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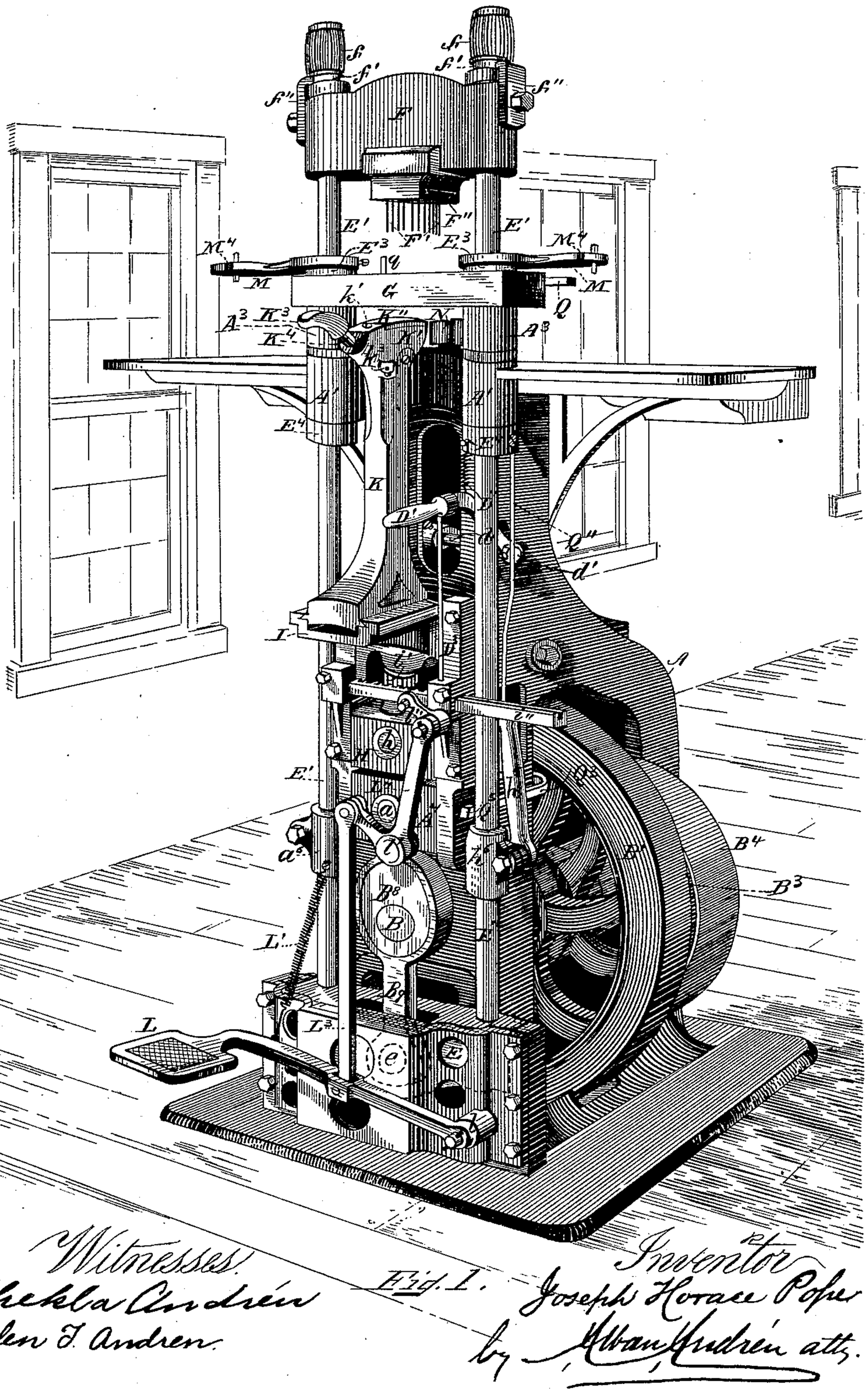
J. H. POPE.

HEEL NAILING MACHINE.

No. 446,885. Patented Feb. 24, 1891.



Witnesses:
Thekla Andrén
Helen J. Andren

Fig. 1.

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(No Model.)

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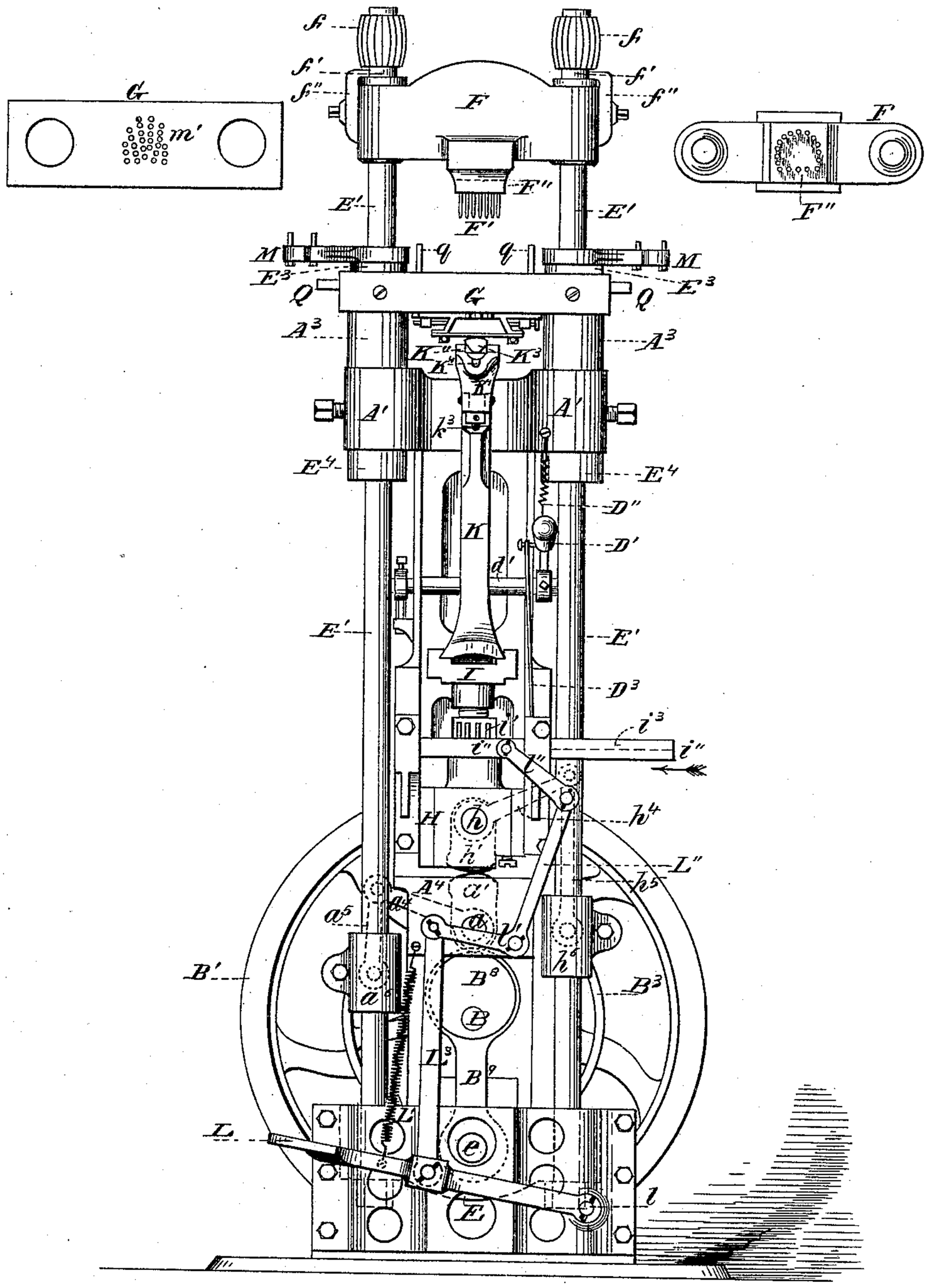

Fig. 2.

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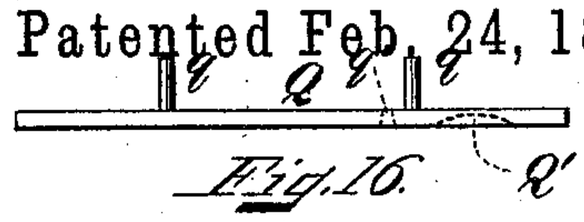

Fig. 16.

