(No Model.)

4 Sheets—Sheet 1.

W. Z. BEAN.

NAILING MACHINE.

No. 282,602. Patented Aug. 7, 1883.

Fig 1.

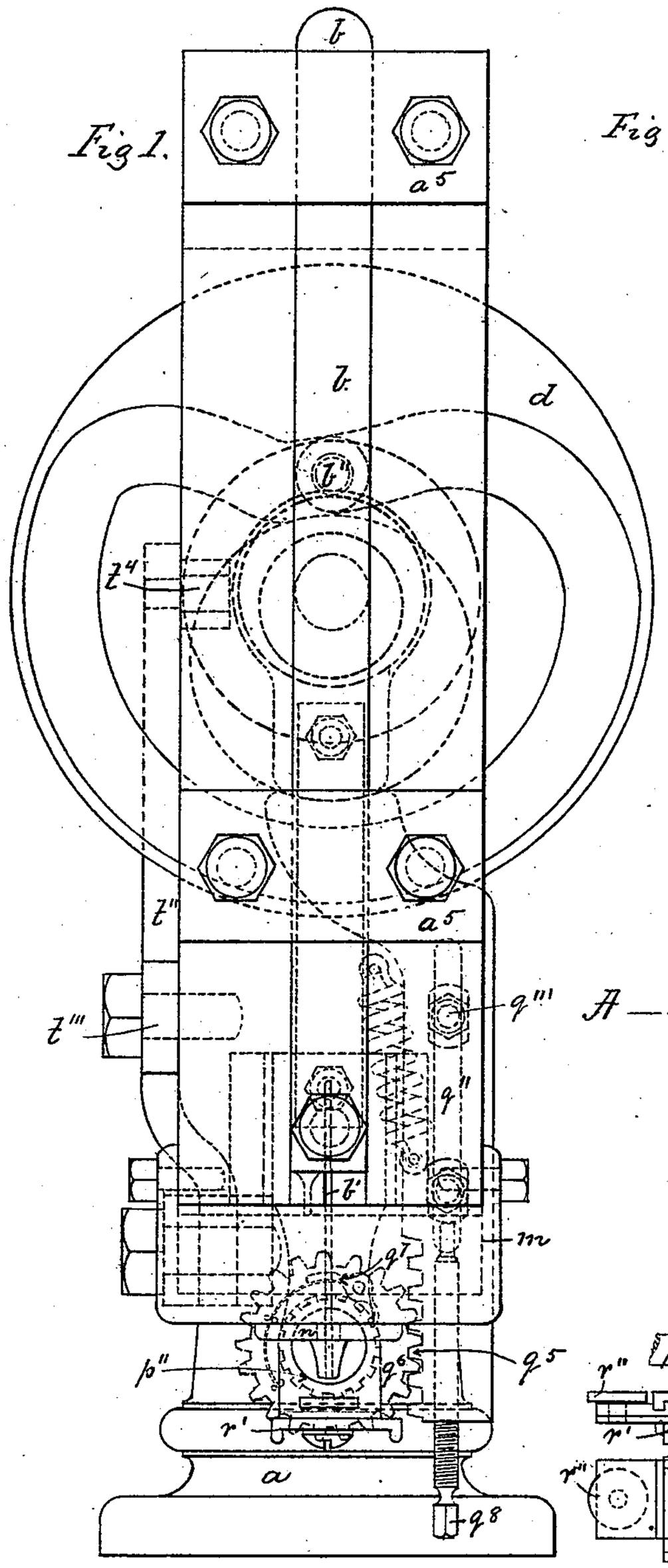


Fig 6.

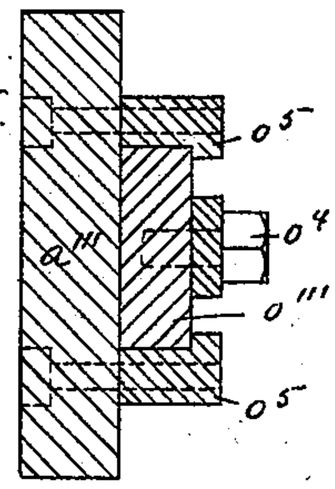
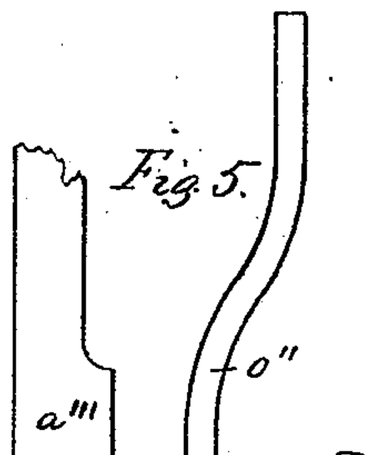


Fig 5.



