

(No Model.)

5 Sheets—Sheet 1.

M. A. TYLER.

HEEL NAILING MACHINE.

No. 305,723.

Patented Sept. 23, 1884.

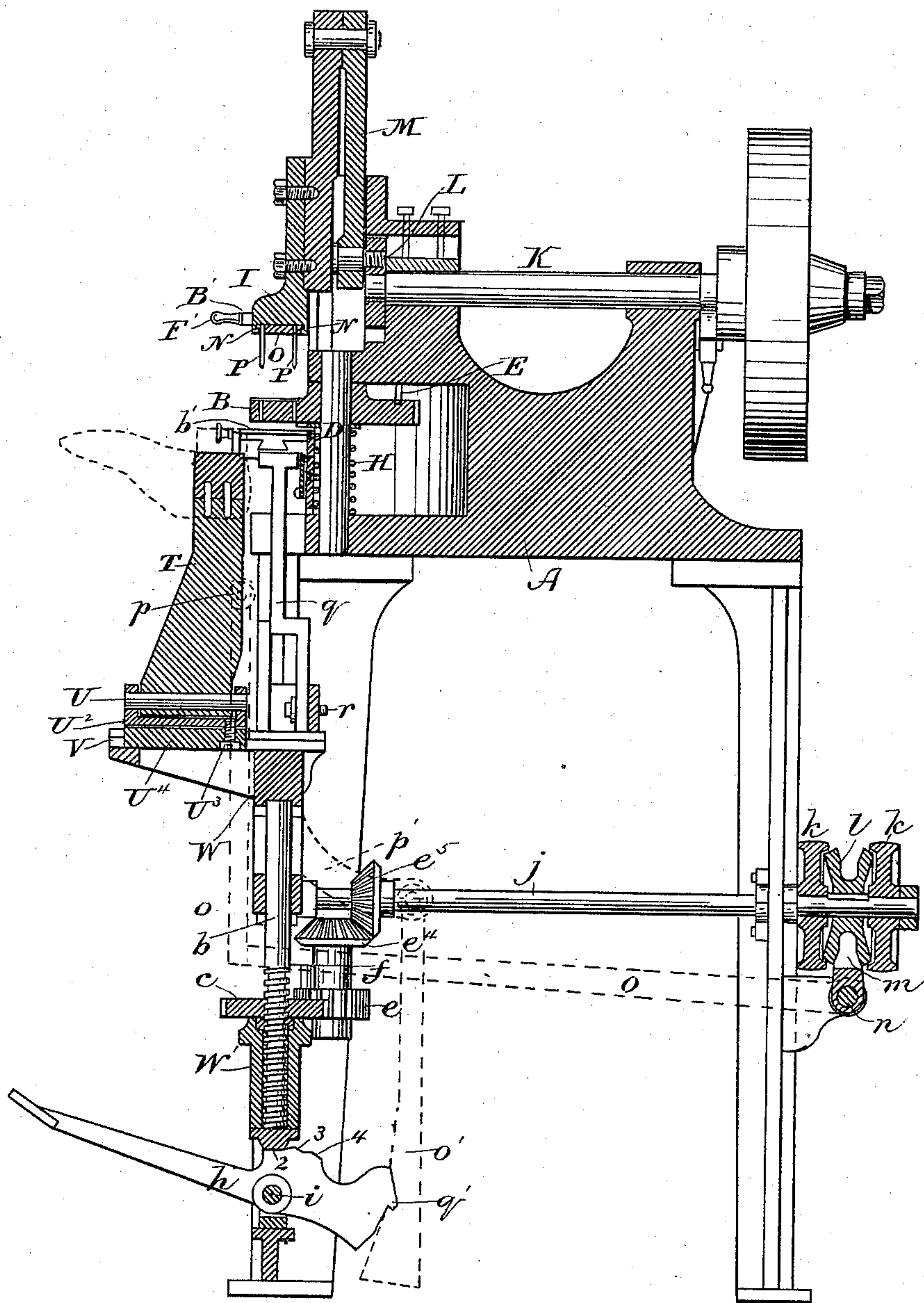


Fig. 1.

WITNESSES

*John M. Croshaw*  
*A. L. White*

INVENTOR

*M. A. Tyler*  
*by Wright & Brown*  
*Attys*

(No Model.)

