(No Model.) 5 Sheets—Sheet 1.

J. H. POPE.

HEEL NAILING MACHINE.

No. 399,631. Patented Mar. 12, 1889.

Fig. 1.

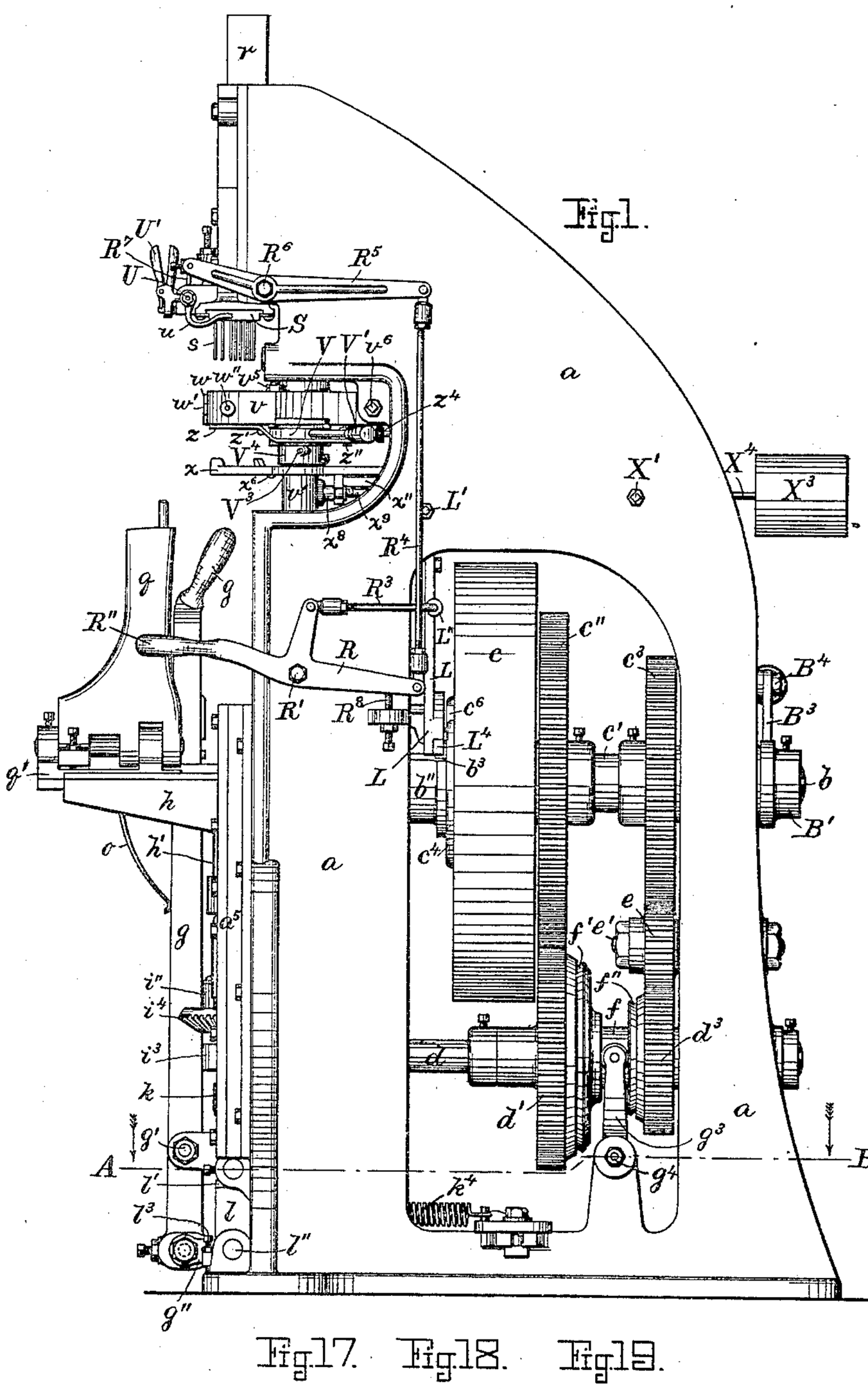
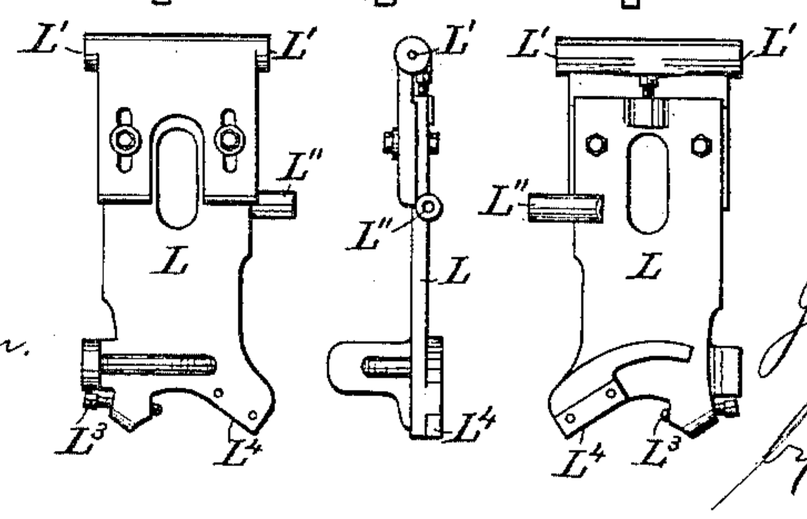


Fig. 17. Fig. 18. Fig. 19.



Witnesses.
Henry Chadbourn.
Selma R. Schelin.

Inventor
J. Horace Pope.
by Alban Andrén
his atty.

(No Model.) 5 Sheets—Sheet 2.

J. H. POPE.

HEEL NAILING MACHINE.

No. 399,631. Patented Mar. 12, 1889.

Fig. 2.

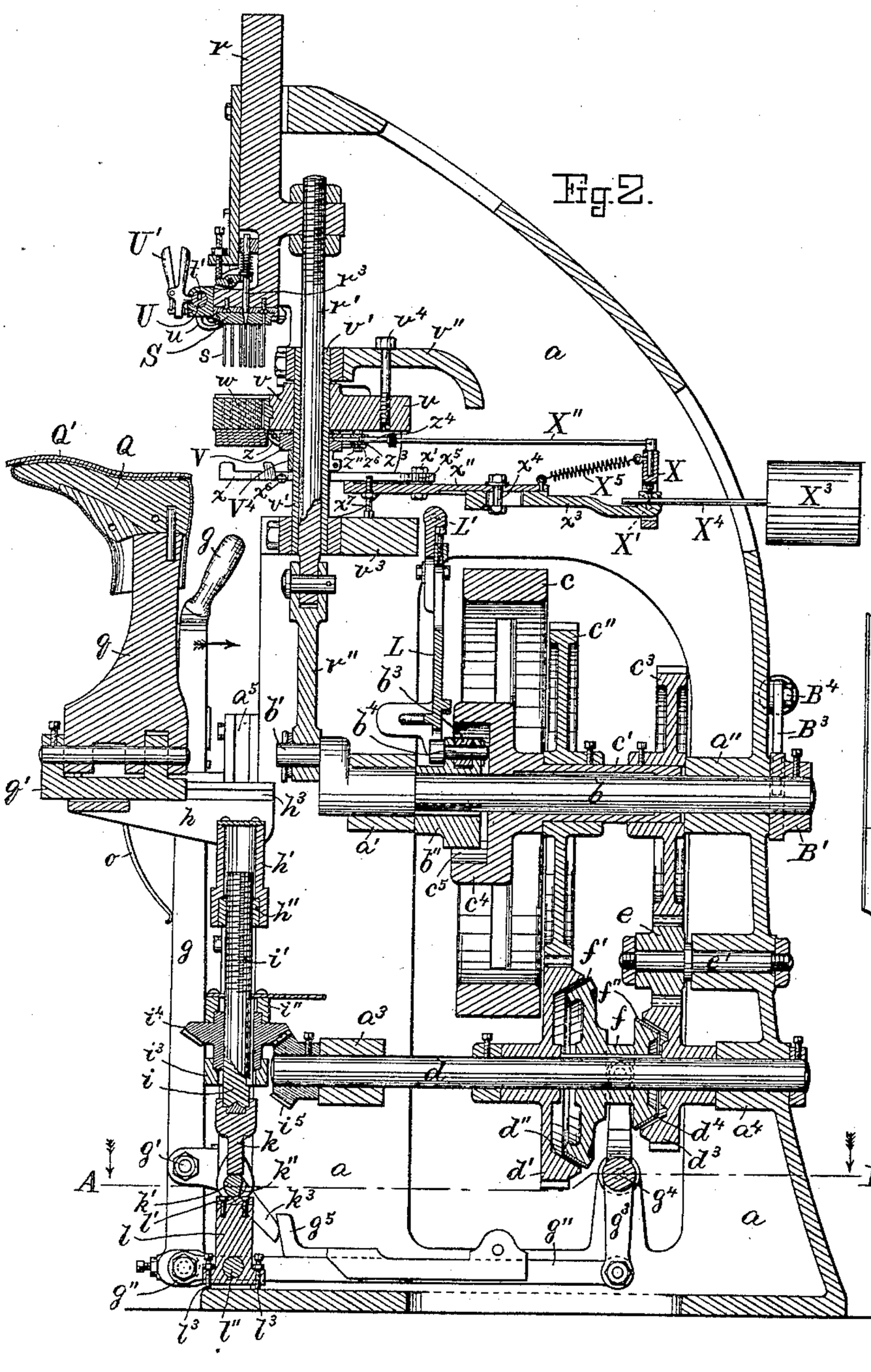


Fig. 22.

