(No Model.) 5 Sheets—Sheet 1.

W. S. FITZGERALD.

BOOT OR SHOE NAILING MACHINE.

No. 433,281. Patented July 29, 1890.

Fig. 11.

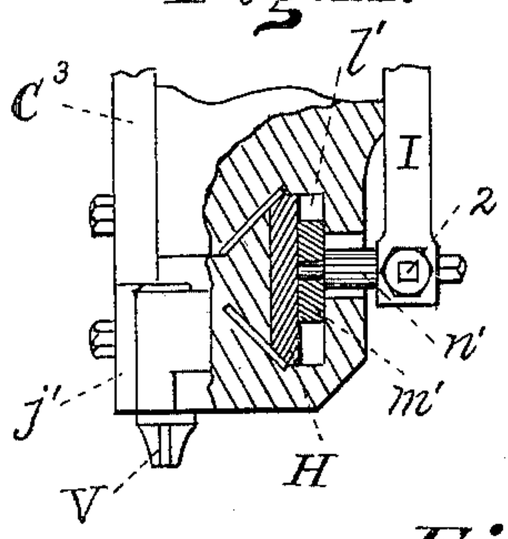

Fig. 1.

Fig. 7.

Witnesses.
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by H. C. Lodge Atty.

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W. S. FITZGERALD.

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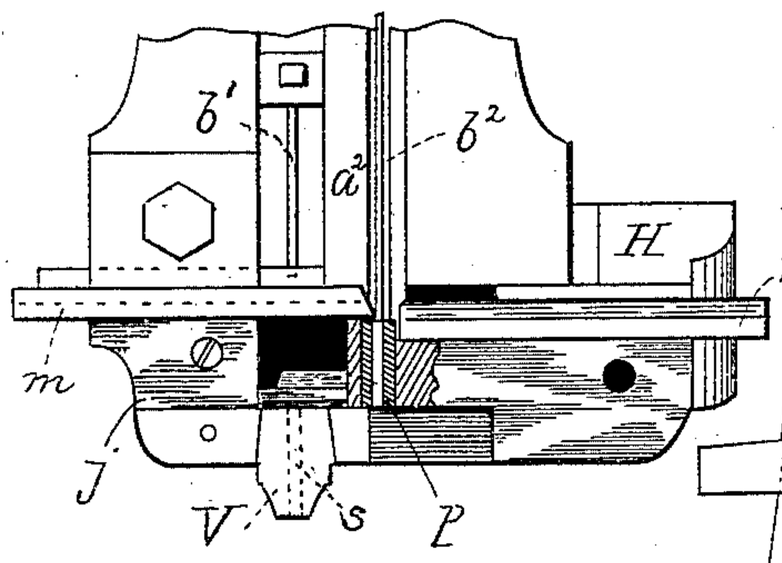

Fig. 10.

