

(No Model.)

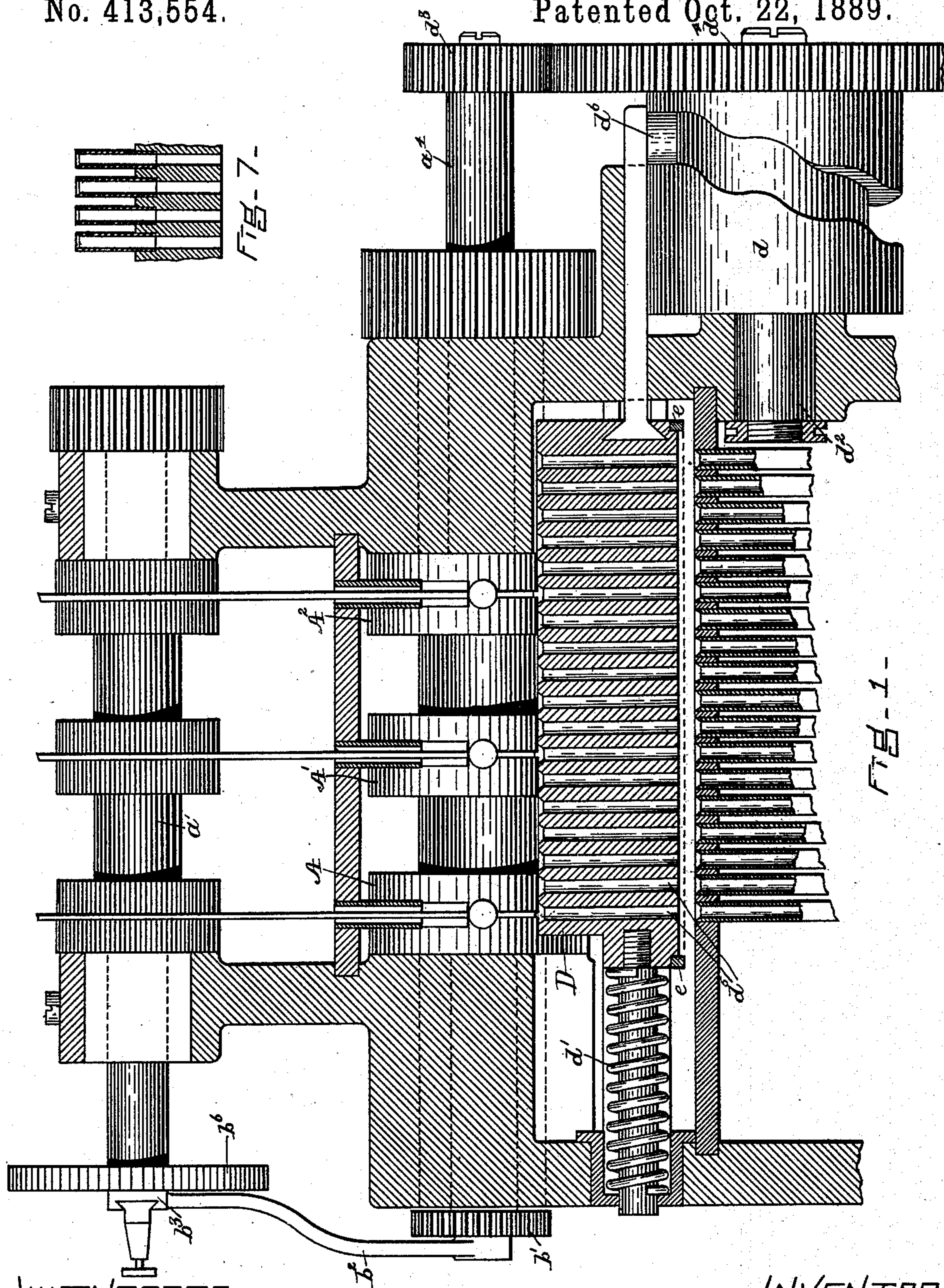
5 Sheets—Sheet 1.

F. F. RAYMOND, 2d.

NAIL MACHINE.

No. 413,554.

Patented Oct. 22, 1889.



WITNESSES.

J. M. Dolan
A. F. Macdonald.

INVENTOR.
F. F. Raymond

(No Model.)