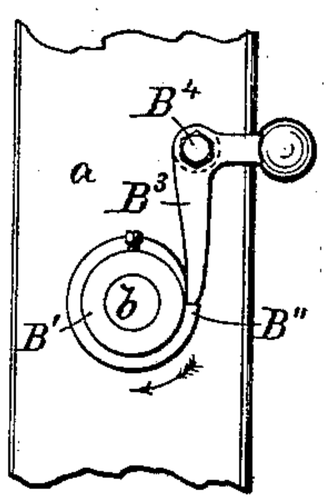


Fig. 21.

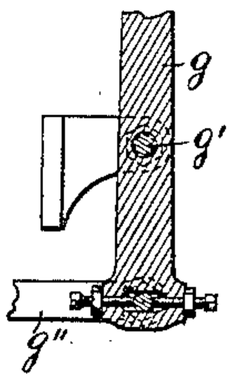
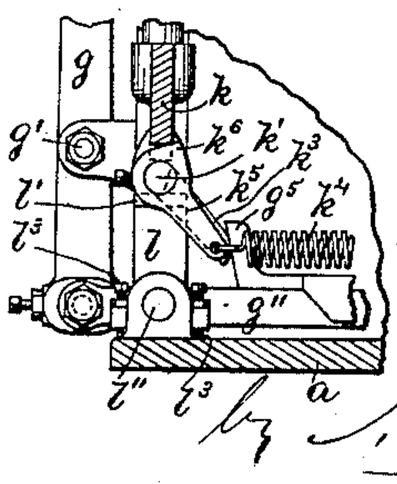


Fig. 20.



Witnesses

Henry Chadbourn.

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(No Model.) 5 Sheets—Sheet 3.

J. H. POPE.

HEEL NAILING MACHINE.

No. 399,631. Patented Mar. 12, 1889.

Fig. 3.

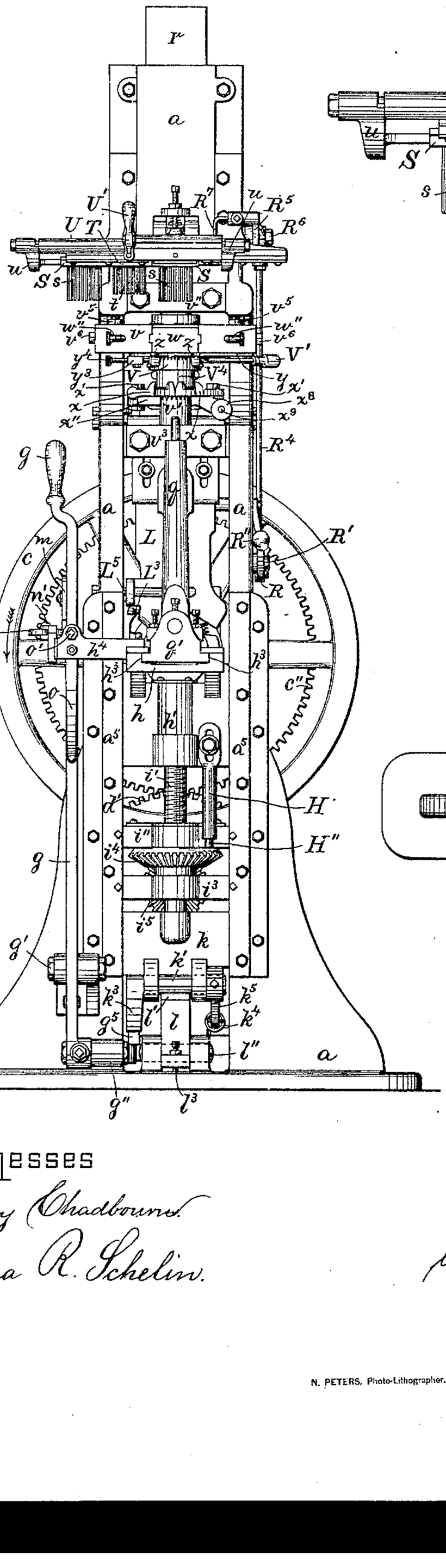


Fig. 23.

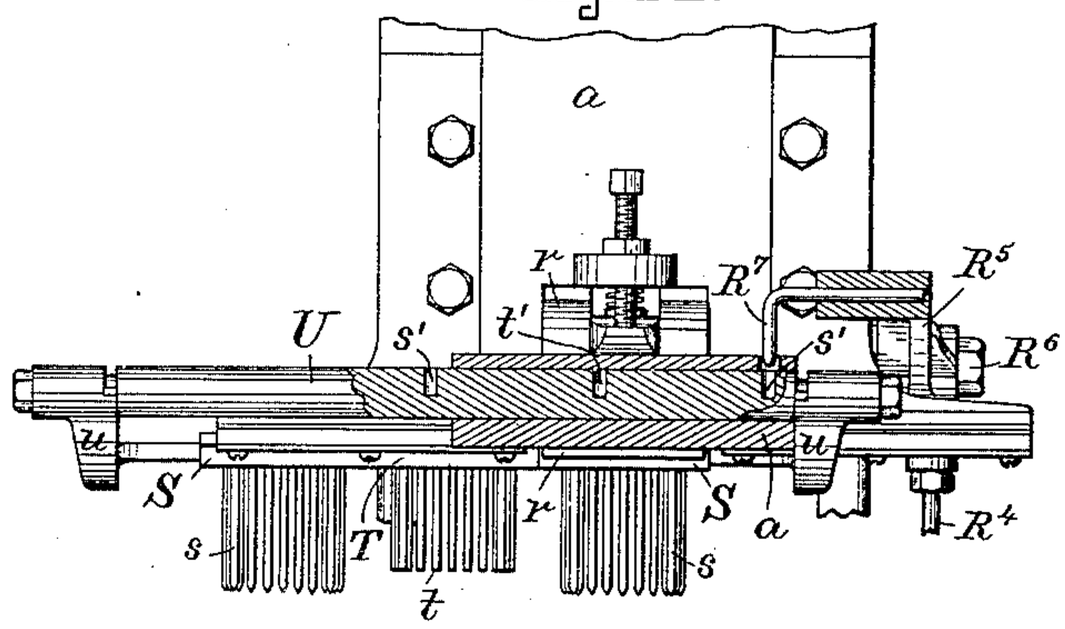
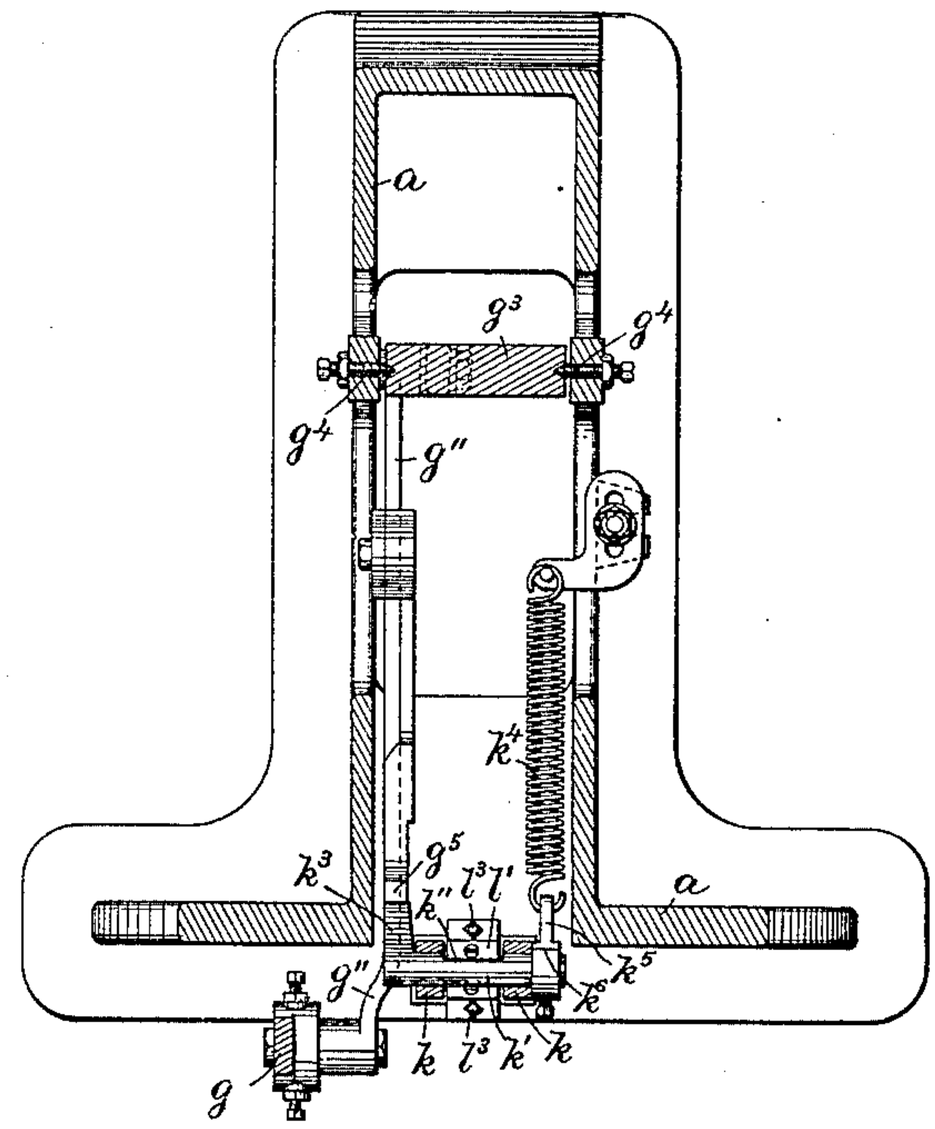


Fig. 4.



