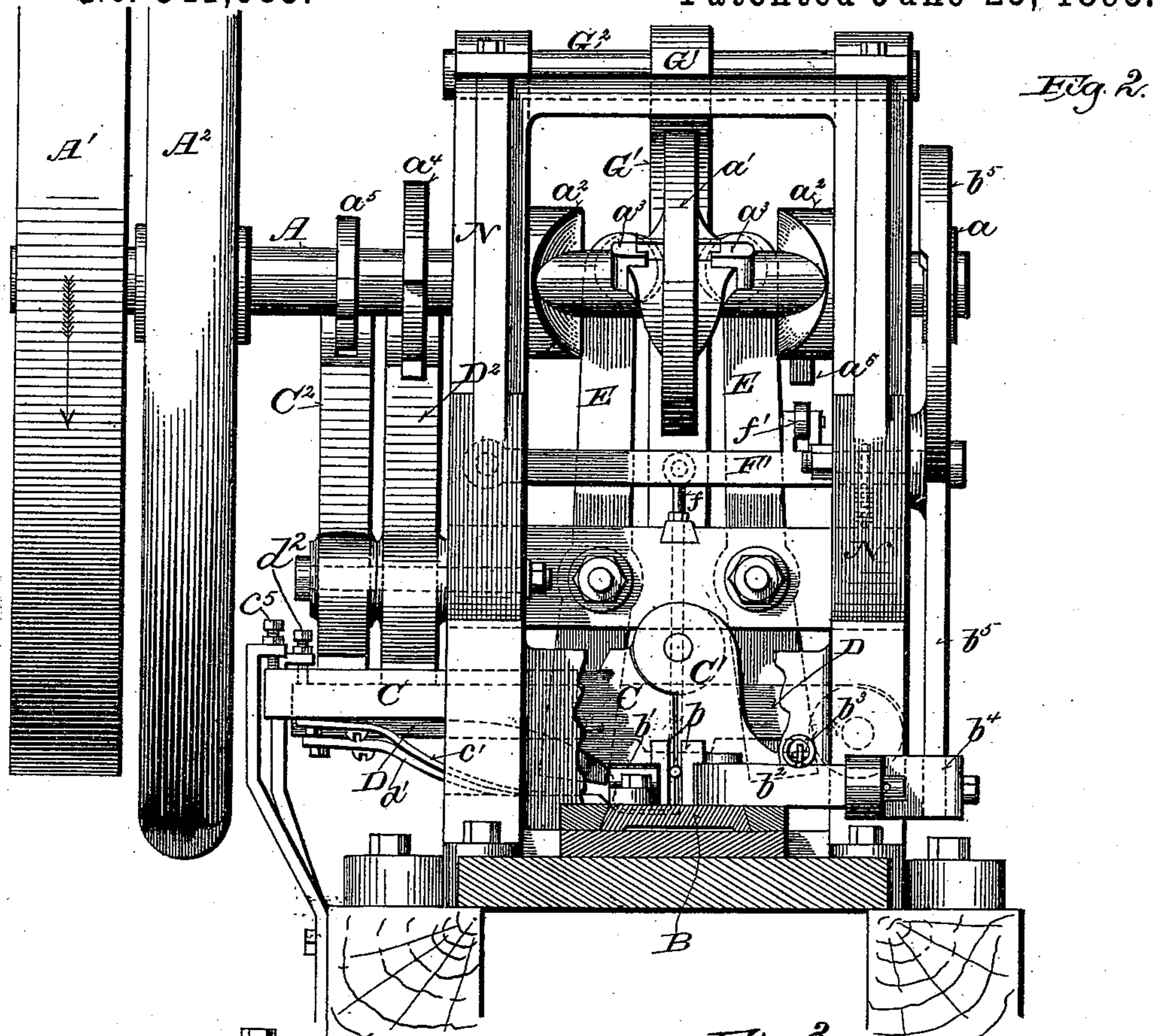
Patented June 25, 1895.



