

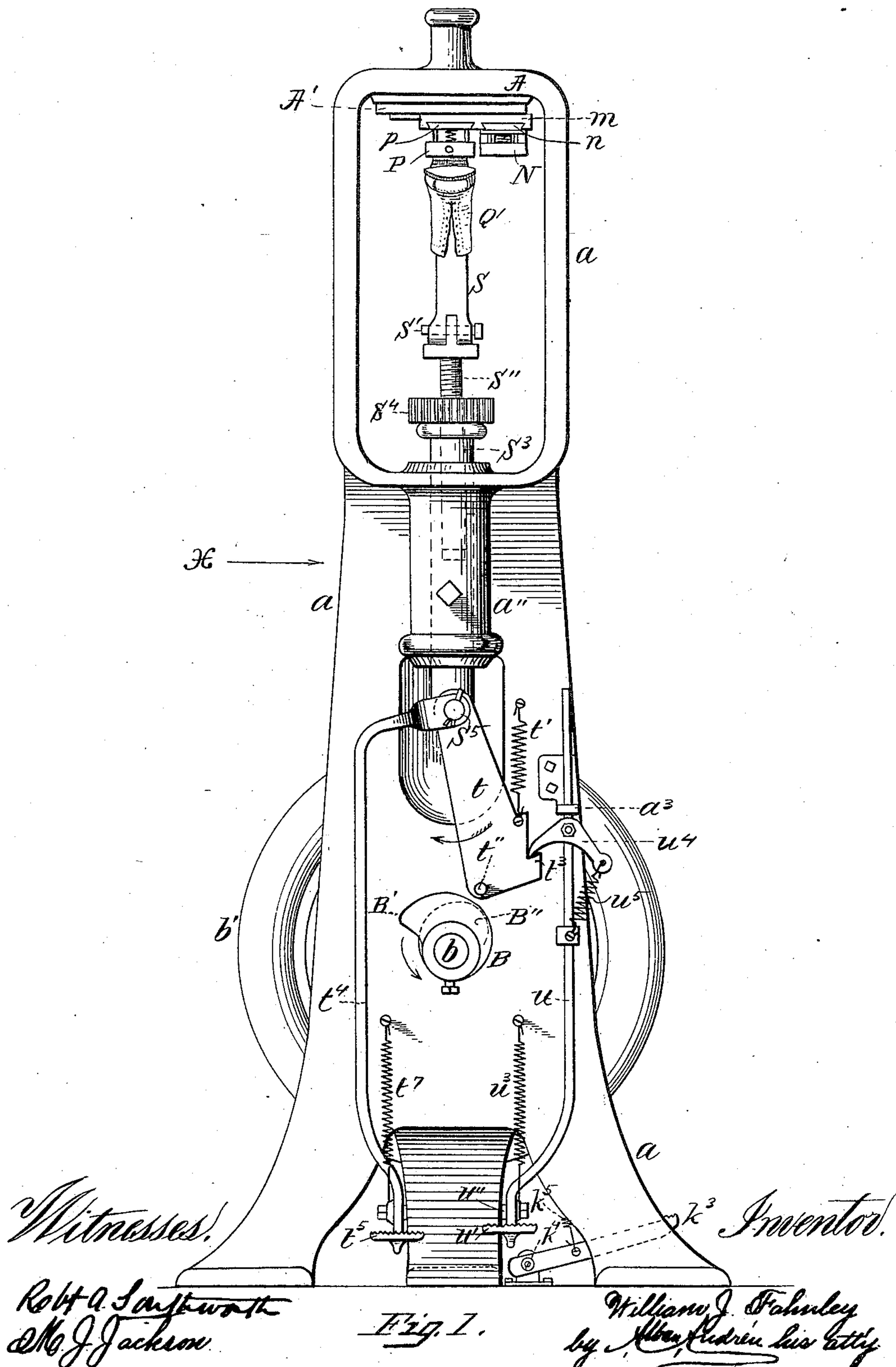
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5 Sheets—Sheet 1.

W. J. FAHNLEY.
HEEL NAILING MACHINE.

No. 428,044.

Patented May 13, 1890.



