(No Model.)

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W. Z. BEAN.

NAILING MACHINE.

No. 389,632. Patented Sept. 18, 1888.

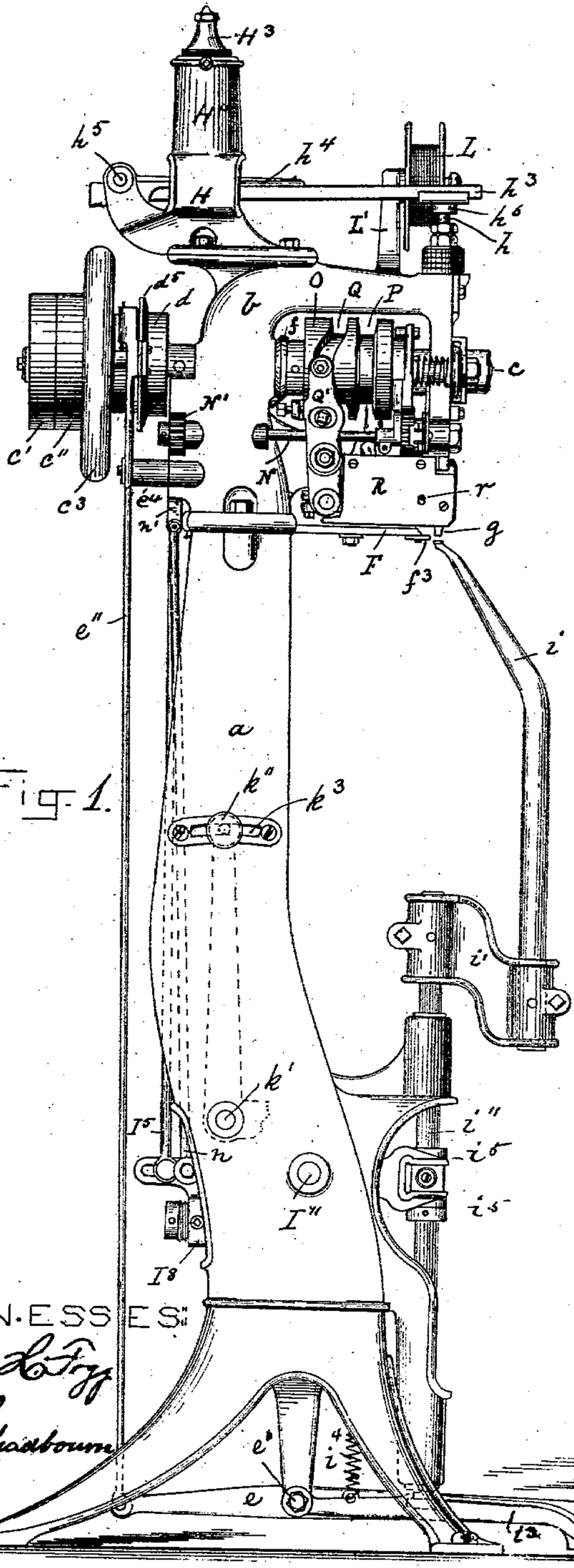

Fig. 1.

WITNESSES:
Charles L. Fry
Henry Chadbourn

INVENTOR:
William Z. Bean
by Albert Hedrick
his atty

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W. Z. BEAN.

NAILING MACHINE.

No. 389,632. Patented Sept. 18, 1888.

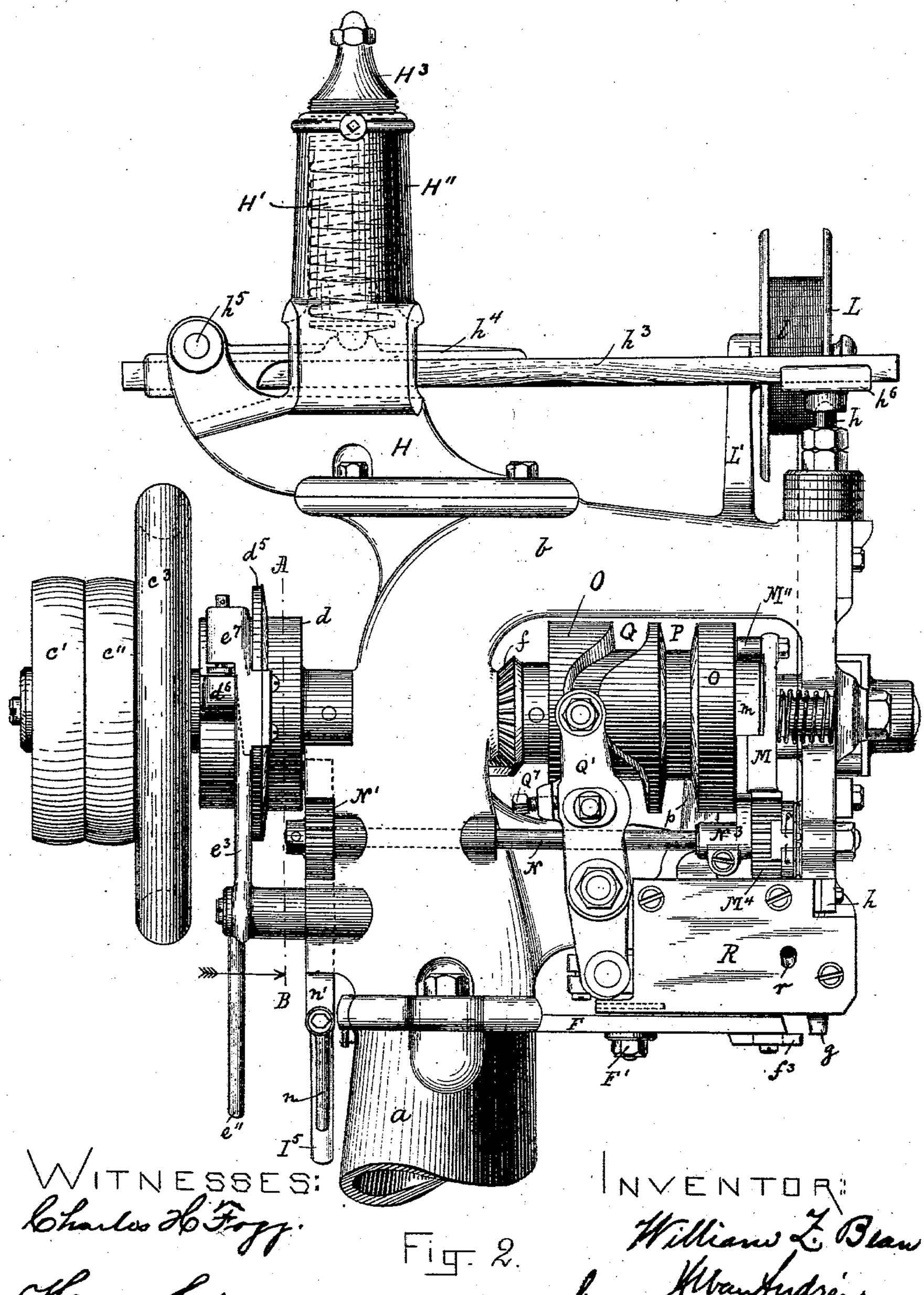


Fig. 2.

Witnesses:
Charles H. Fogg.
Henry Chadbourn.

Inventor:
William Z. Bean
by Wilkinson Andrews
his Atts

(No Model.) 10 Sheets—Sheet 3.

W. Z. BEAN.

NAILING MACHINE.

No. 389,632. Patented Sept. 18, 1888.

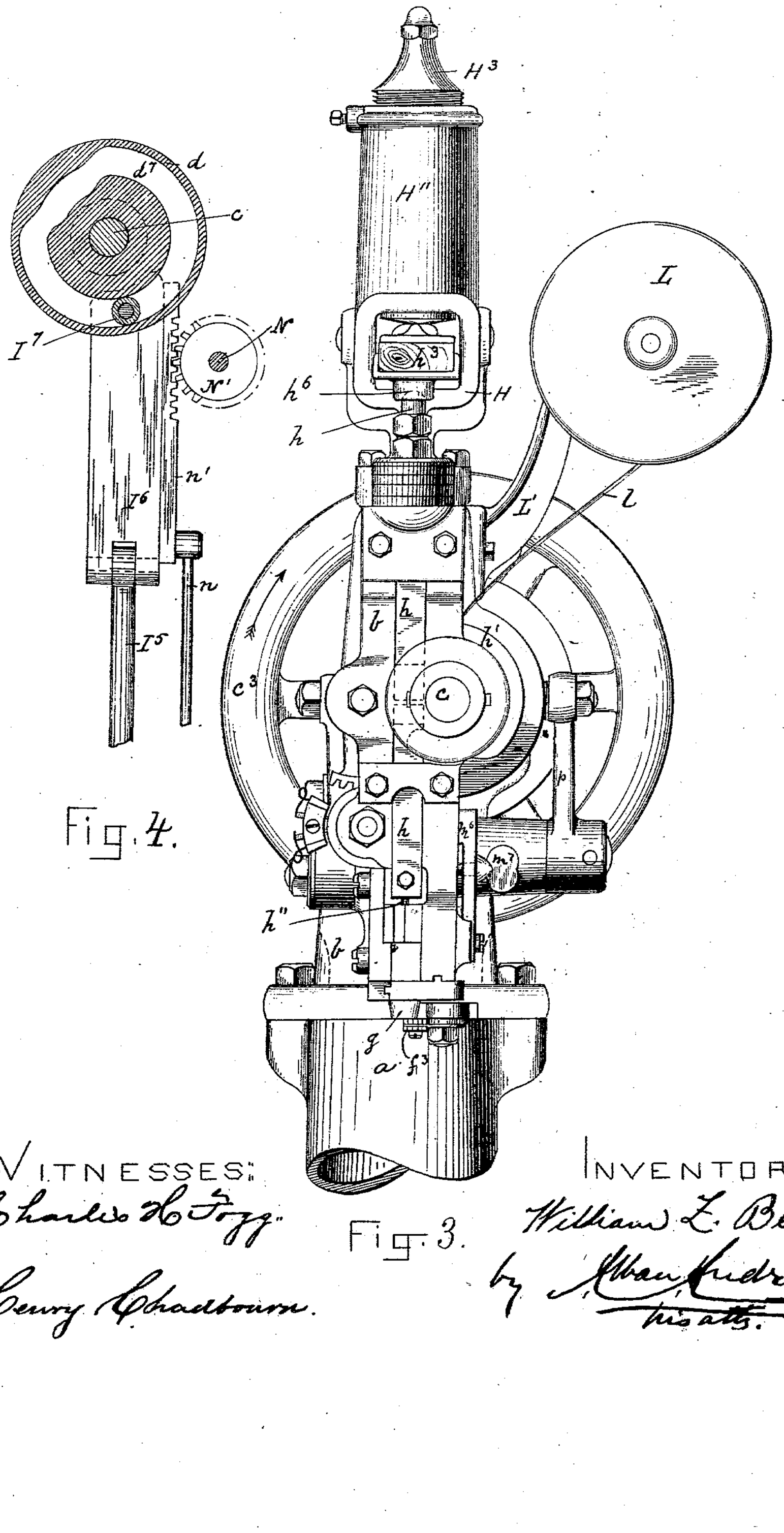


Fig. 4.

Fig. 3.

WITNESSES:
Charles H. Fogg.
Henry Chadbourn.