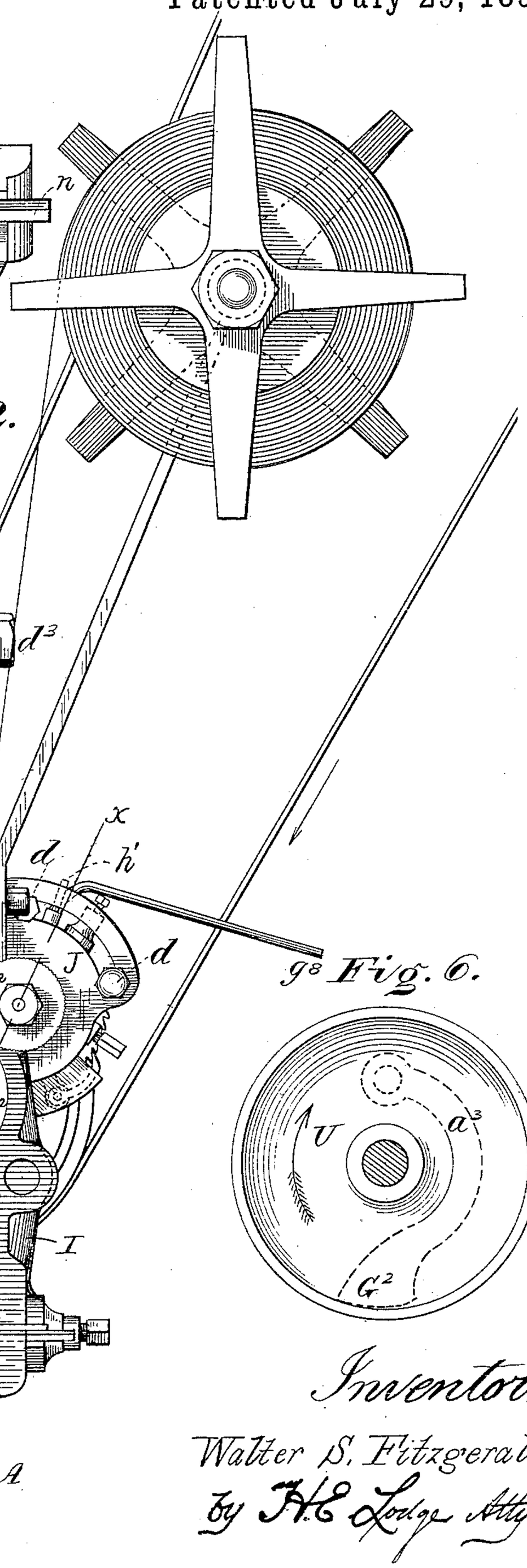

Fig. 2.

Fig. 6.

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(No Model.) 5 Sheets—Sheet 3.