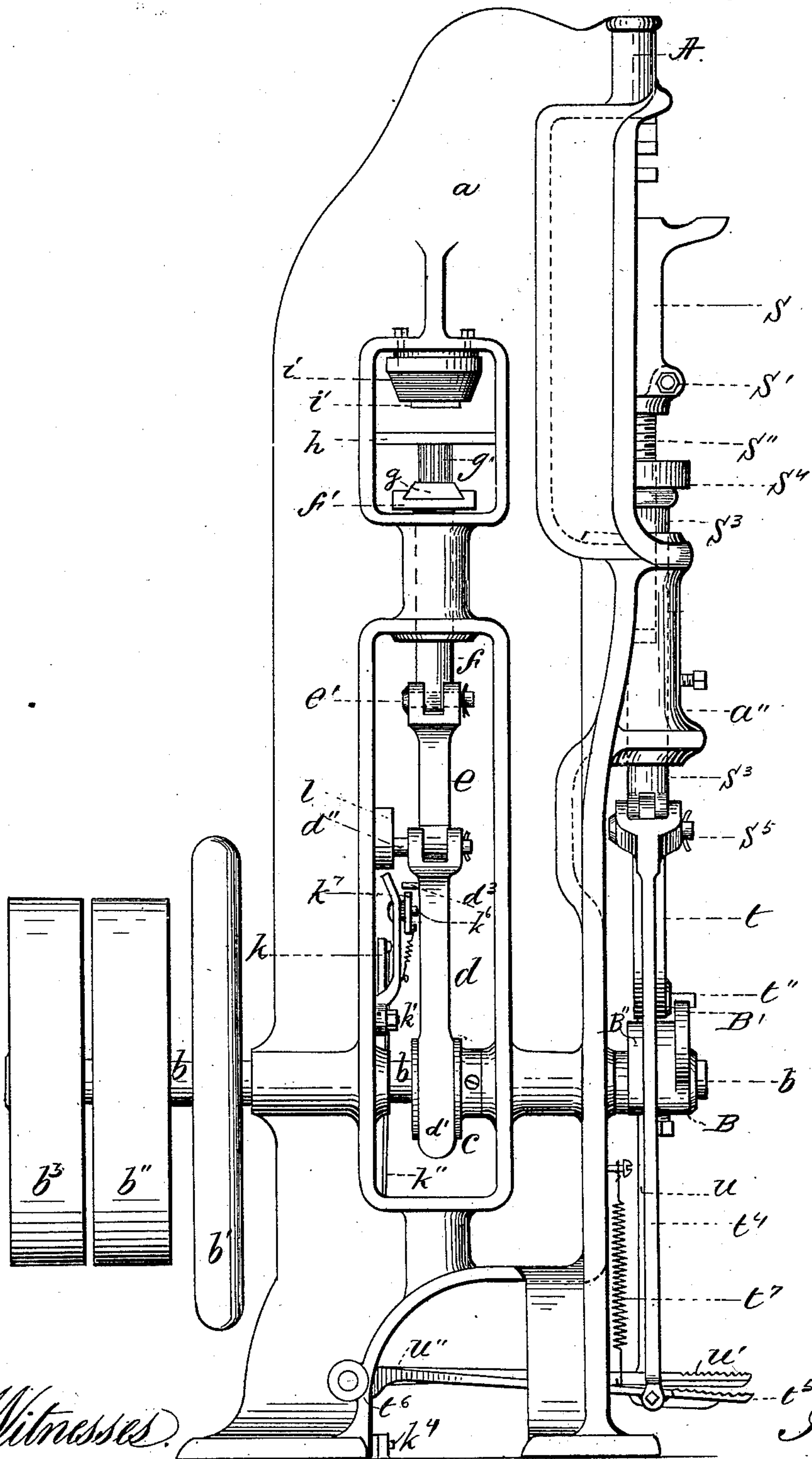
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5 Sheets—Sheet 2.

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No. 428,044..

Patented May 13, 1890.



Witnesses.