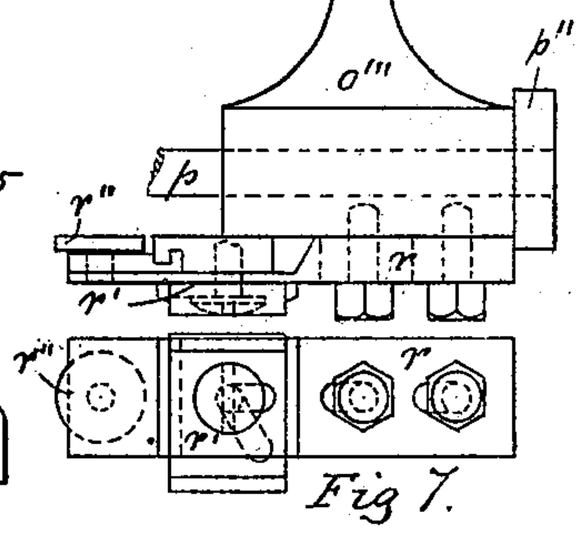


Fig 7.

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NAILING MACHINE.

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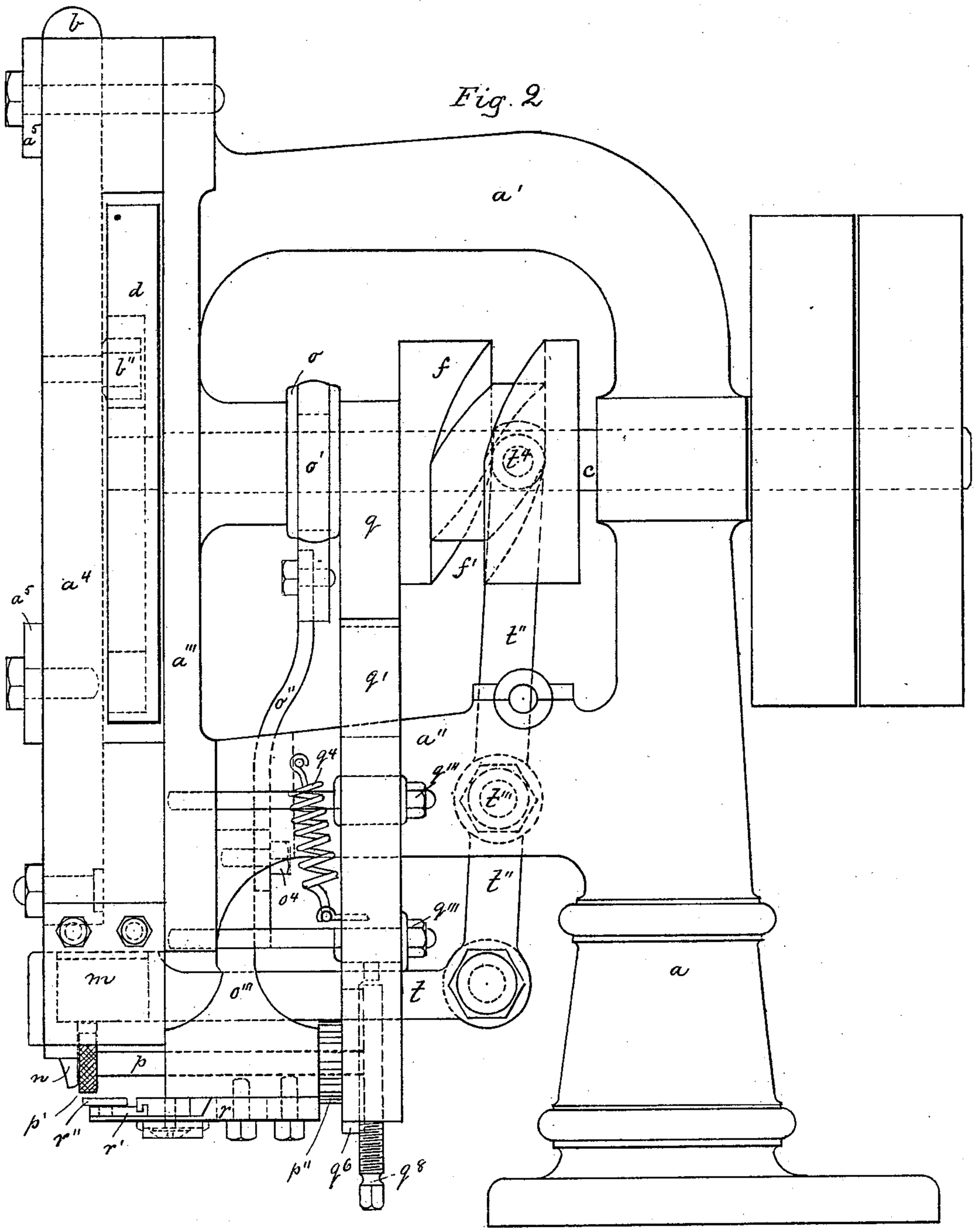
Fig. 2