5 Sheets—Sheet 2.

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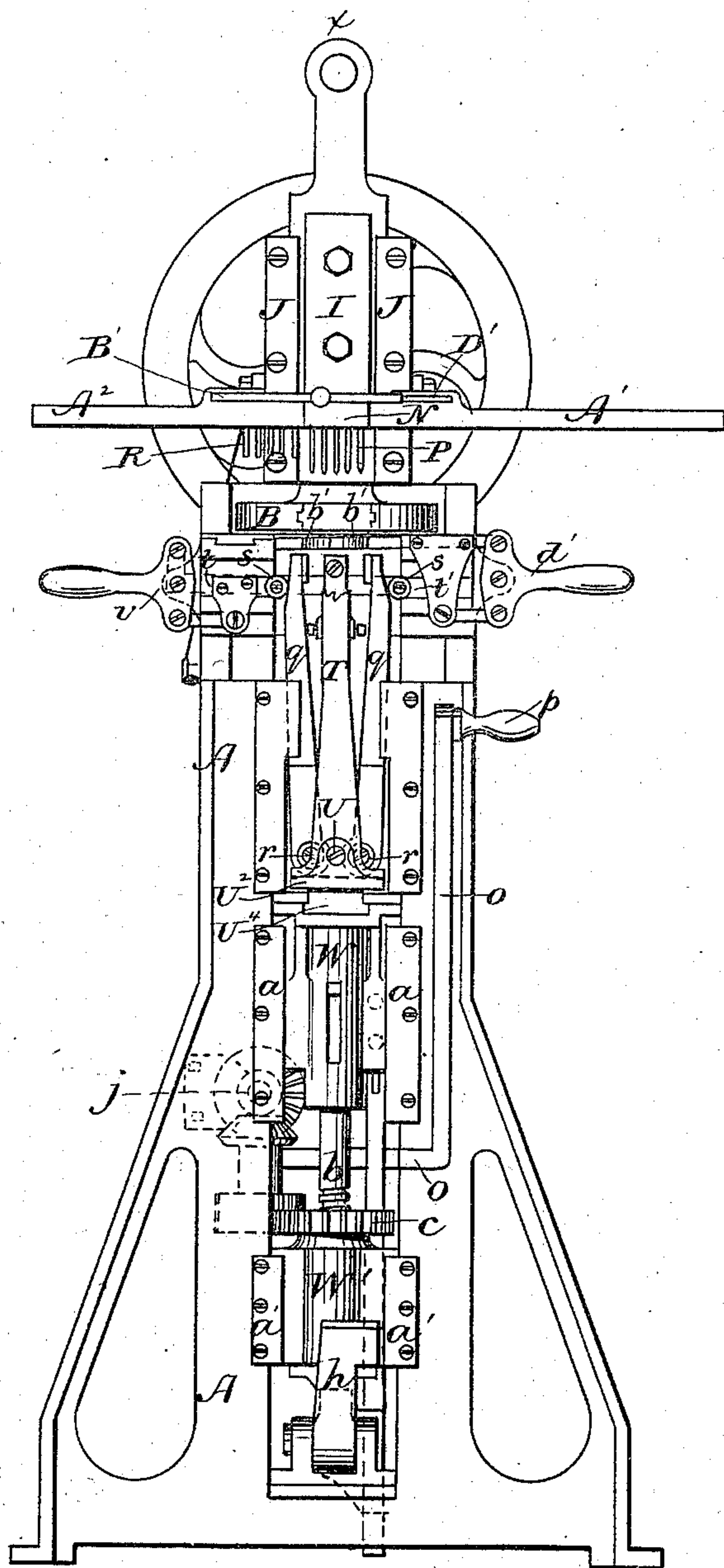


Fig. 2.

WITNESSES

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(No Model.)

5 Sheets—Sheet 3.

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Patented Sept. 23, 1884.