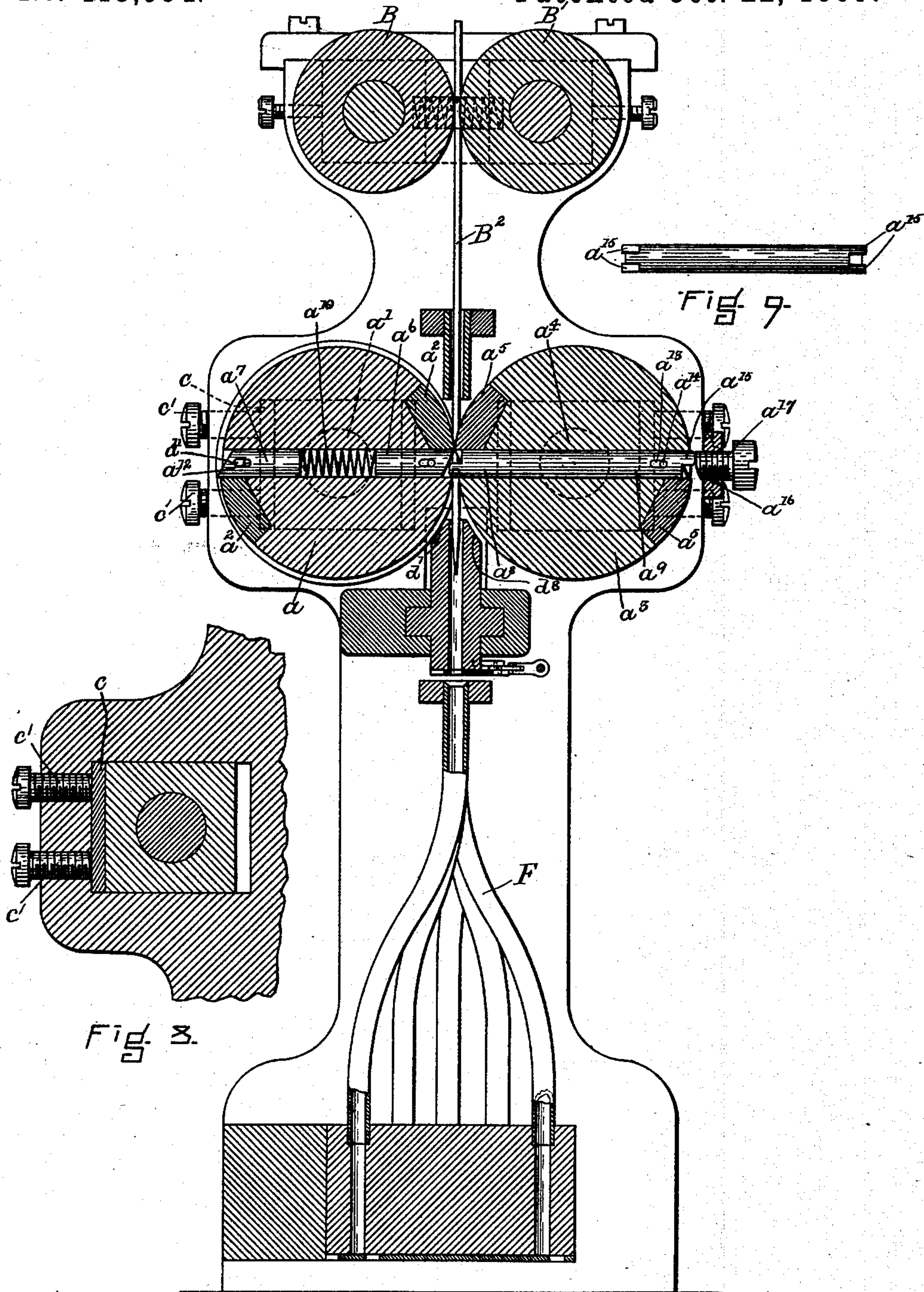
5 Sheets—Sheet 2.

F. F. RAYMOND, 2d.

NAIL MACHINE.

No. 413,554.

Patented Oct. 22, 1889.



WITNESSES.

J. M. Dolan
A. F. McDonald.

Fig. 2.

INVENTOR.
F. F. Raymond

(No Model.)