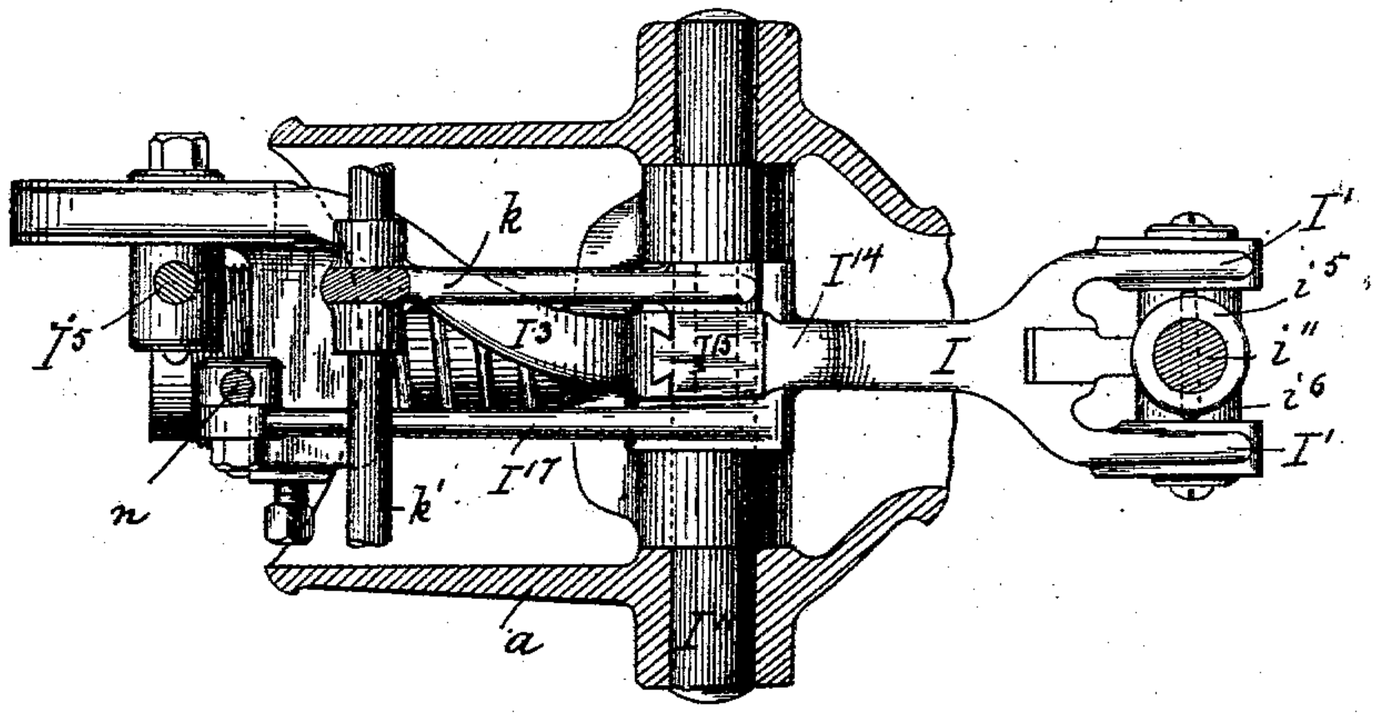
INVENTOR:
William Z. Bean.
by Albert Lindén
his atty.

(No Model.) 10 Sheets—Sheet 4.

W. Z. BEAN.

NAILING MACHINE.

No. 389,632. Patented Sept. 18, 1888.



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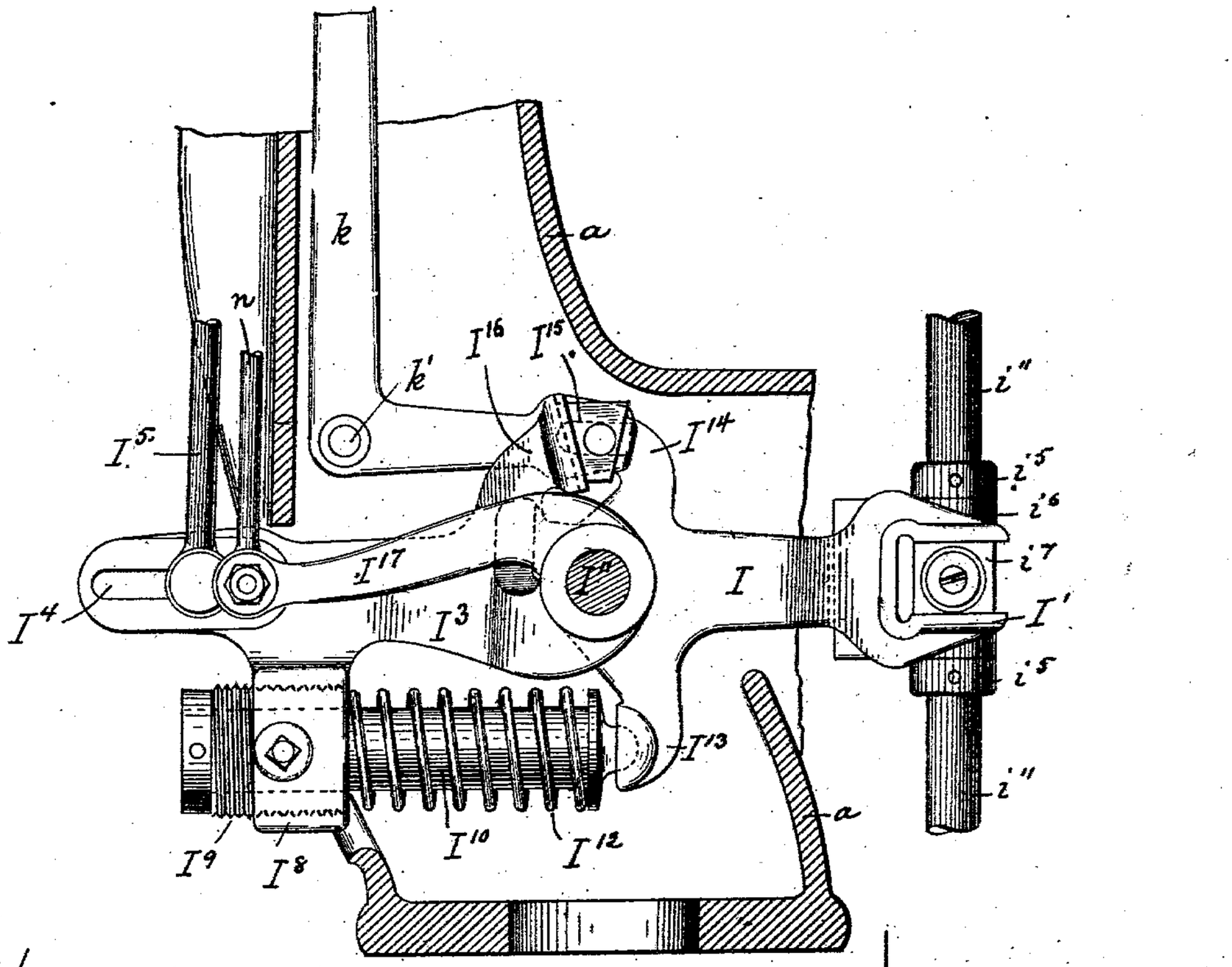


Fig. 5.

WITNESSES:
Charles H. Fogg.
Henry Chadbourne

INVENTOR:
William Z. Bean
by Albert Andrews.
his atty.

(No Model.) 10 Sheets—Sheet 5.

W. Z. BEAN.

NAILING MACHINE.

No. 389,632. Patented Sept. 18, 1888.

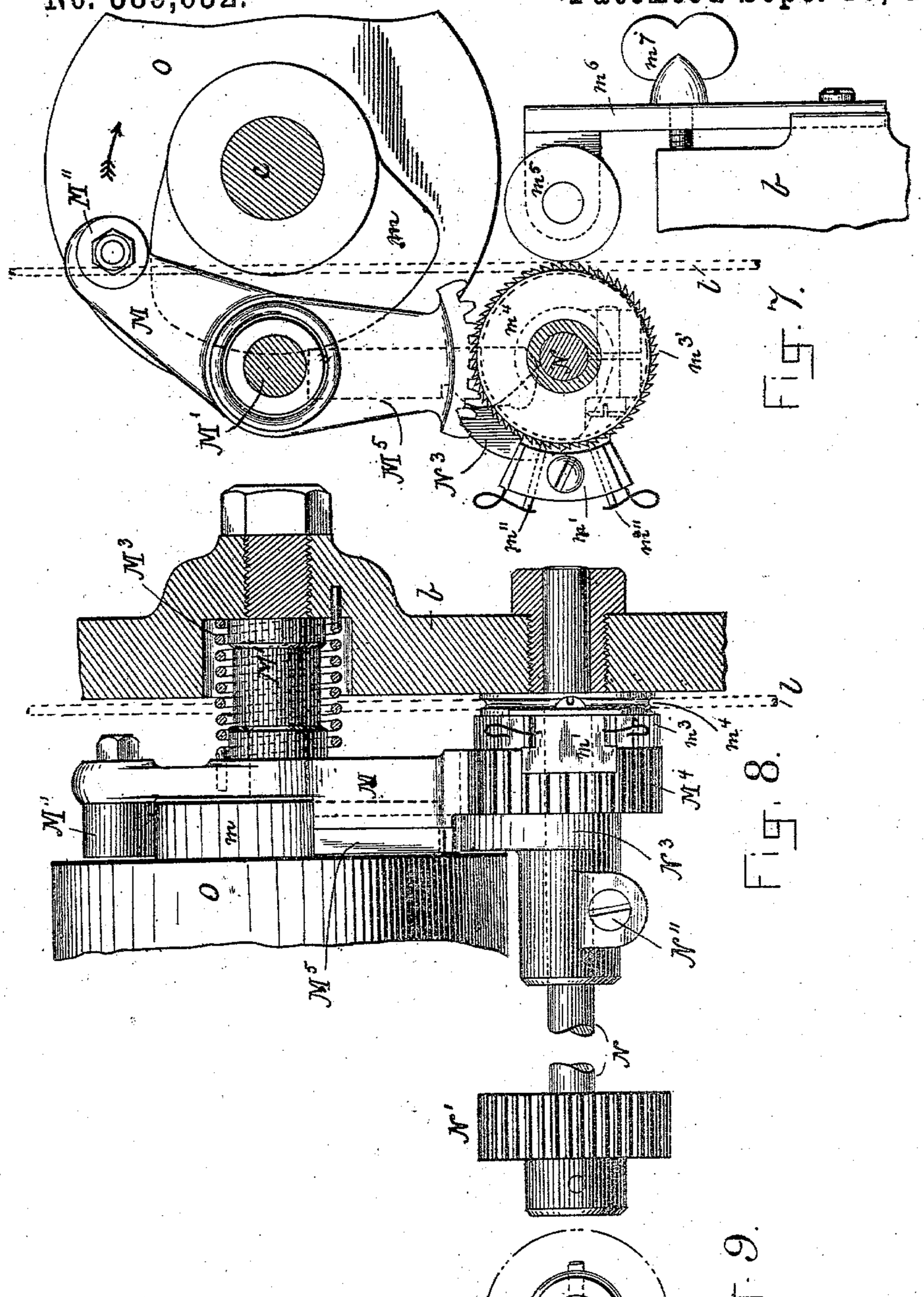


Fig. 7.

Fig. 8.

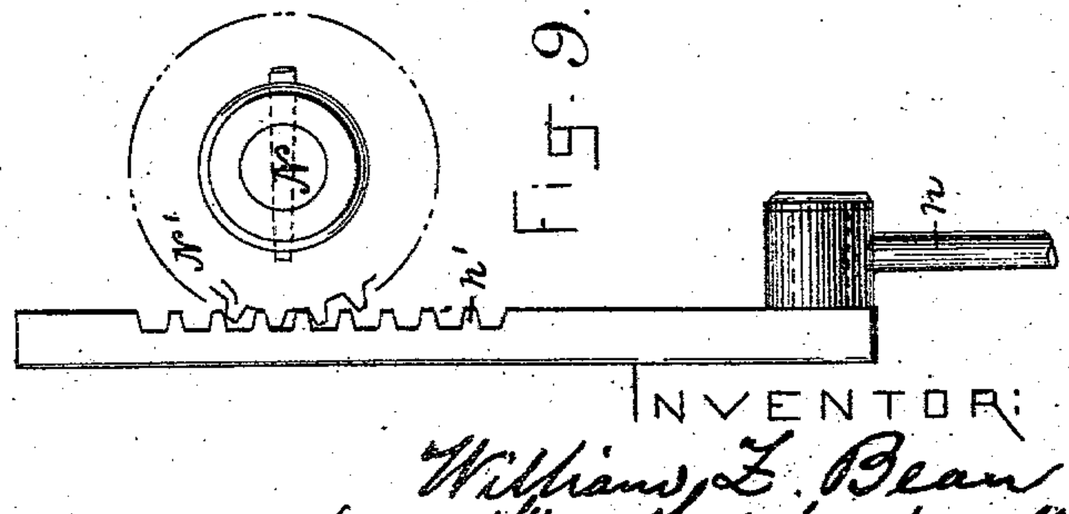


Fig. 9.

WITNESSES:

Charles H. Fogg.

Henry Chadbourn.