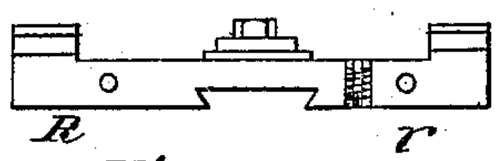

Fig. 17.

Fig. 3.

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(No Model.) 7 Sheets—Sheet 4.

J. H. POPE.

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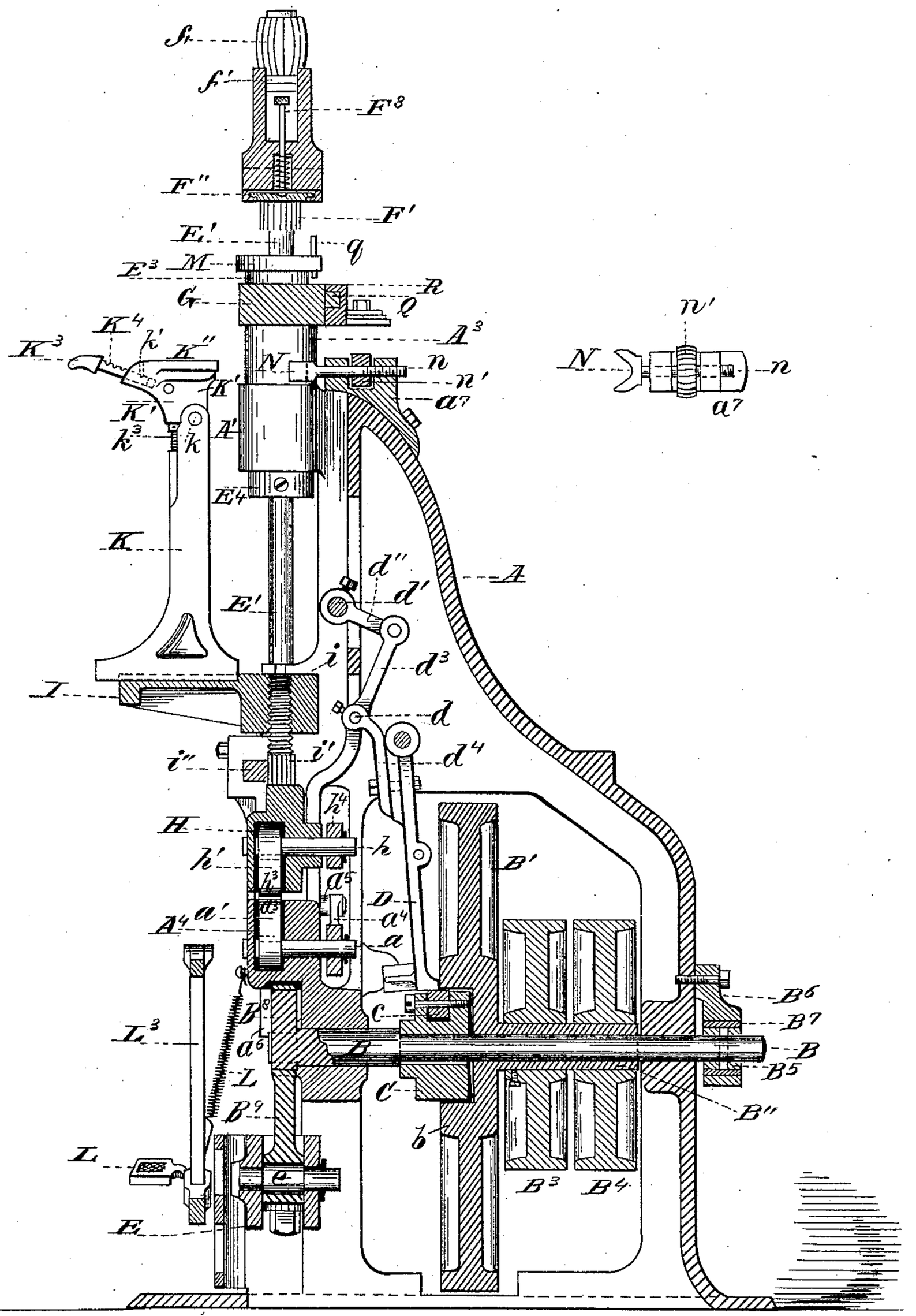

Fig. 4

Witnesses.
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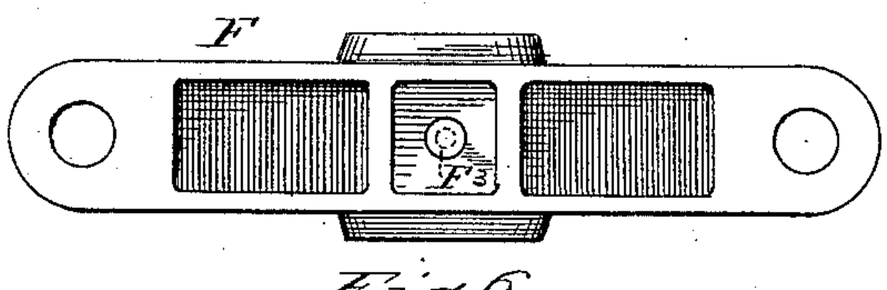

Fig. 6.

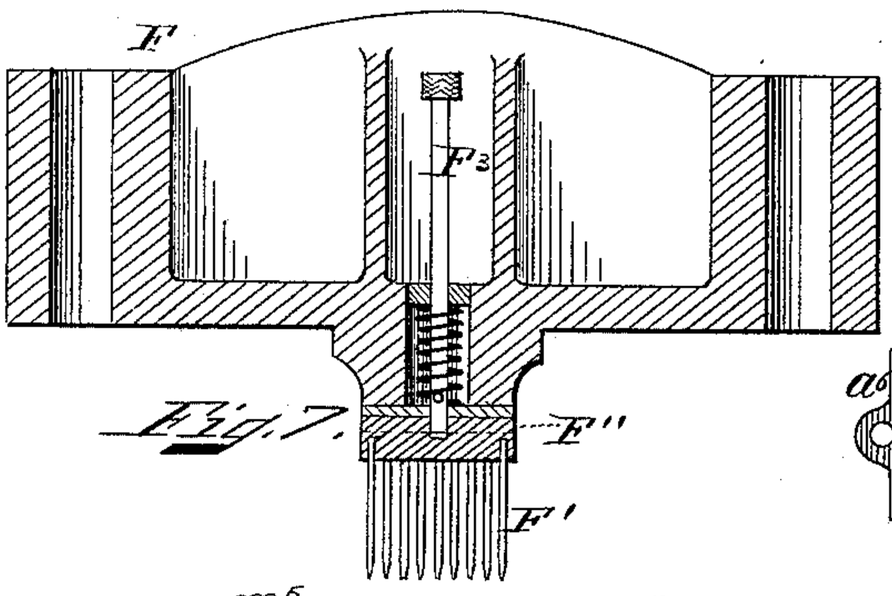

Fig. 7.