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NAILING MACHINE.

No. 282,602. Patented Aug. 7, 1883.

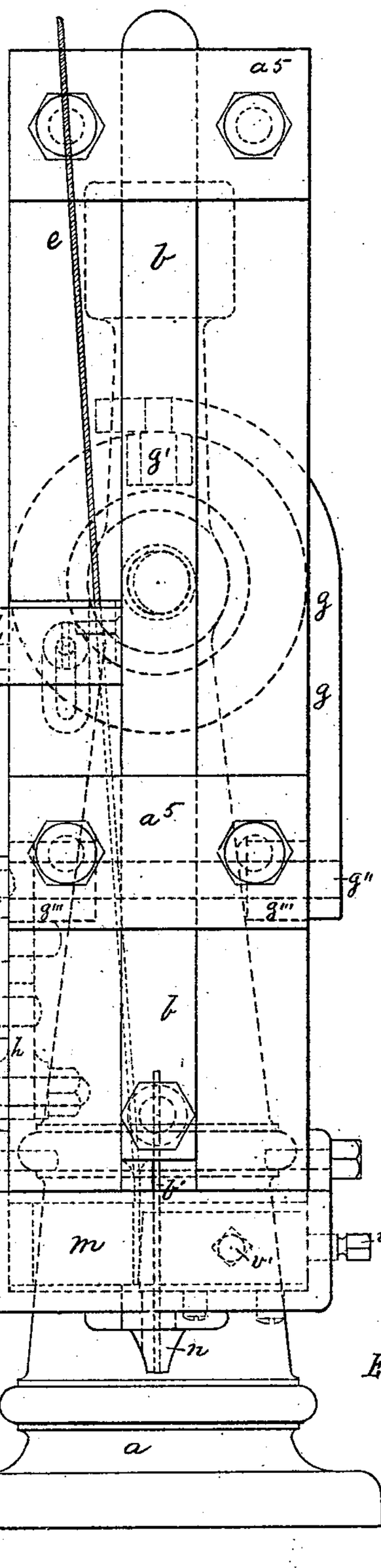

Fig. 3.

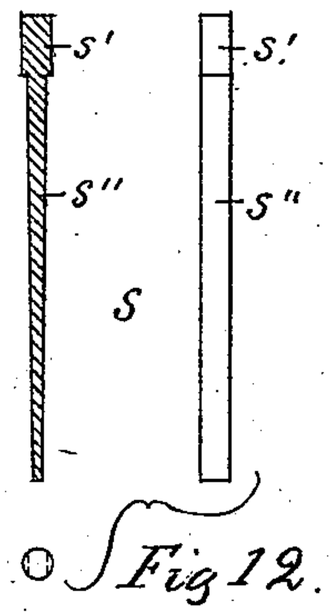

Fig 12.