W. S. FITZGERALD.

BOOT OR SHOE NAILING MACHINE.

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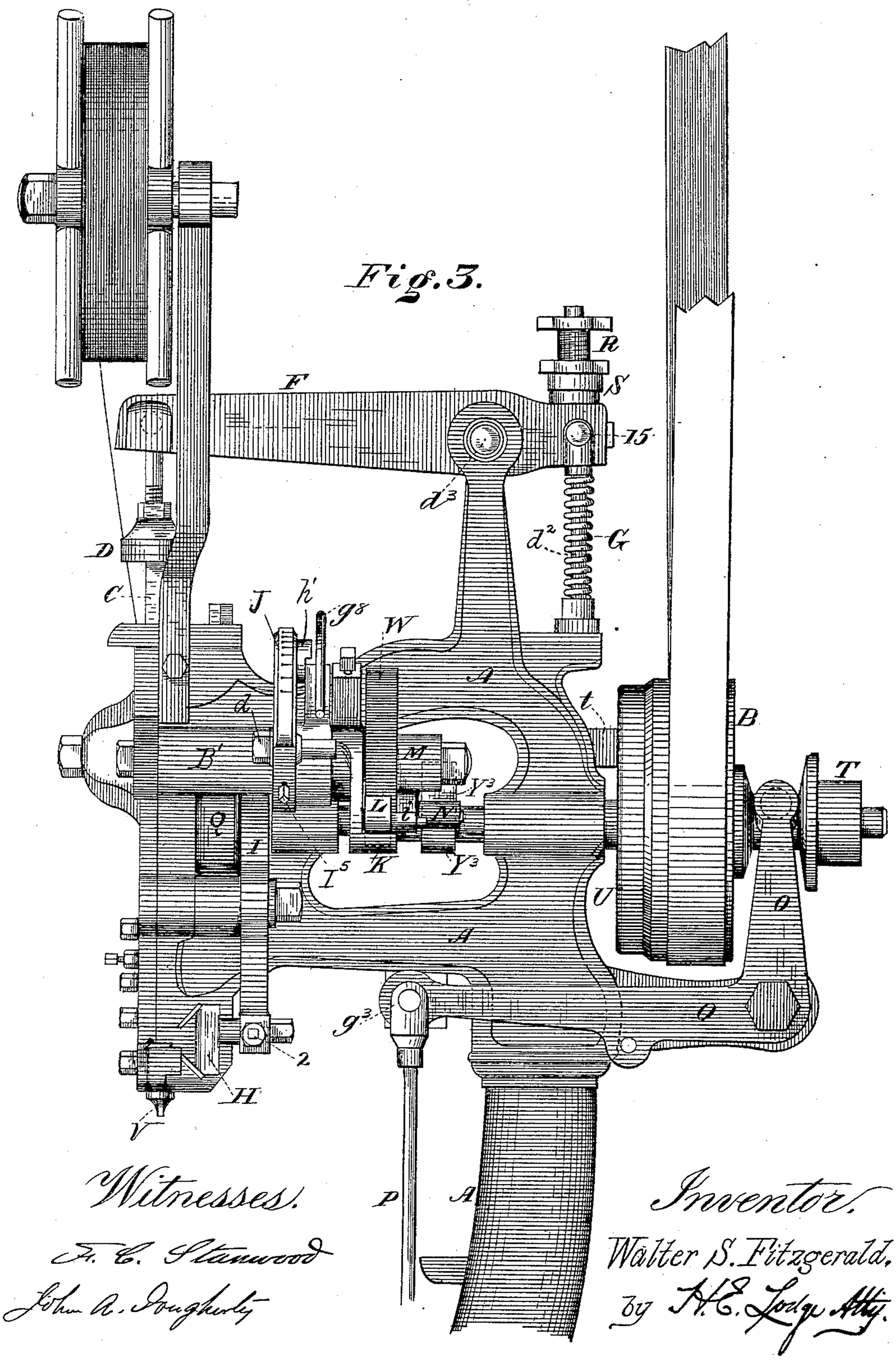
Fig. 3.