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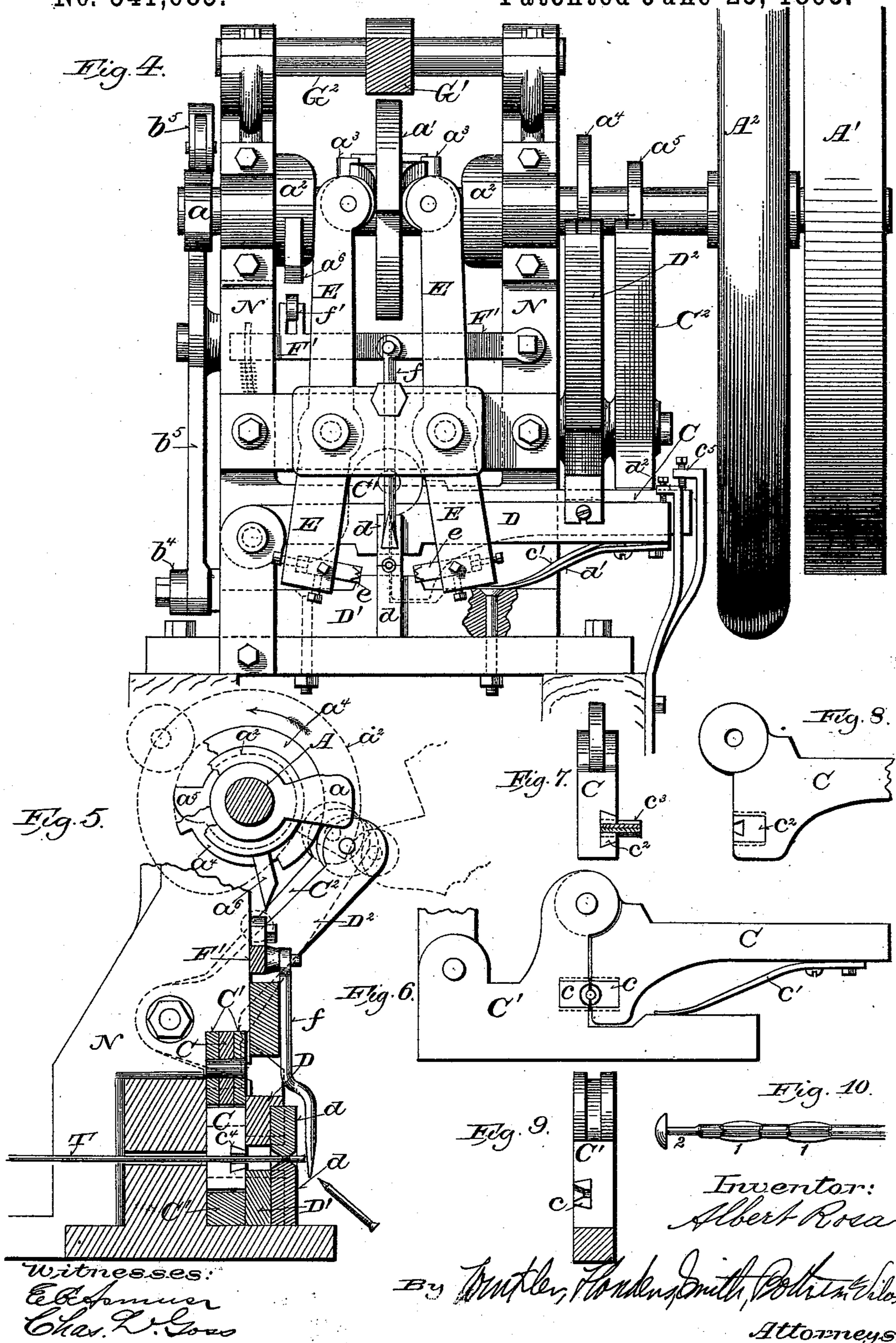
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No. 541,685.

Patented June 25, 1895.



# UNITED STATES PATENT OFFICE.

ALBERT ROSA, OF MILWAUKEE, WISCONSIN, ASSIGNOR OF THREE-FOURTHS  
TO AUGUST OSTER, CHARLES KOEPPEN, AND CHARLES RENNER, OF SAME  
PLACE.

## WIRE-NAIL MACHINE.

SPECIFICATION forming part of Letters Patent No. 541,685, dated June 25, 1895.

Application filed September 25, 1890. Serial No. 366,101. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT ROSA, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Wire-Nail Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The main object of my invention is to produce nails from a continuous wire blank.

It consists of certain novel features in the construction and arrangement of the parts composing the machine, hereinafter particularly described and pointed out in the claims. In the accompanying drawings like letters designate the same parts in the several figures.