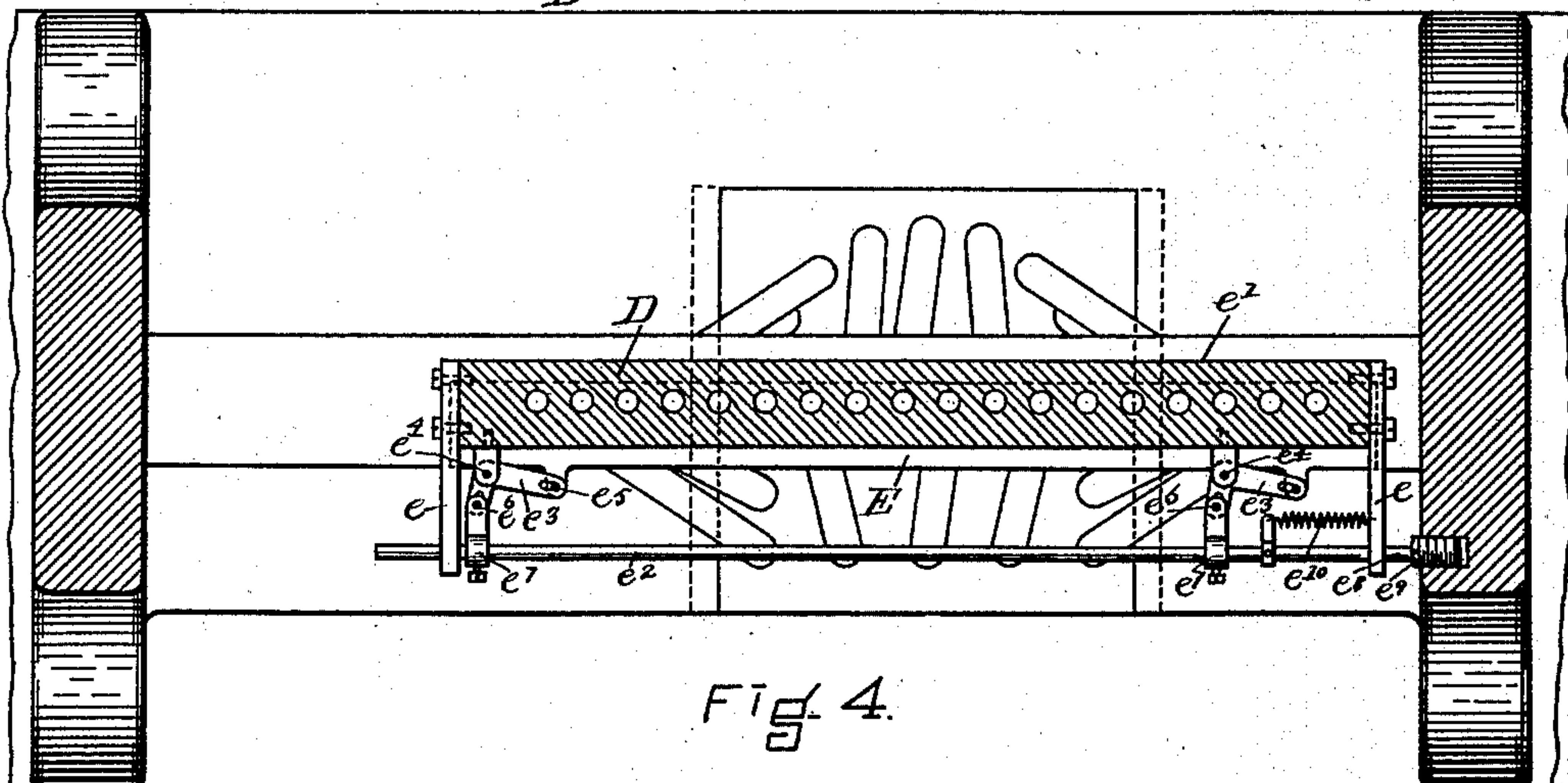
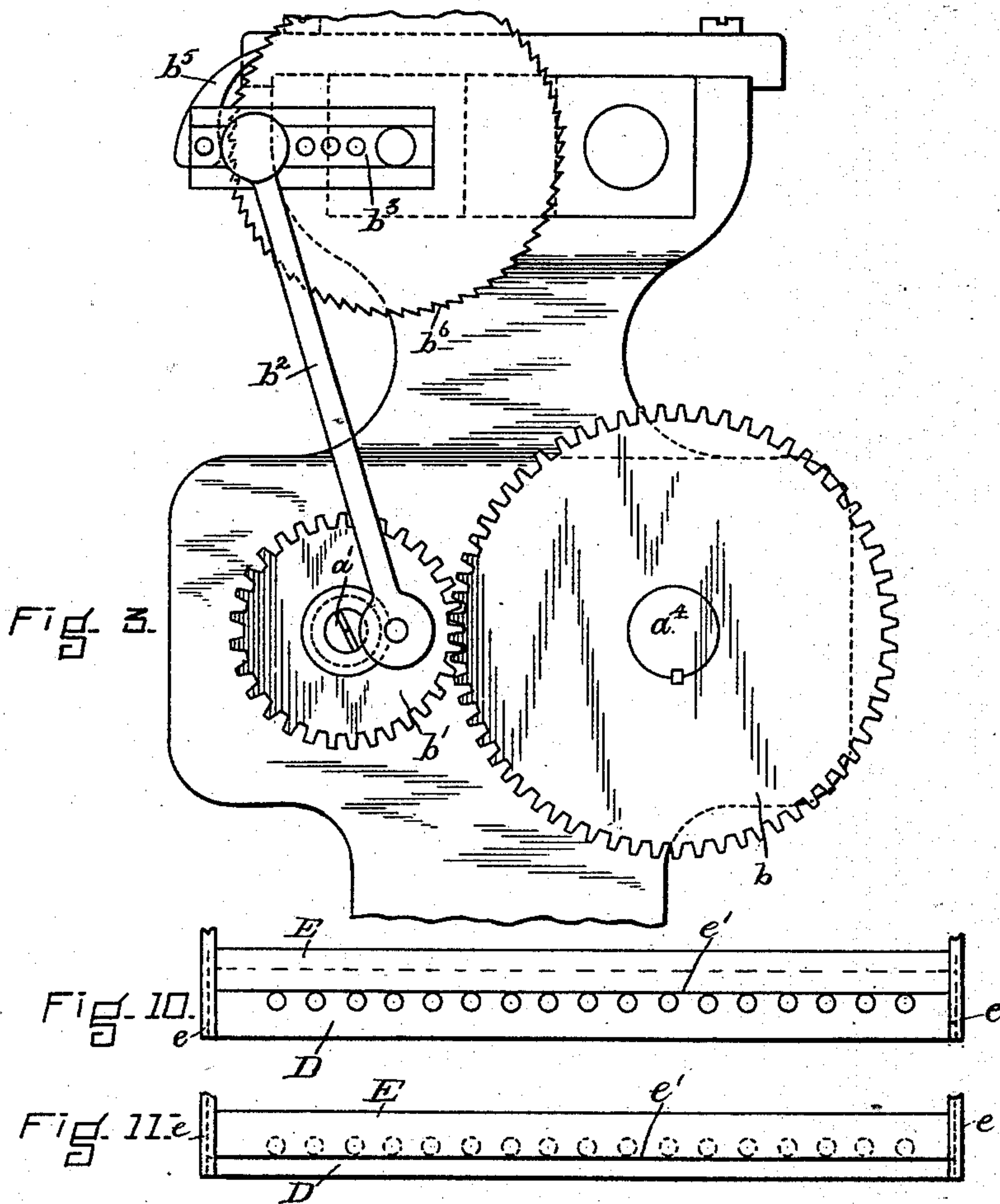
5 Sheets—Sheet 3.