Witnesses

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(No Model.) 5 Sheets—Sheet 4.

J. H. POPE.

HEEL NAILING MACHINE.

No. 399,631. Patented Mar. 12, 1889.

Fig. 5.

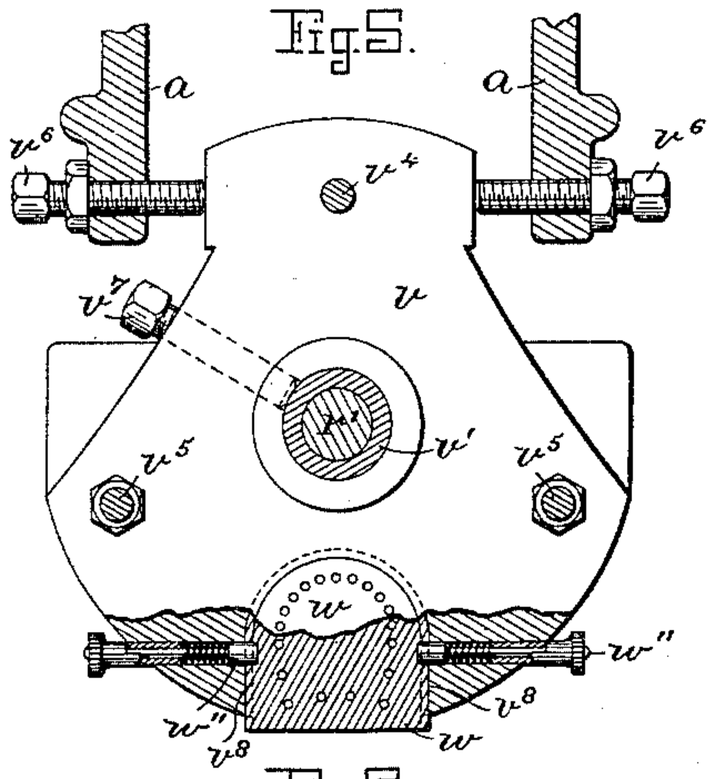


Fig. 6.

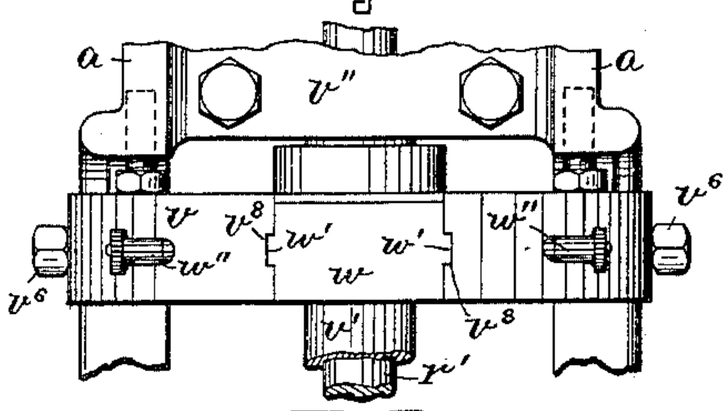


Fig. 8.

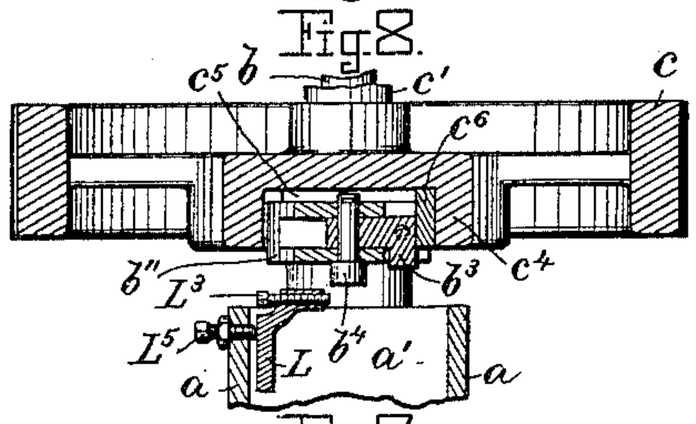


Fig. 7.

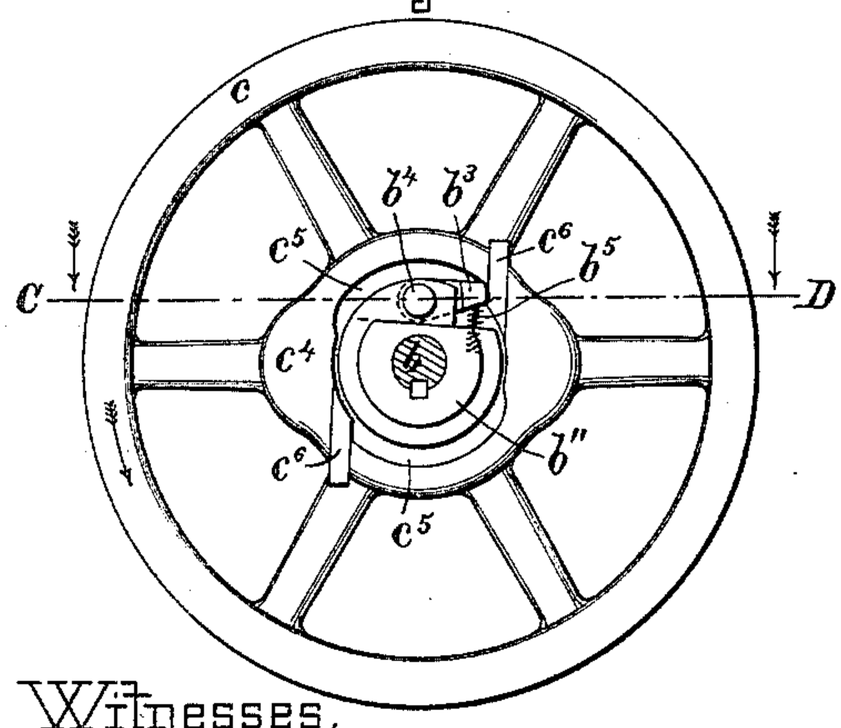


Fig. 10.