Witnesses.

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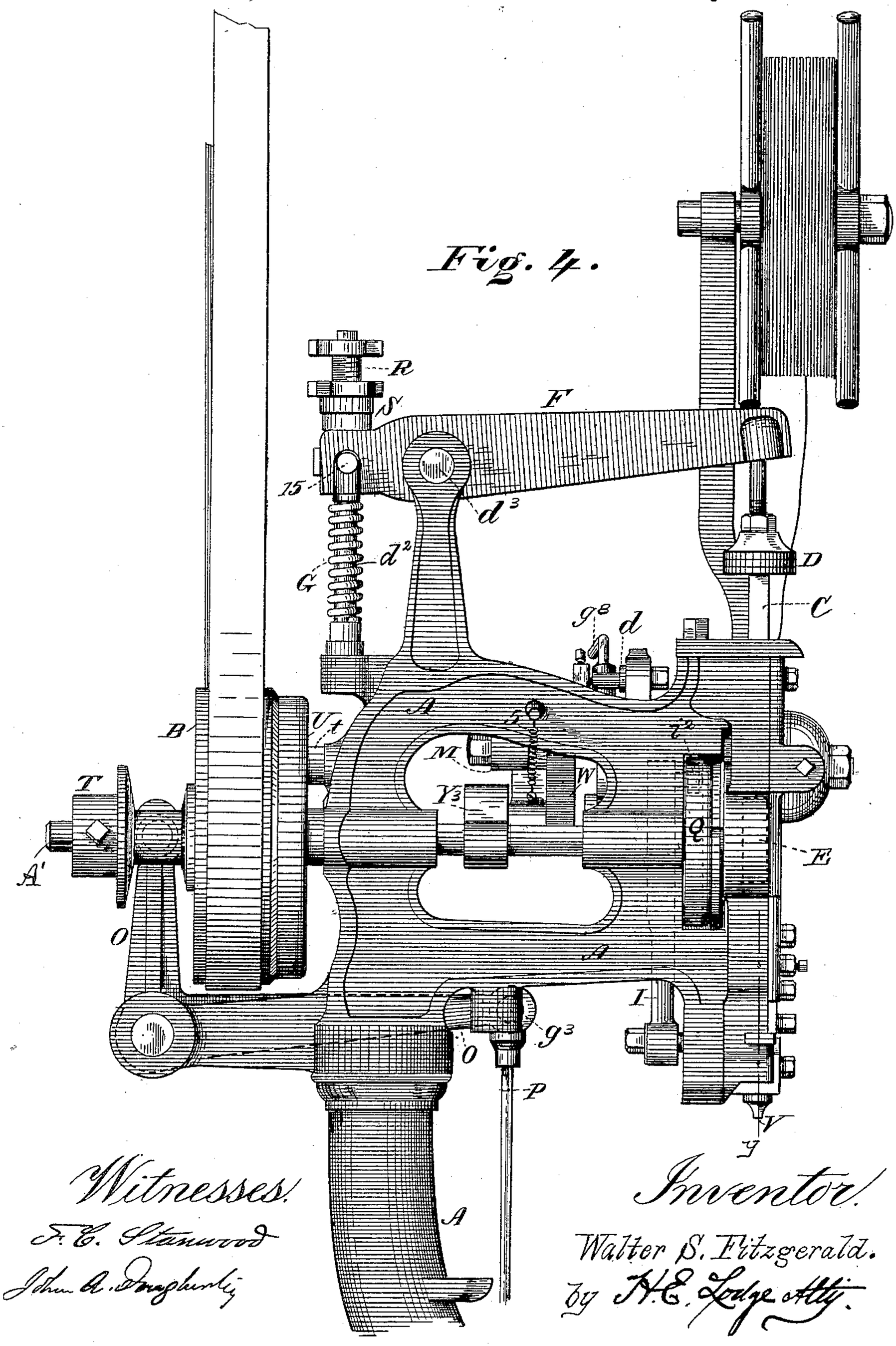
(No Model.) 5 Sheets—Sheet 4.