F. F. RAYMOND, 2d.

NAIL MACHINE.

No. 413,554.

Patented Oct. 22, 1889.



WITNESSES.

J. W. Dulan.
A. B. McDonald.

INVENTOR.

F. F. Raymond

(No Model.)

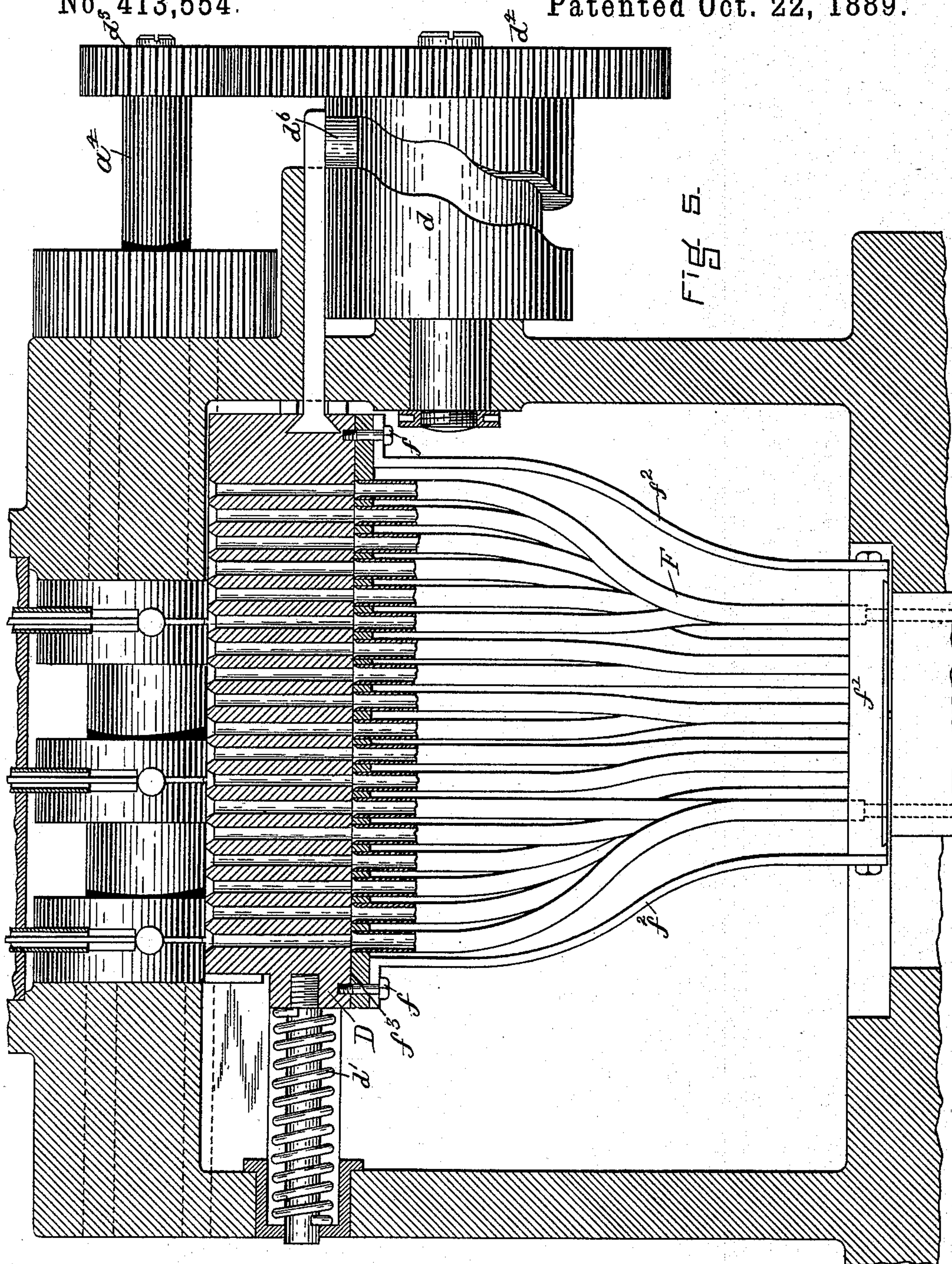
5 Sheets—Sheet 4.

F. F. RAYMOND, 2d.

NAIL MACHINE.

No. 413,554.

Patented Oct. 22, 1889.



WITNESSES -
J. M. Dolan
A. F. McDonald.

INVENTOR
D. F. Raymond

(No Model.)