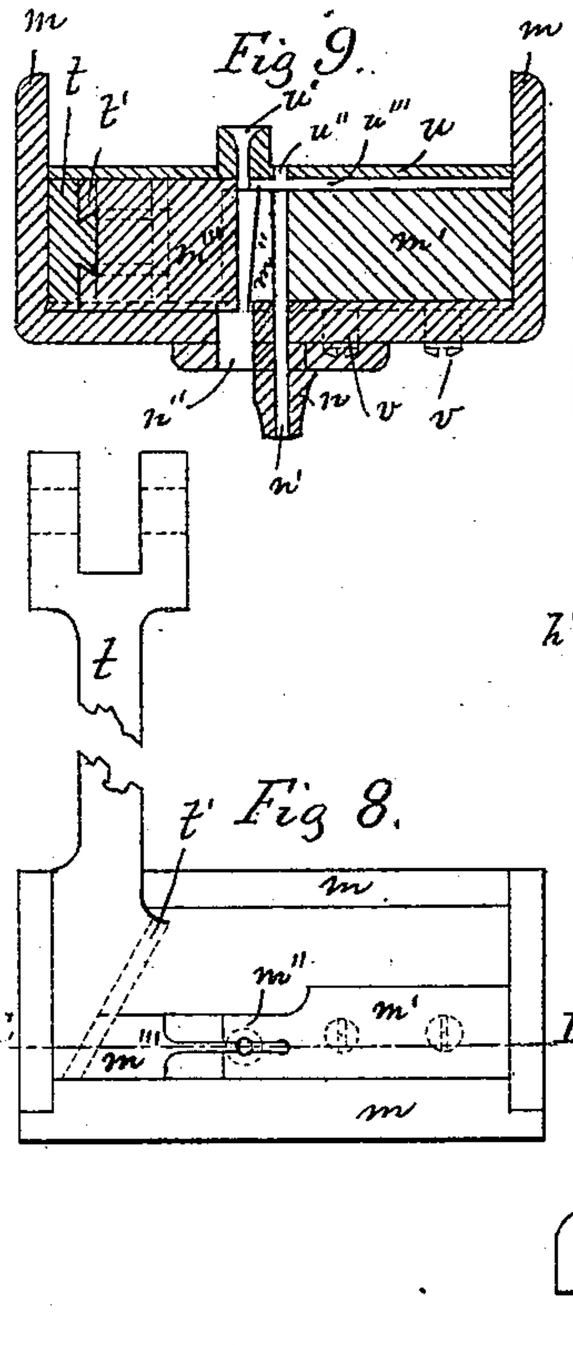

Fig 9.

Fig 8.