Mr. J. Jackson.
Rt. a Southworth

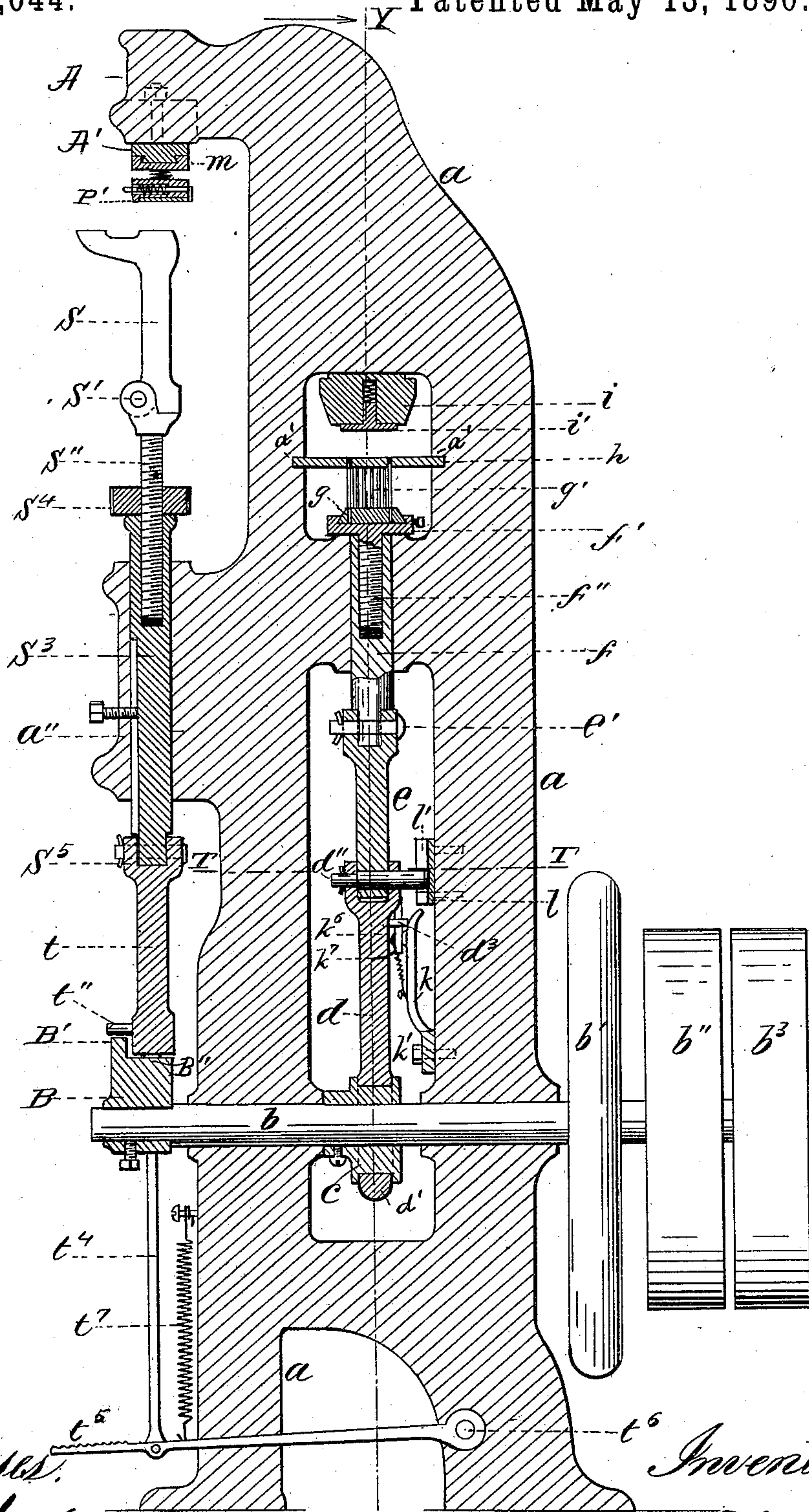
Fig. 2.

William J. Mahoney
by Alan Audin his atty.

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Patented May 13, 1890.



Witnesses:

Mr. Jackson.

Robert A. Southworth

Fig. 3.

⁶ *Inventor*

William J. Sturley
by *Evan Linder*, his atty.

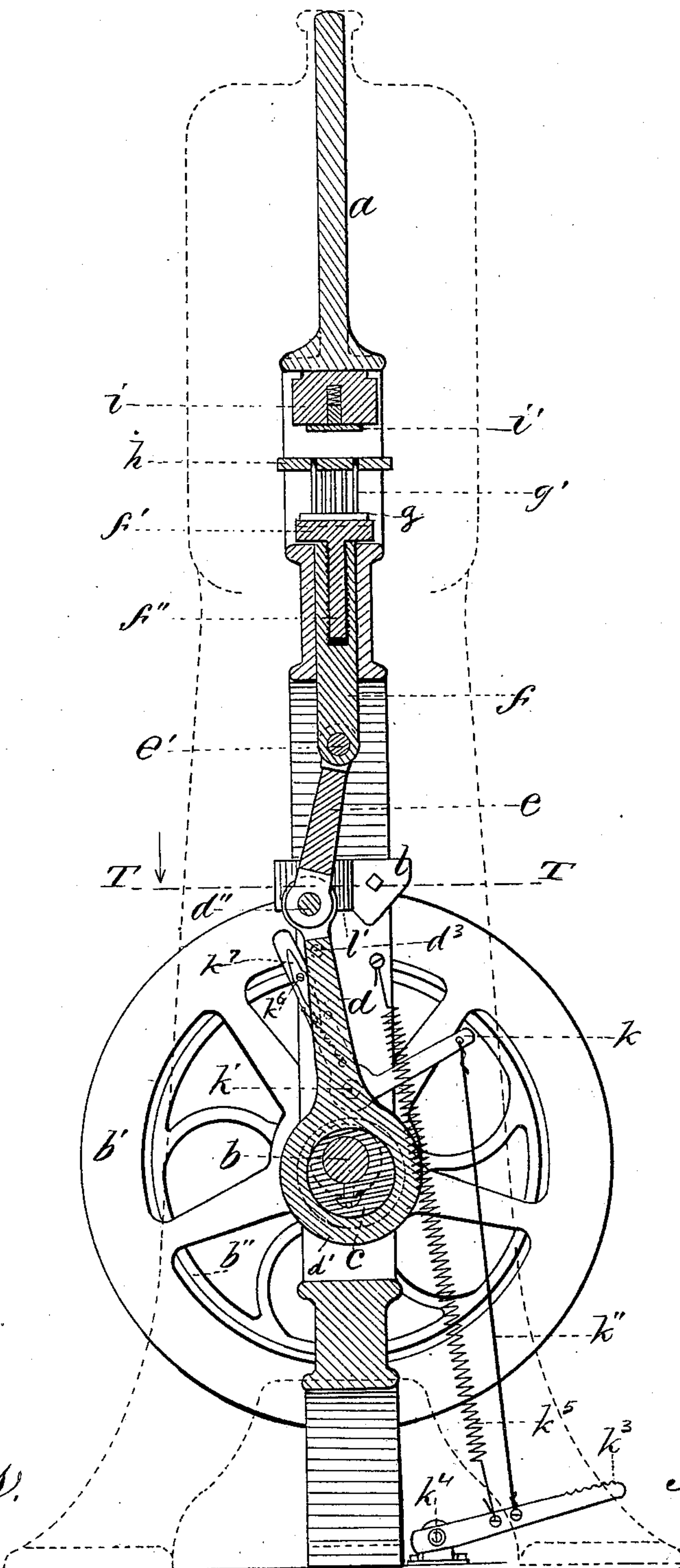
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5 Sheets—Sheet 4.