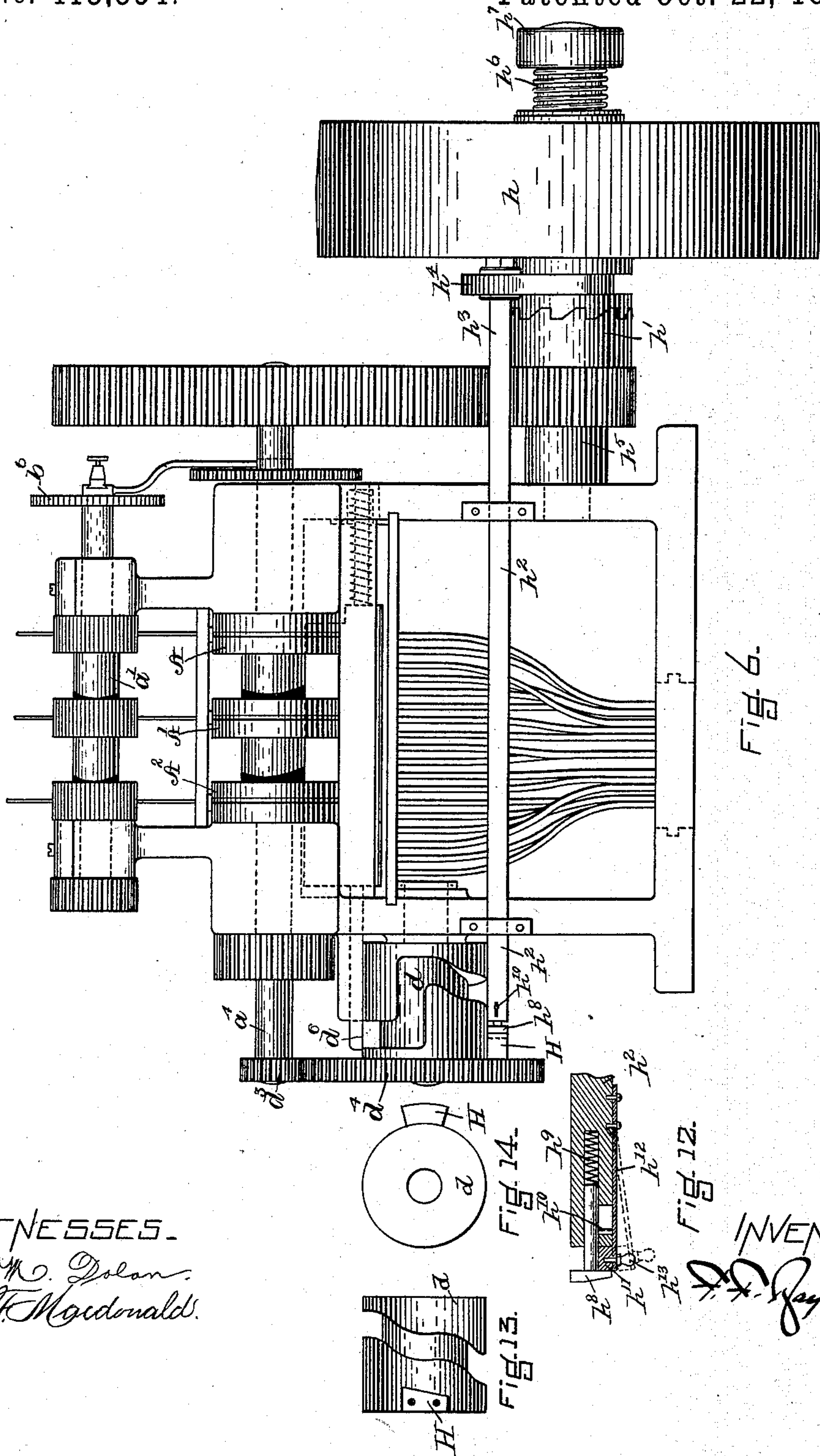
5 Sheets—Sheet 5.

F. F. RAYMOND, 2d.

NAIL MACHINE.

No. 413,554.

Patented Oct. 22, 1889.



WITNESSES.

J. M. Dolan.
A. F. McDonald.

INVENTOR.

F. F. Raymond.

UNITED STATES PATENT OFFICE.

FREEBORN F. RAYMOND, 2D, OF NEWTON, MASSACHUSETTS.

NAIL-MACHINE.

SPECIFICATION forming part of Letters Patent No. 413,554, dated October 22, 1889.

Application filed February 11, 1889. Serial No. 299,512. (No model.)

To all whom it may concern:

Be it known that I, FREEBORN F. RAYMOND, 2d, of Newton, in the county of Middlesex and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Nail Making, Distributing, and Driving Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The invention is an improvement upon that described in my Letters Patent of the United States, No. 381,280, dated April 17, 1888; and it relates especially to various details of construction and organization, to which reference is hereinafter made.