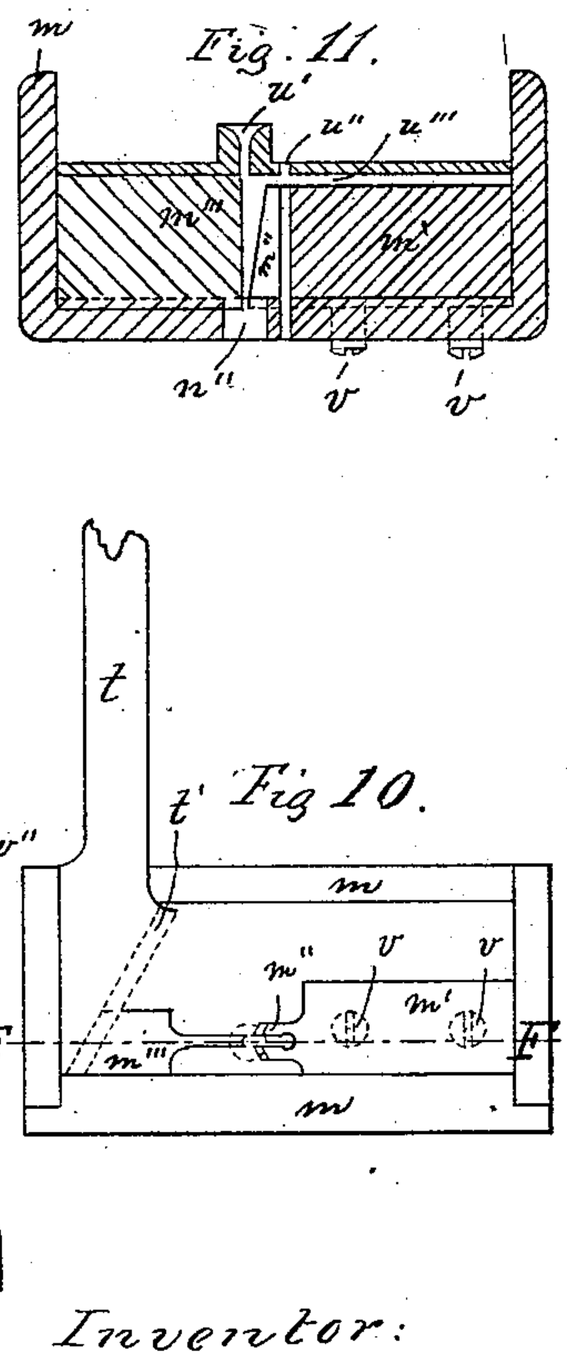

Fig. 11.

Fig 10.

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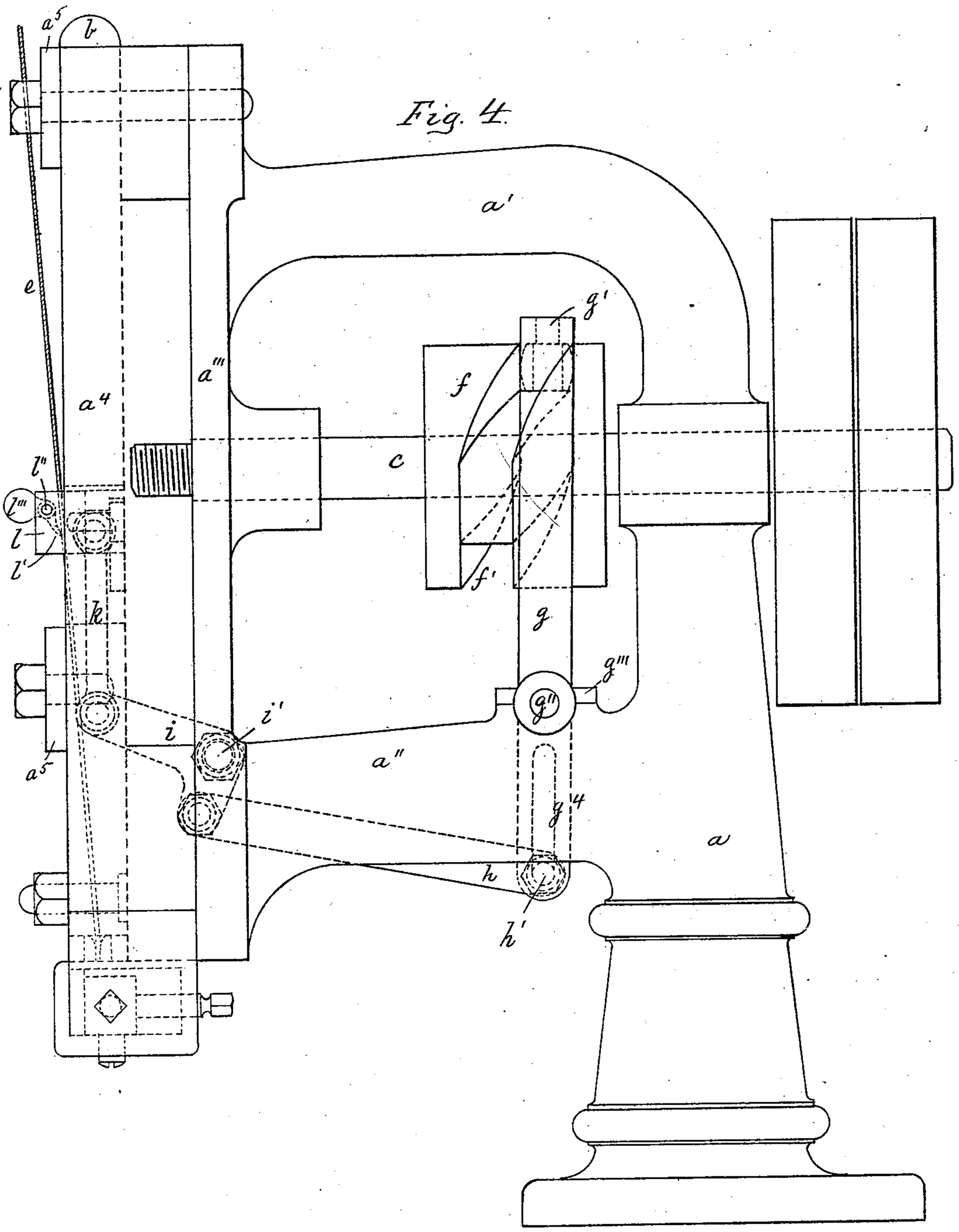
W. Z. BEAN.