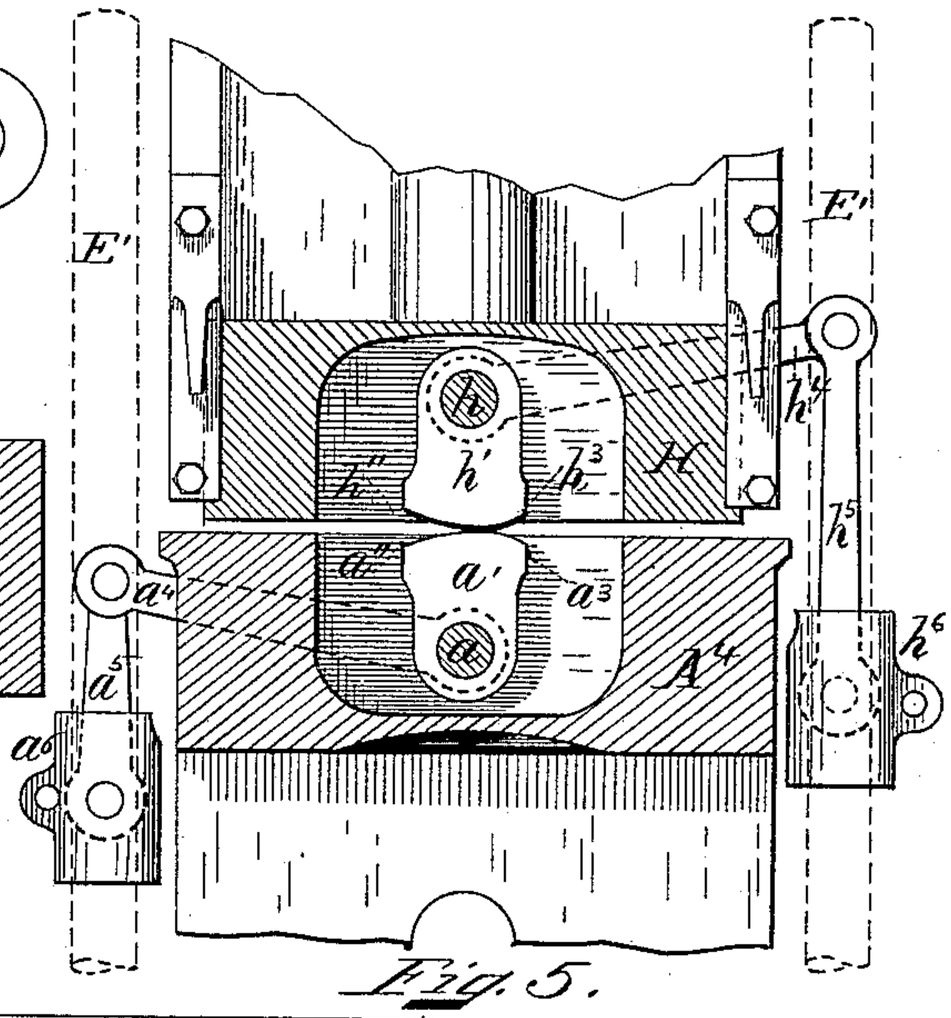

Fig. 5.

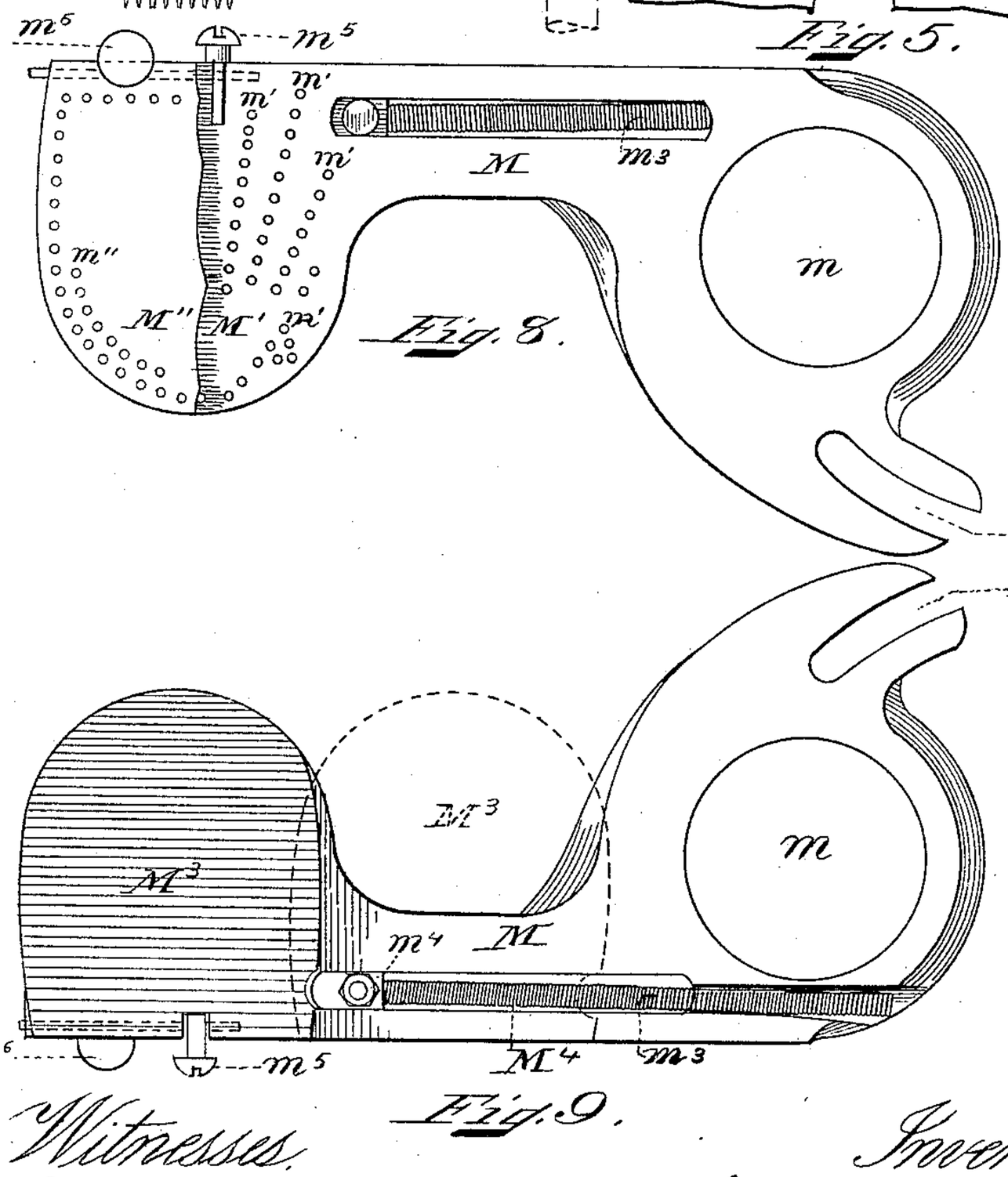

Fig. 8.

Fig. 9.

Witnesses.
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Joseph Horace Pope
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J. H. POPE.

HEEL NAILING MACHINE.

No. 446,885. Patented Feb. 24, 1891.

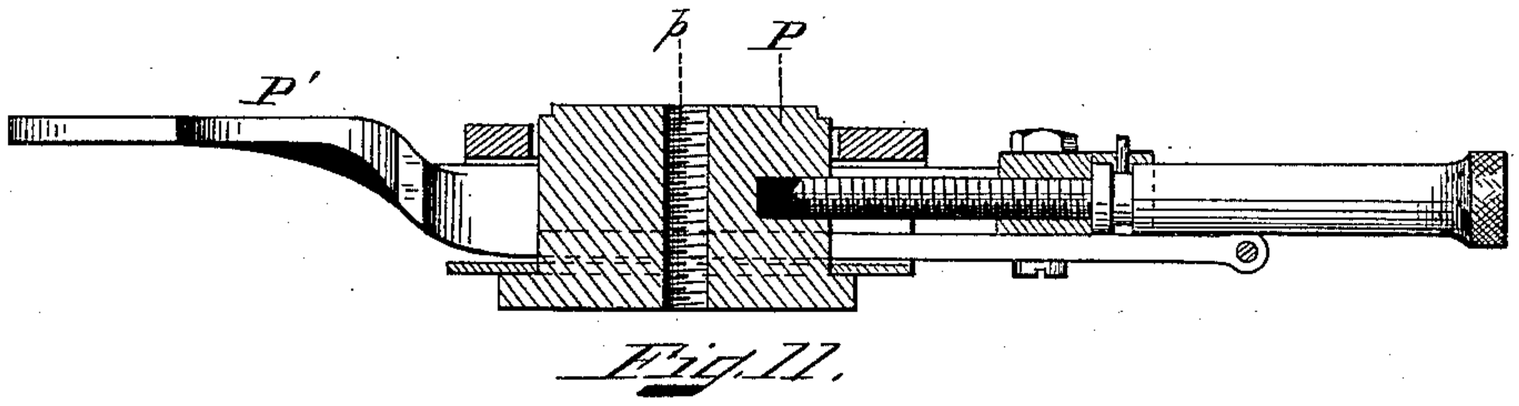

Fig. 11.