INVENTOR:

William Z. Bean

by Munn & Andrew his atty

(No Model.) 10 Sheets—Sheet 6.

W. Z. BEAN.

NAILING MACHINE.

No. 389,632. Patented Sept. 18, 1888.

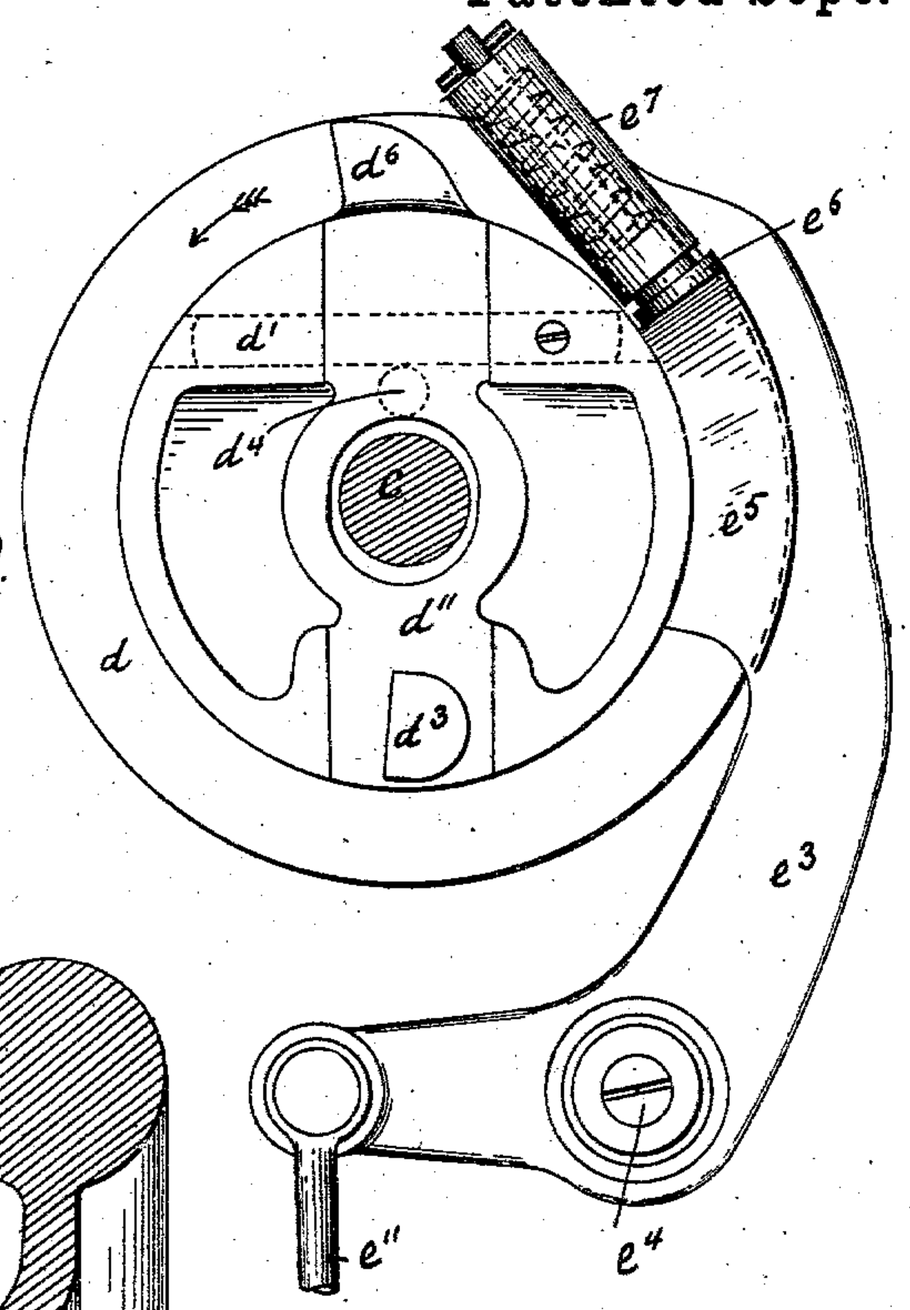


Fig. 10.

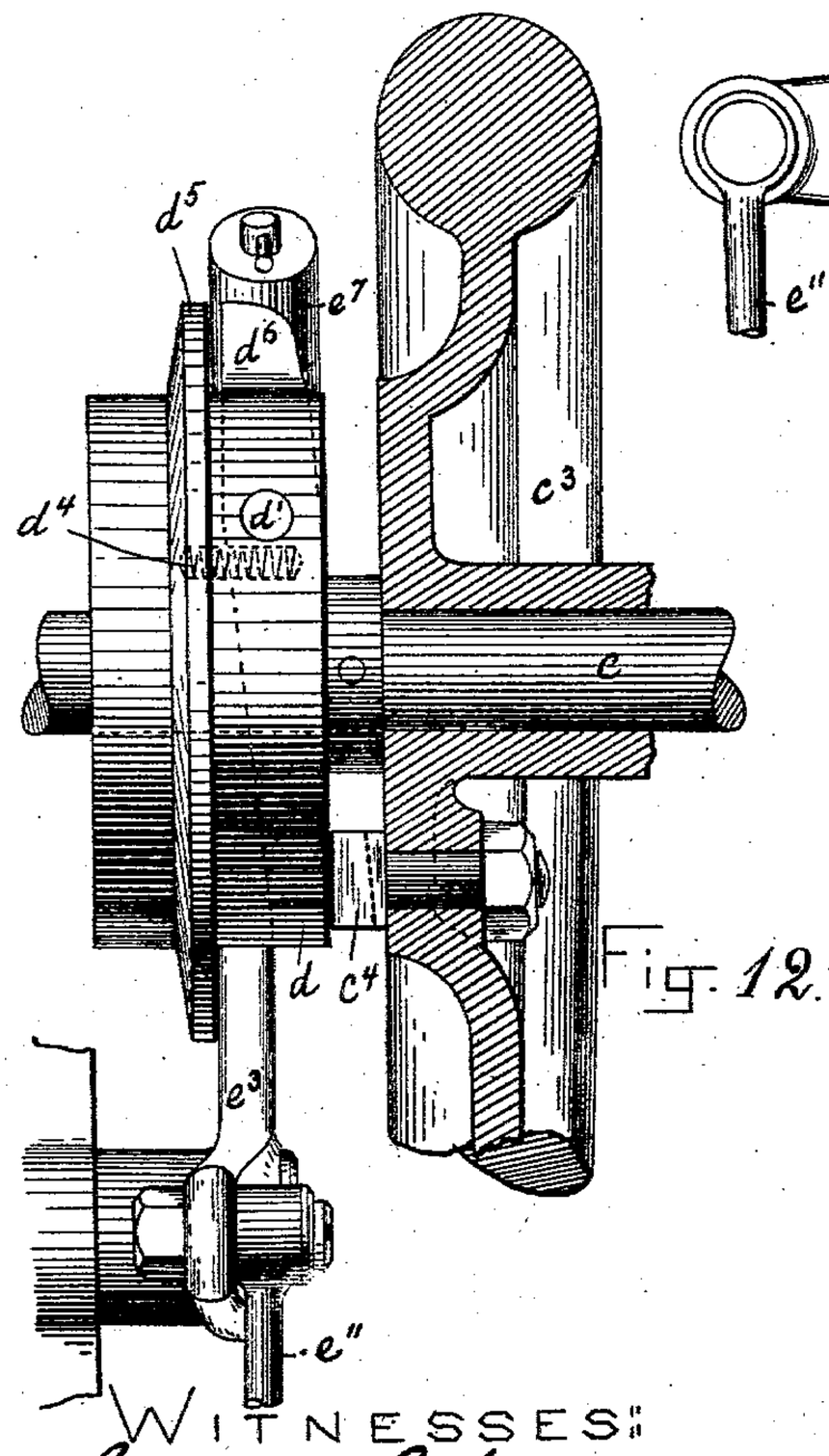


Fig. 12.

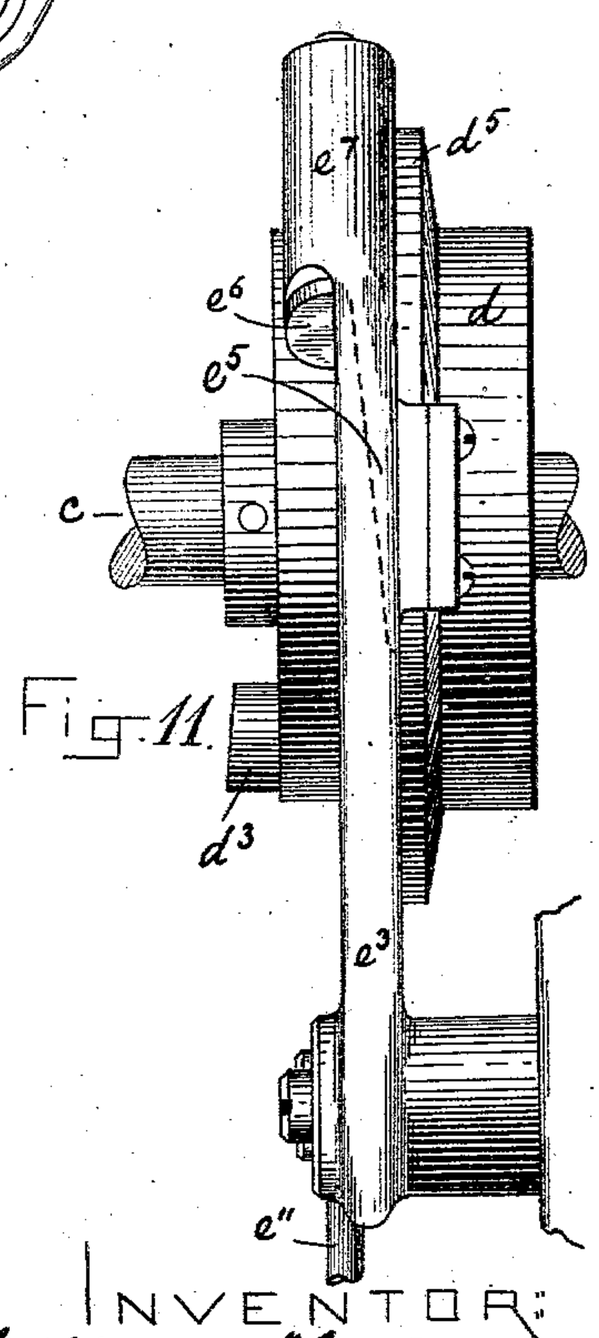


Fig. 11.

WITNESSES:
Charles H. Pigg.
Henry Chadbourne.

INVENTOR:
William Z. Bean.
by Albert Andrew
Atty

(No Model.) 10 Sheets—Sheet 7

W. Z. BEAN.

NAILING MACHINE.

No. 389,632. Patented Sept. 18, 1888.