NAILING MACHINE.

No. 282,602. Patented Aug. 7, 1883.

Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM Z. BEAN, OF BOSTON, MASSACHUSETTS.

NAILING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 282,602, dated August 7, 1883.

Application filed December 9, 1882. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM Z. BEAN, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Nailing-Machines; and I do hereby declare that the same are fully described in the following specification and illustrated in the accompanying drawings.

This invention relates to improvements in nailing-machines for making headed nails from a continuous metal wire and driving and clinching the said nails automatically at one operation, as will hereinafter be more fully shown and described, reference being had to the accompanying drawings, where—

Figure 1 represents a front elevation of the improved machine, showing mechanism for driving the nail and for cutting and making it, as well as mechanism for feeding the shoe. Fig. 2 represents a side elevation of that portion of the machine represented in Fig. 1. Fig. 3 represents a front elevation of the machine, showing mechanism for feeding the endless wire to the cutting mechanism; and Fig. 4 represents a side elevation of that portion of the machine represented in Fig. 3. Fig. 5 represents a detailed side view of a portion of the shoe-feed mechanism. Fig. 6 represents a cross-section on the line A B, shown in Fig. 5. Fig. 7 represents a bottom view of the shoe-guide shown in Fig. 5. Fig. 8 represents a top view of the cutting mechanism for slicing off the sides of the nail; and Fig. 9 represents a longitudinal section on the line C D, shown in Fig. 8. Fig. 10 represents a modification of the said cutting mechanism for slicing off the sides of the nails; and Fig. 11 represents a longitudinal section on the line E F, shown in Fig. 10. Fig. 12 represents, in side view, longitudinal section, and bottom view, an enlarged nail as cut and shaped in the machine, and previous to its being driven into the work.

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

The head or frame that is adapted to be secured to a suitable standard is composed of the upright *a*, horizontal arms *a'* *a''*, and front piece, *a'''*, preferably cast in one piece together.

To the front piece, *a'''*, is secured the plate a^4, which serves as a guide for the up-and-down movable driver-bar *b*, and is provided with caps a^5 a^5, for preventing the driver-bar *b* from dropping out from its bearings in the plate a^4 during its up-and-down motion.

b' is the driver, as usual, secured in a suitable manner to the lower end of the driver-bar *b*.

The driver-bar *b* is operated up and down by means of the rotary driving-shaft *c*, its grooved face-cam *d* engaging with a pin and roll *b''* on the driver-bar *b*, as usual.

The mechanism for feeding the endless wire *e* to the cutting mechanism is carried out as follows: Upon the driving-shaft *c* is secured a cam, *f*, having a groove, *f'*, on its periphery, which actuates a pin and roll, *g'*, on the upper end of the rocking lever *g*, which is hung on the fulcrum-shaft *g''*, located in bearings *g'''* *g'''*, as shown. To the opposite end of the rock-shaft *g''* is secured the slotted lever g^4, having link *h* jointed to it by means of the adjustable screw-bolt *h'*, as shown in Figs. 3 and 4, in such a manner that the rear end of the link *h* may be adjusted up and down on the slotted lever g^4, to obtain any desired length of feed, according to the length of nail required. The forward end of the link *h* is jointed to the lower end of the knee-lever *i*, adapted to rock on the fulcrum *i'*, and having its forward end jointed to the lower end of the link *k*, the upper end of which is jointed to the vertically-movable block *l*, that is made to slide up and down in suitable bearings on the front of the plate a^4, as shown in Figs. 3 and 4.

Through the block *l* is made a perforation or groove, through which the wire *e* passes loosely on its way through a slot or perforation in the driver-bar *b* and plate a^4 to the cutting mechanism.