W. S. FITZGERALD.

BOOT OR SHOE NAILING MACHINE.

No. 433,281. Patented July 29, 1890.

Fig. 4.



Witnesses.
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(No Model.) 5 Sheets—Sheet 5.

W. S. FITZGERALD.

BOOT OR SHOE NAILING MACHINE.

No. 433,281. Patented July 29, 1890.

Fig. 5.

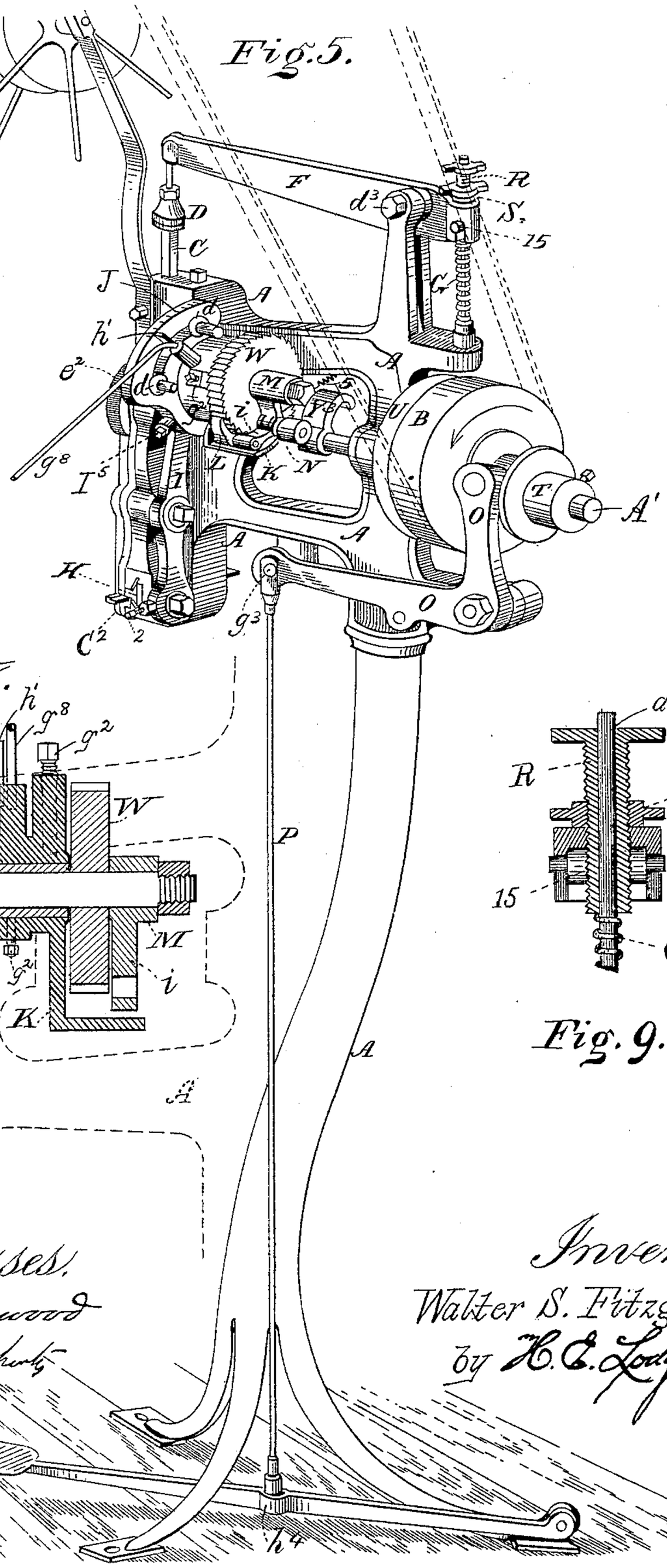

Fig. 8.

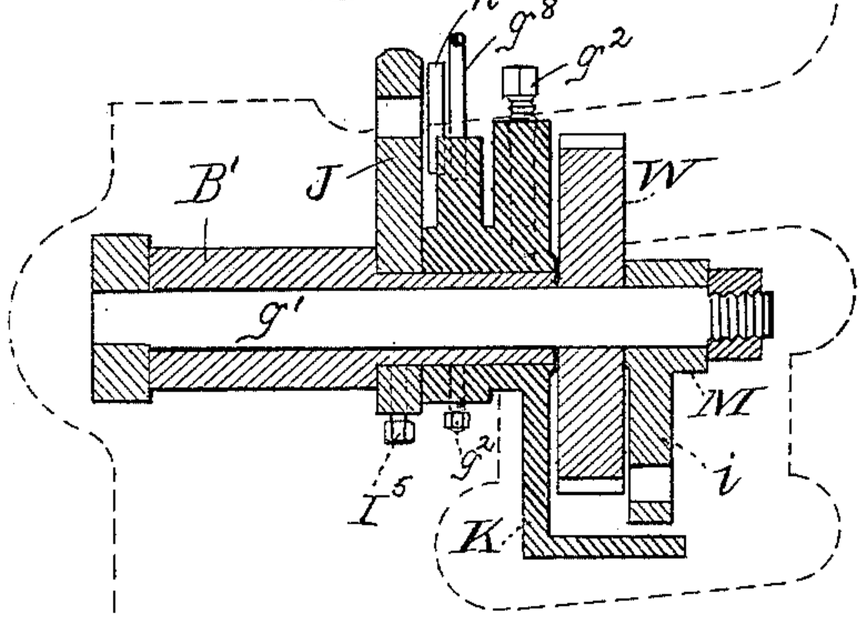

Fig. 9.

Witnesses.
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UNITED STATES PATENT OFFICE.

WALTER S. FITZGERALD, OF BOSTON, MASSACHUSETTS.

BOOT OR SHOE NAILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 433,281, dated July 29, 1890.

Application filed November 29, 1889. Serial No. 331,841. (No model.)

To all whom it may concern:

Be it known that I, WALTER S. FITZGERALD, 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 Boot or Shoe Nailing Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to boot or shoe nailing machines, particularly that class employed in sole-laying or sole-tacking for the purpose of holding the outer soles in place temporarily and previous to their being permanently sewed or nailed to the boot or shoe in process. Further, my invention relates to that class of machines in which a continuous wire, fed by means of two toothed wheels from a reel located above the machine, is corrugated, cut, pointed, and made into nails, which are then driven into the sole of the boot or shoe in process.