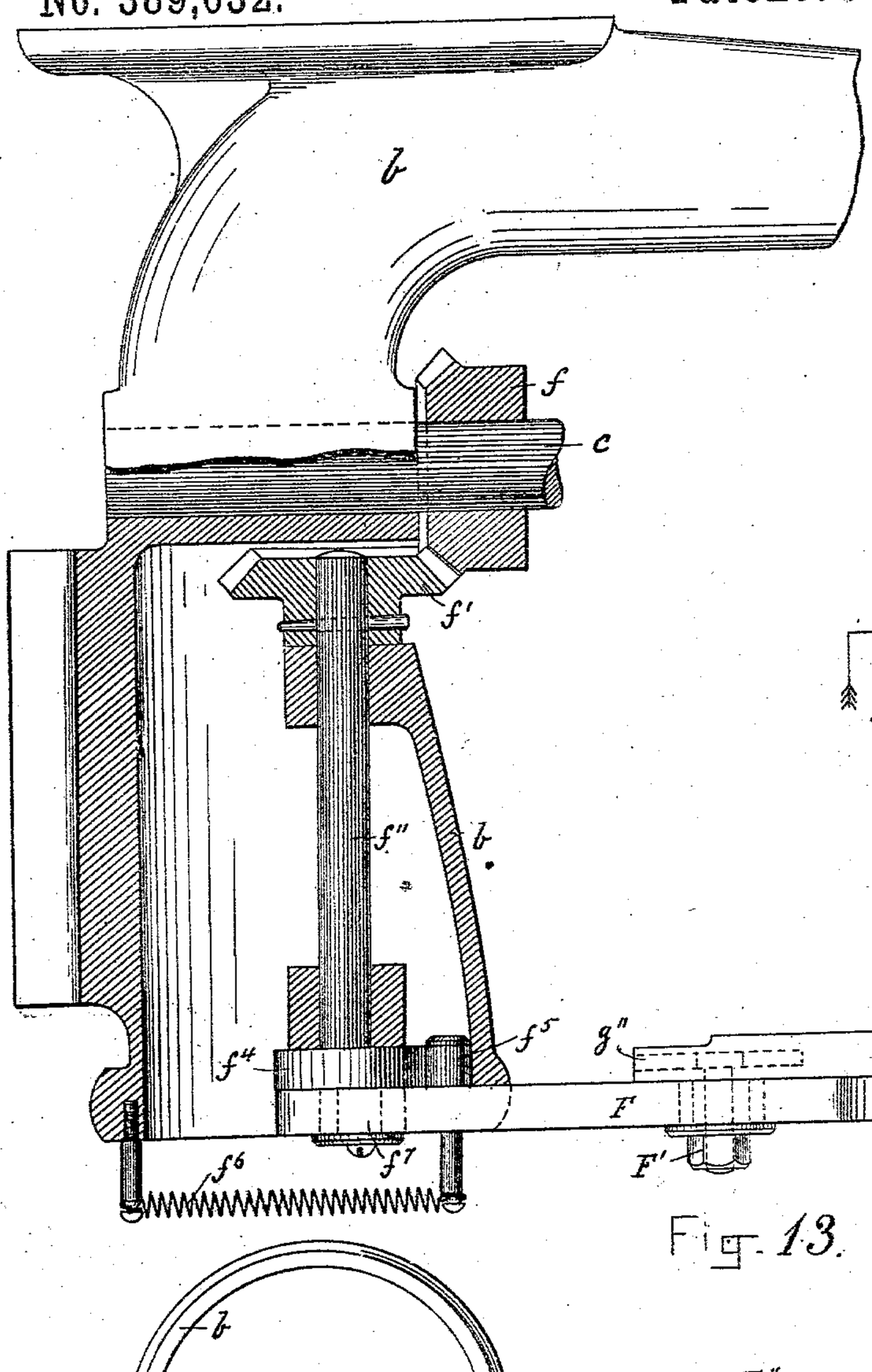
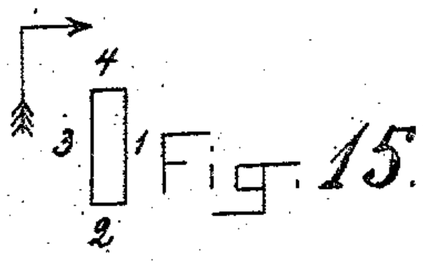


Fig. 13.



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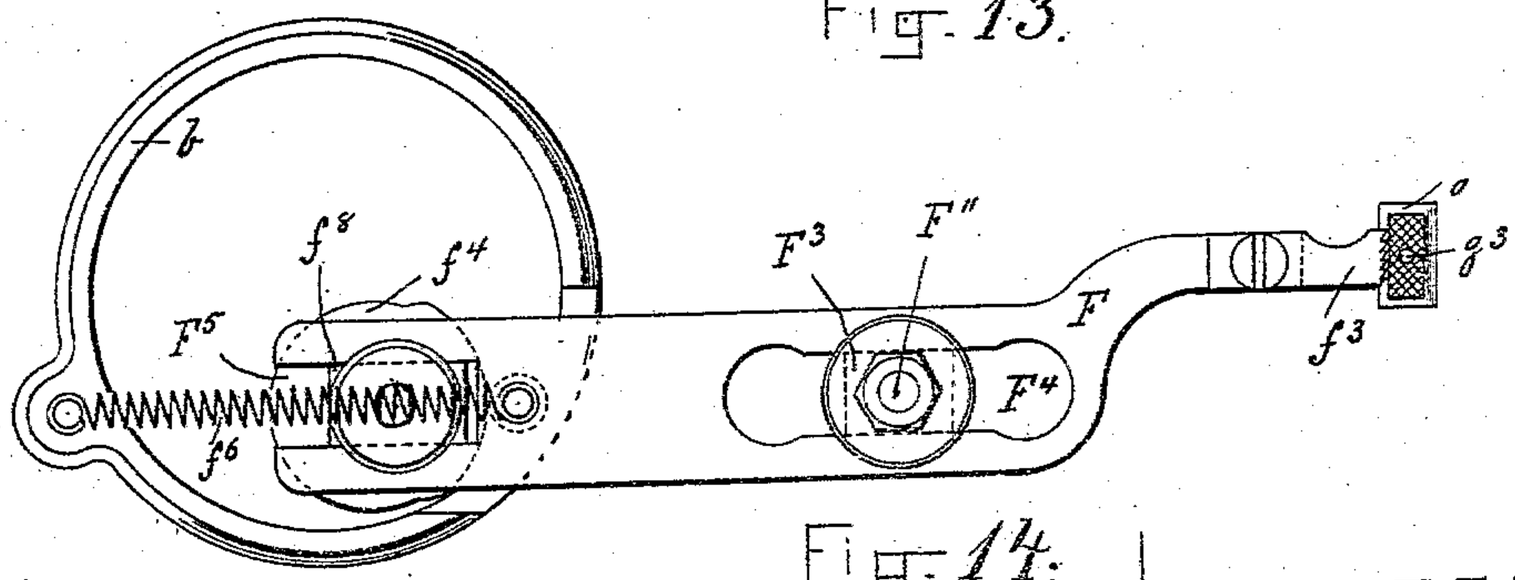


Fig. 14.

WITNESSES:

Charles H. Fogg.

Henry Chadbourn

INVENTOR:

William Z. Bean

by Urban Kindrein

his atty.

(No Model.) 10 Sheets—Sheet 8.

W. Z. BEAN.

NAILING MACHINE.

No. 389,632. Patented Sept. 18, 1888.

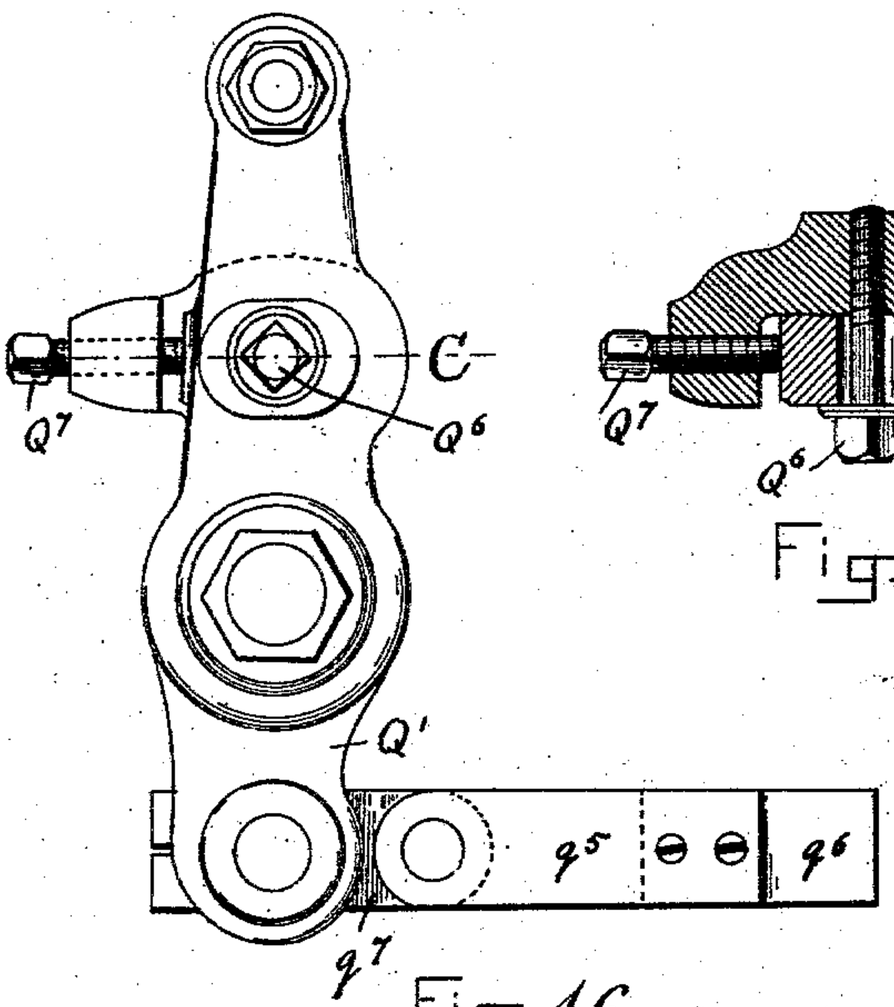


Fig. 16.

Fig. 18.

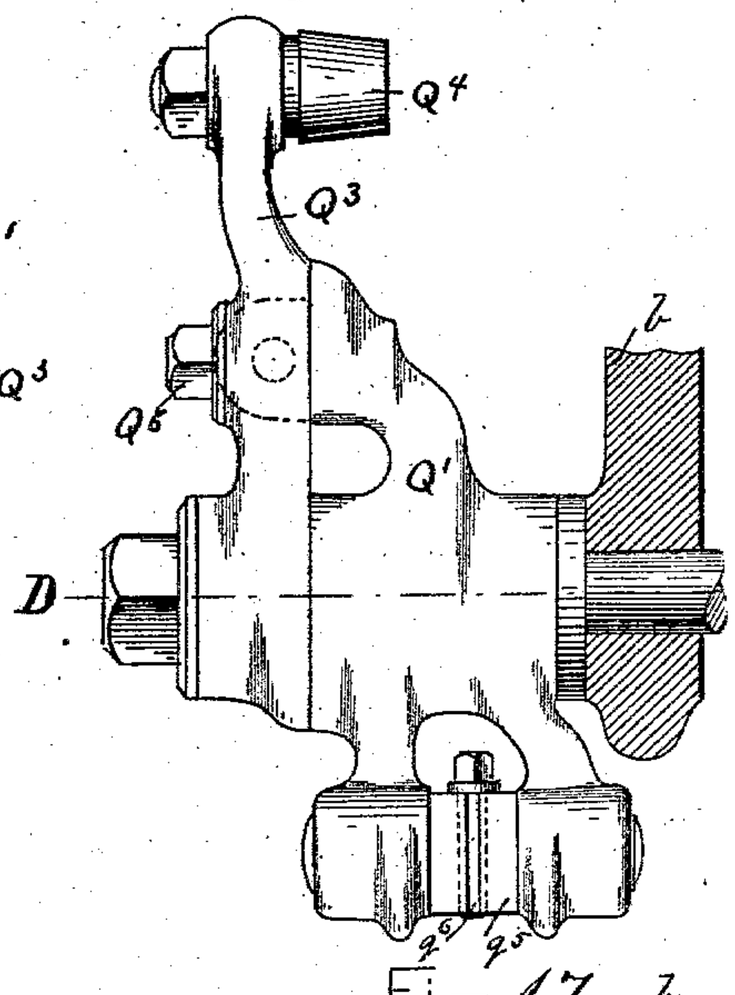
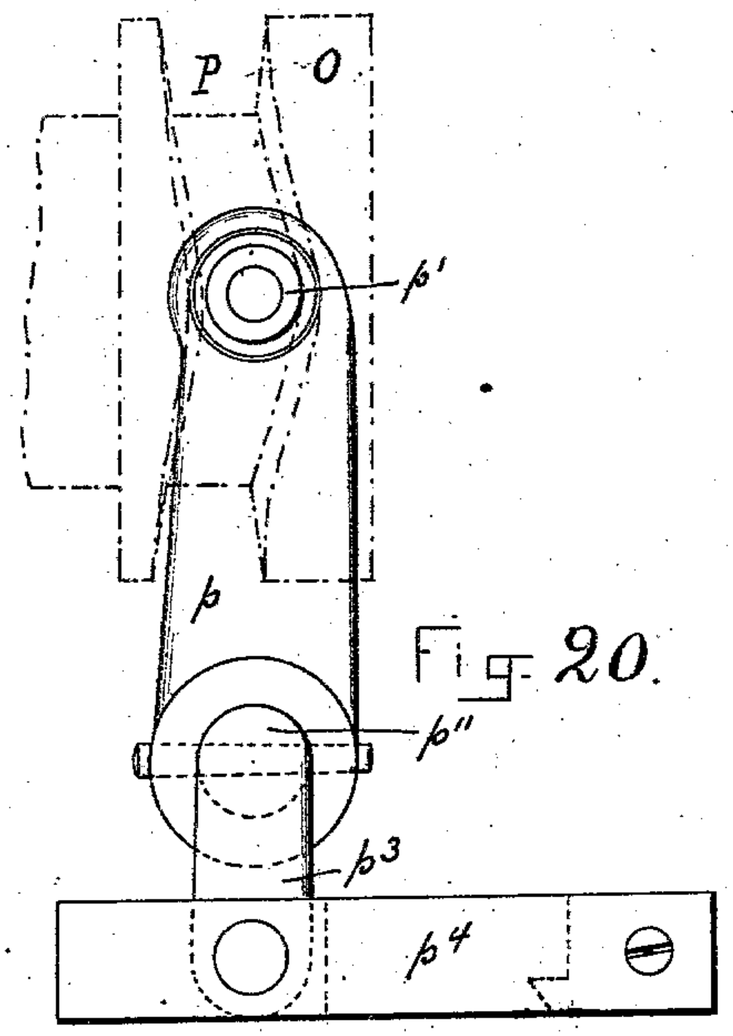


Fig. 17.