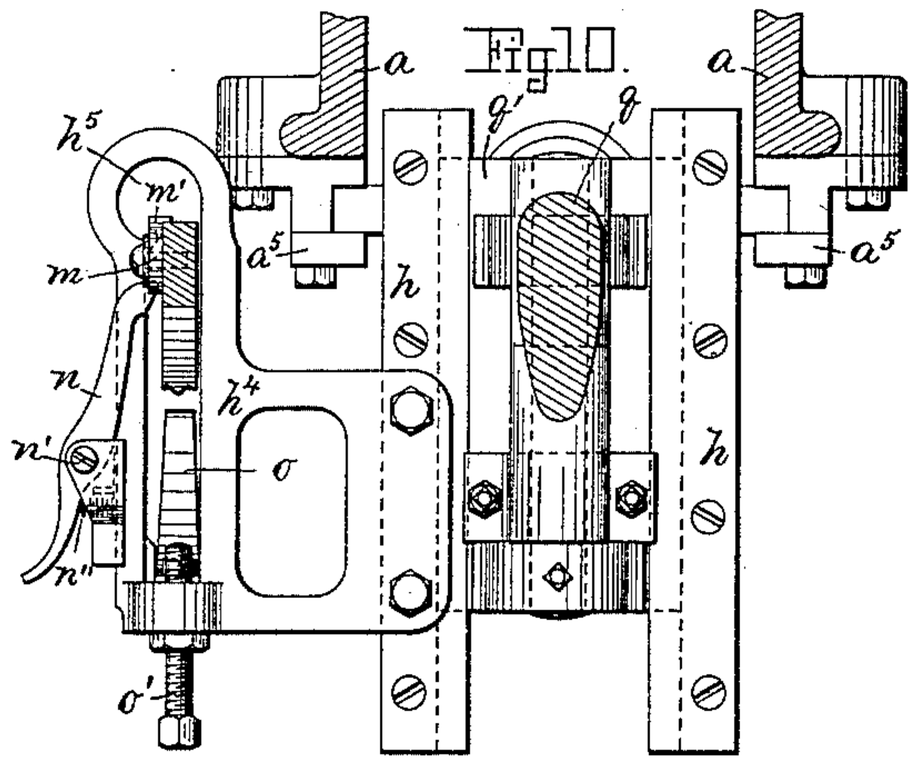
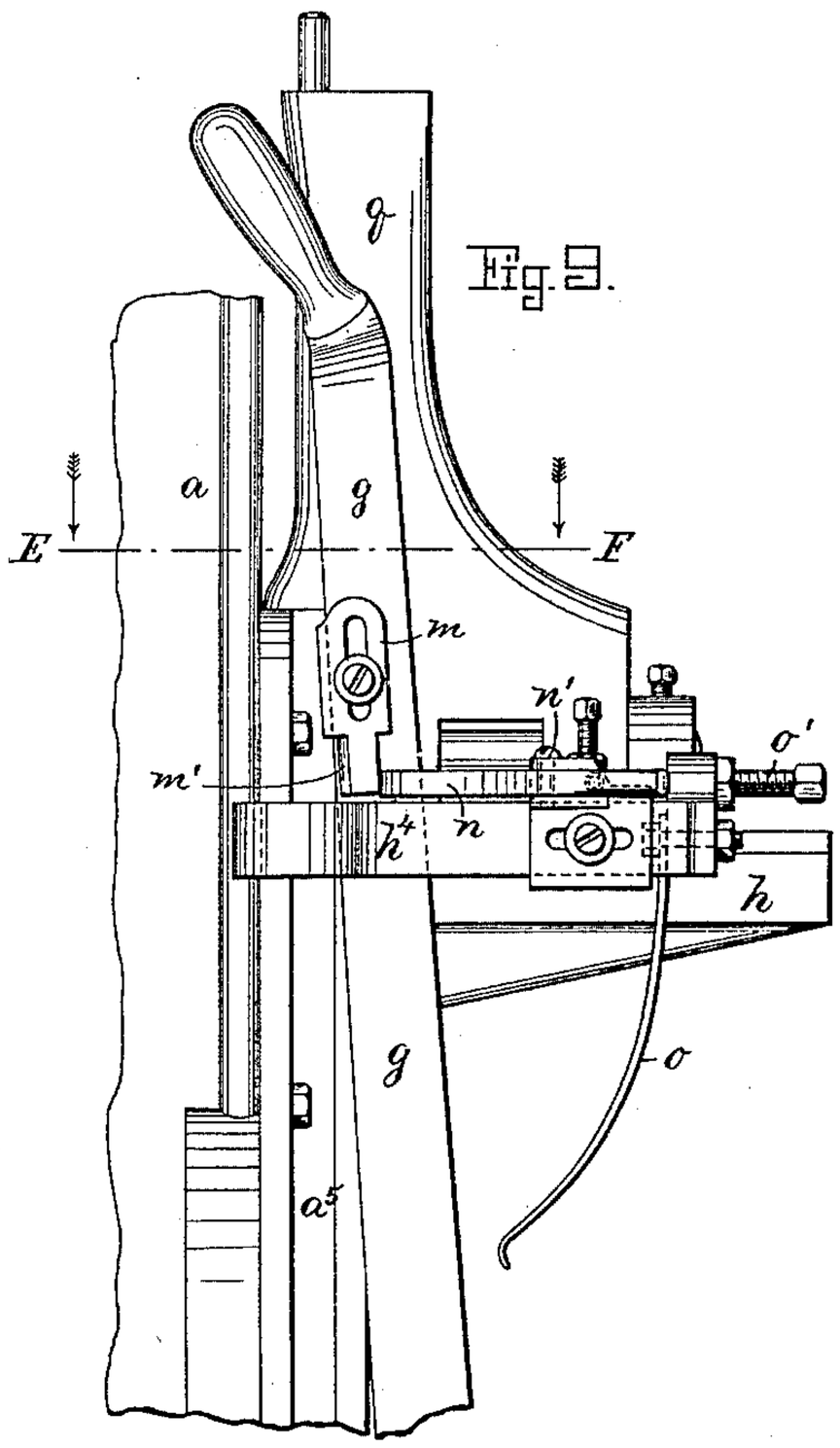


Fig. 9.



Witnesses.
Henry Chadbourn.
Selma R. Schelin.

Inventor
J. Horace Pope.
by Albert G. Davis & Co. his Attys.

(No Model.) 5 Sheets—Sheet 5.

J. H. POPE.

HEEL NAILING MACHINE.

No. 399,631. Patented Mar. 12, 1889.

Fig. 11.

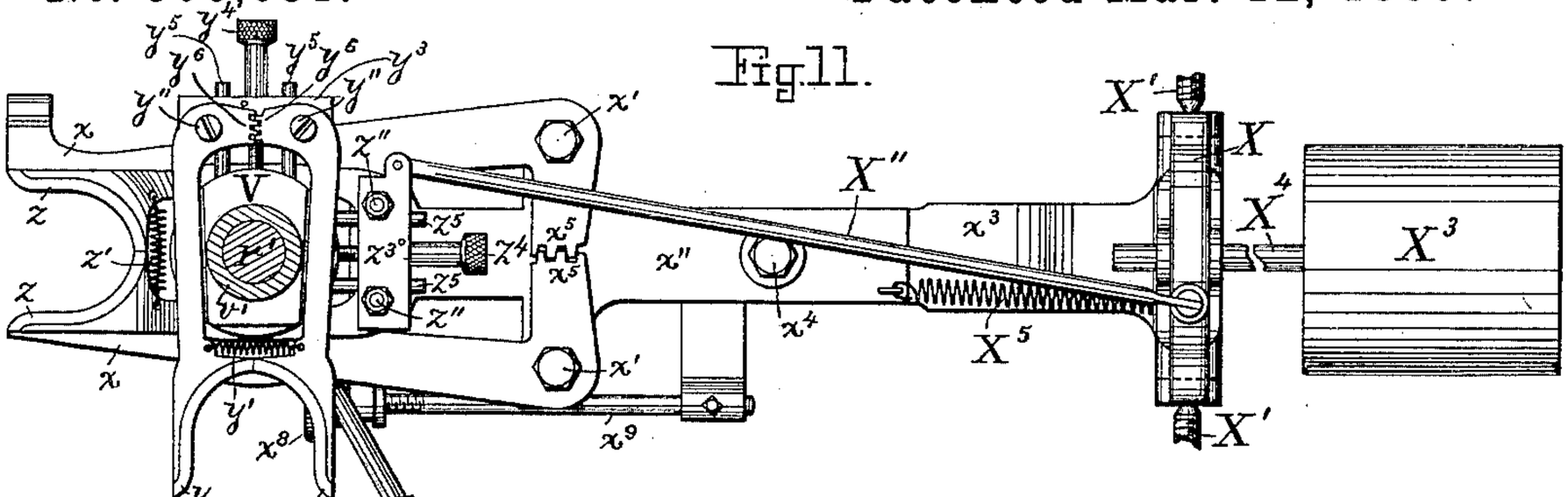


Fig. 12.

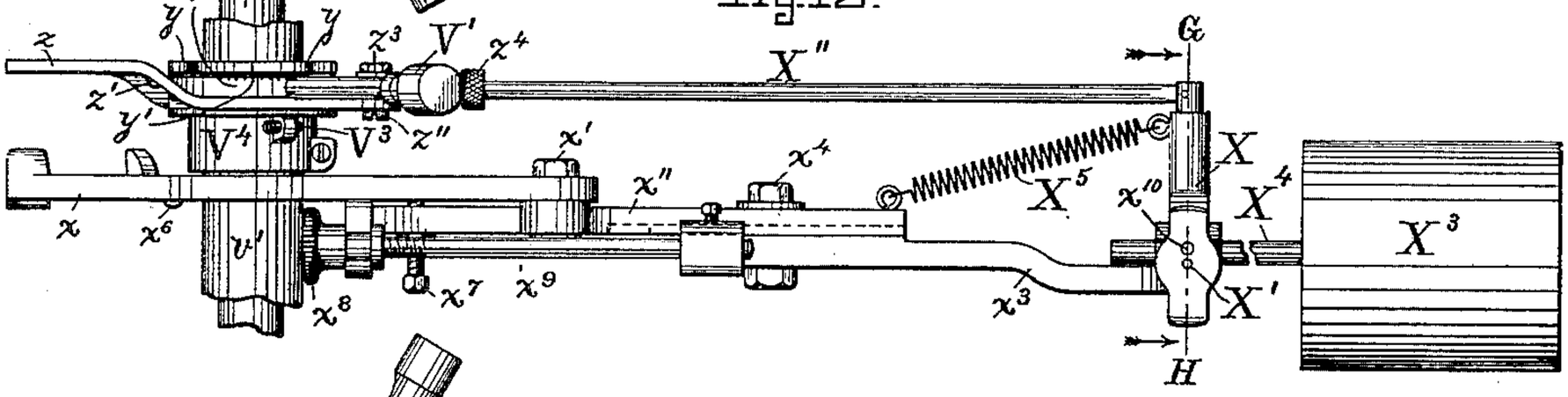


Fig. 13.