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Patented May 13, 1890.



Witnesses:

Inventor.

Wm J Jackson
Robert A Southworth

Fig 4.

by William J. Fahsley
Alban Judson, his atty

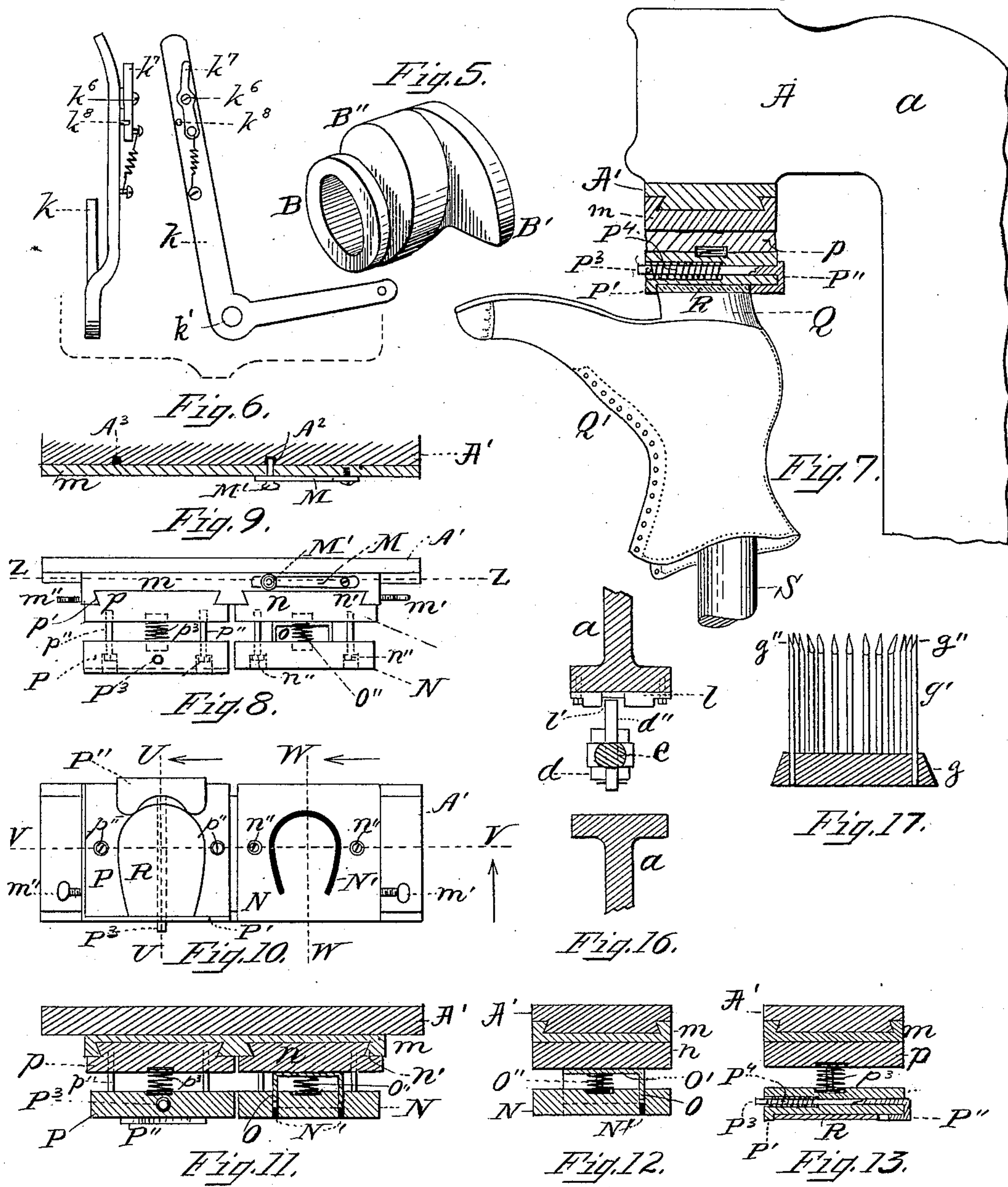
(No Model.)