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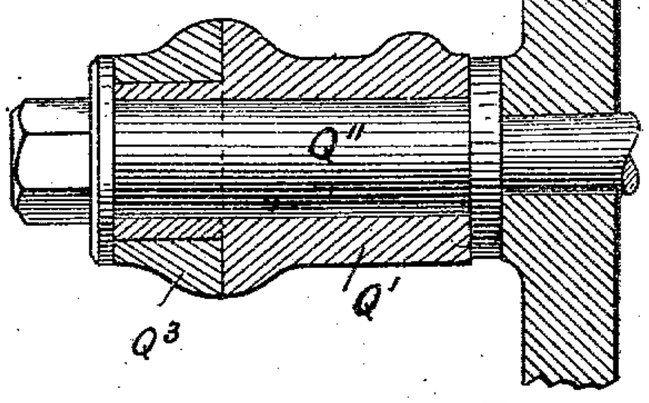

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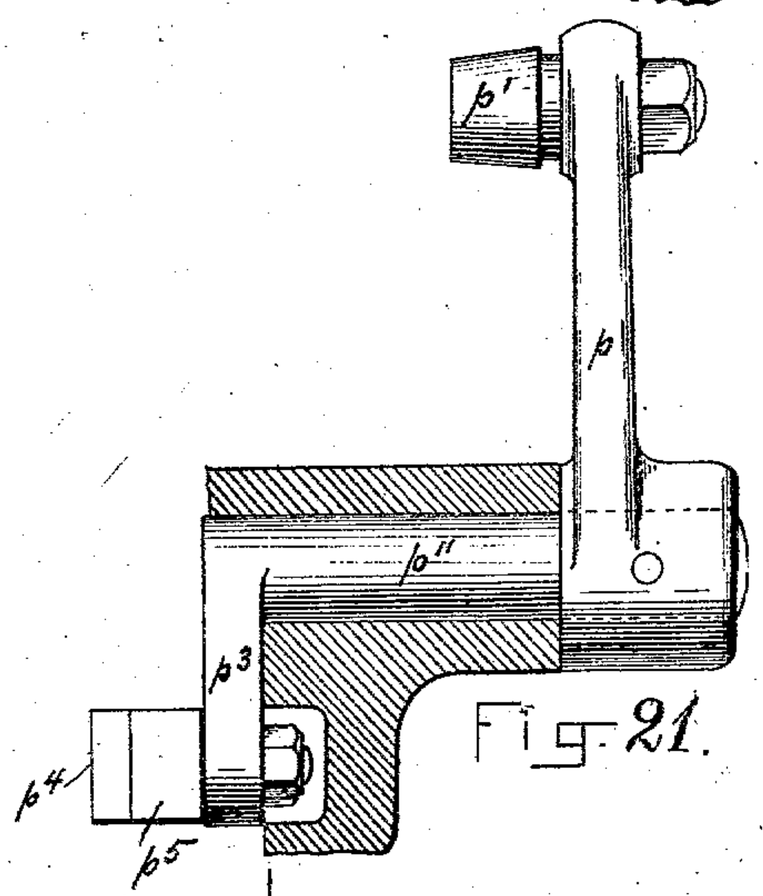


Fig. 21.

WITNESSES:
Charles H. Pigg.
Henry Chadbourn.

INVENTOR:
William Z. Bean.
by Munn & Fendrick his attys

(No Model.) 10 Sheets—Sheet 9.

W. Z. BEAN.

NAILING MACHINE.

No. 389,632. Patented Sept. 18, 1888.

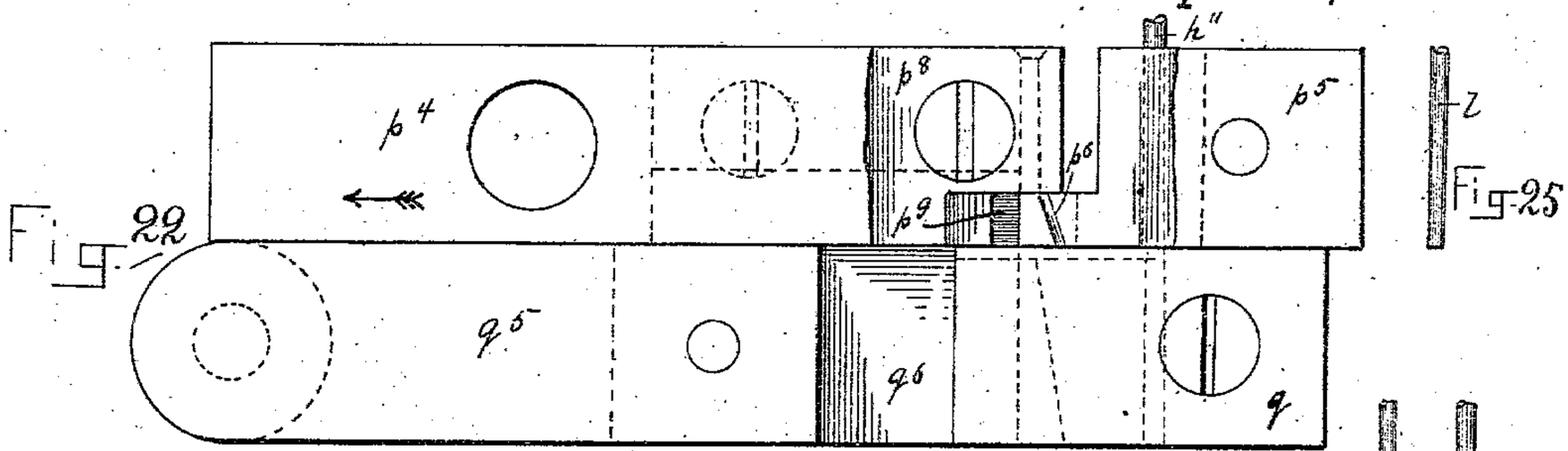
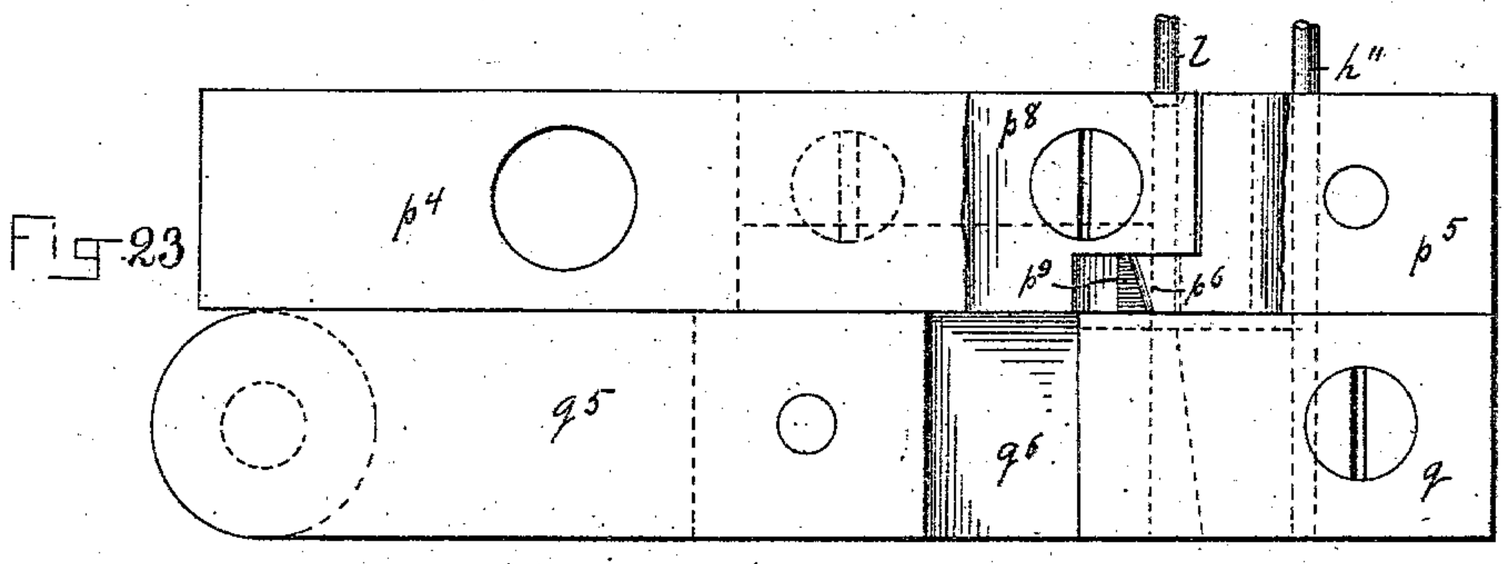


Fig. 22.

Fig. 25.



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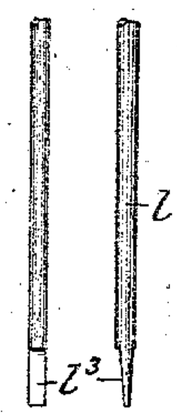

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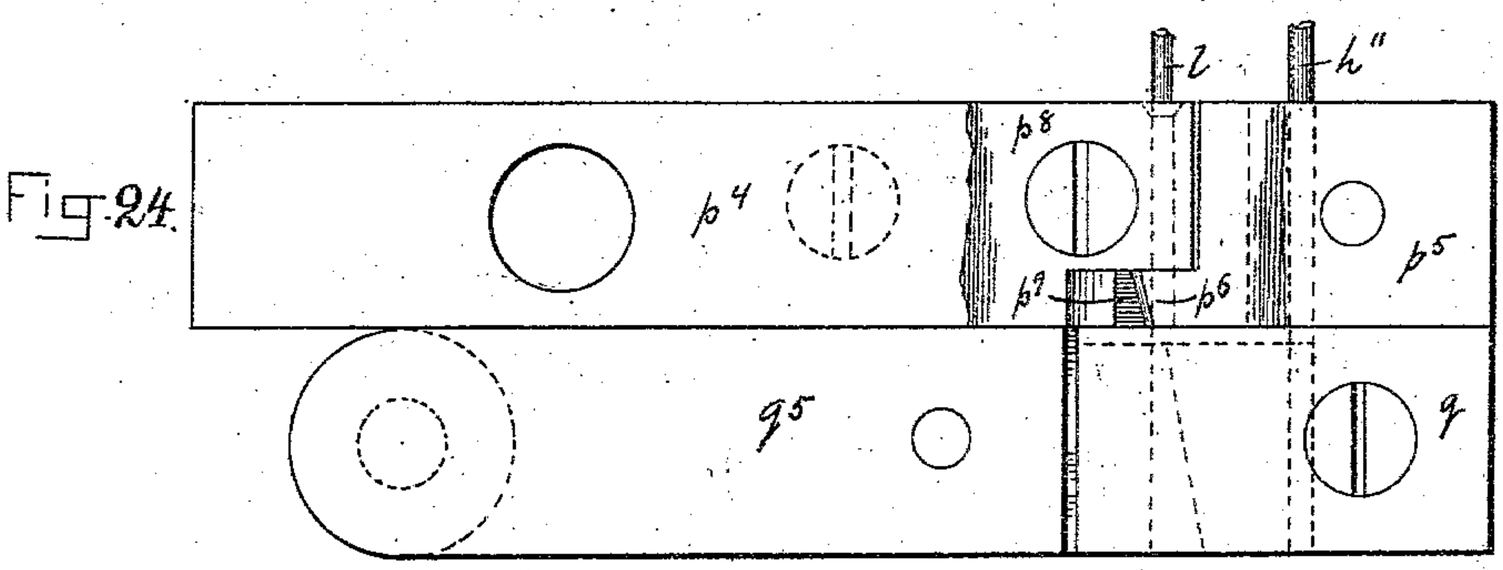