To the block *l* is hinged at *l''* the feed-pawl *l'*, having cast or made in one piece with it the counter-weight *l'''*, as shown in Fig. 4, and it will thus be seen that when the block *l* is moved upward the pawl *l'* will slide loosely upward on the wire *e*, and when the said block *l* commences to move downward the pawl *l'* is caused to impinge against the wire *e* by the action of the weight *l'''*, and thereby to feed the wire to the cutting mechanism an equal distance to

the movement imparted to the block *l* by the feeding mechanism heretofore described and shown.

To the lower end of the plate a^4 is secured the cutter-box *m*, containing the cutting mechanism for cutting and shaping the nail, hereinafter to be described, and to the bottom of such cutter-box *m* is secured the perforated throat *n*, as shown in Figs. 1, 2, and 3.

The mechanism for feeding the work and for releasing it from contact with the throat when feeding the work the distance between the nails to be driven is carried out as follows: To the driving-shaft *c* is secured the eccentric block *o*, surrounded with strap *o'*, to which is secured the downwardly-projecting link *o''*, that is hinged to the sliding block *o'''* by means of the screw-bolt o^4, as shown in Figs. 1 and 2. The sliding block *o'''* is made to move between the guides o^5 o^5, secured to the rear of the front piece, *a'''*, as shown in Fig. 6. The lower part of the up-and-down movable block *o'''* serves as a bearing for the horizontal feed-shaft *p*, to the forward end of which is secured the corrugated feed-roller *p'*, in close proximity to the stationary throat *n*, as shown in Fig. 2. By means of the eccentric *o*, strap *o'*, link *o''*, and sliding block *o'''*, the shaft *p* and its feed-roller *p'* are automatically moved downward, so as to press the work downward and to release it from contact with the throat *n* immediately after the nail has been driven, to enable the feed of the work to take place.

The feed-roller *p'* is intermittently rotated to feed the work by the following means: To the rotary driving-shaft *c* is secured the eccentric block *q*, actuating the up-and-down sliding bar *q'*, having slot-hole *q''*, through which is inserted the guide-bolts *q'''* *q'''*, as shown. The eccentric *q* actuates the bar *q'* to push it downward, and when the said eccentric ceases to act upon it it is automatically moved upward by the influence of the coiled spring q^4, one end of which is secured to the arm *a''* and the other end to the sliding bar *q'*, as shown in Fig. 2. The lower end of the sliding bar *q'* is provided with a rack, q^5, that engages with a gear-wheel, q^6, loosely journaled upon the rear end of the shaft *p*, which gear-wheel has jointed to its face the pawl q^7, that actuates the ratchet-wheel *p''*, secured to the feed-shaft *p* during the downward stroke of the sliding bar *q'*; but during the upward stroke of the latter the pawl q^7 rides loosely over the ratchet-wheel *p''* without moving it, and in this manner an intermittent and automatic feed of the work is obtained at the time, as above described.

q^8 is a regulating-screw screwed through the lower end of the sliding bar *q'*, and adapted to rest against the lower guide-bolt, *q'''*, by means of which the sliding bar *q'* can be vertically adjusted, so as to regulate the amount of the feed of the work as may be desired.

To the under side of the sliding block *o'''* is secured the laterally-adjustable shoe-guide *r*, provided with the adjustable plate *r'*, having shoe-guide roller *r''* journaled in its forward end, to adjust the position of the nails to be driven from the outer edge of the shoe-sole.

s in Fig. 12 represents the nail after being shaped and cut off in the cutter-box *m* and previous to its being driven. Said nail has a circular or polygonal head, *s'*, and a wedge-shaped tapering shank, *s''*, made by having two opposite sides of the wire shaved or sliced or cut off from the wire in such a manner as to leave a circular or polygonal head, *s'*, as shown in said Fig. 12. Such improved nail will form a subject-matter for a subsequent application for Letters Patent.