5 Sheets—Sheet 5.

W. J. FAHNLEY.
HEEL NAILING MACHINE.

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Patented May 13, 1890.



Witnesses: Fig. 14.
Robt A. Southworth
Chas J. Jackson.

Fig. 15.

Inventor:
 William J. Fahuley
 by Allan Audrie Smith

UNITED STATES PATENT OFFICE.

WILLIAM J. FAHNLEY, OF LYNN, MASSACHUSETTS, ASSIGNOR OF ONE-HALF
TO FREDRIK W. A. BERGENGREN, OF SAME PLACE.

HEEL-NAILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 428,044, dated May 13, 1890.

Application filed February 24, 1890. Serial No. 341,445 (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. FAHNLEY, a citizen of the United States, and a resident of Lynn, in the county of Essex 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.

10 This invention relates to improvements in heel-nailing machines; and it consists of mechanism for perforating the heel to receive the nails before the heel is attached to the boot or shoe sole, and also of mechanism for driving the nails inserted in the heel-perforations in the shoe-sole, and of a device for spanning the top lift onto the heel after it has been secured to the shoe-sole, as will hereinafter be more fully shown and described,
15 reference being had to the accompanying drawings, wherein—

Figure 1 represents a front elevation of the machine. Fig. 2 represents a side elevation of the same as seen from X in Fig. 1. Fig. 3. 25 represents a vertical section of the same. Fig. 4 represents a longitudinal section on the line Y Y, shown in Fig. 3. Fig. 5 represents a detail perspective view of the cam for raising the jack. Fig. 6 represents detail end and
30 side views of the knee-lever for operating the awl-block or heel-perforating device. Fig. 7 represents a detail section of the head of the machine, showing a shoe in position on the jack for spanning the top lift to the heel. 35 Fig. 8 represents a detail front view of the longitudinally-adjustable driver and spanker blocks. Fig. 9 represents a horizontal section on the line Z Z, shown in Fig. 8. Fig. 10 represents a bottom view of the driver and
40 spanker blocks. Fig. 11 represents a cross-section on the line V V, shown in Fig. 10. Fig. 12 represents a cross-section on the line W W, shown in Fig. 10. Fig. 13 represents a cross-section on the line U U, shown in Fig. 10. Fig. 14 represents a detail perspective
45 view of the nail-driving plate. Fig. 15 represents a perspective view of the heel after its perforations have received the nails preparatory to driving the same; and Fig. 16
50 represents a detail cross-section on the line

T T, shown in Fig. 4. Fig. 17 represents a vertical section of the awl-block and awls.

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

a is the frame or standard of the machine, in bearings in the lower portion of which is journaled the driving-shaft *b*, having attached to it outside of the standard *a* the balance-wheel *b'* and fast pulley *b''*. *b*³ is a 55 loose pulley on the rear end of said shaft *b* for the purpose of shipping on it the driving-belt when the machine is not in use.

The shaft *b* is set in a continuous rotary motion by means of belt-power applied to its 60 pulley *b''*, as is usual in machinery of this kind.

The mechanism for perforating the heel for the purpose of loading it with the nails by which it is to be attached to the boot or shoe 70 sole is constructed as follows: On the driving-shaft *b* is attached the eccentric-block *c*, surrounded by the strap *d'*, having made in one piece with it or secured to it the upwardly-projecting rod *d*, as shown in Figs. 2, 75 3, and 4. The upper end of the rod *d* is jointed, by means of a pin *d''*, to another rod or link *e*, the upper end of which is jointed at *e'* to the lower end of the vertically-movable plunger-rod *f*, adapted to move up and 80 down in a suitable bearing in the standard *a*, as shown. To the upper end of the plunger *f* is secured the awl-block carrier *f'*, preferably provided with a downwardly-projecting screw-threaded spindle *f''*, working in a correspond- 85 ing screw-threaded vertical bore in the upper end of the plunger *f*, as shown in Figs. 3 and 4. The carrier *f'* is preferably made dovetailed for the reception of the correspond- 90 ingly-shaped awl-block *g*, which is horizontally adjustable therein, and may be secured to it by means of set-screws or equivalent devices.

g' g' are the awls secured to the awl-block *g*. *h* is a heel-rest plate, secured in a suitable 95 manner to the standard *a*, and it is perforated to receive and allow the awls *g' g'* to pass up through it during the operation of perforating the heels.