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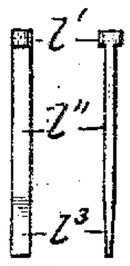

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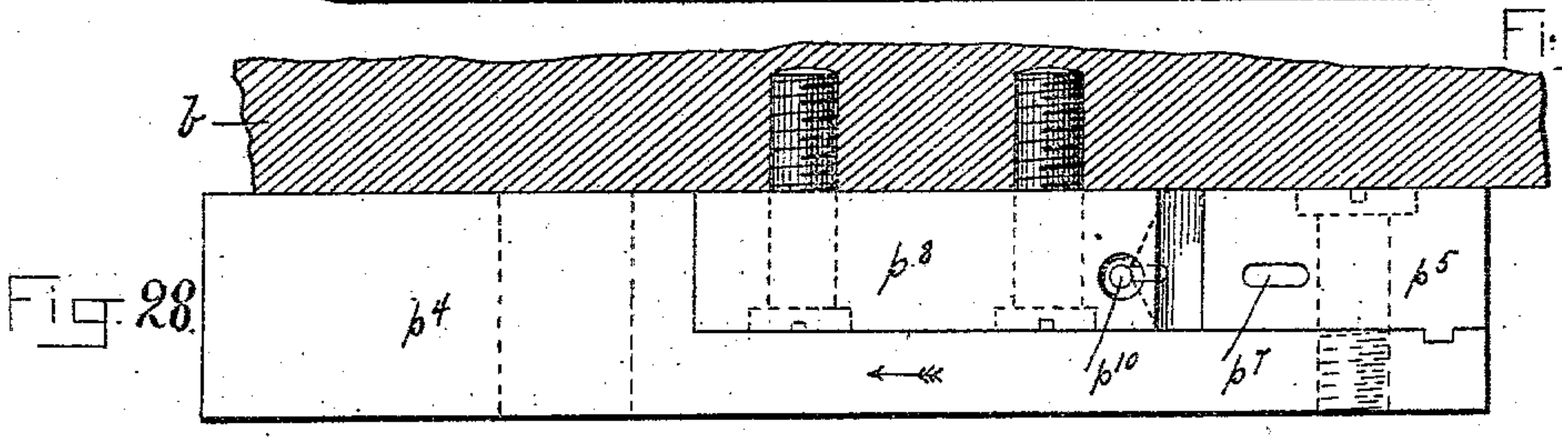

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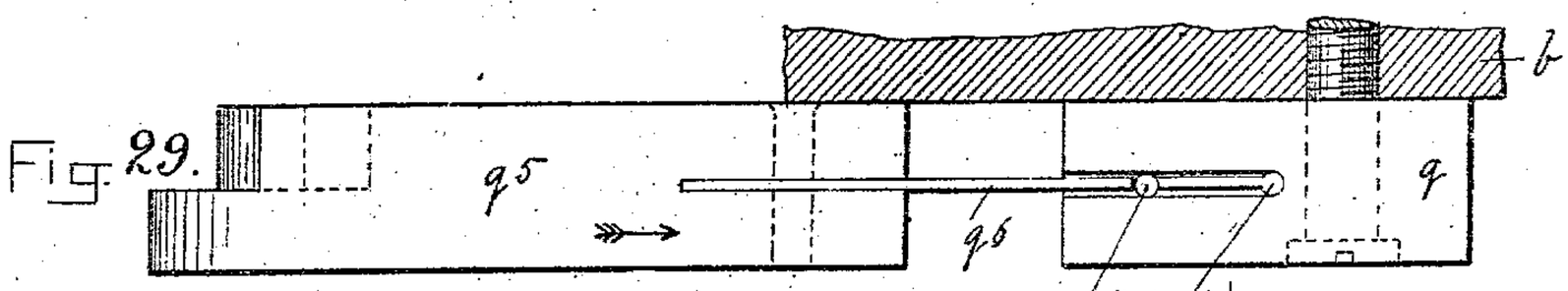


Fig. 29.

WITNESSES:
Charles H. Fogg.
Henry Chadbourn.

INVENTOR
William Z. Bean
by Albert Sudrén. his atty.

(No Model.) 10 Sheets—Sheet 10.

W. Z. BEAN.

NAILING MACHINE.

No. 389,632. Patented Sept. 18, 1888.

Fig. 30

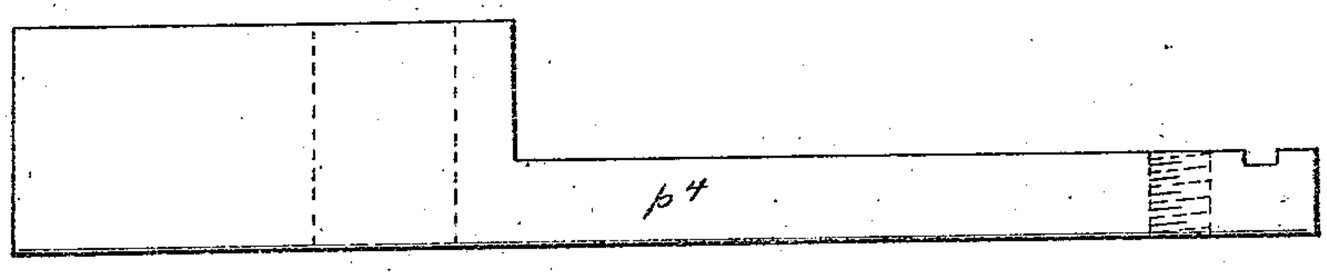
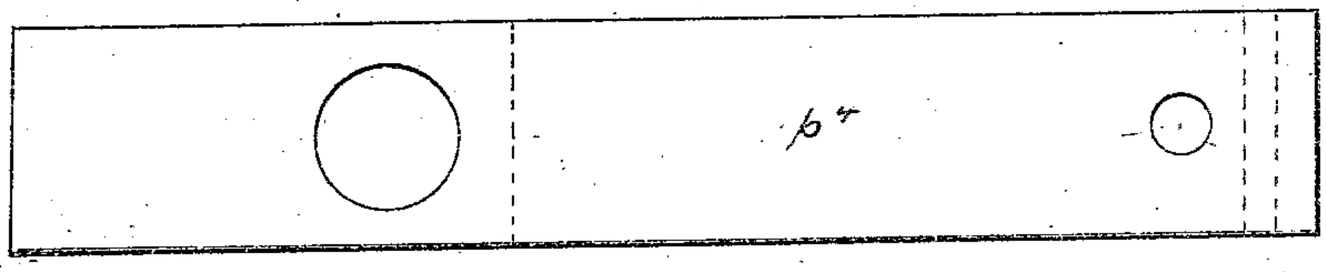


Fig. 31



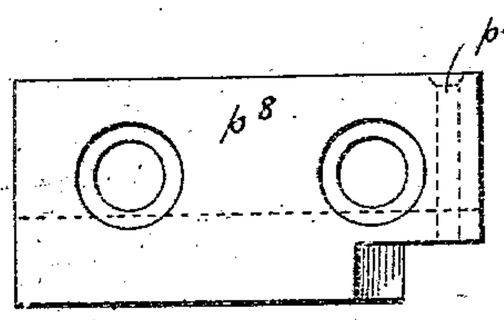
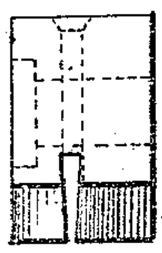


Fig. 35.



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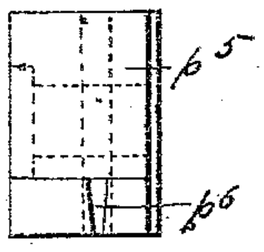

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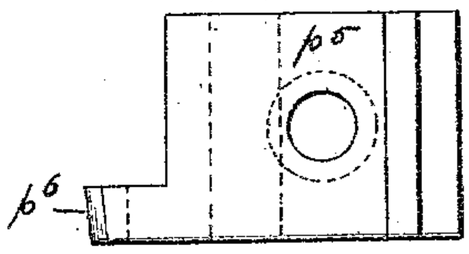

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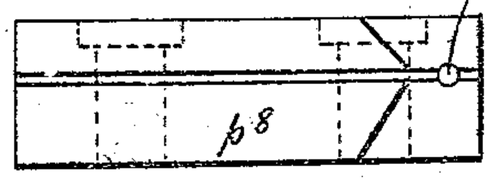

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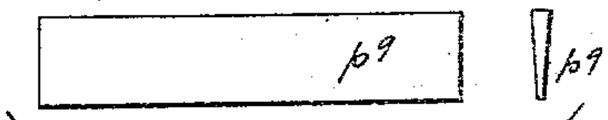

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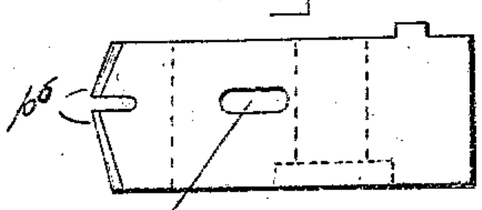


Fig. 33.

Fig. 39.

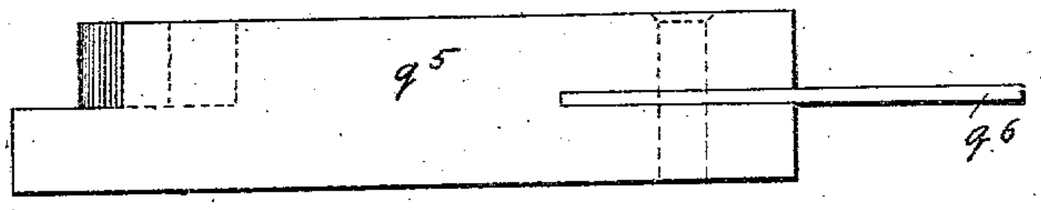


Fig. 40.

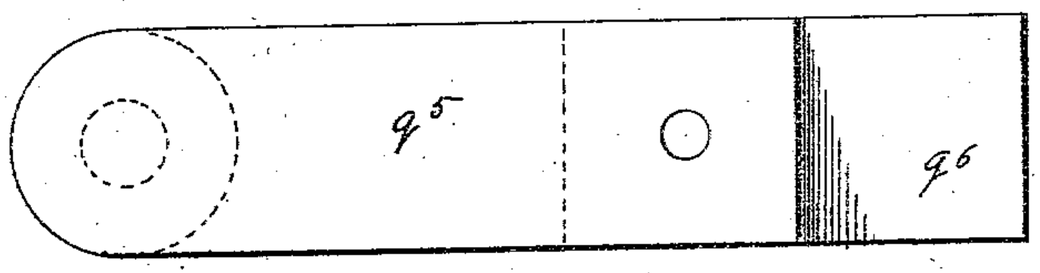
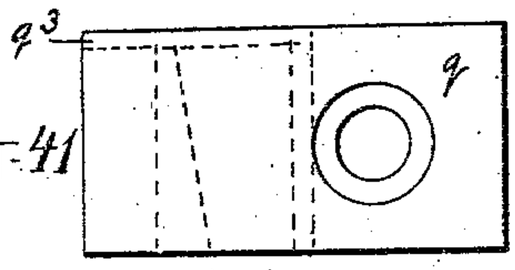


Fig. 41



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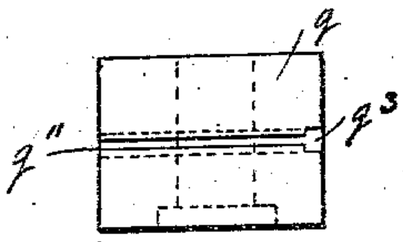
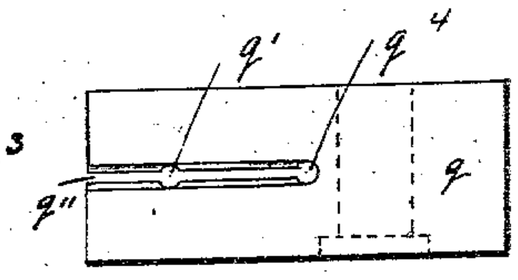


Fig. 43.