Figure 1 is a side elevation of the machine. Fig. 2 is a rear elevation looking from the left with reference to Fig. 1; Fig. 3, a plan view of the feeding mechanism; Fig. 4, a front elevation looking from the right with reference to Fig. 1; Fig. 5, a vertical medial section. Figs. 6 to 11, inclusive, represent details, and Fig. 12 illustrates one kind of nail which the machine is designed to make.

A is a cam shaft upon which are mounted the driving pulley A', balance wheel A<sup>2</sup> and cams a, a', a<sup>2</sup>, a<sup>4</sup> and a<sup>5</sup>, the cams a<sup>2</sup> a<sup>2</sup> being placed on opposite sides of the cam a', which has cam formations a<sup>3</sup> a<sup>3</sup> on the sides.

Referring to Figs. 2 and 3, B is a horizontal reciprocating slide or carriage provided with jaws b b, one of which is carried by the bell crank lever b<sup>2</sup>, and is movable therewith toward and from the other jaw, which is relatively fixed.

b<sup>3</sup> b<sup>3</sup> are retracting springs, one attached to the slide B and the other to the lever b<sup>2</sup> and tending to carry the movable jaw therein away from the fixed jaw. A link b<sup>4</sup> connects the lever b<sup>2</sup> with a lever b<sup>5</sup>, the upper end of which has a friction roller in the path of cam a, as shown in Figs. 1 and 4. The rotation of the cam shaft A causes the slide B, through the connections just described, to move for-

ward a definite distance, carrying the wire blank T with it. When the lever b<sup>5</sup> is released by the cam a, the slide B is withdrawn by springs b<sup>3</sup> against an adjustable stop block B', and the jaws b b are opened at the same time by the action of the spring b<sup>3</sup> attached to lever b<sup>2</sup>. The block B' is adjusted by means of a screw b<sup>6</sup> to regulate the length of travel of slide B for the purpose of making longer or shorter nails. The blank T passes through a hole in a cross piece of frame N and then between two dies c c, one held in a lever C and the other in a block C' to which said lever is fulcrumed, as shown in detail in Fig. 6.

For making ordinary nails, such as those shown in Fig. 5, simple guide blocks c<sup>4</sup> are substituted for dies c c, but for making nails of the kind shown in Fig. 12 and in process of construction in Figs. 10 and 11, the dies c c are employed, which reduce the blank and partially form the shank of the nail. For serrating the shanks of nails, dove-tailed holders c<sup>2</sup> are substituted for the dies and guide blocks, and in these holders are inserted dies such as c<sup>3</sup>, shown in Fig. 7. The lever C is loosely engaged at one end by the bell crank lever C<sup>2</sup> fulcrumed to the frame of the machine and carrying at its upper end a friction roller in the path of cam a<sup>5</sup>, which acts through said levers to force the movable die toward the fixed die, as shown in Figs. 2, 4 and 5. The dies are moved apart by spring c' acting upwardly against lever C. The blank next passes between dies d d, one held in a lever D and the other in a fixed block D', shown in Figs. 4 and 5. The lever D is depressed so as to bring the dies together by a bell crank lever D<sup>2</sup>, loosely engaging said lever and actuated by the cam a<sup>4</sup>. It is raised so as to separate the dies by an upwardly acting spring d'. Adjustable stops c<sup>5</sup> and d<sup>2</sup>, shown in Figs. 2 and 4, limit the upward movement of levers C and D.

Referring to Figs. 1, 2 and 4, e e are pointing dies and cutters, adjustably held in the lower ends of levers E E, which are fulcrumed to the front of the machine, and have at their upper ends, friction rollers, projecting between the faces of cams a<sup>2</sup> and a<sup>3</sup>.

f is a vertically reciprocating rod arranged

to break off the fin or burr produced by the pointing cutters and dies *e e*. It is attached at its upper end to a horizontal lever *F'*, which is depressed by the cam *a*<sup>6</sup>, engaging the friction roller *f'*, and it is moved in the reverse direction by a spring *f*<sup>2</sup>, shown in Fig. 1, and indicated by dotted lines in Fig. 4.

*G* is a hammer for forming the heads of the nails, adjustably attached to a vibrating arm *G'*, and provided with removable dies *g*, for forming heads of different shapes. The hammer arm is attached to a rock shaft *G*<sup>2</sup> and has a friction roller *g'* in range with the cam *a'*, which moves the hammer outwardly. Springs, *H*, located one on each side of the hammer arm and connected by a cross piece *h'*, carrying a roller *h*, which bears against the back of the hammer arm, produce the blows by which the heads of the nails are formed. The force of the blows is regulated by setting the cross piece *h'* with its roller *h*, up or down on the springs *H*, or by turning the nuts *h*<sup>2</sup> by which said springs are secured to the base of the machine or other suitable support, in or out.