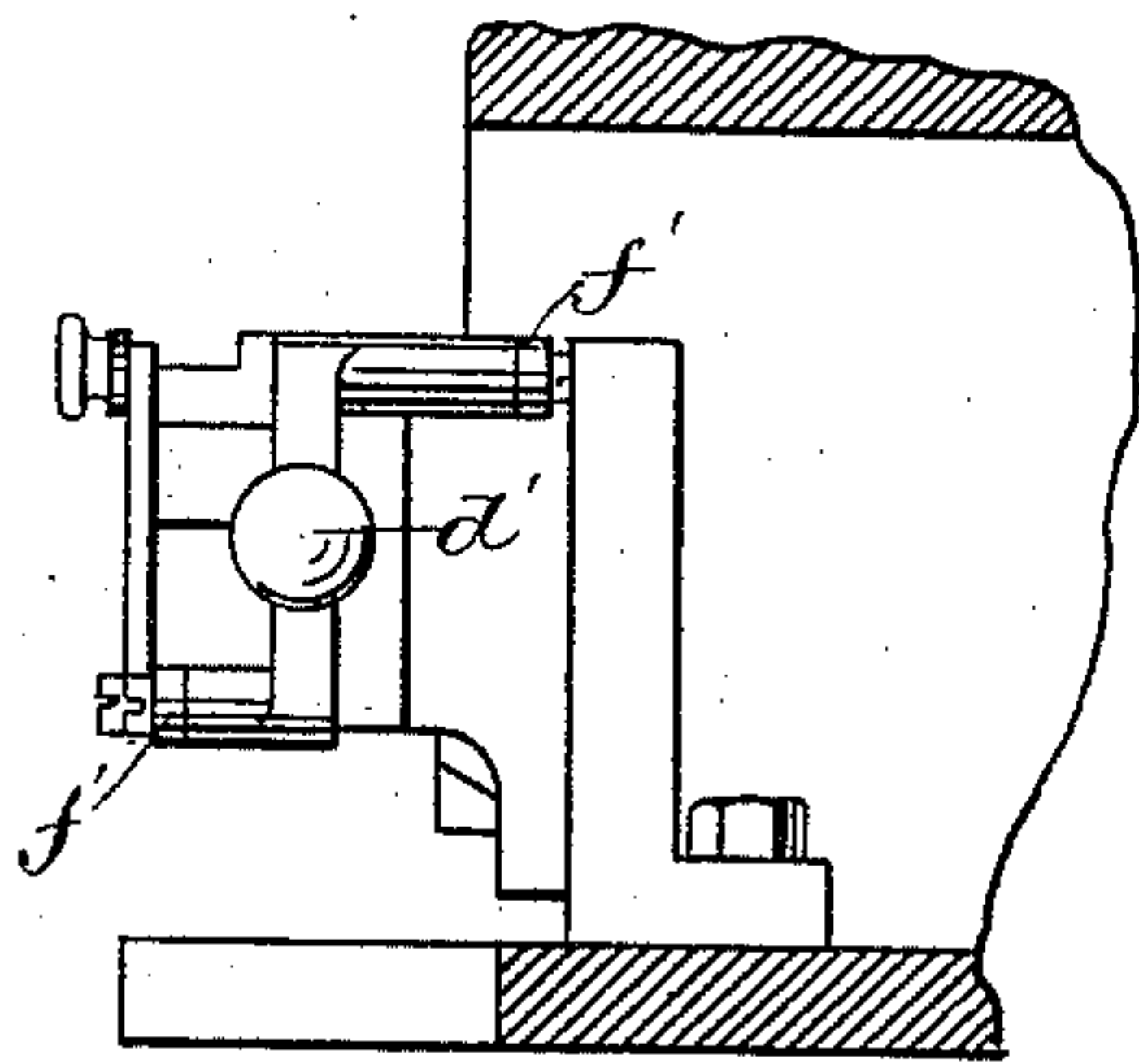
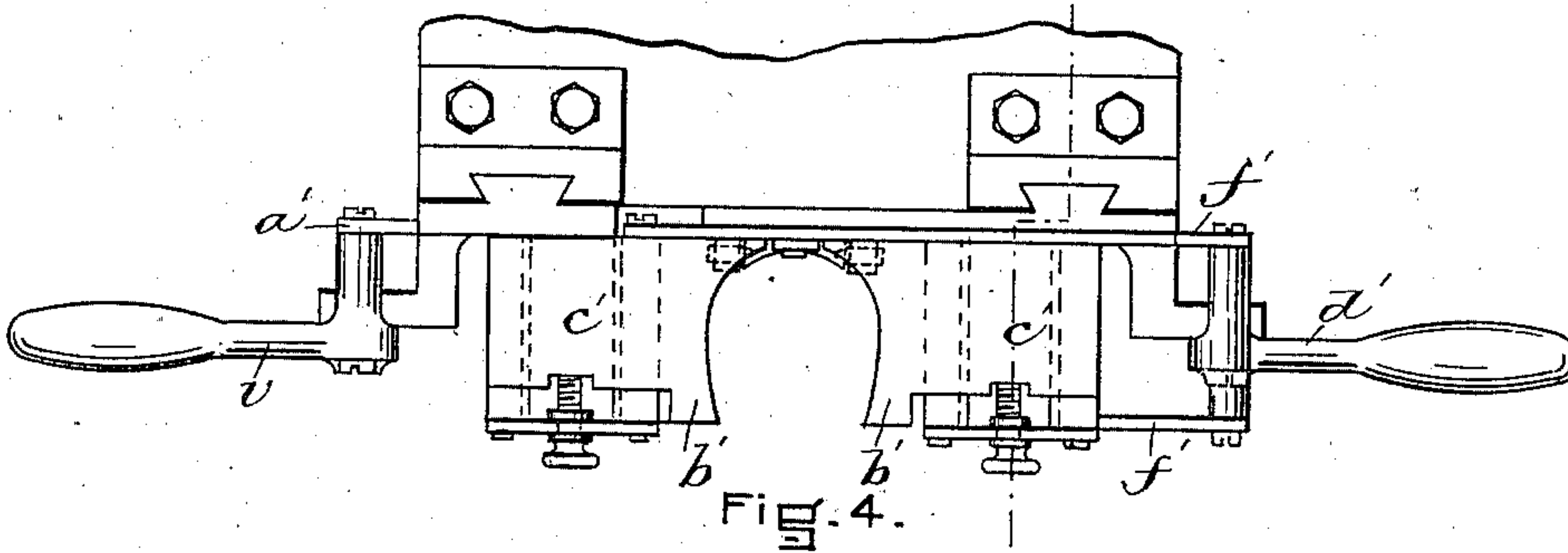