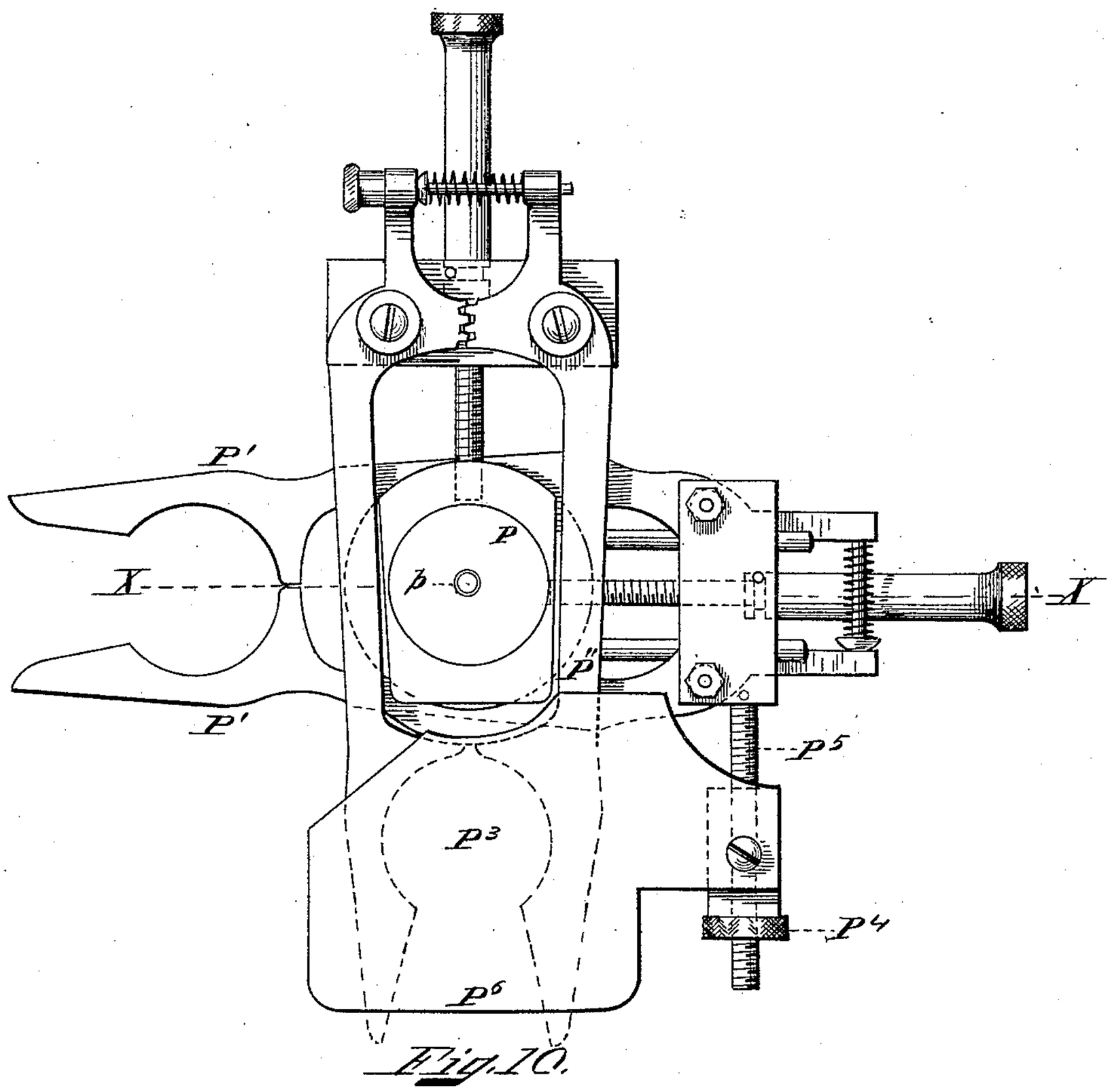

Fig. 10.

Witnesses.
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J. H. POPE.

HEEL NAILING MACHINE.

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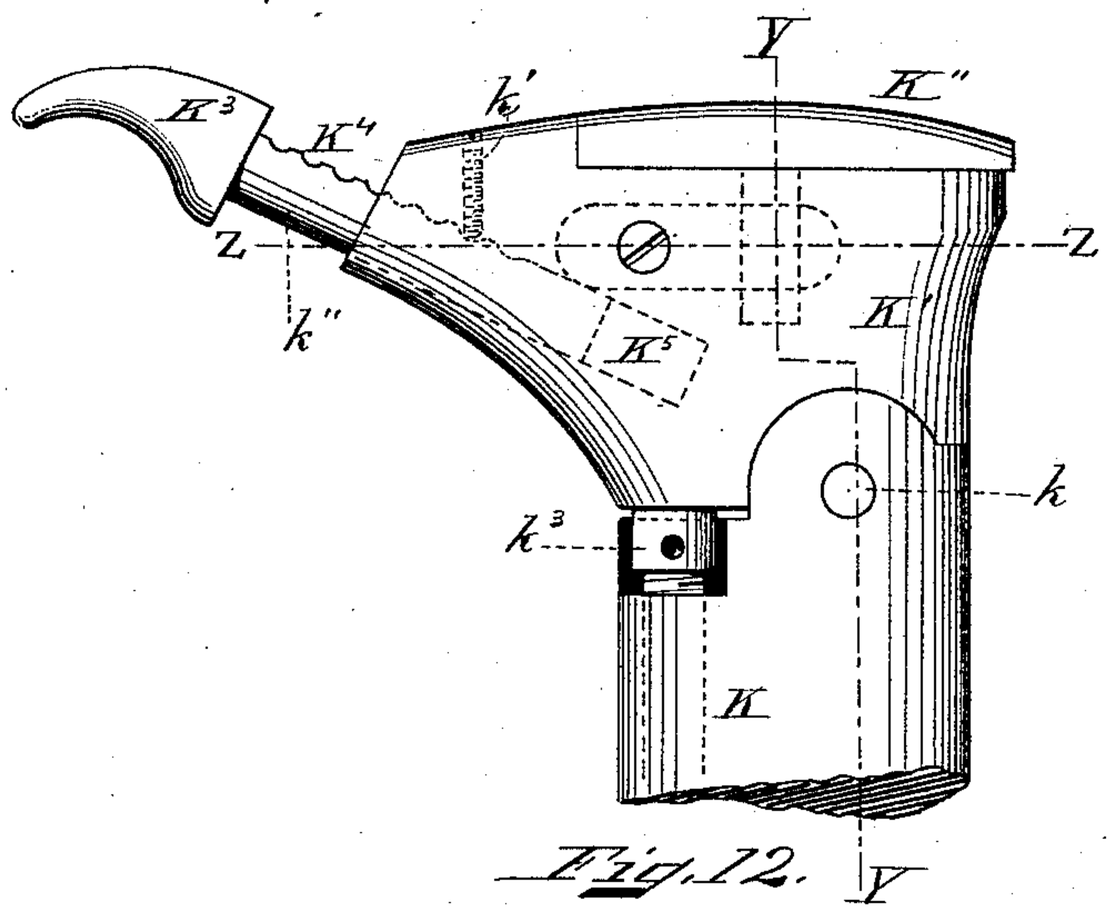

Fig. 12.

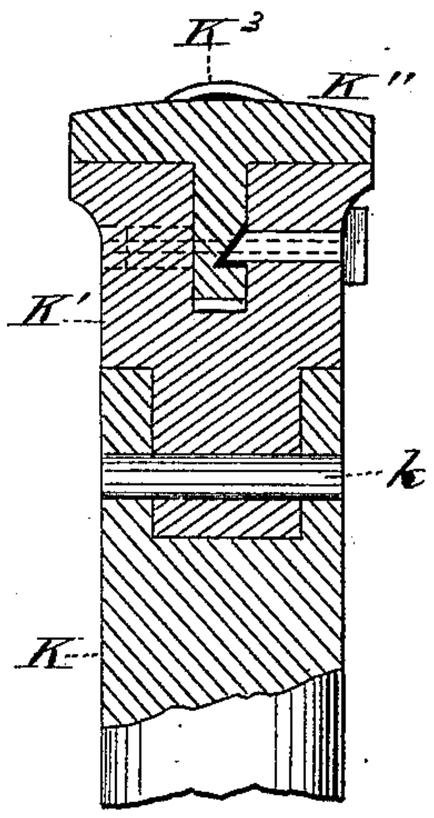

Fig. 13.