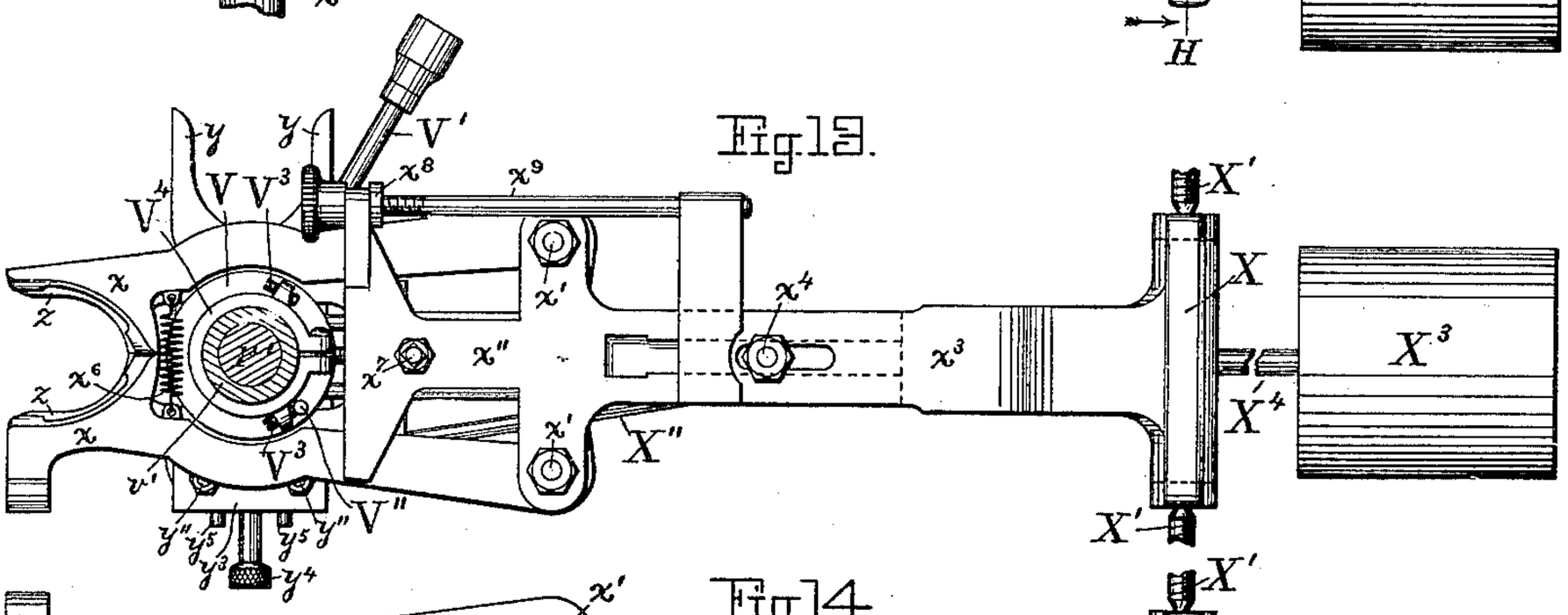


Fig. 14.

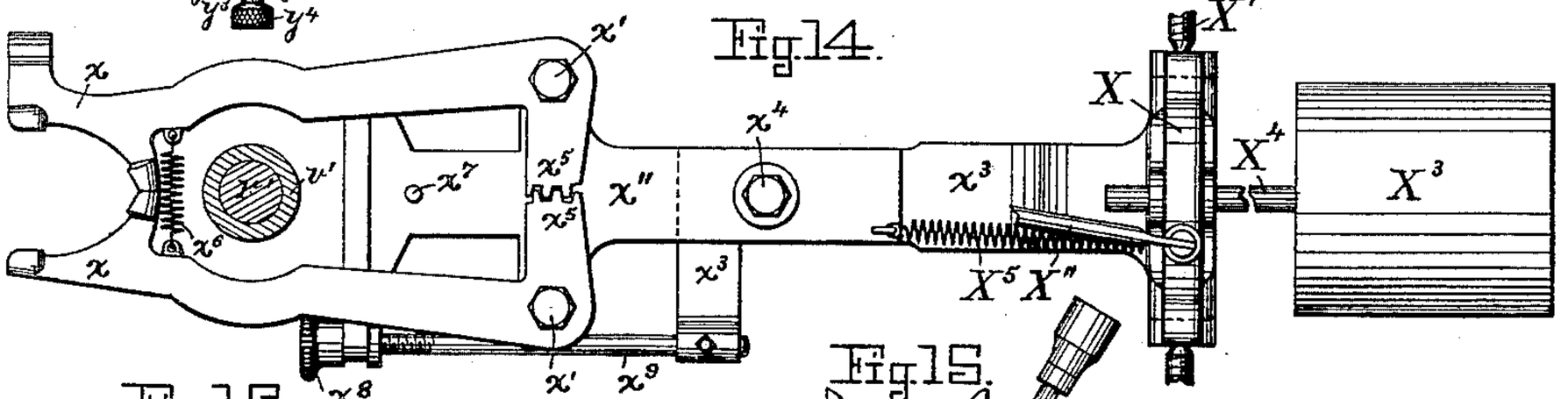


Fig. 16.

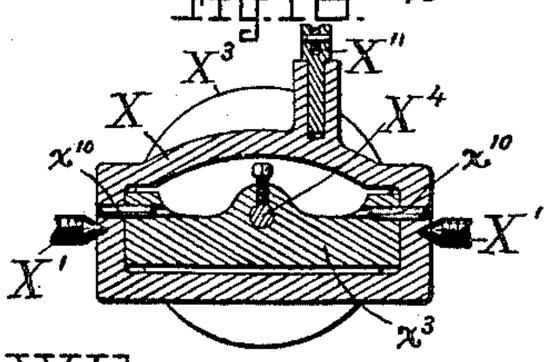
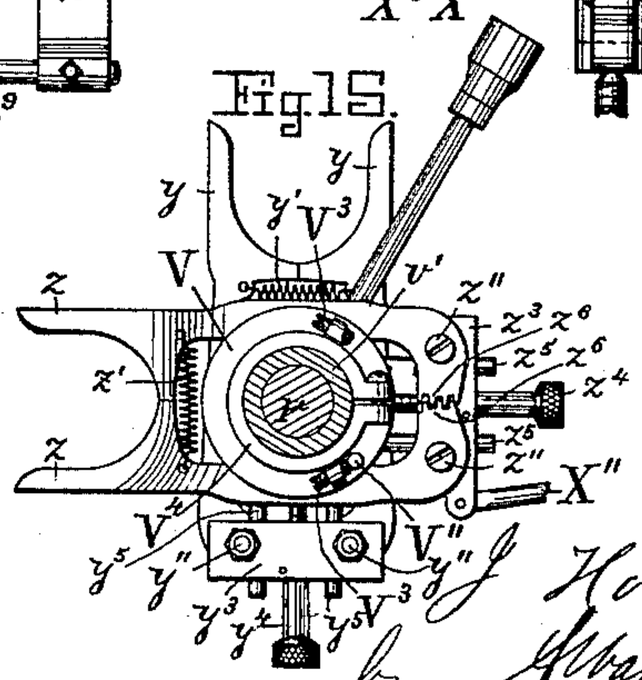


Fig. 15.



Witnesses.

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Inventor

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by Albert G. Davis & Co. his attys.

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. 399,631, dated March 12, 1889.

Application filed November 7, 1888. Serial No. 290,179. (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 Heeling-Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention relates to improvements in heeling-machines for the purpose of nailing the heels to boots and shoes, while the latter are held on a wooden last-support on a jack, and also to secure a top lift to the heel without driving the nails through such top lift.

This invention relates to improvements on the patent granted to Tyler and Merritt, June 30, 1885, No. 321,401; and it consists in an improved releasing mechanism for releasing the pressure on the jack and shoe after the heel has been attached to the shoe or for releasing such pressure after the top lift has been pressed on; also, to an automatic releasing mechanism on the pressure-lever, and a spring-pawl and an adjustable latch on said lever for holding the friction device to lower the jack for inserting the top lift or removing the shoe, as the case may be; also, to improved means for locking the nail-die in position on the die-holder; also, to improvements in the shoe-centering jaws and means for automatically moving the shoe ahead, so that the nail-heads that project upward shall come on one side of the holes in the nail-die, thereby presenting a solid metal support on the nail-die when the top lift is spanked on the projecting ends of the nails, and thus dispensing with a spanker-plate; also, in means for adjusting the front and rear parts of the shoe-clamp bracket; also, in an improved heel and top-lift clamp combined, consisting of expansive spring-jaws arranged at right angles to each other—one for the heel and one for the top lift—to enable the assistant to put in the top lift while the heel is being nailed, and to put in the heel while the top lift is being pressed on; also, in means for adjusting each pair of jaws at right angles to each other for the purpose of adjusting the heel and top lift in proper positions relative to the nail-die, and to stop-screws for regulating the swinging motion of the clamps, so as to bring the heel or top lift centrally below the nail-die; also, to an improved combined starting and safety lever and connecting mechanism for preventing the machine from being started, except when the awls or drivers are directly above and opposite the holes in the nail-dies, and to other improvements, as will be hereinafter more fully shown and described, reference being had to the accompanying drawings, wherein—

Figure 1 represents a side elevation of the improved machine. Fig. 2 represents a central longitudinal section of the same. Fig. 3 represents a front elevation of the machine. Fig. 4 represents a cross-section on the line A B, shown in Figs. 1 and 2. Fig. 5 represents a detail plan view of the die-holder, shown partly in section. Fig. 6 represents a detail front view of the die-holder. Fig. 7 represents a detail front elevation of the main driving-pulley and its clutch mechanism. Fig. 8 represents a cross-section on the line C D, shown in Fig. 7. Fig. 9 represents a detail side view of the automatic releasing device for holding the friction-clutch in lowering the jack. Fig. 10 represents a cross-section on the line E F in Fig. 9. Fig. 11 represents a detail plan view of the heel, boot, and top-lift clamp. Fig. 12 represents a side view of the same. Fig. 13 represents a bottom view of the same. Fig. 14 represents a detail plan view of the boot-clamps. Fig. 15 represents a detail bottom view of the heel and top-lift clamps. Fig. 16 represents a cross-section on the line G H in Fig. 12. Figs. 17, 18, and 19 represent, respectively, detail front, side, and rear views of the swinging lever or plate for operating the clutch on the driving-pulley. Figs. 20 and 21 represent detail sectional views of mechanism for releasing the pressure on the jack. Fig. 22 represents a rear view of the driving-shaft and its locking-pawl, and Fig. 23 represents a detail sectional front elevation of the awl and driver-shipper mechanism and safety centering device.