WITNESSES:

Charles H. Fogg

Henry Chadbourn.

INVENTOR:

William Z. Bean.

by Albert Andrews his atty

UNITED STATES PATENT OFFICE.

WILLIAM Z. BEAN, OF WEST MEDFORD, MASSACHUSETTS, ASSIGNOR TO THE BAY STATE SHOE FASTENING COMPANY, OF NASHUA, NEW HAMPSHIRE.

NAILING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 389,632, dated September 18, 1888.

Application filed April 30, 1888. Serial No. 272,229. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM Z. BEAN, a citizen of the United States, and a resident of West Medford, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Nailing-Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention relates to improvements in nailing-machines for nailing or pegging boot or shoe soles.

The machine is of that kind in which the nails are made from a continuous wire and as such nails are shaped they are automatically moved or carried below the driver-bar and driven by the latter in the sole of the boot or shoe, that is supported on top of a suitable horn.

My present invention consists in means for actuating the driver-bar and for feeding the wire from a reel; also, in means for operating the cutters to shape the nail previous to its being driven; also, in means for carrying the nail, after it has been shaped, to the throat, where it is driven; also, in means for feeding the shoe or spacing the nails; and means for varying such feed at the will of the operator; also, in means for clamping the shoe between the top of the horn and bottom of the throat while the nail is being driven, and means for releasing the shoe after the nail is driven to allow the shoe-feed to take place, and also in means for starting and stopping the machine in such a manner that the driver-bar shall be in its lowest position when the machine is stopped.

The invention is constructed as follows, reference being had to the accompanying drawings, wherein—

Figure 1 represents a side elevation of the complete machine. Fig. 2 represents an enlarged side view of the head of the machine. Fig. 3 represents a front view of the head of the machine. Fig. 4 represents a cross section on the line A B in Fig. 2, showing the grooved cam and connections for operating the horn and feeding the wire. Fig. 5 is a detail view of the mechanism for actuating the shoe-horn. Fig. 6 is a top view of the same, showing the frame or standard in section. Fig. 7 is a detail front view of the wire-feed mechanism. Fig. 8 is a side view of the same, showing frame in section. Fig. 9 represents an end view of the rack and pinion for actuating the wire feeding mechanism. Fig. 10 is a detail back view of the shipper device for starting and stopping the machine. Fig. 11 is a side view of the same, as seen from X in Fig. 10. Fig. 12 is another side view of the same, as seen from Y in Fig. 10, the balance-wheel being shown in section. Fig. 13 is a detail sectional side elevation of the shoe-feeding device. Fig. 14 is a bottom view of the same. Fig. 15 is a diagram showing the four motions of the end of the serrated feed-foot for feeding the shoe. Fig. 16 is a detail side elevation of the cutter and nail-carrying lever with its male die-cutter or nail-carrier. Fig. 17 is an end view of the same. Fig. 18 is a cross-section on the line C, shown in Fig. 16. Fig. 19 is a cross-section on the line D, shown in Fig. 17. Fig. 20 represents a side view of the nail-point cutter and the lever for its operation, and Fig. 21 represents an end view of the same. Figs. 22, 23, and 24 represent side views of the nail cutters and carrier in various positions during the operation of the machine. Figs. 25, 26, and 27 represent the shapes of the wire corresponding to the respective portions of the cutters shown in Figs. 22, 23, and 24. Fig. 28 represents a plan view of the upper cutter in the position shown in Fig. 22. Fig. 29 represents a plan view of the lower cutter and carrier in the position as shown in Fig. 22. Fig. 30 and 31 represent, respectively, top and side views of the upper movable cutter-bar. Fig. 32 is a side view of the movable cutter for forming the tapering point of the nail. Fig. 33 is a bottom view, and Fig. 34 is an end view, of the same. Fig. 35 represents a side view of the stationary holder for the cutter-blade for forming the tapering point of the nail; and Figs. 36 and 37 represent, respectively, bottom and end views of the same. Fig. 38 represents side and end views of the said stationary cutter-blade for forming the tapering point of the nail. Fig. 39 is a plan view of the lower movable nail

cutter and carrier. Fig. 40 is a side view of the same. Fig. 41 is a side view of the stationary lower cutter for forming the shank of the nail; and Figs. 42 and 43 represent, respectively, end and top views of the same.

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

a, in Figs. 1, 2, and 3, represents the hollow frame or standard, as usual, to the upper end of which is secured in a suitable manner the head *b*. In bearings in the said head *b* is journaled the driving-shaft *c*, on which is arranged the loose pulley *c'*, on which the driving-belt is shipped when the machine is not required for use.

c'' is the driving-pulley, made in one piece with or suitably secured to the balance-wheel c^3. Both the pulley *c''* and balance-wheel c^3 are loosely journaled on the shaft *c*. To the inner face of the balance-wheel c^3 is secured in a suitable manner the tooth or projection c^4. (Shown in Fig. 12.)

The mechanism for locking and unlocking the balance-wheel c^3 to and from the driving-shaft *c* is constructed as follows: On the shaft *c* is firmly secured the circular hub or disk *d*, having pivoted to it at *d'*, as shown in Figs. 10 and 12, the lever *d''*, having in one end a lateral projection, d^3, that is normally pressed outward beyond the face of the disk *d* by the influence of the spring d^4, (shown in dotted lines in Fig. 12,) so as to cause it to be acted on by the projection c^4 on the rotary balance-wheel c^3, and thus to impart a rotary motion from the latter to the disk *d* and shaft *c*, secured to it. For the purpose of disengaging the balance-wheel c^3 from the disk *d* and shaft *c*, I employ a treadle-lever, *e*, (shown in Fig. 1,) pivoted at *e'* to the base of the standard *a*, and having hinged to its rear end the upwardly-projecting link or rod *e''*, the upper end of which is hinged to the bell-crank lever e^3, that is free to turn on the fulcrum-pin e^4, secured to the rear of the head *b*, as shown in Figs. 1, 2, 10, 11, and 12. The upper end of the bell-crank lever e^3 is guided on a flange or circular rib, d^5, on the disk *d*, as shown in said Figs. 1, 2, 10, 11, and 12, and on the rear portion, on the upper end of said bell-crank lever e^3, is made an incline or wedge, e^5, which is brought in position relative to the disk *d*, as shown in Fig. 10, by the weight of the rod *e''*, or by a weight or spring on treadle-lever *e*, as soon as the operator lets go his foot-pressure on the treadle-lever *e*, causing the lever *d''* to be tripped on its fulcrum *d'* by the radial dog or projection d^6 on said lever *d''* coming in contact with the wedge or incline e^5 on the bell-crank lever e^3, and thereby disengaging the projection d^3 on lever *d''* from the projection c^4 on the balance-wheel c^3, thus allowing the latter to rotate freely without imparting motion to the disk *d* and shaft *c* as long as the bell-crank lever e^3 is held by the foot-pressure of the operator in the position shown in Fig. 10. The dog d^6 as it rides on the wedge e^5 is brought to a standstill against the lower end of the spring-pressed or yielding bolt e^6, that is mounted in a box, e^7, in the upper end of the lever e^3, as shown in Fig. 10, thus avoiding the shock or jar that otherwise would occur if the dog d^6 came to a standstill against a rigid projection on the lever e^3.

To start the machine, it is therefore only necessary for the operator to depress the treadle *e*, when the lever e^3 is swung away from the disk *d*, causing the lever *d''* to be liberated and its tooth d^3 forced outward by the influence of the spring d^4 and a rotary motion imparted to disk *d* and shaft *c* by the projection c^4 acting on the lever projection d^3, as above described. It will thus be seen that the shaft *c* is always stopped in the same position of its revolution, and I arrange the cam for lifting the driver-bar on it in such a manner that the spring for depressing the latter shall hold it in its lowest position when the driving-shaft is stopped.

The mechanism for intermittently feeding the boot or shoe to space the nails is constructed as follows:

To the driving-shaft *c* is secured the bevel miter-gear *f*, that meshes in the teeth of the miter-gear *f'*, secured to the vertical shaft *f''*, located in bearings in the head *b*, as shown in Fig. 13.

f^3 is the serrated feed-foot, secured to the forward end of the feed-bar F. (Shown in Figs. 13 and 14.) Fig. 15 shows a diagram on which 1, 2, 3, and 4 represent the four motions to be imparted to said feed-foot in the direction shown by the arrow in said figure. The motions 2 and 4—that is, from and to the sole-edge—are imparted to the serrated foot f^3 and bar F by means of the cam f^4, secured to shaft *f''*, and held in contact with the pin or pin and roll f^5 by the influence of the spring f^6, one end of which is secured to the bar F (or a pin on it) and the other end secured to the head *b*, or any other stationary part of the machine, as shown in Figs. 13 and 14, and it will thus be seen that the motion 4 is caused by the cam f^4 and the motion 2 caused by the spring f^6.

g is the stationary throat, having a vertical perforation through it for the nail and driver to pass through. The under side of the throat *g* is serrated, as shown in Figs. 13 and 14, and said throat is secured to the outer end of the stationary throat-bar *g'*, which latter is secured to the head of the machine in any suitable manner.

g'' in dotted lines in Fig. 13 is a horizontal groove in the rear end of the stationary throat-bar *g'*, and in it is adjustably secured by means of the nut F' the fulcrum-pin F'', on which is located loosely the block F^3, arranged within the slot F^4 in the bar F, as shown in Figs. 13 and 14. By adjusting the position of the fulcrum-pin F'' to or from the throat *g* the shoe-feed is regulated according to the nail-spacing desired.

For the purpose of imparting to the feed-foot f^3 the feed motion 1 and return motion 3, as shown in Fig. 15, I employ the crank-pin f^7,

secured to shaft f'' or its cam f^4, on which pin is journaled the block f^8, the latter being free to slide in the forked or slotted opening F^5 in the rear end of the bar F, as shown in Fig. 14.

h is the driver-bar, adapted to slide up and down in guides in the forward end of the head *b*. Said driver-bar is moved upward against the influence of a spring or springs by means of a cam, *h'*, secured to shaft *c* and adapted to come in contact with a projection or pin and roll on the driver-bar, as is common in machines of this kind.

h'' is the driver, secured to the lower end of the driver-bar vertically above and centrally in a line with the perforation g^3 in the throat *g*.

The mechanism for forcing the driver-bar downward as soon as released from the cam *h'* is shown in Figs. 1, 2, and 3, and consists of an elastic bar, h^3, preferably made of wood and having its rear end inserted in or secured to a metal shoe or plate, h^4, that is pivoted at h^5 to a bracket, H, secured to the top of the head *b*, as shown. Between the free end of the spring h^3 and top of the driver-bar *h* is interposed a metal plate or shoe, h^6. (Shown in said Figs. 1, 2, and 3.) In addition to the spring h^3, I use a coiled spring, H', located in the shell or case H''. Said spring acts in its lower end upon the metal shoe or plate h^4, and its upper end presses against the under side the screw-plug H^3, that is screwed through the upper end of the case or shell H''. It will thus be seen that the force with which the driver-bar is actuated to drive the nail can be regulated to a nicety by simply adjusting the screw-plug H^3.

i is the horn, the upper end of which is introduced into the boot or shoe during the operation of nailing it, as is usual in machines of this kind. The lower end of the horn *i* is adjustably secured in the bracket or arm *i'*, the inner end of which is adjustably secured to the vertical horn-shaft *i''*, which latter is journaled in bearings in front of standard *a*, as shown in Fig. 1, in which bearings said shaft *i''* may turn around its axis, as well as move up and down. The lower end of the spindle or shaft *i''* is connected to the horn-releasing treadle i^3, which is hung at *e'*, as shown in Fig. 1. A spring, i^4, attached to the standard *a* and to the treadle i^3, serves to raise the treadle i^3 to the position shown in Fig. 1.