My invention may be properly considered as an improvement upon and relating to the invention contained in United States Letters Patent No. 324,312, issued in my name on the 11th day of August, 1885; and it consists, primarily, in improved mechanism, by which the length of nails can be instantly varied according to the position in which it is to be placed in the shoe or the style of shoe. Such mechanism, in brief, consists of an oscillating shield adapted to cover the feed-pawl, which intermittently moves away therefrom, the increase or diminution in the feed being occasioned by the variation in the length of time which the pawl is permitted to remain in engagement with the ratchet-wheel, it being understood that when the pawl is free from the shield it becomes active.

The drawings herewith annexed represent, in Figure 1, an end elevation of a machine embodying my invention. Fig. 2 is a similar view, the covering-plates C^2 C^3 being removed. Fig. 3 is a front elevation looking at the right side of the machine, as shown in Figs. 1 and 2. Fig. 4 is an elevation of the opposite side or looking at the left of the machine, as illustrated in Figs. 1 and 2. Fig. 5 is a perspective view of the machine as a completed organization of parts under my invention. Fig. 6 is a side view, in elevation, of the friction-block and oscillating lever-brake to stop the main shaft. Fig. 7 is a rear view of the swinging flanged segment and other co-operating parts in connection with the feed mechanism for regulating the length of the nails to various sizes. Fig. 8 is a longitudinal section of the feed-shaft, its ratchet-wheel, pawl, and other co-operating parts on line x x. Fig. 9 is a vertical central section of the spring-adjusting mechanism for the driving-bar. Fig. 10 is a detached vertical section of the wire-cutting plates on line y in Fig. 4. Fig. 11 is a detail section of the parts uniting the sliding block with its operating-lever.

My invention relates to boot or shoe sole laying or tacking machines, as before premised.

In the drawings, A is the head or casting to which the various parts are secured.

B is a loose friction-pulley, which drives the machine when brought into contact with the friction-block U, keyed upon the main driving-shaft A′.

T is a collar fastened to the main shaft by a set-screw and maintains the pulley in a position close to the friction-block. The pulley B has endwise movement on its shaft by means of the bell-lever O, furnished with an anti-friction roll. The latter engages in a groove cut in the hub of the loose pulley, which is actuated by the rod P, pivotally united at h^4 to the treadle f^2.

To prevent the main shaft from turning back when the friction-block U is released from contact with the driving-pulley, I have arranged a stop-lever brake. (See Fig. 6.) This lever consists of a swinging arm a^3, the lower extremity or foot G^2 of which wipes upon the inside periphery of the rim on the side of the outer diameter of the friction-block U. This arm is pivoted loosely to the frame A at t at a point above the center of the driving-shaft. (See Figs. 3 and 4.) Therefore when the latter moves in its proper direction the swinging arm is inoperative. On the other hand, should reverse motion occur, the contact of the foot G^2 with the rim of the

block U carries the stop a^3 with it; but since the stop is hung above the center of the driving-shaft the foot will move eccentrically of the rim and the block is immediately stopped. This device is noiseless and much more efficient than a pawl and ratchet.

C is the driving-bar, to the lower extremity of which is removably secured the driver b'.

D is a stop, screw-threaded upon the upper end of the bar to regulate the distance the latter shall drop.

a^2 is a steel plate grooved at b^2 and secured in the face of the head A. (See Fig. 2.) This plate (see Fig. 10) extends quite down to the tube p, which carries the nail transversely over to and above the receiver or throat V, vertically bored at s, through which passage the nail is driven to enter the boot or shoe. Through the groove b^2 the endless wire from the reel is fed down into the tube p, removably secured in the nail-carrier or sliding block H. (Shown in Figs. 3 and 10.)

E is a face view of the cam, Fig. 2, which elevates the driving-bar by the agency of a pivoted finger c^2 laterally of the bar.

F is a lever pivoted at d^3 upon a post rising from the frame A and with one end resting upon the top of the driving-bar C. Beneath the opposite end of said lever is placed a spring G spirally about a rod d^2. The tension of this spring is adjusted by the mechanism. (See Fig. 9.) The under side of the lever is transversely slotted or forked to receive an interiorly-screw-threaded nut 15, with arms which enter the slots. An exteriorly-screw-threaded sleeve R engages the nut, while a check-nut S retains the sleeve in any position. The top of the spring bears against the lower end of the sleeve, which is centrally bored and through which the spring-supporting rod d^2 freely passes.