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

On the drawings, *a a* represent the general frame of the machine, having bearings *a'* and *a''* for the driving-shaft *b*, on which

is loosely journaled the driving-pulley and balance-wheel c, provided with a hollow sleeve, c', surrounding the shaft b, and to said sleeve are secured the gear-wheels c'' and c^3.

In bearings a^3 and a^4, below the shaft b, is located the shaft d. On said shaft are loosely journaled the gear-wheels d' and d^3, the former meshing in the teeth of the gear-wheel c'' and the latter meshing in the teeth of the intermediate pinion, e, that is loosely journaled on a pin or stud, e', secured to the frame of the machine. The pinion e meshes in the teeth of the gear c^3. On the shaft d is splined the hub f, which is capable of a longitudinal adjustment on said shaft, said hub having cast in one piece with it or secured to it the conical friction-clutches f' and f'', the former being somewhat larger than the latter, said clutches being adapted to be forced, respectively, into or against correspondingly-shaped conical clutch-recesses d'' and d^4 in the faces of the respective gears d' and d^3, as shown in Fig. 3.

The above-described mechanism is arranged in a manner and for a purpose substantially as shown and described in the Patent No. 321,401. I do not claim it as my invention, and I wish to state that I do not confine myself to the precise mechanism, as other or well-known mechanism may be used for imparting a rotary motion from the shaft b to the shaft d, and to reverse the motion on the latter without departing from the essence of my invention.

The friction-clutches f' and f'' are moved longitudinally on the shaft d by means of the hand-lever g, that is pivoted at g' to the front of the frame a, and has hinged to its lower end the link g'', the rear end of which is hinged to the rock-lever g^3, that is supported on the fulcrum-pin g^4, and has a forked upper end embracing the hub f between the friction-clutches f' and f'', in a manner and for the purpose as shown and described in said Letters Patent No. 321,401.

h is the jack-supporting frame or bracket, that is vertically adjustable in guides a^5 a^5 on the front of the machine, as shown in Figs. 1, 2, and 3, said bracket having on its under side a hollow post or tube, h', within which is secured or made in one piece the nut h'', as shown in Fig. 2. The nut h'' receives the upper screw-threaded end, i', of the pressure-shaft i, which latter is guided in stationary bearings i'' i^3, secured to the front of the machine, and between them is splined on said shaft i the bevel-gear i^4, meshing in the teeth of the bevel-gear i^5, secured to the front end of the clutch-shaft d, as shown in Fig. 2, in a manner and for the purpose as shown and described in the said Patent No. 321,401. When the clutch f' is forced against the gear d', the jack-support h will be gradually forced upward, and the heel of the boot that is held upon the jack and its last will be forced with a gradual pressure against the under side of the stationary nail-die holder v, that is held stationary during the operation of the machine, and after the heel is nailed, or after the top lift is spanked on, the clutch f'' is forced against the gear d^3, causing the shaft d, bevel-gears i^4 i^5, and screw-shaft i i' to turn in an opposite direction, and thus cause the jack-support to be lowered, as fully shown and described in the above-mentioned patent.

To the jack-support h is adjustably secured the downwardly-projecting bar H', preferably provided in its lower end with a friction-piece, H'', which, as the jack-support reaches its lowest position, is brought to bear against the top of the gear i^4, and thus arrests the downward motion of said jack-support.

For the purpose of releasing the pressure on the jack and shoe after the heel has been nailed on or the top lift pressed on the projecting ends of the nails, I use in connection with the lever g a releasing device constructed as follows: The lower end of the vertical shaft i rests in a cup-bearing in the vertically-adjustable block k, that is capable of a slight vertical motion in the guides a^5 a^5, said block having journaled to it in its lower end a horizontal cam-shaft, k', adapted to rest on the top of the step or block l, or on a hardened-steel plate, l', secured to the top of said step, as shown in Figs. 2 and 3. The said step l is shown as pivoted to a horizontal shaft, l'', located in bearings on the frame a, and provided with regulating set-screws l^3 l^3, passing through ears on said step and screwed against the base-plate of the machine, as shown in Figs. 2, 3, and 4, for the purpose of regulating the position of said step and to secure it firmly in a vertical position; but this is not essential, as the said step may be cast in one piece with the frame of the machine, or otherwise secured to it, without departing from the essence of my invention.

The cam-shaft k' has on one side a cut-away or eccentric portion, k'', and it will thus be seen that if the shaft k' is turned slightly around its axis the reduced or eccentric part of it is brought in contact with the top of the step l, thus allowing the block k, shaft i, and jack-support h to drop slightly, sufficient to release the pressure between the heel and the nail-die, and after such a release is accomplished the jack-support and its connections are lowered the proper distance by forcing the clutch f'' against the clutch-wheel d^3, causing the shaft d to be rotated in the desired direction and the screw-shaft i i' to be turned by means of the respective gears i^4 and i^5. Such release and downward motion of the jack-support are accomplished by forcing the lever g toward the machine in the direction of the arrow shown in Fig. 2, the link g'' being for this purpose provided with a tooth or projection, g^5, that is preferably secured in an adjustable manner to said link, as shown in Figs. 2 and 4, and adapted to actuate a lever, k^3, secured to or forming a

part of the cam-shaft k', as shown in Figs. 2, 3, and 4.

A spring, k^4, one end of which is secured to a lever, k^5, on the cam-shaft k', and the other end, preferably, adjustably secured to the frame a of the machine, as shown in Figs. 1, 3, 4, and 20, tends to automatically return the lever g, its clutch-lever g^3, and clutches f' f'' to the normal position shown in Figs. 1 and 2, when the operator releases his hold on said lever g, and it does so after the lever has been released by the automatic releasing device, hereinafter to be described.

The lever k^5 has on it a swell or stop projection, k^6, (shown in Fig. 20,) that serves as a stop against the block k, for preventing the cam-shaft k' to be turned too far around its axis when the lever g is released, and it also acts as a stop to return the levers g and g^3 to their normal vertical position, (shown in Fig. 2,) and to limit their automatic motions to this extent.

q is the jack, as usual, having means for securing to its upper end the last Q, that carries the shoe Q', as shown in Fig. 2. The lower part of the jack q is pivoted to a plate, q', that is adapted to slide in and out in guides h^3 on the jack-support h, as shown in Figs. 1, 2, and 3. The said jack is mounted in its support h in the same manner as shown and described in the Letters Patent No. 321,401.

The automatic releasing mechanism on the lever g is constructed as follows: Cast in one piece with or secured to the jack-support h is a plate or bracket, h^4, having a vertical perforation, h^5, for receiving the lever g, as shown in Figs. 9 and 10. To the side of the lever g is adjustably secured a latch, m, having an inclined or tapering forward end, m', as shown in Fig. 9. On the plate h^4 is pivoted at n' the spring-pressed pawl n, actuated by means of a spring, n'', as shown in Fig. 10. After a heel has been nailed on the shoe it is requisite to lower the jack sufficiently to enable a top lift to be spanked on, and after the latter has been spanked on the jack must again be lowered to permit it and its last and shoe to be drawn forward. To lower the jack, the lever g is swung toward the machine into the position shown in Figs. 9 and 10, causing the cam-shaft k to release the upward pressure on thejack and the screw-shaft i i' to be automatically turned sufficiently to lower the jack the required distance. In swinging the lever g to the position shown in Fig. 9, the latch m passes by the free end of the spring-pressed pawl n, and the latter holds the lever g in the position shown in Fig. 9 until the jack and its support have been lowered sufficiently to cause the pawl n to sink below the lower end of the latch m, when the lever g will be automatically returned to its normal vertical position (shown in Figs. 1 and 2) by the influence of the spring k^4, hereinbefore mentioned, and the further downward motion of the jack-support arrested. The latch m is adjustable on the lever g, so as to obtain a downward motion of the jack a little greater than the thickness of the top lift to permit the insertion of such top lift between the heel and nail-die. By means of this automatic releasing device on the lever g the operator need not hold said lever in position during the lowering of the jack, as all that is necessary for him to do is to swing the lever g to the position shown in Fig. 9, where it will be held by the spring-pawl n until the jack is lowered the desired distance, when said lever will be automatically released and returned to its normal vertical position.

o is a spring secured in one end to the bracket h^4, its free end being adapted to be brought in contact with the lever g when the latter is swung outward for the purpose of forcing the jack upward, said spring serving the purpose of automatically returning the lever g to its normal vertical position when the operator releases his hold on said lever after having swung it outward to its fullest extent.

o' is an adjustable set-screw on the bracket or plate h^4, for limiting the outward motion of the lever g and the friction between the clutch f' and its wheel d'.

r is the plunger by which the awl and driver blocks are actuated, one block at a time, substantially in a manner as fully shown and described in the patent granted May 1, 1888, to Tyler and Merritt, No. 382,121, said plunger being movable up and down in guides in the head of the machine, and has attached to it the shaft r', the lower end of which is pivoted to the connecting-rod r'', that is connected to the crank-pin b' on the shaft b, as shown and described in United States Letters Patent No. 321,401.

v' is a sleeve surrounding the shaft r', which sleeve is firmly secured in a suitable manner to the bearings v'' v^3 on the frame of the machine. Directly below the bearing v'' is adjustably secured to the sleeve v' the die-holder v. (Shown in Figs. 1, 2, 3, 5, and 6.) The said die-holder is vertically adjustable on the sleeve v', according to the depth that the nails are to be driven, by means of a regulating set-screw, v^4, passing through the bearing v'' and screwed into the rear part of said die-holder. Set-screws v^5 v^5, made adjustable in screw-threaded perforations in the frame or head of the machine, serve as supports for the upper side of the die-holder against the upward pressure of the jack and its shoe and heel, by which all torsion and strains on the sleeve v' are taken off and the upward pressure on the die-holder transferred directly to the frame of the machine. By means of lateral screws v^6 v^6, passing through screw-threaded portions of the frame a, the die-holder can be adjusted laterally and with the greatest nicety, for the purpose of bring-

ing the perforations in the nail-die in lines directly below the positions of the awls or drivers.

v^7 is a screw for securing the die-holder to the sleeve v', as shown in Fig. 5.

w in Figs. 5 and 6 is the perforated nail-die having side ribs, w' w', adapted to fit and slide in correspondingly-shaped grooves v^8 v^8 in the recessed die-holder.