The invention described in said patent comprises a number of nail pointing and severing devices adapted to simultaneously operate to point and sever a number of nails from as many wires and to deliver them through stationary throats or passages to a movable nail-receiving block, which has an intermittent feeding movement to bring holes therein successively in register with the stationary throats or passages to receive the nails as formed and delivered. This requires that the nails drop by gravity from the nail pointing and severing devices through the throats to the movable nail-receiving block, and if for any reason a nail should stop in a throat it may interfere with or retard the operation of the device. If, however, the throats or passages, instead of being formed in stationary tubes or parts of the machine, are formed upon or carried by the receiving-block, this liability to accident is entirely overcome, the nails being delivered directly from the nail pointing and severing devices into nail-receiving holes of the receiving-block, which being extended upward enables the holes in said upper part to take the place of the stationary throats or passages.

The invention further relates to nail pointing and severing devices comprising one or more pairs of die-rolls carrying two or more sets of pointing and severing devices, whereby each rotation of the rolls makes two or more nails.

It further relates to an imperforate slide-

plate for covering and uncovering the holes of the receiving-block and a means for automatically moving it to open and close said holes.

It further relates to the manner of operating the nail-receiving block.

It further relates to a nail-receiving block of the character described in said patent and a distributor secured thereto to be movable therewith.

It further relates to various details of organization and construction, all of which will hereinafter be explained.

In the drawings, Figure 1 is a view in vertical section from side to side of the central and upper parts of a machine having the features of my invention. Fig. 2 is a vertical cross-section thereof. Fig. 3 is a view in side elevation. Fig. 4 is a view in horizontal section to show the nail-receiving block, principally in plan, and the distributor below it. Fig. 5 is a view in vertical section illustrating the distributor as connected with the nail-receiving block and movable therewith. Fig. 6 is a view in front elevation, and represents the stop-motion mechanism. Figs. 7 to 14, inclusive, are detail views.

A represents one set of nail pointing and severing devices, A' a second set, and A² a third set. Each set comprises a roll *a*, (see Fig. 2,) mounted or formed upon a shaft *a'* and having the sections *a*² of two pointing-dies, and another roll *a*³, mounted or formed upon the shaft *a*⁴ and having sections *a*⁵ of two pointing-dies. The roll *a* is represented as provided with the sections *a*⁶ *a*⁷ of nail-severing devices, the section *a*⁶ acting in connection with one of the dies *a*² and the section *a*⁷ in connection with the other of the dies. The roll *a*³ has the sections *a*⁸ *a*⁹ of the nail-severing device, one of which sections *a*⁸ acts with one of the dies *a*⁵ and the other *a*⁹ with the other die *a*⁵. These severing devices vary from those described in Patent No. 375,209 to C. C. Small, dated December 20, 1887, in that they are arranged in the rolls to operate to sever two nails upon each revolution of the rolls instead of one. Consequently the sections *a*⁶ *a*⁷ are represented as made in two parts and as having between them a spring *a*¹⁰, which operates to press both sections *a*⁷ *a*⁶

outwardly, and each of the sections has a slot a^{11} and a pin a^{12} , which extends across the roll through the slot and holds it in place.

The sections $a^8 a^9$ of the severing device are represented as a continuous rod having each end brought into position to act to sever the nail. It is shown as provided with a slot a^{13} , through which a pin a^{14} , attached to the roll, extends. It is also represented as having at each end the projection a^{15} at one side of the cutting-edge, which is brought in contact with the cam a^{16} of the adjustable cam-screw a^{17} to cause the cutter to be operated to sever the nail, the projection a^{15} upon the end which is operating entering a recess which is formed in the face of the opposite roll. This movement of the severing device to sever the nail moves the projection a^{15} of the end of the cutter which is operating into position to come in contact upon a half-revolution with the cam-face a^{16} , while the section of the cutter which is not operating is moved into position to be moved forward upon a half-revolution of the roll by the cam a^{16} to sever a nail. The rod should be held in the roll by a sufficiently tight fit to prevent it from being moved radially except by the cam a^{16} .

B B' are the feed-rolls, and there is a separate set for each pair of nail pointing and severing rolls, and they are caused to be operated to feed the wire B² during each half-revolution of the rolls $a a^3$. This movement is provided by means of the gear b upon the shaft a^4 , made fast to said shaft, and the gear b' on the shaft a' , which is not fast to said shaft, but is free to rotate thereon, and this gear is connected by a link b^2 with a lever b^3 , pivoted at b^4 to the shaft of one of the feed-rolls, and having a pawl b^5 , which engages the ratchet-wheel b^6 . As the gear b' makes two revolutions for every revolution of the gear b , it follows that the two movements of rotation and two periods of rest are given the feed-rolls B B' for every full revolution of the rolls $a a^3$.

I have, for the purposes of adjusting the rolls $a a^3$ in relation to each other, arranged behind the boxes carrying the shaft a' the steel plates c , against which adjusting-screws c' bear. This enables the rolls to be set at any required distance from each other, and consequently the taper of the point of the nail to be varied in length, and also the point of the nail to be varied in thickness.