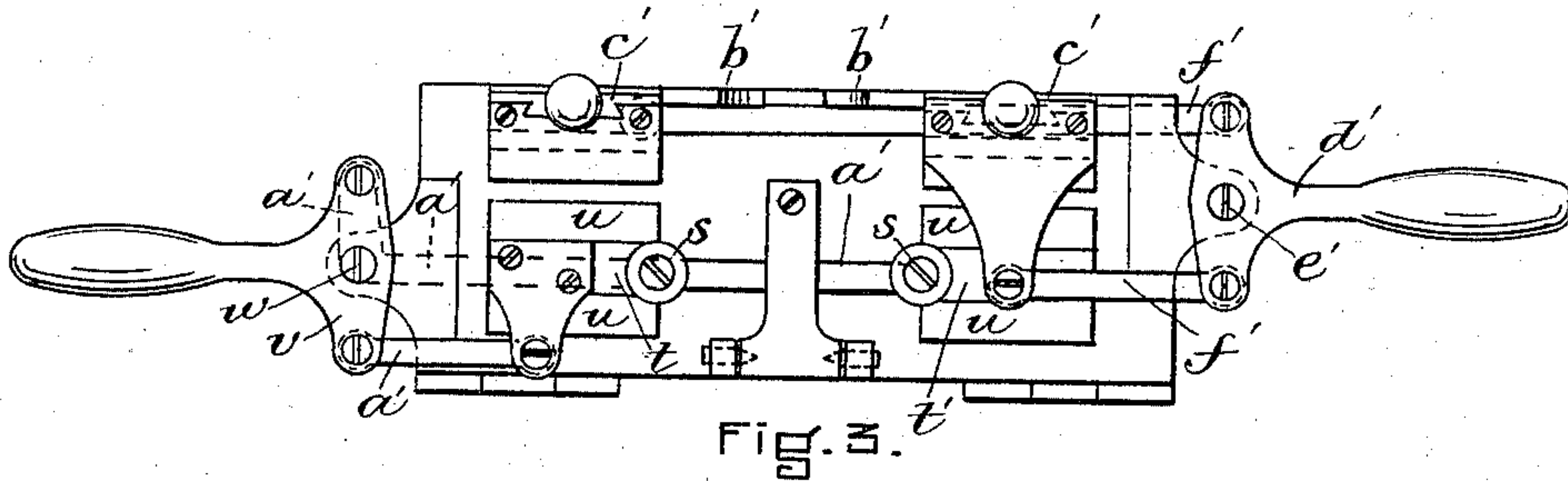