The perforated heel-rest *h* is preferably 100

supported and located in grooves $a'a'$ in the standard a , so that it may be removed therefrom and substituted by another, according to size of the heel to be perforated and the number of awls used on the awl-block. Above the perforated heel-rest h is secured to the standard a the block i , to the under side of which is adjustably secured the upper heel-rest plate i' . To the side of the standard a is pivoted at k' the knee-lever k , to the forward end of which is connected the rod k'' , the lower end of which is connected to the treadle-lever k^3 , pivoted at k^4 to the floor or lower part of the standard a , as may be most suitable. The treadle-lever k^3 , the rod k'' , and knee-lever k are normally held in the positions shown in Fig. 4 by the influence of a suitable spring k^5 when the perforating device is not in operation.

During the rotation of the shaft b no vertical motion is imparted to the plunger f as long as the treadle k^3 is not depressed, owing to the fact that the rod d is loosely jointed to the link e and the latter to the plunger f , and to impart a vertical motion to said plunger f it is essential that the rods d and e should be held temporarily in a line with the said plunger, and for this purpose I make use of the following mechanism: To the upper end of the knee-lever k is loosely pivoted at k^6 the dog k^7 , which is prevented from swinging toward the left, Fig. 4, by its lower end coming in contact with a pin or side projection k^8 on the knee-lever k , as shown in Figs. 4 and 6. On the side of the rod d is a pin or projection d^3 , against which the upper end of the dog k^7 comes in contact when the treadle k^3 is depressed, causing the rod d and link e to be moved in a line with the plunger f , and as the rod d is forced upward while in such a position the projecting end of its hinge-pin d'' is caused to enter a vertical groove l' in a stationary guide l , secured to the standard a , as shown in Figs. 4 and 16, by which the rod d and link e are held in a linear position relative to the plunger f by the depression of the treadle k^3 , and thus causing a vertical movement to be imparted to the plunger f , awl-block carrier f' , awl-block g , and awls $g'g'$. By removing the downward pressure on the treadle k^3 it and the knee-lever k are automatically returned to their normal positions, (shown in Fig. 4,) allowing the driving-shaft b to rotate without imparting a vertical motion to the plunger f .

To perforate the heel it is only necessary to place it in position between the heel-rests h and i' and to depress the treadle k^3 , when an upward movement is imparted to the awl-block and its awls, as above described, causing the latter to penetrate the heel and drop down to the positions shown in Figs. 3 and 4, when the perforated heel is removed and another one put in its place to be perforated, and so on. The heel so perforated is loaded by hand with nails, as is common in machin-

ery of this kind, and subjected to the driving and spanking operation in the machine.

The mechanism for driving the nails and spanking the top lift on the heel is constructed and operated as follows: A is the forwardly-projecting head on the standard a , and to the under side of the same is secured in a suitable manner the plate A' , on which is longitudinally adjustable the driver and spanker block carrier m , the latter having, preferably, for this purpose a dovetailed longitudinal recess adapted to fit a corresponding dovetailed rib or projection on the under side of the plate A' , as shown in Figs. 1, 3, 7, and 9, by which arrangement the carrier m can be moved to the right and left on the plate A' for the purpose of moving the driver-block and spanker-block alternately to positions centrally above the shoe-holding jack, as will hereinafter be described. The driver-block consists of a plate n , having, preferably, a dovetailed projection n' on its upper side adapted to fit a correspondingly-shaped recess in the under side of the carrier m , by which arrangement the said plate n can be adjusted forward or back on the carrier m for the purpose of securing the driver-block in a proper position to said carrier relative to the heel that is to be nailed. Below the plate n is arranged the vertically-yielding plate N , which is prevented from getting detached from said plate n by means of headed bolts $n''n''$, passing loosely through vertical perforations in the yielding plate N and screwed into the plate n , as shown in Figs. 8 and 11. The plate N has a heel-shaped or arched slot or perforation N' made through it, the contour of which corresponds to the curved line in which the nails are to be driven in the previously perforated and loaded heel, and in said slot is vertically adjustable a correspondingly-shaped nail-driver plate O , having a top piece or cover O' , between the under side of which and top of plate N is located a suitable spring O'' , for the purpose of holding the upper end of the driver-plate O against the under side of the plate n and holding the plate N expanded from the said plate n , as shown in Figs. 8 and 11. The lower edge of the nail-driver plate O has a series of notches or recesses O^3O^3 , corresponding in positions to the locations of the nails in the heel, or a portion of such nails, and serves for the purpose of allowing the nail-heads of the nails directly below such notches to project slightly above the top of the heel to permit the top lift to be afterward spanked on the projecting nail-heads.

m' is a set-screw going through one end of the plate m for the purpose of securing to it the plate n after the latter has been properly adjusted.

The spanker device consists of a plate p , having, preferably, an upper dovetailed projection p' , adapted to fit and to be adjusted forward and back in a corresponding recess

in the under side of the plate *m*, as shown in Figs. 1, 8, and 11, in the same manner and for the same purpose as the plate *n*, hereinbefore described.