D is the nail-receiving block. It is operated progressively in one direction by the cam d , which communicates to it advancing movements alternated by periods of rest, and in the other or return direction by a spring d' . (See Fig. 1.) I have represented the cam as a cylinder-cam and as mounted upon a shaft d^2 , connected with the shaft a^4 by means of the gear d^3 on the shaft a^4 and the gear d^4 on the shaft d^2 , the gear d^4 making one revolution for every three revolutions of the gear d^3 . The cam d is constructed to impart to

the nail-receiving block D a progressive movement of six steps, the first step bringing the nail-receiving holes d^5 into position to receive the nails from the nail pointing and severing devices, and each successive movement bringing a new nail-receiving hole into line with each of the nail-making devices until the last holes are reached and nails delivered to them, when the cam-pin d^6 rides off the cam, and by the spring d' the nail-receiving block, with the nails therein, is returned to its original position to be again advanced by the cam. Simultaneously with this movement the machine comes to rest. The nail-receiving block D is extended upward between the lower parts of the various sets of rolls $a a^3$ to bring the upper openings of its nail-receiving holes immediately below the meeting-point of the die-sections, the said openings being a little more than the length of the point of a nail from a horizontal central line extending through the centers of the various sets of rolls. To accomplish this result, the block may be cut away upon its upper corners $d^7 d^8$, (see Fig. 2,) or there may be secured to the block independent tubes or cylinders extended upward therefrom, as represented in Fig. 7. It will be seen that for every revolution of the rolls $a a^3$ two nails are made and severed, and that the nail-receiving block is advanced two steps to bring two nail-receiving holes into position to receive nails.

When the distributor is separate from the nail-receiving block, I prefer to use an imperforate covering-plate E, (see Fig. 4,) which is provided with lateral movements relatively to the nail-receiving block D to open and close the holes therein. It is attached to the under surface of the nail-receiving block by arms e , which also act as guides. Its edge e' extends, when the holes are closed, a trifle beyond them, and it is moved laterally sufficiently to expose the full area of the holes. This movement as represented is provided for the plate by means of a rod e^2 , carried by the arms e , and the rock-levers e^3 , which are pivoted at e^4 to brackets or projections extending from the side of the block D, are connected at e^5 with the plate E and at e^6 with blocks e^7 , carried by the rod e^2 . The return movement of the block D causes the end e^8 of the rod to come in contact with an adjustable stop e^9 , which causes the plate E to be moved to the position represented in Fig. 10 and the holes to be uncovered, and upon the starting forward of the block D, after it has discharged its nails, the plate E is closed by means of the spring e^{10} , which serves to return the rod e^2 to its original position and at the same time move the plate E to cover the holes.

F represents the distributor, which in Fig. 2 is like that shown in my said patent, No. 381,280, and in Fig. 5 it is represented as secured to the nail-receiving block D by means of bolts or other fastenings f , and when it is thus

attached to the nail-receiving block it is unnecessary to employ the hole-covering plate E, the nails not then being retained in the holes of the nail-receiving block, but passing through the holes or passages of the receiver to the lower ends thereof and remaining there until the nail-receiving block and distributor have been returned to their original position after having received a load of nails, and preferably until the nail-carrier block G has been moved beneath it, when the slide-plate *g* is moved by it, or in any other way, and the holes of the distributor uncovered and the nails permitted to drop into the holes of the nail-receiving block. The carrier is like that described in my said patent and serves to transfer nails from the distributor to the nail-driving devices. When the distributor is thus attached to the nail-receiving block, it is moved forward with it in the same step-by-step way and automatically returned by the spring, and I prefer to then make the lower block *f'* quite thin and to suspend it by means of bars *f''* from the upper part *f''* of the distributor, and the frame of the machine is shaped to permit this cross movement of the distributor, (see Fig. 5,) the frame also being shaped to support the lower end of the distributor against the movement of the carrier G.

The machine is automatically stopped by means of a small wedge-cam H, carried on the inner face of the gear *d''*, which is located to cause the movable member *h* of the clutch to be moved away from the fixed member *h'* upon the end of the last forward movement of the nail-carrier and immediately when the cam-pin *d''* comes in line with the straight portion of the cam-groove. This movement is given the movable member *h* of the clutch by means of the slide-bar *h''*, which is connected at its end *h''* by a yoke *h''* with the member *h* of the clutch. This member slides on the shaft *h''*, and a spring *h''* upon the shaft, bearing against a nut or washer *h''*, acts against the hub of the movable section of the clutch, which in this case is also a pulley to hold it in contact with the fixed member *h*. The slide-bar *h''* also has at its other end the longitudinally-movable block *h''*, which has a stud entering a hole in the end of the slide-bar, and which is moved outward from the end of the bar by the spring *h''*, the extent of its outward movement being limited by the stop *h''*. There is also attached to the slide-bar a latch *h''*, held by a spring *h''* and having a knob *h''*, whereby it is operated. This latch-block is attached by its spring to the slide bar *h''* to close between the inner surface of the block *h''* and the end of the slide-bar *h''* when the block is moved outward sufficiently to permit it, and the block takes this position automatically after the cam H has cleared it, and upon the contact of the cam H with it, the latch-block *h''* being interposed between it and the end of the slide-bar, the slide-bar is operated to move the

driven member *h* of the clutch from the member *h'* and in opposition to a spring *h''*, so that the machine is caused to stop. To start the machine, the latch *h''* is withdrawn from between the block *h''* and the end of the slide-bar *h''*, the spring *h''* immediately moves the driven member of the clutch into contact with the other member, and the machine, starting, moves the cam H from contact with the face of the block *h''*, and after the cam has thus left the block the spring behind the shank and block causes the block to be moved outward from the end sufficiently to permit the latch *h''* to shut between it and the end of the slide-bar, and consequently when the cam again comes in contact with the block *h''* it moves the slide-bar and driven member of the clutch, as above explained.