My improved machine operates as follows: The wire blank *D* from which the nails are to be formed, is placed as shown in Fig. 3, between the jaws *b b*, and passed through the hole in the cross piece of frame *N*. The machine being set in motion, and the cam shaft revolving in the direction indicated by arrows on the drawings, the slide or carriage *B* is advanced intermittently by means of the cam *a*, acting through the lever connections hereinbefore described. The movable jaw *b* being at the same time carried by the bell crank lever *b*<sup>2</sup> toward the fixed jaw *b*, engages the blank and causes it to advance with said slide. The cam *a*, releasing the lever *b*<sup>5</sup>, permits the springs *b*<sup>3</sup> *b*<sup>3</sup>, which are strained by the advance movement of the carriage, to withdraw it against the adjustable stop *B'*, the spring *b*<sup>3</sup> connected with the lever *b*<sup>2</sup>, acting at the same time to move its jaw *b* outwardly and release the blank *T*. The length of nails is determined by the advance movement of the jaw-carrying carriage *B*, which is regulated by means of the adjustable stop *B'*.

When nails like or similar to those shown in Fig. 5 are to be made, the blank passes between guide blocks *c*<sup>4</sup> carried by the lever *C*, and block *C'* to which said lever is fulcrumed. The blank then passes between the dies *d d* held in the lever *D* and the block *D'*. These dies are formed and arranged to serrate or roughen the shank of the nail adjacent to its head and also to hold the blank and form the under side of the head produced by the hammer die. The die *g* striking against the outer faces of the dies *d*, operates therewith to form heads of the desired shape, which may be varied by employing different dies. After the head is formed, the blank is advanced the desired distance in the manner hereinbefore specified, and the point is formed and the nail severed from the blank by the dies and

cutters *e e*. Immediately following the formation of the point by the dies *e e*, the rod *f* descends, as shown in Fig. 5, and breaks off any fin or burr left by said dies upon the end of the blank. The operation is repeated as described and nails are thus formed in rapid succession.

When nails like or similar to those shown in Fig. 12, are to be made, reducing dies *c c*, substituted for the guide blocks *c*<sup>4</sup> and operating transversely to reducing dies *d*<sup>3</sup> *d*<sup>3</sup> of the proper form substituted in place of the dies *d d*, produce formations at intervals on the blank, like those shown at 1 1, Figs. 10 and 11, and the dies *d*<sup>3</sup> *d*<sup>3</sup>, acting at right angles upon such formations, complete the shanks or stems of the nails, as shown at 2, Figs. 10 and 11. The points of nails of this kind are formed in the manner specified.

It will be observed that in making nails of the kind last mentioned, the formations for the production of the shanks or stems, are separated by short intervals. This is for the purpose of affording sufficient material for the production of the heads, which are relatively large as compared with their shanks or stems.

It is obvious that a great variety of nails can be made in this machine by simply changing the feed and dies.

I claim—

1. In a nail machine, the combination of a reciprocating carriage, an angular lever fulcrumed thereto and provided with a jaw opposite a jaw fixed to said carriage, an adjustable stop block arranged to limit the return movement of said carriage, a spring connecting said angular lever with the machine bed and tending to move said carriage toward said stop block and at the same time to carry the movable jaw away from the fixed jaw, a cam shaft provided with a cam, and a lever fulcrumed to the frame of the machine and projecting into the path of said cam to be periodically engaged thereby and connected with the angular jaw carrying lever whereby said jaw will be closed and the carriage moved in one direction by engagement of the cam with the lever, substantially as and for the purposes set forth.

2. In a nail machine, the combination of blank holding dies one being movable toward and from the other, a cam shaft provided with a cam, a vibrating hammer arm provided with a head forming die movable toward and from the holding dies endwise of the blank held therein and with a projection in the path of said cam, and two leaf springs arranged on opposite sides of said hammer arm and connected at or near their free ends by a cross piece which carries a roller bearing against the hammer arm, substantially as and for the purposes set forth.