On horn-spindle *i''* are secured collars i^5 i^5, (shown in Figs. 1 and 5,) and between said collars is located on said spindle *i''* a hub, i^6, in which the spindle *i''* may turn freely around its axis. The hub i^6 has mounted on side trunnions the guide-blocks i^7 i^7, located in the forked ends I' I' of the lever I, as shown in Figs. 5 and 6. The lever I is hung on the fulcrum-pin I'', that is supported in bearings in the standard *a*. On the fulcrum I'' is also hung the lever I^3, having a slot, I^4, in its rear end, and to said slot is adjustably secured the lower end of the link or rod I^5, the upper end of which is hinged to the bar I^6, (shown in Fig. 4,) said bar being guided in the rear of the head *b* and having a pin or pin and roll, I^7, projecting into a cam-groove, d^7, on the front face of the disk *d*, by which an intermittent and positive rocking motion is imparted from the disk *d* to the lever I^3, and the amount of such rocking motion can be regulated by adjusting the connecting-pin of the lower end of the rod I^5 in the slot I^4, according to the amount of lift desired on the horn, which is to be made in proportion to the thickness of the sole that is to be nailed.

The motion from the lever I^3 is communicated to the lever I and horn *i* as follows: The lever I^3 has on its under side a hollow screw-threaded hub, I^8, (shown in Fig. 5,) on which is adjustable the screw-threaded sleeve I^9, through which passes the pin I^{10}, the forward end of which is pressed by means of a coiled spring, I^{12}, against a cup-shaped wing or projection, I^{13}, made in one piece with lever I. By regulating the screw-threaded sleeve I^9 in the hub I^8 the power of the spring I^{12} can be adjusted to obtain the desired upward pressure on the horn *i*. For the purpose of limiting the upward motion of the horn *i*, I make on the upper side of the lever I a stop projection, I^{14}, that is brought in contact with a wedge, I^{15}, that is made adjustable in guides in a projection, I^{16}, on top of lever I^3. The position of the wedge I^{15} on the projection I^{16} is regulated by means of a bell crank lever, *k*, hung on the fulcrum-pin *k'* in the frame or standard *a*, and having its horizontal outer end made forked to embrace a trunnion on the said wedge I^{15}, as shown in Figs. 5 and 6. The upper end of lever *k* is adjustably secured to the standard *a* by means of a thumb or hand nut, *k''*, the screw or bolt of which passes through a slot, k^3, in the standard *a*, as shown in Fig. 1, or in any other similar or equivalent manner. It will thus be seen that a yielding upward motion is imparted to the horn *i* as the rod I^5 is forced down, and when such rod is drawn upward the horn is depressed by the wedge I^{15} and the projections I^{16} and I^{14} on the levers I^3 and I, respectively.

L is a reel loosely mounted on a spindle attached to the bracket L', as shown in Figs. 1, 2, and 3.

l is the wire on the reel, that is automatically fed, shaped, cut off, and driven by mechanism, as will now be described.

m is a cam on the shaft *c*, which as it rotates imparts a rocking motion to the lever M, which is hung on the stud or fulcrum-pin M', said lever having a pin and roll, M'', in its upper end, as shown in Figs. 7 and 8. By means of said cam *m* the lever M is rocked in one direction, and after the said cam ceases to act on it the spring M^3 forces it in an opposite direction. The lower end of the lever M is toothed and meshes in the teeth of the pinion M^4, that is loosely journaled on the rock-shaft N, which latter is supported in bearings in the head *b*, as shown. To said pinion M^4 is secured in a suitable manner the pawl-carrying piece *m'*, provided with spring-pressed pawls *m''* *m''*, which, as the gear M^4 is intermittently oscillated, impart an intermittent rotary motion to

the ratchet-wheel m^3, that is loosely journaled on the shaft N and has attached to it the grooved feed-wheel m^4, between which and a similarly-grooved loose feed-roller, m^5, the wire l is intermittently and automatically fed downward to the cutters, there to be shaped and carried to the throat where the detached nails are to be driven.

The roller m^5 is mounted loosely on a stud on the arm m^6, that is secured in its lower end to the head b and provided with a regulating thumb-screw, m^7, by means of which the roller m^5 can be adjusted toward the feed-wheel m^4, so as to obtain a proper grip or hold on the wire. By this arrangement a constant feed is obtained; but for the purpose of varying the feed according to the length of nail to be driven I use the following mechanism:

In one piece with or attached to the lever I, Figs. 5 and 6, is the lever I^{17}, the rear end of which has connected to it the upwardly-projecting rod n, the upper end of which is connected to the rack n', adapted to move up and down in guides in the rear of the head b, as shown in Figs. 4 and 9. The teeth on the rack n' engage in the toothed pinion N', secured to the shaft N, as shown in said figures. To the shaft N, in close proximity to the loose pinion M^4, is secured in an adjustable manner, preferably by means of the clamping screw N'', the cam arm or projection N^3, which, as the shaft N is rocked and afterward kept stationary, serves as a stop for the rod or arm M^5, that is secured to the back of the lever M, as shown in Fig. 8 and dotted lines in Fig. 7. By this mechanism it will be seen that the spring M^3 can only return the lever M (when cam m ceases to act on it) as far as the projection N^3 will allow, and thus limit the feed motion according to the length of nail to be driven. By varying the position of the projection N^3 on shaft N the amount of nail-feed can thus be regulated.

The mechanism for actuating the cutters by which the wire is cut and carried to the place to be driven is arranged as follows: On the shaft c is secured the cam O, having cam-grooves P and Q, as shown in Figs. 2 and 20. The nail that I make from the wire l is shown in Fig. 27, and said nail will form subject-matter for a separate application. Said nail has a head, l', of a sectional form equal to the wire from which it is made, a flat shank, l'', caused by the removal or cutting off of two opposite sides of the wire, and a tapering point, l^3, caused by the removal or cutting off of two tapering chips at the lower end of the nail.

The tapering point l^3 is automatically made by what I term the "upper cutters" in the following manner: On the lever p is a pin and roll p', fitting into the cam-groove P, the lower end of such lever being secured to the rock-shaft p'', that is journaled in a bearing in the head b and provided with a crank or arm, p^3, to which is pivoted the upper cutter-bar, p^4, and by this means an intermittent reciprocating motion is imparted to said cutter-bar. To said cutter-bar p^4 is secured the block p^5, having the tapering cutter-jaws p^6 in its forward end, as shown in Figs. 22, 23, 24, 32, 33, and 34.

Through the cutter-block p^5 is made a vertical slot, p^7, for the driver-bar to pass through. Opposite to the cutter-block p^5 is secured firmly to the head b, or any other stationary part of the machine, the stationary holder p^8, for the tapering cutter-bar p^9, which is inserted in a longitudinal groove in said holder, as shown in Figs. 35, 36, 37, and 38. The end of the said cutter-bar p^9 is made of a taper corresponding to that of the cutter-jaws p^6.

p^{10} is a vertical perforation through the holder p^8, into which the end of the wire l is fed from the reel. In pointing the wire nail the wire is fed through the perforation p^{10} in the stationary holder p^8 until the lower end of the wire comes flush with the lower edge of said holder. As the cutter-bar p^4 and its cutter-block p^5 are moved in the direction of the arrow shown in Fig. 22, the point l^3 of the nail is formed by the cutter-jaws p^6 passing by the stationary cutter-blade p^9, as shown in Fig. 23. The cutter-bar p^4 and its block p^5 are then automatically moved back to their original positions, as shown in Fig. 22, and the now pointed wire is fed down in the perforation q' in the stationary lower cutter, q, (shown in Figs. 29 and 43,) said cutter having a vertical slit, q'', of a width equal to the shank l'' of the desired nail, and said slit has an enlargement, q^3, in its upper end equal to the diameter of the original wire, as shown in Fig. 42, for forming the head l' of the nail. The shank l'' is formed and the nail carried to the place q^4 in the lower cutter, q, directly above the perforated throat g by the reciprocating lower cutter and carrier bar, q^5, having secured to its forward end the flat steel cutter q^6, as shown in Figs. 29, 39, and 40, and in so doing the sides of the nail-wire are cut off, thus forming the shank l'' at the same time as the upper end of the head of the nail is cut off by coming in contact with the under side of the cutter-jaws p^6. After the now finished and detached nail has been carried to the place to be driven, it drops into the perforated throat g, its point resting on the shoe-sole, and it is driven by the downward blow of the driver-bar, as is usual in machines of this kind.

The carrier and cutter bar q^5 is intermittently reciprocated by automatic mechanism from the cam O, as follows: To the rear end of the bar q^5 is pivoted the link q^7, and to this is pivoted the lower end of the lever Q', that is hung on the fulcrum-pin Q'', secured to the head b, as shown in Figs. 16, 17, and 19. On the fulcrum-pin Q'', or upon a hub on the lever Q', is pivoted the lower end of a lever, Q^3, the upper end of which has a pin and roll, Q^4, that projects into the cam-groove Q on the rotary cam O, as shown in Figs. 2, 16, and 17.

For the purpose of regulating and adjusting the throw of the carrier and cutter bar q^5 so that its cutter and carrier q^6 shall carry the finished nail to the place where it is to be

driven, I make in the lever Q^3 a slotted perforation, Q^5, (shown in Fig. 18,) through which passes freely the set-screw Q^6, that is screwed firmly into the lever Q′ after the proper position of the lever Q^3 relative to the lever Q′ is ascertained, and to prevent such relative positions from being disarranged I employ a set-screw, Q^7, (shown in Figs. 2, 16, and 18,) that is screwed through an ear on the lever Q′ and has its inner end resting against the side of the adjustable lever Q^3.

r in Fig. 2 is a perforation in the covering-plate R for allowing the chips to pass through as the cutters are shaping the nails.

The operation of the machine may be briefly described relative to the four motions 1, 2, 3, and 4 of the shoe-feed dog f^3, as illustrated by the diagram in Fig. 15, to be as follows: During the motion 1 the dog f^3 feeds the shoe, the driver-bar cam is lifting, the wire-feed is at rest, as is also the bottom cutter and carrier, the upper cutters are resting and then acting, and the horn is released from the throat. During the motion 2 the dog f^3 is drawn back, the driver-bar is resting, the wire-feed is resting and then feeding, the bottom cutter and carrier returns and rests, the upper cutters are cutting and then resting, and the horn is still released. During the motion 3 the dog f^3 is returning without feeding, the driver-bar is resting, the wire-feed is feeding and then resting, the bottom cutter and carrier is resting and then cutting, the upper cutters are resting and then returning, and the horn is released, as before, and commences to clamp the sole against the throat, and finally during the motion 4 the dog f^3 presses forward, the driver-bar is driving, the wire-feed is at rest, the bottom cutter and carrier is returning and then resting, the upper cutters are returning and then resting, and the horn is clamped against the sole and then released, and so on.

What I wish to secure by Letters Patent and claim is—

1. In a nailing-machine, the compound and adjustable spring mechanism for forcing downward the driver-bar, consisting of the spring h^3, pivoted at one end and having its other end pressing against the driver-bar, in combination with the auxiliary and adjustable spring H′, inclosed in case H″, having its lower end pressing against the spring h^3, and having the pressure-regulating nut H^3 in its upper end, as set forth.

2. In a nailing-machine, the automatic device for actuating the horn in a vertical direction, consisting of the rock-lever I^3, intermittently rocked by its connection to the driving-shaft, as described, and having the adjustable spring-pressed bolt I^{10} and wedge-carrying arm I^{16}, combined with the rock-lever I, connected to the horn-spindle, the arms or projections I^{13} I^{14}, and the adjustable wedge I^{15}, as and for the purpose set forth.

3. In a nailing-machine, the compound cutters, as described, for shaping the point and shank and carrying the nail to the place to be driven, consisting of the stationary upper blade, p^9, and the intermittently-reciprocating upper cutter, p^5, having the slotted perforation p^7 for receiving the driver-bar, and having the forked cutter-jaws p^6 for the formation of the bevel point of the nail, in combination with the lower stationary slitted die, *q*, and the intermittently-reciprocating lower cutter and carrier, q^6, for the purpose of forming the reduced shank of the nail and to carry the nail to the place to be driven, substantially as set forth.

4. In a nailing-machine, the rock-lever M and the cam and its spring for automatically-operating it, and connecting mechanism, substantially as described, to the feed-wheel m^4, combined with the projection M^5 on said rock-lever, and the adjustable-rocker cam or stop projection N^3, for limiting the return movement of the feed-lever M according to the amount of feed of the wire desired, as herein specified.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 24th day of April, A. D. 1888.

WILLIAM Z. BEAN.

Witnesses:
HENRY CHADBOURN,
HERBERT L. CHAPIN.