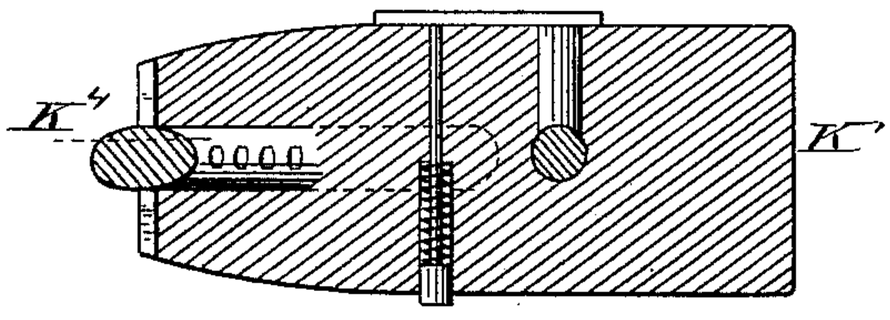

Fig. 14.

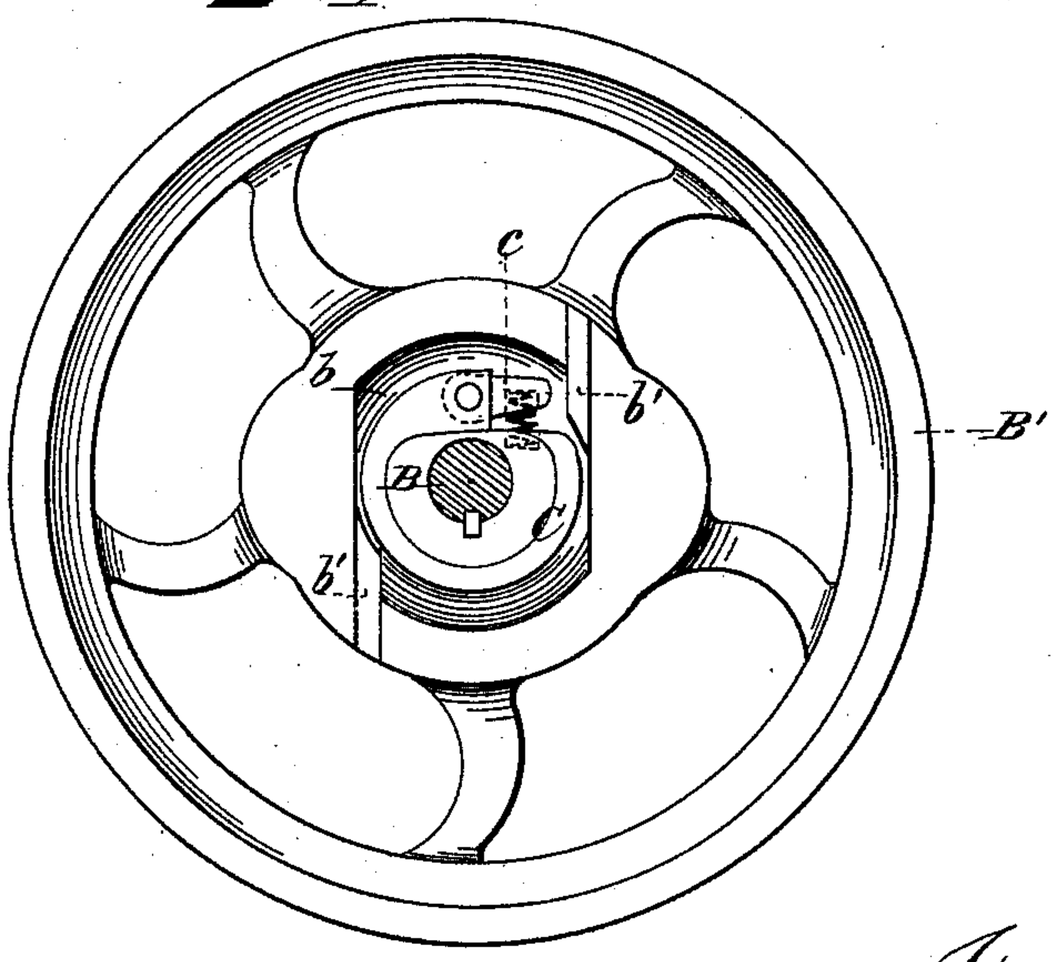

Fig. 15.

Witnesses.
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Helen T. Andréen.

Inventor.
Joseph Horace Pope
by Albert Andréen atty.

UNITED STATES PATENT OFFICE.

JOSEPH HORACE POPE, OF BROCKTON, MASSACHUSETTS, ASSIGNOR TO THE AMERICAN HEELING MACHINE COMPANY, OF SAME PLACE.

HEEL-NAILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 446,885, dated February 24, 1891.

Application filed August 18, 1890. Serial No. 362,273. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH HORACE POPE, a citizen of the United States, and a resident of Brockton, in the county of Plymouth and State of Massachusetts, have invented new and useful Improvements in Heel-Nailing Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention relates to improvements in heel-nailing machines for the purpose of nailing heels to the soles of boots or shoes and spanking on the top pieces on such heels; and the said invention is carried out as follows, reference being had to the accompanying drawings, wherein—

Figure 1 represents a perspective view of the improved machine. Fig. 2 represents a front elevation of the same. Fig. 3 represents a side elevation of the same. Fig. 4 represents a central vertical section of the said improved machine. Fig. 5 represents a detail sectional view showing the rocker-cams for forcing the shoe-heel against the under side of the die-block. Fig. 6 represents a plan view of the upper driver-carrying head, and Fig. 7 represents a vertical section of the same. Fig. 8 represents a top view of the loader for receiving the nails preparatory to placing them in the perforations in the die-block, and Fig. 9 represents a bottom view of the same. Fig. 10 represents a top view of the heel and top-piece holding clamps and spanker-plate. Fig. 11 represents a cross-section on the line X X, shown in Fig. 10. Fig. 12 represents a detail side view of the upper portion of the jack. Fig. 13 represents a section on the line Y Y, shown in Fig. 12. Fig. 14 represents a horizontal section on the line Z Z, shown in Fig. 12. Fig. 15 represents a detail front elevation of the balance-wheel and driving-shaft clutch. Fig. 16 represents a detail view of the loader safety-bar, and Fig. 17 represents a detail view of the guide-piece for such safety-bar.

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

This invention has for its object the attachment of heels to boots or shoes by means of nails driven directly through the heels without making awl-perforations in the same, which is accomplished by means of a perforated stationary die-block, a vertically-movable driver-block having drivers attached to it, loaders in which the nails are received previous to delivering them into the perforated die-block, a spanker device for spanking the top piece on the projecting heads of the nails by which the heel is secured to the boot or shoe, and with such devices I use an improved jack adapted to be moved horizontally to and from the position below the die-block and adapted to be raised and lowered relative to the same, and safety devices for the purpose of preventing the machines from being started until the treadle for raising the jack is depressed and for preventing the machine from being started until the loader is swung out of the way of the driver-block, as well as for preventing the nails from being unloaded while the top piece and spanker-plate are below the die-block.

The invention also consists in the combination, construction, and arrangements of parts, as will be hereinafter more fully shown and described.

In the drawings, A represents the main frame or standard of the machine, in bearings in which is located the driving-shaft B. On said driving-shaft is loosely journaled the balance-wheel B′, having a sleeve B″ attached to it, which sleeve is loosely journaled on the said driving-shaft B. On said sleeve B″ is arranged the fast pulley B^3 and loose pulley B^4, to which belt-power is applied in the usual manner.

The balance-wheel B′ has a recessed hub *b*, having projections *b′ b′*, adapted to be brought in contact with a spring-pressed pawl *c*, pivoted to a hub C, firmly secured to the driving-shaft B, as is common in machinery of this kind and similar machines where it is desired to set the driving-shaft in rotation and to stop it after making one revolution.