By aid of the above mechanism the lever, being pivoted nearer its tail end, gives the driving-bar multiple velocity in its descent, as compared with a direct-acting spring operating on the upper end of the driving-bar C. This extra velocity added to the driving-bar not only insures better work, but makes the labor for the operator much less onerous.

The mechanism for feeding the continuous wire from the reel is as follows: In Fig. 1, e e' e^2 represent two toothed wheels. The former is mounted upon a stud f', and is incidentally actuated by the movement of the other and co-operating wheel at the time the wire is advanced in feed movement therebetween. The stud f' is adjustable by means of a screw f^2, and thereby the position of this feed-wheel is regulated with respect to the wheel e^2 to accommodate wire of different sizes. The feed-wheel e^2, on the contrary, is mounted upon the wire-feeding shaft g', parallel with the main shaft and revolubly secured in a portion of the frame A, here formed into a boss or sleeve B'. (See Figs. 3 and 8.) Upon this boss are mounted the following elements: first, a slotted bracket J, in which two movable studs d d are inserted, and by their agency serve to fix the length of the nails to be made, as will hereinafter be described, and secondly, a hub, from which depends a shield K. This hub is held in any fixed position upon the boss B' by a friction-screw g^2, and is operated by the hand-lever g^8. In proximity to where this lever enters the hub I have inserted a pointer h', which is used in connection with an index marked on the periphery of the bracket J. The position of this pointer indicates the length of nail to be produced.

To cause the proper intermittent movement of the feed-shaft to advance the wire in the production of a nail, I have securely fastened upon the shaft f', adjacent to the shield K and its hub, a toothed or ratchet wheel W, while loosely upon the same shaft is mounted a bell-crank lever i, furnished at its free end with a spring-actuated pawl L. A loose roll N upon a stud laterally of this pawl-lever wipes the actuating bent arm or cam Y^3 affixed to the main shaft. (See Fig. 5.)

By reference to Fig. 7 it will be seen that the pawl is adapted to swing within the shield K; but while it is covered by said shield the pawl is inactive—that is, it is so hung that its tail wipes against the shield, thereby holding the nose disengaged from the teeth on the ratchet-wheel. Thus the pawl becomes active only when its rear end has emerged from the end of the curved rim or flange which forms a part of the swinging shield.

The variable lengths of nails are produced as follows: By reference to Fig. 2, assume that the index-finger is against the upper stop d. This will throw the shield K upward, (see Fig. 7,) and the rear end of the pawl will remain the longest interval within the shield, being disengaged from the latter only at the very last of its advance movement; hence the pawl will engage the ratchet only for a very limited forward motion. The nail will consequently be the shortest with the shield in this position. If the hand-lever g^8 is now depressed until the index contacts with the other stop-pin d, the other and extreme length of nail will be produced. The shield will now (see Fig. 7) be thrown toward the right in direction of arrow. As a result, the tail of the pawl is freed almost immediately from the shield, moving out from the latter. Engagement of the pawl and ratchet now occurs, and the latter receives the full feed motion of the pawl occasioned by the agency of the cam Y^3.

The nail is produced as follows, (see Figs. 3 and 10,) in which H is a block sliding transversely through the lower portion of the head or frame A: Within the block is fastened a hardened steel tube or receiver p, within which is fed the wire previously corrugated or roughened by its passage between the teeth of the feed-wheels e' e^2 and from which the nails are now cut. Within the front side of this block is secured the male knife n, formed with a rib, which centers the female knife m,

having a similar groove cut longitudinally. The latter knife or cutter is fixed and extends up to the wire, which is fed just in front of it. The nail is cut by means of the aforesaid sliding block, which is actuated by a lever I. This latter is controlled in its movements by an epicycloidal rimmed wheel Q, actuating the upper end of said lever, which is furnished with a loose roll i^2, traveling upon the inner surface of the rim, whereby the block H is caused to reciprocate. (See Fig. 4.)