5 *m''* is a set-screw for the purpose of securing the plate *p* in position on the plate *m* after it has been adjusted forward or back relative to the position of the jack below it. Below the plate *p* is arranged the vertically-
10 yielding plate *P*, which is loosely connected to the plate *p* by means of headed screws *p''* going loosely through vertical perforations in the movable plate *P* and screwed into the plate *p*, as shown in Fig. 11. The plate *P*
15 is normally expanded from the plate *p*, as shown in Figs. 1, 8, and 11, by means of a spring *p³* interposed between the plates *p* and *P*.

20 *R* in Figs. 7, 10, 11, and 13 is the top lift that is to be spanked on the projecting nail ends *q q q* of the heel *Q*, after the latter has been secured to the boot or shoe, and said top lift is temporarily held on the under side of the plate *P* as follows: On the under side of
25 the plate *P*, at the forward end of the same, is a rib *P'*, against which the breast of the top lift is made to rest, as shown in Figs. 10 and 13.

30 *P''* is an angular plate, the rear end of which is attached to a pin *P³*, passing loosely through a perforation in the plate *P* and automatically pulled toward the front of the machine by means of a suitable spring *P⁴*, which causes the front lower portion of the angular plate
35 *P''* to bear against the rear part of the top lift *R*, as shown in Fig. 10. The forward end of the spring-pressed plate *P''* is preferably made forked, as shown in Fig. 10, so as to cause the top lift to be automatically centered
40 when pushed into position on the under side of the plate *P*. To secure a top lift temporarily in position on the under side of the plate *P*, it is only necessary to push the pin *P³* slightly backward, causing the angular
45 plate *P''* to be moved back sufficiently to enable the top lift to be placed on the under side of said plate *P* between the rib *P'* and forked end of the plate *P''*. By removing the pressure on the pin *P³* the angular plate
50 *P''* is drawn forward by the agency of the spring *P⁴*, causing the top lift to be held between said rib *P'* and forked end of the plate *P''*, as shown in Figs. 10 and 13.

55 The carrier *m* has attached to it one end of the flat spring *M*, having secured to its free end a knob *M'*, having a pin *M''*, passing loosely through a perforation in the side of said carrier *m*, and having its inner end adapted to be locked in either one of the two
60 locking recesses *A'' A³* in the side of the plate *A'*, as shown in Figs. 8 and 9. It will thus be seen that when it is desired to bring either the driver-block or spanker-block opposite to the shoe-holding jack all that it is necessary
65 to do is to take hold of the knob *M* and pull the pin *M''* outward sufficiently to disengage it from the recess *A''* or *A³* in which it was

locked, and to slide the carrier *m* to the right or left, as the case may require, and secure it to the plate *A'* by allowing the pin *M''* to enter the corresponding recess in the plate *A'*.
70 Suitable stops may be arranged on the plate *A'* to limit the sliding motion and adjustment of the carrier *m*, as is common in machines of this kind.

75 *S* is the jack on which the shoe *Q'* is held during the operation of nailing the heel and spanking on it the top lift. Said jack is pivoted at *S'* to the upper forward end of the screw-threaded rod *S''*, the lower end of which
80 is guided in a vertical cylindrical recess in the upper end of the vertical plunger *S³*. The screw-rod *S''* is splined in said recessed plunger *S³*, so as to prevent its turning around its axis; but the rod *S''* is otherwise free to be
85 raised or lowered therein, which is accomplished by means of a nut *S⁴*, surrounding the screw *S''* and supported on the upper end of the plunger *S³*, as shown in section in Fig. 3. By this arrangement the jack *S* can be ad-
90 justed up or down according to the height of the heel that is to be nailed or spanked. The plunger *S³* is vertically movable in a bearing *a''* in the front portion of the standard *a*, and it is splined therein, so as to prevent its turn-
95 ing around its axis while moving up and down in said bearing. The lower end of the plunger *S³* is pivoted at *S⁵* to a lever *t*, which is normally held in the inoperative position shown in Fig. 1 by the influence of a suit-
100 able spring *t'*. The lever *t* has at its lower end a front projection *t''* and a side lip *t³*, for purposes as will hereinafter be described.

To the pin *S⁵* is pivoted the upper end of the treadle-rod *t⁴*, the lower end of which is
105 suitably connected to the treadle-lever *t⁵*, pivoted at *t⁶* to the lower part of the standard *a*, and connected by means of a spring *t⁷* to the said standard *a*, as shown in Figs. 1 and 2, which mechanism serves for the purpose
110 of lowering the jack by depressing the treadle-lever *t⁵*, to enable the shoe to be placed in position on the jack preparatory to nailing the heel on said shoe, by the forcing upward of the said jack and the loaded heel against
115 the driver-block and afterward against the spanker-block, as the case may be.