The pawl *c* is normally depressed by means of a spring-pressed swing-piece D, pivoted to the frame A at *d* and having its lower end adapted to keep the spring-pressed pawl *c* out of contact with the balance-wheel projections *b′ b′* as long as the swing-piece remains in its normal position. (Shown in Figs. 3 and 4.) The swing-piece D is operated by means of a

handle D′, secured to a shaft d', journaled in the frame A, said shaft having attached to it a lever d'', connected by means of a link d^3 to a projection or arm d^4 on the swing-piece D, as shown in Fig. 4.

D″ is a spring attached in one end to a handle D′ and in its other end to a stationary part of the frame A, as shown in Figs. 2 and 3, which spring serves to hold the handle D′ normally in its upper position and the swing-piece D also in its normal position—that is, so that its lower end shall keep the spring-pressed pawl c out of contact with the balance-wheel-hub projections b' b' for the purpose of allowing the said balance-wheel to rotate freely without imparting motion to the hub C and driving-shaft B as long as the starting-handle D′ is held upward by its spring D″, as shown in Fig. 3.

When it is desired to impart rotation to the driving-shaft B from the fast pulley B^3 and balance-wheel B′, it is only necessary to temporarily depress the handle D′, by which the swing-piece D is released from the spring-pressed pawl c, which is then liberated and pressed outward by its spring, and as the balance-wheel rotates one of the projections b' comes in contact with the said pawl, and thus imparts a rotation to the hub C and driving-shaft B until said pawl, after completing one revolution, is brought in contact with the lower end of the spring-piece D, which in the meantime has been allowed to return to its normal position by the operator releasing his pressure on the handle D′, and thus prevents more than one complete revolution of the hub C and the driving-shaft B for every time the starting-handle D′ is momentarily depressed. The object of this starting and stopping mechanism of the driving-shaft is for the purpose of automatically returning the driver-head to its highest position after a heel has been nailed or its top piece spanked on. For the purpose of preventing the driving-shaft B from being moved by its momentum after it is stopped at the completion of one revolution I employ the friction device at the rear end of said driving-shaft, consisting of a sleeve B^5, attached to the rear end of the shaft B and journaled in a hub B^6, attached at the rear end of the frame A, as shown in Figs. 3 and 4. Between said sleeve B^5 and the hub B^6 is interposed a friction-surface B^7, preferably made of leather, as shown in Fig. 4; but this is not material, as any other suitable or equivalent friction device may be used without departing from the essence of my invention.

The mechanism for moving the driver-block up and down relative to the stationary block is constructed as follows: To the front end of the driving-shaft B is secured an eccentric B^8, surrounded by an eccentric-strap B^9, the lower end of which is pivoted at e to the lower head or cross-piece E, which latter is guided in suitable bearings in the lower front portion of the frame or standard A. To said lower head E are secured the upwardly-projecting rods E′ E′, having secured in an adjustable manner to their upper ends the head or cross-piece F.

The head F is preferably made vertically adjustable on the rods E′ E′, as follows: Each of said rods passes loosely through a vertical perforation in said head and is screw-threaded in its upper end and there provided with a regulating hand-nut f, having annular groove f', adapted to receive a lip f''', secured in a suitable manner to the said head F, and it will thus be seen that by turning the hand-nuts f f the head F may be adjusted vertically on the rods E′ E′ for the purpose of adjusting the driver-blocks and drivers relative to the stationary perforated die-block G. The said die-block is preferably secured to the frame or standard A as follows: E″ is a sleeve loosely surrounding each rod E′ and made to pass loosely through the stationary die-block G and a perforated ear A′ on the frame or standard A, as well as through a perforated sleeve A^3, interposed between the under side of the die-block G and stationary ear A′, as shown in Fig. 3. The sleeve E″ secures the die-block G to the ears A′ A′ on the frame of the machine by means of a collar E^3 in the upper end of said sleeve A″, which collar rests on the top of the die-plate G and a nut E^4, secured on the lower end of the sleeve E″ against the underside of each ear A′, as shown in Figs. 2, 3, and 4. The rods E′ E′, as will be seen, are thus guided up and down in the said stationary sleeves E″ E″, and the die-block G is firmly secured to the upper end of the frame A.

F′ represents the drivers secured in a suitable manner to the driver-block F″, which is detachably secured in grooved ways on the under side of the upper head F and locked in position to the latter by means of a spring-pressed locking-pin F^3, the lower end of which is adapted to enter a centering notch or recess in the upper portion of the detachable nail-driver block F″, as shown in Fig. 4.

The improved jack and mechanism for its operation are constructed and arranged as follows: A^4 is a stationary block or projection forming a part of the front portion of the frame A. At a point above such stationary block is arranged a vertically-movable jack support or block H, adapted to slide up and down in suitable guides on the front portion of the machine. On the top of such movable block H is supported the lower end of the vertical jack-screw i, which works in a female screw-thread in the bracket I, having ways on its upper side, on which the jack K is adapted to slide out and in relative to the stationary die-block G. The pressure-screw i has made in one piece with its lower end a pinion i', the teeth of which mesh in the teeth of a rack i'', which is adapted to slide horizontally in guides provided on the movable jack support or block H. Said rack is operated in one direction (the one shown by arrow in Fig. 2) by the pressing of the treadle-lever L and in an opposite direction by the spring L′, attached

to said treadle-lever and any stationary part of the machine above it, as shown in Fig. 2. The treadle-lever L is pivoted at *l* to the frame of the machine and is connected to a bell-crank lever at L″ by means of link or bar L^3. The bell-crank lever L″ is pivoted at *l′* to the stationary block A^4 or any other stationary part of the machine and has its upper end preferably connected to the rack *i″* by means of a link *l″*, as shown in Fig. 2. It will thus be seen that by depressing the lever L against the influence of its spring L′ the bell-crank lever L″ will be rocked on its fulcrum and the rack *i″* moved in the direction of the arrow shown in Fig. 2, causing it to turn the pinion *i′* and screw *i*, and thus causing the jack-bracket I and its jack to be moved upward until the top of the sole of the shoe held on the jack is brought in contact with the under side of the heel held by the clamps. In addition to such treadle mechanism for moving the jack upward, I use an automatic mechanism for putting on an increased pressure on the jack for the purpose of pressing and holding the heel of the boot or shoe firmly against the under side of the die-block during the operation of driving the nails into the heel and sole, as well as during the operation of spanking the top piece on the projecting ends of the nails, and this mechanism is constructed, arranged, and operated as follows:

In the stationary block A^4 is journaled a pin or shaft *a*, and in the movable block H is journaled a similar shaft or pin *h*, said pins or shafts having secured to them the respective cams *a′ h′*, having cam-surfaces *a″ h″* and concentric surfaces a^3 h^3, as shown in Fig. 5. The said cams are operated from the rods E′ E′ by means of levers a^4 h^4, secured, respectively, to the shafts *a h*, said levers being connected in their outer ends to links a^5 h^5, the lower ends of which are pivoted to adjustable blocks a^6 h^6, secured to the vertically-movable rods E′ E′, as shown in Fig. 5, and by this arrangement the cam-surfaces *a″ h″* are made to work against each other during the first quarter-revolution of the eccentric B^8 on the driving-shaft B, by which the block H and the jack carried by it are moved upward for the purpose of giving the increased pressure on the heel against the under side of the stationary die-block G. During the next quarter-revolution of the said driving-shaft and eccentric the concentric surfaces a^3 h^3 of the cams *a′ h′* are brought together, allowing said cams to rock without imparting further upward movement to the jack, during which time the driver descends and drives the nails into the heel. During the final half-revolution of the said driving-shaft and eccentric the rods E′ E′ are raised upward to their normal position. The cams *a′ h′* are rocked, and also returned to their normal position, by which the block H and jack K, with its shoe held thereon, are lowered sufficiently to release the increased pressure between the heel and die-block, after which the jack is wholly lowered to its lowest position by the operator releasing his pressure on the treadle-lever L, when the latter is swung upward by the influence of its spring L′, causing the rack *i″* to be moved in a direction opposite to that shown by arrow in Fig. 2, by which the screw-shaft *i* is turned on its axis within the female screw-thread in the bracket I, thereby causing the jack to be lowered to its original normal position for the purpose of removing the heeled shoe or for the purpose of placing a top piece and spanker-plate below the perforated die-block for spanking on such top piece, as the case may be.