3. In a nail machine, the combination with holding dies and pointing and cutting off dies, of a cam shaft provided with cams arranged to force one of each pair of dies toward the

other, a vibrating hammer arm placed in the path of a cam on said cam shaft and provided with a head forming die movable endwise of the blank toward and from the holding dies, and two leaf springs placed on opposite sides of the hammer arm and connected at or near their free ends with a cross piece carrying a friction roller which bears against the hammer arm, substantially as and for the purposes set forth.

4. In a nail machine, the combination with holding dies and pointing and cutting off dies, of a cam shaft provided with cams arranged to force one of each pair of dies toward the other, a vibrating hammer arm supported and arranged to swing on an axis parallel with the cam shaft and extending therefrom into the path of a cam on said cam shaft, a hammer adjustably secured upon said hammer arm and provided with a head forming die, two leaf springs on opposite sides of the hammer arm, and a cross piece connecting said springs at or near their free ends, adjustable endwise thereof and provided with a friction roller bearing against said hammer arm, substantially as and for the purposes set forth.

5. In a nail machine, the combination of holding dies, a cam shaft provided with a cam arranged to force one of said dies toward the other, a vibrating hammer arm supported on an axis parallel to the cam shaft and extending into the path of a cam thereon, a hammer provided with a head forming die secured to said hammer arm, and two leaf springs adjustably attached to the frame of the machine and connected at or near their free ends by a cross piece which has a roller bearing against the hammer arm, substantially as and for the purposes set forth.

6. In a nail machine, the combination of a primary set of reducing dies and a secondary set of reducing dies arranged to operate upon the nail blank transversely to and a short distance from the other set so as to leave portions of the blank unreduced between the reduced portions and whereby the fins formed by the first set of dies will be obliterated by the second set, a head forming die movable endwise of the blank against one pair of reducing dies which serve to hold the blank and act with the head forming die to form the heads of nails from the unreduced portions of the blank, pointing dies and cutters arranged to act on the end of the reduced portion of the rod next to the unreduced portion to form a point to the shank and sever the shank from the rod, and means for detaching from the end of the shank any fin or burr left thereon by the dies, substantially as and for the purposes set forth.

7. In a nail machine, the combination of holding dies and pointing and cutting off dies, a cam shaft provided with cams arranged to operate the movable dies, a severing rod movable vertically between the holding and cut-

ting off dies, a vertically movable horizontal lever with which said rod is connected extending into the path of a cam on said cam shaft, and a spring acting on said lever in opposition to said cam, substantially as and for the purposes set forth.

8. In a nail machine, the combination of a cam shaft provided with cams, two sets of dies arranged to operate transversely to each other upon the blank, levers carrying the movable die of each set and having arms approximately parallel with the cam shaft, angular levers bearing at one end against said arms and extending at the other end into the path of cams on said cam shaft, springs acting on the die holding levers in opposition to said cams, and adjustable stops arranged to limit the opening movement of said die holding levers, substantially as and for the purposes set forth.

9. In a nail machine, the combination of two fixed die holding blocks, two die holding levers pivotally connected with said blocks and having arms extending horizontally crosswise of the machine, one pair of die holding blocks and levers having vertically disposed die holding faces and the other pair horizontally disposed die holding faces, angular levers fulcrumed to the frame of the machine and bearing at one end upon the arms of said die holding levers and projecting at the other end into the paths of cams on said cam shaft, springs acting on the die holding levers in opposition to said cams, and two vertically disposed levers provided at one end with pointing and cutting off dies on opposite sides of the path of the nail blank and projecting at the opposite end into the paths of double acting cams on said cam shaft, substantially as and for the purposes set forth.

10. In a nail machine, the combination of a cam shaft A, provided with cams  $a$ ,  $a'$ ,  $a^2$ ,  $a^3$ ,  $a^4$  and  $a^5$ , dies  $c$   $c$  and  $d$   $d$ , arranged in pairs on opposite sides of the path of the nail blank, one of each pair being movable transversely thereto and carried by a lever actuated by one of said cams, pointing dies  $e$   $e$ , acting transversely upon the nail blank and carried by levers actuated by one of said cams, a spring actuated hammer G, provided with a heading die  $g$ , a vibrating hammer arm  $G'$  having a projection in the path of the cam  $a'$ , a reciprocating carriage B, provided with jaws  $b$   $b$ , and connections by which it is advanced by the cam  $a$ , and a retracting spring connected with said carriage, substantially as and for the purposes set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

ALBERT ROSA.

Witnesses:

W. J. ALLEN,  
E. E. ASMUS.