The shaping of the nail previous to driving it into the shoe-sole is accomplished by the following means: Within the cutter-box *m* is located the stationary cutter or cutting-die *m'*, which is slotted in its forward end, *m''*, corresponding to the shape of tapering shank *s''* of the nail *s*. (Shown in Fig. 12.) *m'''* is the laterally-sliding male cutter adapted to pass between the slotted forward end of the cutting-die *m'*, as shown in Figs. 8, 9, 10, and 11. The sliding male cutter *m'''* is moved to and from the stationary cutter *m'* by means of the link *t*, having dovetailed end *t'* fitting into a correspondingly-dovetailed recess in the rear of the male cutter *m'''*, by means of which a forward-and-back positive motion of the cutter *m'''* is obtained from said link *t*, the latter being jointed in its outer end to the rocking lever *t''*, supported on the fulcrum *t'''*, and provided with pin and roll t^4 in its upper end, operated by the grooved cam *f'*, secured to the rotary driving-shaft *c*, as shown in Figs. 1 and 2.

u is the stationary top-cutter, between the under side of which and the upper edge of the sliding cutter *m'''* the wire is cut off the required length, after being fed into the cutter-box *m* through the inlet-tube *u'*, the bottom of which constitutes the cutting-edge.

At the side of the inlet-tube *u'* is a perforation, *u''*, through which the driver is made to pass in driving the nail out through the perforation *n'* in the throat *n*, after it has been cut off and shaped by the cutters above mentioned.

Between the top of the stationary cutter *m* and under side of the top cutter, *u*, is made a space, *u'''*, for receiving the head of the nail after the shank has been shaped and while the nail is carried or pushed by the cutter *m'''* to a position centrally below that of the driver *b'*. The cutter *m'* is vertically adjustable to and from the under side of the top cutter, *u*, by means of adjusting-screws *v v*, (shown in Figs. 9 and 11,) so as to regulate the length of the desired head of the nail. After the cutter *m'* has been properly adjusted it is made stationary and firmly secured to the cutter-box *m* by means of the screws *v'* *v''*. (Shown in Fig. 3.)

Through the bottom of the cutter-box *m* and throat *n* is made a perforation, *n''*, (shown in Fig. 9,) to allow the chips cut off from the sides of the nail to drop through.

The operation of the machine is as follows: The boot or shoe to be nailed is supported on a suitable jack in the usual way, and automatically held up against the under side of the throat *n* by the usual means, and while the shoe-sole is held against the throat the wire nail is driven, it previously having been cut off and shaped by the cutting mechanism, as described. After the nail is driven, the shoe-sole is depressed from its contact with the throat *n* by means of the vertically-movable block *o'''* and its connecting mechanism to the rotary shaft *c*, causing it to rest against the rotary feed-roller *p'*, which is then set in a rotary motion by means of eccentric *g* and connecting mechanism, as described, by which means the work is fed the required distance between the nails to be driven, and after being fed the feed-roller *p'* ascends to allow the work to be brought up against the throat in a position to allow a new nail to be driven, after being first cut off and shaped by the cutting mechanism, and so on.

Having thus fully described the nature, construction, and operation of my invention, I wish to secure by Letters Patent and claim—

1. In a nailing-machine, the herein-described releasing mechanism for depressing the work from the throat *n*, consisting of rotary driving-shaft *c*, eccentric *o*, strap *o'*, link *o''*, sliding block *o'''*, shaft *p*, and feed-roller *p'*, combined and arranged as set forth and described.

2. In a nailing-machine, the herein-described feeding mechanism for feeding the work, consisting of rotary shaft *c*, eccentric *q*, sliding bar *q'*, guides *q''' q'''*, spring *q⁴*, rack *q⁵*, loose gear *q⁶*, pawl *q⁷*, and the ratchet-wheel *p''*, secured to shaft *p*, provided with feed-roller *p'*, combined and arranged in a manner and for the purpose set forth.

3. In a nailing-machine, the herein-described wire-feeding mechanism, consisting of rotary shaft *c*, cam *f*, lever *g*, with its pin and roll *g'*, shaft *g''*, slotted lever *g⁴*, adjustable link *h*, knee-lever *i*, link *k*, sliding block *l*, and weighted pawl *l' l'' l'''*, combined and arranged in a manner and for the purpose set forth.

4. In a nailing-machine, the nail cutting and shaping mechanism, consisting of stationary cutter-box *m*, adjustable cutter *m'*, having slotted forward end, *m''*, sliding cutter and carrier *m'''*, connecting-link *t*, dovetailed joint *t'*, and connecting mechanism to the driving-shaft *c*, combined with the stationary top cutter, *u*, and inlet-tube *u'*, as and for the purpose set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

WILLIAM Z. BEAN.

Witnesses:
ALBAN ANDRÉN,
HENRY CHADBOURN.