The improved jack is fully shown in detail in Figs. 12, 13, and 14, and is constructed as follows: To its upper end is pivoted at *k* a metal last K′, provided with the removable last-plate K″, having a suitable locking device for securing it in a detachable manner to the upper end of the metal last K′. The said pivoted last K′ is further provided with an adjustable toe-piece K^3, having a shank K^4, adapted to slide in an inclined recess K^5 in said metal last K′ and to be secured in any desired position relative to the latter by means of set-screw *k′*, the point of which is made to press or bite into notches or locking-recesses *k″ k″* on the shank K^4, as fully shown in Fig. 12. The rocking motion of the last K′ is regulated by means of an adjusting-screw k^3, interposed between the jack K and the pivoted last K′, as shown in said Fig. 12.

The improved loader is fully shown in detail in Figs. 8 and 9, and it consists of a metal frame M, having a perforation *m*, adapted to receive the rod E′, around which said loader may be turned. The said frame is supported above the stationary die-block G, preferably on the collar E^3 of the sleeve E″, as shown in Fig. 2. M′ is the heel-shaped perforated loader, made in one piece with the frame M, as shown in Figs. 8 and 9, said loader M′ having a series of rows of nail-perforations *m′ m′*, as shown in Figs. 2 and 8, and above such plate is temporarily secured a covering-plate M″, having perforations *m″ m″* arranged on it, according to the places in which the nails are to be driven in the heel that is to be nailed, and the said perforations *m″* coincide with some of the perforations in *m′* in the loader M′, and by this arrangement it and the same loader may be used for a variety of shapes and sizes of heels, it being only necessary to secure to the top of such loaders the perforated cover-plate M″, the latter being provided with perforations corresponding to the position of the nails to be driven.

The cover M″ may be secured to the top of the loader M′ in any suitable or well-known manner without departing from the essence of my invention. Below the loader M′ is arranged the sliding non-perforated shield M^3,

which is normally held by the influence of a spring m^3 in the position shown by dotted lines in Fig. 9. Previous to filling the loader its bottom plate or shield M^3 is moved against the influence of the spring m^3 to the position shown in full lines in Fig. 9, and this is done, preferably, by taking hold of a pin or knob m^4, projecting through the slotted perforation M^4 in the frame M.

The plate or shield M^3 is held in its outer position below the loader M′ by means of a suitable spring-pressed locking device actuated by a trigger m^5, as shown in Figs. 8 and 9.

The loader M′ has at its front a downwardly-projecting pin m^6, adapted to be swung against the front of the die-block G when the loader is to be discharged, which is done simply by pushing in the trigger m^5, when the shield M^3 is released and drawn by the spring m^3 to the position shown in dotted lines in Fig. 9, allowing the now liberated nails to drop into corresponding perforations in the stationary nail-die or die-block G preparatory to the descent of the head F, its driver-block, and drivers. In practice I prefer to use a pair of such improved loaders, one on each of the rods E′ E′, as shown in Fig. 2, and in the operation of the machine I prefer to employ one or more attendants for the purpose of filling the loaders and swinging them in and out of position.

N in Fig. 4 represents a V-shaped shoe or counter gage provided with a screw-threaded spindle n, adapted to slide forward and backward in a forked bearing a^7, attached to the upper rear end of the frame A, such shoe-gage being made adjustable by means of a nut n', surrounding the screw-threaded spindle n in the forked bracket a^7, as shown in Fig. 4. The screw-threaded spindle n is preferably splined in the said forked bearing, so as to prevent its being turned around its axis while it is being adjusted forward or back by means of the nut n'. This is a very simple arrangement, and by its use the shoe-counter is held in its proper position relative to the position of the nails to be driven.

In connection with the die-block G, I use any well-known device for holding and centering the heels and top pieces to be attached to the boots or shoes, and such a device is fully represented in Figs. 10 and 11, where P represents a block pivoted on a vertical pin p, attached to the frame A or any stationary part thereof, said block being provided with longitudinally-adjustable and laterally-expansive spring-pressed heel and top-piece clamps P′ P′ and top-piece clamps P″ P,″ said clamps preferably arranged at right angles with each other, as is common in machines of this kind. In combination with the expansive top-piece clamps P″, I use a metal spanker plate P^3, which is capable of longitudinal adjustment relative to said clamp by means of a regulating-nut P^4 and a screw-threaded spindle P^5, on which the spanker-plate P^3 is preferably guided, as shown in Fig. 10. The object of this adjustable spanker-plate is for the purpose of serving as a guide for the breast of the top piece while it is being inserted between the expansive top-piece clamps, and thus preventing the top piece from being placed irregularly between its clamps, the front edge P^6 of the said spanker-plate P^3 serving as a guide or templet for the breast portion of the top piece.

In connection with this machine I use three safety devices, as follows:

One is for the purpose of preventing the machine from being started until the treadle is depressed for raising the jack; and this device is constructed as follows: I make on the upper right-hand portion of the rack i'' a longitudinal groove i^3, (shown in Figs. 1, 2, and 3,) and to the starting-lever D′, I attach a downwardly-projecting rod D^3, the lower end of which is normally made to rest on the top of the ungrooved portion of the rack i'', so as to prevent the starting-lever D′ from being accidentally depressed for starting the machine until the treadle-lever L has been depressed and the rack i'' moved in the direction of the arrow shown in Fig. 2 to permit the lower end of the safety rod D^3 to enter the longitudinal groove i^3 in the right-hand portion of the rack i''.

The second safety device is for the purpose of preventing the machine from getting started until the loader is swung out of the way of the driver-block; and this device consists of a horizontally-sliding bar Q, adapted to slide forward and back in a guide R, secured to the top portion of the frame A, the said bar Q being provided on its upper side with pins or projections q q, adapted to be received in curved slots M^4 M^4 in the loader-frames M M, said bar Q being also provided on its under side with the elongated or V-shaped notch or recess Q′, as shown in Fig. 16, adapted to receive the upper end of a rod Q″, the lower end of which is connected to an arm Q^3, loosely pivoted to the swing-piece D and normally held upward by the influence of the spring Q^4, one end of which is secured to the arm Q^3 and the other being secured to the frame A, as shown in Fig. 3. In front of the end lever Q^3 is made on the frame A a stop projection Q^5, which prevents the swing-piece D from being moved forward to start the machine until the bar Q has been moved to one side sufficiently to enable the upper end of the rod Q″ to enter the recess Q′ on the under side of the sliding bar Q, at which time the arm Q^3 is raised sufficiently by its spring Q^4 to allow it to be pushed forward with the swing-piece D without coming in contact with the stop projection Q^5. The curved slot M^4 on the loader-frame M is so arranged relative to the pins q q on the bar Q that the swing movement of the loader when swung out of its position below the driver-block will impart a sliding motion to the bar Q, so as to permit the upper end of the rod

Q″ to enter the recess Q′ when the loaders are swung out of position, thus permitting at this time the starting of the machine; but when the loader is swung in position below the driver-block it causes the bar Q to be moved in its bearings to one side, by which the upper end of the rod Q″ is depressed by coming in contact with the non-recessed portion of said bar, causing the pivoted arm Q^3 to be depressed and held opposite to the stop projection Q^5 on the frame A, thus preventing the swing-piece D being operated by the handle D′ for starting the machine as long as the loader is in a position below the driver-block, and thus preventing the accidental breaking of the drivers.

The third safety device is for the purpose of preventing the nails from being unloaded from the loaders while the top piece and spanker-plate are below the die-block, and this is accomplished by the spanker-plate P^3 coming in contact with a spring-pressed locking-pin *r*, arranged in the stationary guide-piece R and having its upper end adapted to enter a perforation *q′* in the sliding bar Q, as shown in Figs. 16 and 17, and by such movement of the spanker-plate the pin *r* is locked into the perforation *q′* on the bar Q, by which the latter is locked in position, and while in said position the loaders are prevented from being swung into position below the driver-block by their grooved ears M^4 M^4 coming in contact and acting as stops against the pins *q q*.

The nail-perforations in the stationary die-block G correspond in number and position with the perforations *m′ m′* in the loaders M′, and the perforations in the plate or cover M″ correspond in number and position with the drivers F′, according to the number and location of the nails to be driven in the heel, and it will thus be seen that I am able to use a standard perforated die-block and a correspondingly-perforated standard-loader for the purpose of nailing heels of various sizes, it being only necessary to cover up a portion of the perforated loader by means of the perforated plate M″, having perforations corresponding to the number of drivers used on the driver-block and the nails to be driven.