The nail-die is automatically held and locked in position in the die-holder by means of the spring-pressed pins w'' w''. (Shown in Figs. 5 and 6.)

x x represent the expansive boot-clamps or shoe-centering jaws for centering and holding the rear of the boot in position while perforating or nailing the heel, which clamps are pivoted at x' x' in their rear ends to the block x'', which is adjustably secured to the suspension-bar x^3 by means of the screw-bolt x^4 going through slotted perforations in said parts x'' and x^3, as shown in Figs. 11, 12, 13, and 14, such adjustment being essential for the purpose of adjusting said boot-clamps relative to the nail-die, according to variations in the heels that are to be nailed.

The inner rear ends, x^5 x^5, of the expansive boot-clamps are geared together, as shown in Figs. 11 and 14, to cause both clamps to open and close equally, and thus properly centering the boot relative to the nail-die. An expansive spring, x^6, connects the boot-clamps between their fulcra and outer ends, and serves to hold the boot-clamps properly against the rear part of the boot or shoe that is being nailed.

x^7 is an adjustable set-screw screwed through the bar or block x'', which screw rests on the bearing v^3, Fig. 2, and serves as a support for the boot-clamps, so as to prevent their dropping too far below the nail-die and holder. By loosening the set-screw x^4 the boot-clamp support x'' can be adjusted forward and back relative to the part x^3 by means of the thumb-nut x^8, journaled in a bearing in the part x'', and adapted to receive the screw-threaded end of the spindle x^9, secured in a suitable manner to the part x^3 or a lateral extension thereon, as shown in Figs. 11, 12, and 14. The rear end of the part x^3 is pivoted at x^{10} x^{10} to the yoke X, (shown in Figs. 11, 12, 13, 14, and 16,) which latter is pivoted to stationary fulcra X′ X′, which may be secured to any stationary part of the main frame of the machine, such latter fulcra being arranged below the fulcra x^{10} x^{10}, on which the part x^3 swings, as shown in Figs. 12 and 16. It will thus be seen that by rocking the yoke X on its fulcra X′ X′ a longitudinal motion is imparted to the boot-clamps, and this is done for the purpose of moving the nailed boot or shoe heel previous to spanking the top lift on it sufficiently to cause the projecting ends of the nails to be moved out of the path of the perforations in the nail-die, so that when the top lift is put on top of the projecting ends of the nails and said top lift pressed on a solid metal portion of the nail-die shall come opposite to the places where the nails are located, which solid metal portion of the nail-die will thus serve as a rest and solid support when the top lift is spanked on, and by this arrangement I am able to dispense with the usual spanker-plate for this purpose. The yoke X is automatically turned around its fulcrum for this purpose by means of a rod, X″, connected in one end to the said yoke and in its forward end to a block on the heel-clamps, as shown in Figs. 11 and 12. The boot-clamps and their attachments are balanced by means of a counter-weight, X^3, having a rod, X^4, that is secured in an adjustable manner to the rear end of the part x^3, as shown in Figs. 11, 12, 13, 14, and 16. A spring, X^5, that connects the upper end of the yoke X to the rear end of the boot-clamp support x'', tends to aid in holding said boot-clamps in their proper horizontal position.

The adjustable and expansive heel and top-lift clamps used in connection with the boot-clamps above described are constructed as follows: Above the boot-clamps is journaled, on the sleeve v', a hub or block, V, to which is secured a handle, V′, by means of which said block or hub may be turned ninety degrees around its axis, so as to bring successively the heel and top-lift clamps in position centrally below the nail-die, the said hub being limited in its swinging motion forward and back around the sleeve v' by means of a stop projection, V″, secured to said hub that comes in contact with adjustable regulating-screws V^3 V^3, screwed through ears or projections on a collar, V^4, secured in an adjustable manner to the sleeve v' above the boot-clamps, as shown in Figs. 12, 13, and 15.

The heel and top-lift clamps are precisely alike, and one may be used interchangeably for the other, if so desired.

y y are the top-lift clamps, held together in an expansive manner by means of the spring y', said clamps being pivoted in their rear ends at y'' y'' to the block y^3, which is adjustable to and from the sleeve v' by means of a thumb-screw, y^4, the block y^3 being guided on pins y^5 y^5, secured to the block or hub V.

The rear meeting edges of the top-lift clamps y y are toothed, as shown at y^6 y^6 in Fig. 11, so as to cause them to expand and contract symmetrically when top lifts of various sizes are introduced between them and withdrawn from between them.

The heel-clamps are arranged below the top-lift clamps and at a right angle to the latter, but are otherwise constructed precisely like the top-lift clamps. z z are the said heel-clamps; z', their connecting-spring; z'' z'', the fulcra on which they are hinged on their rear ends to the adjustable block z^3; z^4, the regulating thumb-screw, and z^5 z^5 the guide-pins on which the block z^3 is adjustable to and from the sleeve v'. z^6 z^6 are the toothed interlocking inner ends of the said heel-clamps, as shown in Figs. 11, 12, 13, and 15. The rod

X″, leading from the yoke X, is connected to By this arrangement of heel and top lift the heel-clamp block z^5, as shown in Figs. 11, 12, and 15, for the purpose above mentioned. clamps arranged at a right angle to each other an assistant can put in the top lift between the top-lift clamps while the heel is being nailed, after which the heel and top-lift clamps may be turned ninety degrees around the sleeve v' by manipulating the handle V′, causing the top-lift clamps and the top lift held between them to come in the position previously occupied by the heel, and when said top lift is being spanked onto the heel the assistant places a heel between the heel-clamps, and so on, thus facilitating the operation of nailing the heels to the boots or shoes and spanking the top lift on without loss of time.

In Figs. 3 and 23, s s are the awls, and t are the drivers, each group of such awls and drivers being secured to the respective independent blocks S S and T, which are laterally movable in guides in the head of the machine and guides in the lower end of the vertically-movable plunger, so that either of the said awl or driver blocks can be guided into the lower end of the plunger and locked into position therein during the time such block is used, in a manner as fully shown and described in the patent to Tyler and Merritt, No. 382,121, before mentioned.

In a stationary guide, a^6, secured to or forming a part of the head of the machine, is guided the shipper-rod U, and to the ends of said rod are secured the fingers u u, the inner ends of which abut against the awl-blocks S S, as shown in Fig. 23, and serve as means for reciprocating the awl and driver blocks in a like manner as shown and described in the Patent No. 382,121.

The shipper-rod U is manipulated in a lateral direction for the purpose of bringing either of the awl or driver blocks directly below the plunger r, according to the work to be done, and said rod is so manipulated by the operator taking hold of a spring-pressed handle or lever, U′, (shown in Figs. 1, 2, and 3,) said handle or lever being mounted on the shipper-rod U in a suitable manner, and is adapted to be locked in position on the guide a^6 after one of the desired awl or driver blocks has been moved into the guides on the under side of the plunger r.

Within the plunger r is located a spring-pressed centering-pin, r^3, the lower end of which is automatically forced into a perforation in that one of the awl or driver blocks that for the time being is connected to the plunger, as represented in Fig. 2; and I wish to state that such construction, arrangement, and mode of operation of the awl and driver blocks form no part of my present invention, it being fully shown and described in the United States Letters Patent No. 382,121 above mentioned; but in machines of this kind it is very essential that the plunger should not be allowed to descend until the awl or drivers are moved to a position coinciding with that of the perforations in the nail-die below said plunger, so as to prevent the accidental breaking of such awls or drivers, and for this purpose I use a starting and safety locking and centering device which is constructed as follows:

R is a starting-lever, pivoted at R′ to the frame a, and having a handle, R″, in its outer end, as shown in Fig. 1. R^3 is a link or rod hinged in one end to a projection or upward extension of the lever R, and in its rear end to the clutch mechanism, hereinafter to be described, by means of which the pulley c and shaft b are coupled together when the plunger r is to be operated. To the rear end of the lever R is hinged the upwardly-projecting rod R^4, the upper end of which is hinged to a lever, R^5, that is pivoted at R^6 to the frame of the machine, and has secured to its forward end a downwardly-projecting centering-pin, R^7, (shown in Fig. 23,) which, when the handle R″ of the lever R is pressed downward, is caused to enter one of the centering-recesses s' s' or t' in the shipper-bar U, that coincides with the operating position of the awl or driver blocks, as shown in Fig. 23, and it will easily be perceived that the handle R″ of the starting-lever R cannot be depressed for the purpose of starting the plunger r unless the shipper-bar U has been moved to such a position relative to the plunger that either of the awl or driver blocks is properly centered relative to the said plunger and the perforated nail-die below it—that is, that the shipper-bar U must be moved laterally to such a position that one of its recesses s' s' t' coincides with the position of the centering projection R^7 on the lever R^5, as shown in Fig. 23, before the plunger r can be started by means of the lever R. The levers R and R^5 are normally held by their own gravity in the non-operative positions shown in Fig. 1, the lever R being in this position supported on an adjustable set-screw, R^8, on the frame a, which limits the downward motion of said lever R.