By providing the rolls with two or more sets of pointing and severing devices I am enabled to run them at a comparatively slow rate of speed and still obtain a rapid supply or delivery of nails, which I consider to be an advantage.

The operation of the invention is as follows: On the starting of the machine the wires previously pointed extend about the distance of the points below the horizontal central line of the rolls and are held in that position temporarily while the nail-receiving block is moved into position to bring one set of holes below the pointed wire. The wire is then immediately fed, and its pointed ends enter the holes of the nail-receiving block. The die-rolls are turning constantly and bring dies into position which point the next group of nails in order and sever the previously-pointed sections, which immediately drop into the nail-receiving holes of the delivery-block. When the wires are held, the nail-delivery block is moved forward a step and the wire fed, and other sets of dies move into position by other rolls to act as before.

So far as the doing away with the stationary throat is concerned, the nail-receiving block may be used with one set of nail-making devices as well as with a number.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a nail making and distributing machine, the combination of nail-making devices of the character specified with a horizontally-movable nail-receiving block having its nail-receiving holes brought into close proximity with the said nail-severing devices, whereby the nails are caused to be directly delivered from the nail-severing devices into the holes of the nail-receiver, as and for the purposes described.

2. The combination of one or more sets of rotary nail pointing and severing rolls arranged upon the same line with a nail-receiving block having a progressive or reciprocating movement upon a line at right angles to the rotation of the dies, and having a section or sections of the block extended between the

lower sections of the die rolls or supports, whereby the nail-receiving hole or holes of said block are brought into close proximity to the severing devices, substantially as described.

3. The combination of a pair of rolls, two or more sets of nail-pointing dies carried by said rolls, and the nail-severing device for each set of dies, whereby each revolution of the rolls forms two or more nails, as and for the purposes described.

4. The combination of a pair of rolls and two or more sets of nail-pointing dies mounted thereon, whereby each rotation of the roll points two or more nails, as and for the purposes described.

5. The combination of the rolls a a^3 , the two sets of pointing-dies a^2 , carried by the roll a , two sets of pointing-dies a^5 , carried by the roll a^3 , and the feeding devices actuated to feed the wire between the operation of each set of dies a^2 a^5 , as and for the purposes described.

6. The combination of the rolls a a^3 , two sections a^2 of dies carried by the roll a , the two sections a^5 of the dies carried by the roll a^3 , the feed-rolls B B' , and the gears b b' , and intermediate operating devices connecting the gear b' with a ratchet-wheel upon one of the feed-roll shafts, substantially as described.

7. The combination of a roll a , the sections a^2 of two dies mounted thereon, with the roll a^3 , and the two sections a^5 of a die mounted thereon, and a severing device for each die, substantially as described.

8. The combination of the roll a , the two sections a^2 of two dies carried thereby, the roll a^3 , the two sections a^5 of two dies carried thereby, and a rod or bar carried by the said roll a^3 , having a cutting-edge at each end and movable in the said roll by means of the projections thereon, and a cam with which the projections are successively brought in contact, substantially as described.

9. The combination of the roll a , having two sections a^2 of two dies mounted thereon, and the pressers or sections of the severing devices a^6 a^7 , the roll a^3 and the two sections a^5 of dies mounted thereon, and the severing devices a^8 a^9 , one for each die, substantially as described.

10. The combination of the nail-receiving block D and the imperforate transversely-

movable hole-covering plate E , as and for the purposes described.

11. The combination of the nail-receiving block D , having a series of holes formed therein, the hole-covering plate E , and actuating devices of the character specified automatically opening and closing the same, whereby the plate is moved to uncover the holes at the end of the movement of the nail-receiving block and to close the same at the beginning of said movement, substantially as described.

12. The combination of the movable nail-receiving block D , the imperforate hole-covering plate E , the rod e^2 , supported by the block D and movable relatively to it and connected with the slide-plate by one or more rock-levers, and said rock-levers, substantially as described.

13. The combination of the movable nail-receiving block D , the imperforate hole-covering plate E , the rod e^2 , supported by the block D and movable relatively to it, and connected with the slide-plate by one or more rock-levers, and said rock-levers, and a spring e^{10} , substantially as described.

14. The combination of the movable nail-receiving block D , the imperforate hole-covering-plate E , the rod e^2 , supported by the block D and movable relatively to it, and connected with the slide-plate by one or more rock-levers, said rock-levers, a spring e^{10} , and an adjustable stop e^9 , substantially as described.

15. The combination of the nail-receiving block D , having a step-by-step movement imparted to it, devices for feeding one or more nails thereto, and a distributor attached to said block to be movable therewith, substantially as described.

16. The combination of devices for making and delivering nails to a nail-receiving block, said nail-receiving block having a step-by-step movement imparted to it in one direction, a distributor attached to or carried by said nail-receiving block, and a nail-carrier G , substantially as described.

FREEBORN F. RAYMOND, 2D.

In presence of—

J. M. DOLAN,

A. F. MACDONALD.