The operation of the machine is as follows: The operator is preferably assisted by one or two attendants, who place the heel in the expansive heel-clamps and the top piece in the expansive top-piece clamps, as well as fill the loaders and swing them in and out of position relative to the drivers.

During the operation of the machine the balance-wheel B′ is set in a continuous rotation by belt-power applied at the pulley B^3. The jack is pulled out, as shown in Fig. 4, and a shoe is placed on the last. A heel is placed in the heel-clamps P′ P′, and a top piece placed in the top-piece clamps P″ P″, after which the heel is swung into its nailing position directly below the perforated die-block. The loaders are filled with as many nails as their perforated covers M″ will permit. The jack is then pushed inward until its counter comes in contact with a V-shaped gage N. The operator then depresses the treadle L, by which the jack is forced upward, so as to bring the heel portion of the boot or shoe sole against the under side of the heel held by the heel-clamps. One of the filled loaders is then swung into position above the die-block G, so that its perforations coincide with those of the said die-block. The loader is then discharged, allowing its nails to drop into corresponding perforations in the die-block with the nail-points resting on the heel. The loader is then swung out of position and reloaded by an attendant. The machine is then set in operation by quickly depressing the handle-lever D′, causing one revolution to be imparted to the shaft B, during the first quarter of which the driver-head is moved downward about one-half of its stroke, and during such motion the heel is automatically and firmly compressed between the under side of the perforated die-block G and the shoe-sole held upon the last for the purpose of holding the heel, shoe, and jack firmly in position during the nailing operation, as hereinabove set forth. During the next quarter-turn of the driving-shaft the jack remains stationary, and the head F continues to move downward, causing its drivers to drive the nails into the heel and sole and causing the points of the nails to be clinched against the metal heel-plate K″, and if a top piece is afterward to be spanked on the heel the nail-heads are left slightly projecting above the heel, as is common in the art of spanking top pieces. During the last half-revolution of the driving-shaft the driver-head is automatically raised to its normal position, the pressure on the heel removed, and the jack lowered by releasing the foot-pressure on the treadle-lever L.

For the purpose of spanking on the top piece the spanker-plate carrying the clamps P″ P″, with the top piece held between, is swung into the position previously occupied by the heel-clamps. After the jack has been again raised by depressing the treadle-lever L the machine is set in operation, as before, causing the projecting upper ends of the nails to be pressed into the under side of the top piece, which is thereby spanked on and secured to the heel without showing the nails in sight on the top piece.

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

1. In a heel-nailing machine, the combination of a main frame, a perforated die-block, a reciprocating nail-driver block, a jack, a jack-support, means for raising the jack-support and advancing the nail-driver block toward the jack, a pair of oscillating cams journaled, respectively, on the jack-support and a fixed part of the main frame and each

provided with a cam-surface and a surface which is concentric with the axis of the cam, and means for oscillating the cams as the nail-driver block advances to first bring the cam-surfaces into contact and subsequently the concentric surfaces, substantially as and for the purpose described.

2. In a heel-nailing machine, the combination, with a main frame, a stationary perforated die-block, a reciprocating nail-driver block, vertically-movable rods for actuating the nail-driver block, a jack, a jack-support, and means for raising the jack-support and jack, of a pair of oscillating cams journaled, respectively, on the main frame and the jack-support and having connections with the vertically-movable rods for placing an increased pressure on the jack as the nail-driver block advances to drive the nails, substantially as described.

3. In a heel-nailing machine, the combination, with a main frame, a stationary perforated die-block, a reciprocating nail-driver block, vertically-movable rods for actuating the nail-driver block, a jack, a jack-support, and treadle mechanism for raising the jack-support, of two rocking shafts or pins journaled, respectively, in the jack-support and the main frame and provided with cams, levers connected with the rocking shafts or pins, and links connecting the levers with the vertically-movable rods for causing the cams to raise the jack-support and thereby place an increased pressure on the jack as the nail-driver block advances to drive the nails, substantially as described.

4. In a heel-nailing machine, the combination of a main frame, a stationary perforated die-block, a reciprocating nail-driver block, a sliding jack having a pivoted metal last provided with an adjustable toe-piece, a jack-support provided with a jack-screw having a pinion, a horizontally-reciprocating rack engaging the pinion, and treadle mechanism connected with the rack for reciprocating the same to raise and lower the jack, substantially as described.

5. In a heel-nailing machine, the combination of a main frame, a stationary perforated die-block, a reciprocating nail-driver block, a sliding jack, a jack-support provided with a jack-screw having a pinion, a horizontally-reciprocating rack engaging the pinion, and a treadle mechanism connected with the rack to reciprocate the same for raising and lowering the jack, substantially as described.

6. In a heel-nailing machine, the combination of a main frame, a stationary perforated die-block, a reciprocating nail-driver block, a sliding jack, a jack-support having a jack-screw provided with a pinion, a horizontally-reciprocating rack engaging the pinion, a treadle mechanism connected with the rack for reciprocating the same to raise and lower the jack, and a pair of oscillating cams having their cam-surfaces brought into superficial contact as the nail-driver block advances for placing an increased pressure on the jack as the nails are driven, substantially as described.

7. In a heel-nailing machine, the combination, with the main frame having a bearing a^7, the stationary perforated die-block, and the reciprocating nail-driver block, of the forked shoe or counter gage N, having a screw-threaded spindle n arranged in the bearing on the main frame, and the screw-nut n', engaging the spindle for adjusting the gage and holding it fixed in its adjusted position, substantially as described.

8. In a heel-nailing machine, the combination, with the expansive top-piece clamps P″, of the spanker-plate P^3, the screw-threaded spindle P^5, on which the spanker-plate is movable horizontally back and forth in a right line, and the nut P^4 for adjusting the spanker-plate on the screw-spindle, substantially as described.

9. In a heel-nailing machine, the combination of the pivoted horizontally-swinging nail-loading frame M, the sliding nail-rest shield M^3, a spring m^3, acting on the nail-rest shield, a spring-pressed locking device for holding the nail-rest shield against the tension of the spring, and a trigger m^5 for releasing the locking device, substantially as described.

10. In a heel-nailing machine, the combination, with a main frame, a stationary perforated die-block, a reciprocating nail-driver block, driving mechanism for operating the nail-driver block, a jack, a jack-screw having a pinion, a rack engaging the pinion and having a groove or recess, and a treadle mechanism connected with the rack, of a starting-lever for the driving mechanism and a vertical rod connected with and moved downward by the starting-lever for causing the lower end of said rod to enter the groove or recess in the rack after the jack has been raised, substantially as described.

11. In a heel-nailing machine, the combination, with a main frame having a locking projection, a stationary perforated die-block, a reciprocating nail-driver block, a jack, means for raising the jack, and driving mechanism for operating the nail-driver block, of the swinging nail-loader having a slot, a horizontally-sliding bar having a recess and a projection adapted to enter the slot of the loader, a starting-lever for driving the mechanism, a spring-pressed arm adapted to strike the locking projection on the main frame, and a rod connected with the spring-pressed arm and adapted to enter the recess in the horizontally-sliding bar, substantially as described.

12. In a heel-nailing machine, the combination, with a main frame, a stationary perforated die-block, a reciprocating nail-driver block, a jack, means for raising the jack, and driving mechanism for the nail-driver block, of a swinging nail-loader having a slot, a stationary guide having a spring-pressed pin, and a horizontally-sliding bar having a stop-

pin and a locking-recess to receive the spring-pressed pin on the stationary guide, substantially as described.

13. In a heel-nailing machine, the combination, with a die-block and a nail-driver block, of a vertically-movable jack support or block having guides, a horizontally-reciprocating rack moving in said guides and rising and falling with the jack support or block, a jack, a jack-screw having a pinion engaging the rack, a treadle, a pivoted bell-crank lever, a link connecting the lever with the treadle, and a link connecting said lever with the rack for reciprocating the latter to raise and lower the jack-support and jack, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 21st day of May, A. D. 1890.

JOSEPH HORACE POPE.

Witnesses:

ALBAN ANDRÉN,

ALICE A. PERKINS.