In connection with the starting-lever R, I use a suitable clutch mechanism for securing the pulley c and shaft b together when the handle R″ of the lever R is depressed by the operator.

In practice I prefer to use the clutch mechanism as is illustrated in Figs. 1, 2, 7, 8, 17, 18, and 19, and it is constructed as follows: On the shaft b is secured the pawl-carrying hub b'', to which is pivoted the pawl b^3 by means of the pin b^4, as shown in Figs. 2, 7, and 8. The pawl b^3 is automatically forced outward by the influence of a spring, b^5. (Shown in Fig. 7.) The hub b'' projects into the hub c^4 of the pulley c, which hub has one or more segmental recesses, c^5 c^5, and locking projections c^6 c^6, preferably made of hardened steel, as shown in Figs. 7 and 8.

From the above it will be seen that when-

ever the pawl b^3 is liberated it will be brought by its spring against either of the locking projections c^6 on the hub c^4 during the rotation of the pulley c, and consequently the motion of the said pulley c will be communicated to the hub b'', shaft b, and plunger r. In connection with the said clutch mechanism and the starting-lever R, I employ a clutch or shipper plate or bar, L, preferably made in two parts, one of which is adjustably secured to the other, as shown in Figs. 2, 17, 18, and 19, which plate is hung at L′ to the frame of the machine, and is pivoted at L″ to the rod R^3, as shown in Fig. 1. To the lower end of the plate or bar L is secured an adjustable set-screw, L^3, which normally serves as a stop against the head of the pin b^4, on which the pawl b^3 is pivoted, so as to cause the shaft b to be stopped when the plunger r is in its highest position, as shown in Figs. 1 and 2.

In the lower end of the shipper-plate L is an inclined projection, L^4, which, during the normal position of the lever L, causes the spring-pressed pawl b^3 to be pressed inward and liberates it from the locking projections c^6 on the hub of the pulley c, thus permitting a free rotation of the latter without imparting a rotary motion to the shaft b.

To start the shaft b, it is only necessary to depress the handle R″, when the plate or bar L is swung away from the pulley c, the set-screw L^3 is liberated from the pin b^4, and the pawl b^3 is liberated from the inclined projection L^4 on the plate L, causing the spring b^5 to force the pawl b^3 outward to the position shown in Fig. 7, when, as the pulley c rotates, one of its projections c^6 will be brought in contact with said expanded pawl b^3, and thus cause the rotary motion of the pulley c to be communicated to the hub b'' and its shaft b. After starting the shaft b and its connections, as above described, the operator lets go his hold on the handle R″, causing the lever R and its plate L to be automatically returned to their normal position, (shown in Fig. 1,) and as the shaft b approaches the end of its revolution the pawl b^3 is automatically forced inward by coming in contact with the inclined face L^4 in the lower end of the plate L, by which the pulley c is liberated from the hub b'' and its shaft b, and the latter is brought to a standstill at the end of a complete revolution by the pin b^4 coming in contact with the set-screw L^3, as before mentioned, and for the purpose of preventing undue strain on the plate L a set-screw, L^5, adjustably secured to the frame a, serves as a rest or support for the said frame, as shown in Fig. 8.

For the purpose of preventing the shaft b from rebounding when thus stopped at the end of its complete revolution, I secure to the rear end of said shaft b a cam or disk, B′, having a tooth or projection, B″, that serves as a stop against the weighted pawl B^3, that is pivoted at B^4 to the frame of the machine, thus causing the shaft b to be automatically and positively stopped at the end of its complete revolution, and in such a manner as to leave the plunger r at the upper end of its stroke, as shown in Figs. 1, 2, and 3.

The operation of the machine is as follows: The jack is drawn outward, as shown in Fig. 2, and the shoe to be heeled is placed on the last, as shown in said figure. A heel is placed between the heel-clamps, and the jack is moved toward the machine until the boot is stopped in its proper position by the boot-clamps. The jack is raised by pulling the lever g outward until the sole of the boot is pressed firmly against the heel and the latter against the under side of the nail-die. The awl-block is moved into the guides of the plunger and centered, as described, after which the machine is set in operation by depressing the handle R″, causing the awls to descend and to penetrate the heel, after which the plunger and awls ascend and remain stationary. The nail-die is then loaded in the usual manner, the driver-block is moved centrally below the plunger, and the machine again set in operation as before, causing the drivers to descend and to drive the nails into the heel and sole of the boot or shoe. The boot or shoe is then lowered by the mechanism, as described, and the top lift, introduced between the top-lift clamps, is swung into position below the nail-die, and the jack and shoe are forced upward as before by the means described, causing the projecting ends of the nails to be forced into the top lift resting against the solid under side of the nail-die, by which the top lift is spanked onto the heel without the need of a spanker-plate. The jack is then again lowered, drawn outward, and the heeled boot or shoe removed and another placed in position on the last and its jack, the heel and top-lift clamps in the meantime having been swung to their original positions and a new heel introduced between the heel-clamps and swung into position below the nail-die, 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 heeling-machine, the cam or eccentric k' k'', arranged between the pressure-screw-supporting block k and the step l, and having the lever or projection k^3, in combination with the lever g and the link g'', connected to the friction-clutch lever g^3, and provided with the tooth or projection g^5, substantially as and for the purpose set forth.

2. In a heeling-machine, the vertically-movable jack-support h and the spring-pressed pawl n, pivoted on said jack-support or an extension thereon, in combination with the jack-operating lever g and the adjustable latch m, secured to said lever, substantially as and for the purpose set forth.

3. In a heeling-machine, the nail-die holder v, having the horizontal grooves v^8 v^8, and the detachable nail-die w, inserted in said holder, in combination with the spring-pressed

fastening-pins w'' w'', arranged in the die-holder and adapted to lock the nail-die to said holder, as specified.

4. In a heeling-machine, the expansive spring-actuated boot or shoe centering jaws x x, pivoted and geared together as described, combined with a yoke, X, to which the supporting-bar of said jaws is pivoted, said yoke being hung on fulcra X′ X′, as described, for the purpose of longitudinally adjusting said jaws relative to the nail-die when the top lift is being spanked, substantially in a manner as set forth and described.

5. In a heeling-machine, a pair of spring-pressed expansive boot or shoe centering jaws, x x, pivoted in their rear ends to the supporting-bar, said bar being hung on fulcra x^{10} x^{10} in the pivoted yoke X, in combination with the balance-weight X^3, substantially as and for the purpose set forth.

6. In a heeling-machine, the expansive spring-pressed boot or shoe centering jaws x x, pivoted in their rear ends to the support x'', in combination with the pivoted bar x^3, and the adjusting-screw x^9 and thumb-nut x^8, arranged on the parts x'' x^3, as described, for the purpose of adjusting the said jaws x x in a longitudinal direction relative to the nail-die, substantially as set forth and described.

7. In a heeling-machine, the starting-lever R, connected to a clutch mechanism for actuating the plunger r, combined with a pivoted safety-lever, R^5, connected to the starting-lever R, as described, and having a tooth or projection, R^7, adapted to enter recesses in the awl or driver block shipper-bar U, for the purpose of preventing the plunger being actuated until the awls or drivers are placed in their proper positions relative to the nail-die, as set forth.

8. In a heeling-machine, the loose driving-pulley c, having recessed hub c^4 and one or more stop projections, c^6, and a hub, b'', secured to the plunger-actuating shaft b, and having the spring-pressed pawl b^3, mounted on the pin b^4, combined with the rocking plate L, connected to the starting-lever R, and having in its lower end the inclined projection L^4 and stop screw or projection L^3, substantially as and for the purpose set forth.

9. In a heeling-machine, the nail-die holder v, mounted on the sleeve v', combined with the regulating-screw v^4 and adjustable rest-screws v^5 v^5, and the lateral regulating and fastening screws v^6 v^6, substantially as and for the purpose set forth.

10. In a heeling-machine, the driving-shaft b and the pulley c, loosely journaled and having clutch mechanism for connecting said parts together, combined with a weighted pawl, B^3, and a toothed hub, B′, secured to the driving-shaft b, substantially as and for the purpose set forth.

11. In a heeling-machine, the vertically-adjustable jack-support h and screw-shaft i i' and gear i^4, connected to a friction-clutch reversing mechanism, as described, combined with an adjustable post or bar, H′, secured to said jack-support and adapted to be brought in contact with said gear i^4 when the jack reaches its lowest position, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 2d day of January, A. D. 1889.

JOSEPH HORACE POPE.

Witnesses:

ALBAN ANDRÉN,

SELMA R. SCHELIN.