To provide for the rocking movement of the lower end of the lever I, which actuates the sliding block, and to permit the latter to travel in right-line movement, a vertical slot l' is cut transversely of the block. (See Fig. 11.) Within this slot is fitted a movable plate m', adapted to receive the end of a connecting-pin n', which passes through and across the lower end of the lever I. This pin is adjustable by means of a set-screw 2, which regulates the throw of the sliding block H accurately, and thereby causes the lever to align the hole in the tube p with the passage s in the throat V, thus insuring positive delivery of the nail in a perfect condition within the boot or shoe. Otherwise the nail would be liable to be crushed or bent when the driver struck it.

The operation of the several elements hereinbefore described is as follows, presuming that a nail has just been formed and driven through the throat V: The block H is to be retracted now to carry the steel receiver or tube p vertically beneath the end of the wire. Revolution of the main shaft, as indicated by the arrows, now operates the cam E to lift the driving-bar against the pressure of the spring G to repeat a blow when desired. At the same time the lever I, by means of its epicycloidal cam-wheel Q, now causes the sliding block H and male knife or cutter to retreat until the steel tube p is aligned beneath the end of the wire. Such movements being completed, the curved arm Y^3 now wipes the roll N and advances the pawl. The latter beneath the shield K is held inactive until said cam has swung it sufficiently to free the rear end from said shield. The pawl now actively advances the ratchet-wheel W, and this produces a semi-rotary movement of the feed-shaft g', which compels the wire to be fed the proper distance requisite for a nail of a given length. The wire enters the passage in the sleeve p, secured to the movable block H. After the wire has been advanced the proper distance continued forward rotation of the main shaft separates the arm Y^3 from the roll on the pawl, when the latter is quickly returned to its normal idle position by the spring v. Furthermore, such rotation now causes movement of the epicycloidal wheel Q to rock the lever I, when the block H advances. The male cutter n is thereby brought into contact with the wire, and by aid of the fixed female cutter said wire is severed and the nail formed. The block continues to advance and carries the nail within the tube p until it is aligned above the passage in the throat V. The cam E has assumed such position that the driver is now suddenly released, when the stored-up energy of the spring G produces a sharp violent blow and the nail is forced into the material of the boot or shoe in process. Said article is held against the throat V in the place where the nail is to be inserted. In connection with this apparatus an anvil is to be employed, as shown in my Letters Patent hereinbefore mentioned.

By means of the hand-lever g^8 and rocking movement of the same with the shield K about the pawl the length of the nail can be varied at every stroke, and thus the machine can readily be adapted for various kinds of work.

What I desire to claim is—

1. In a boot or shoe nailing machine, a frame having a boss, the feed-shaft mounted upon said boss, a toothed wheel fast upon the latter, and the actuating-pawl, combined with a rocking shield frictionally positioned exteriorly of the boss, and a slotted bracket having adjustable stop-pins to control the extremes in movement of the shield, substantially as herein set forth.

2. The combination, in a boot or shoe nailing machine having a continuous wire-feed, suitable feed mechanism, a sliding block with a nail-receiver p, and cutter n thereupon, of the fixed cutter m, the plate m', movable transversely in the sliding block, the connecting-pin n', and operating-lever I, substantially as and for the purposes stated.

3. In combination with the driving-bar C, its lever F, and actuating-cam E, with arm c^2 of the actuating driving-spring G, and its adjusting mechanism composed of the nut 15, screw-threaded sleeve R, moving endwise therethrough, and a check-nut, substantially as set forth and stated.

4. In a boot or shoe nailing machine, the combination, with a main shaft, a wire-feed shaft, and the toothed feed-wheels adapted to have an endless wire passing therebetween, of the cam Y^3 upon the main shaft, the toothed wheel W upon the feed-shaft, the bell-lever i, which engages said cam, the spring-actuated pawl L, carried on said bell-lever, and a rocking shield by which the feed is controlled to vary the length of nails in process, substantially as specified.

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

WALTER S. FITZGERALD.

Witnesses:
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GEO. H. FOX.