The mechanism for forcing upward the jack *S* and its plunger *S³* is constructed as follows: On the front end of the rotary driving-shaft
120 *b* is secured a hub *B*, having a tooth or projection *B'* and a face-cam *B''*, for purposes as will be described. The projection *B'* serves to swing the lever *t* to an upright position by actuating the projection *t''* on said
125 lever, and the cam *B''* serves to raise the said lever *t* upward by coming in contact with the said projection *t''*. It will, however, be observed that when the lever *t* is in the position shown in Fig. 1 the shaft *b* and its cam
130 may rotate without coming in contact with the projection *t''*, and for the purpose of causing the projection *B'* to move the lever *t* to an upright position preparatory to causing

the cam B'' to raise it, it is necessary that the lever *t* should be swung sufficiently in the direction of the arrow shown in Fig. 1 to permit the projection B' to engage with the projection *t''* on said lever *t*, and this is accomplished by a treadle-and-pawl mechanism as follows: In a bearing or bracket *a*³, secured to the front of the standard *a*, is guided the rod *u*, the lower end of which is suitably connected to a treadle-lever *u'*, pivoted at *u''* to the lower portion of the standard *a*, as shown in Figs. 1 and 2, which treadle-lever and rod are normally held upward in the positions shown in said figures by the influence of a suitable spring *u*³, one end of which is attached to the standard *a* and the other end to the treadle-lever *u'*. Below the bracket *a*³ is pivoted to the rod *u* the pawl *u*⁴, to the outer extension of which is connected a spring *u*⁵, having its other end attached to the rod *u* below said pawl, as shown in Fig. 1. The operation of said treadle-and-pawl device is as follows: Supposing the lever *t* and the rod *u*, with its pawl *u*⁴, to be in the positions shown in Fig. 1 and it is desired to swing the lever *t* in the direction of the arrow shown in said Fig. 1 sufficiently to bring the projection B' in contact with the projection *t''* on the lever *t*, this is accomplished by the depression of the treadle-lever *u'* and its rod *u*, by which the pawl *u*⁴ is caused to act on the lever *t* and its projection *t*³, so as to swing it in the direction shown by the arrow in Fig. 1 sufficiently to cause the projection B' to act on the lever projection *t''*, and thereby to swing the said lever *t* to an upright position, when by the further rotation of the shaft *b* the cam B'' comes in contact with the said lever projection *t''*, and thereby forces the lever *t*, its plunger S³, and jack S, with the shoe held thereon, upward against the driver-block, and thus causes the nails in the heel to be driven through the shoe-sole and clinched against the metal jack. After the heel has thus been attached to the sole the jack is moved downward by depressing the treadle-lever *t*⁵, and the carrier *m* is moved toward the left and locked in position, so that the spanker device is placed directly above the jack, when the treadle *u'* is again depressed for the purpose of swinging the lever *t* toward the left, when it is again forced upward by the action of the cam B'' on the projection *t''* and the top lift spanked on the top of the heel by the device, as hereinabove mentioned, and so on during the operation of the machine.

In placing the shoe on the jack S or removing it therefrom it is swung forward around its fulcrum, as shown by dotted lines in Fig. 3.

The awls *g* are preferably provided with outwardly-inclined or tapering points *g'' g''*, as shown in detail in Fig. 17, so as to cause them to penetrate the heel in curved direc-

tions from the center of the heel outward, so as to cause the points of the nails to be turned outward and more easily clinched when driven against the metal jack.

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

1. In a nailing-machine, the mechanism for reciprocating the awl-carrier, consisting of a rotary eccentric or crank and an eccentric rod or pitman on the same, and a link connecting the rod and the awl-carrier, combined with a lever having a spring and treadle for its operation, and having a dog pivoted to it and adapted to engage with a projection on the eccentric rod or pitman, and a stationary guide for receiving a pin or side projection on the latter, substantially as and for the purpose set forth.

2. In a nailing-machine, a horizontally and longitudinally movable carrier and a nail-driving device consisting of an upper plate secured to the carrier, and a vertically-yielding lower plate having a curved or heel-shaped perforation through it, and a correspondingly-shaped nail-driving plate working in said perforation, substantially as and for the purpose set forth.

3. In a nailing-machine, a movable carrier and a nail-driving device consisting of an upper plate secured to the carrier, and a vertically-yielding lower plate having a curved perforation, as described, and a correspondingly-shaped nail-driving plate having notches or recesses at its lower end, substantially in a manner and for the purpose set forth.

4. In combination with the spanker-plate P and its rib or projection P', the angular plate P'', having the spring-pressed pin P³ attached to it for the purpose of securing the top lift to said spanker-plate between the said rib and angular plate, substantially as and for the purpose set forth.

5. In a nailing-machine, a vertically-movable jack-carrying rod and a spring-pressed lever pivoted to it and normally held in inoperative position, as described, combined with a rotary shaft having a projection for swinging the lever into operative position and a cam for raising it, and a treadle-operated pivoted dog for moving the said lever into position to be acted on by the projection on the rotary shaft and its cam, substantially as specified.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 29th day of January, A. D. 1890.

WILLIAM J. FAHNLEY.

Witnesses:

ALBAN ANDRÉN,
M. J. JACKSON.