Fig. 5.

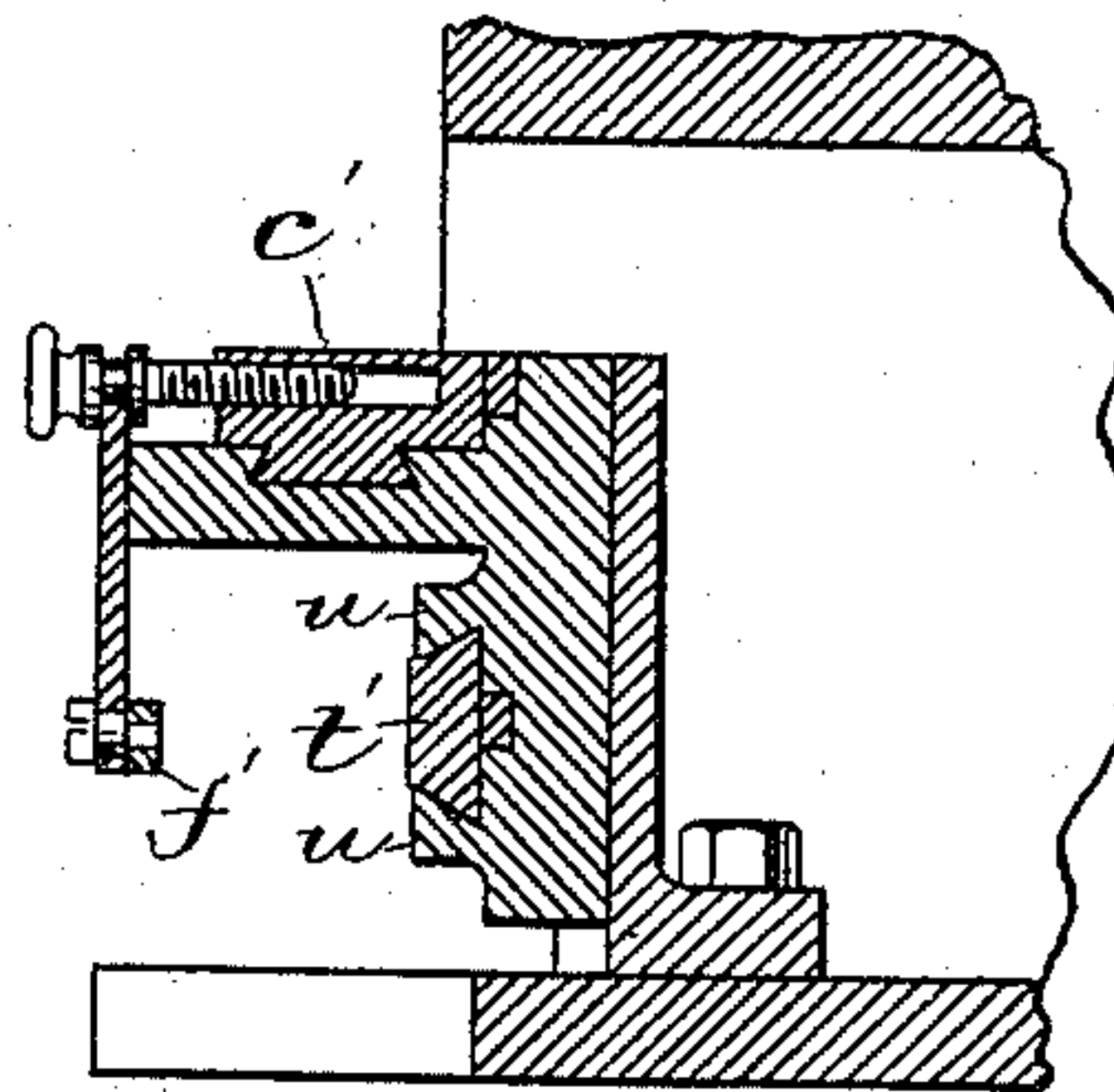
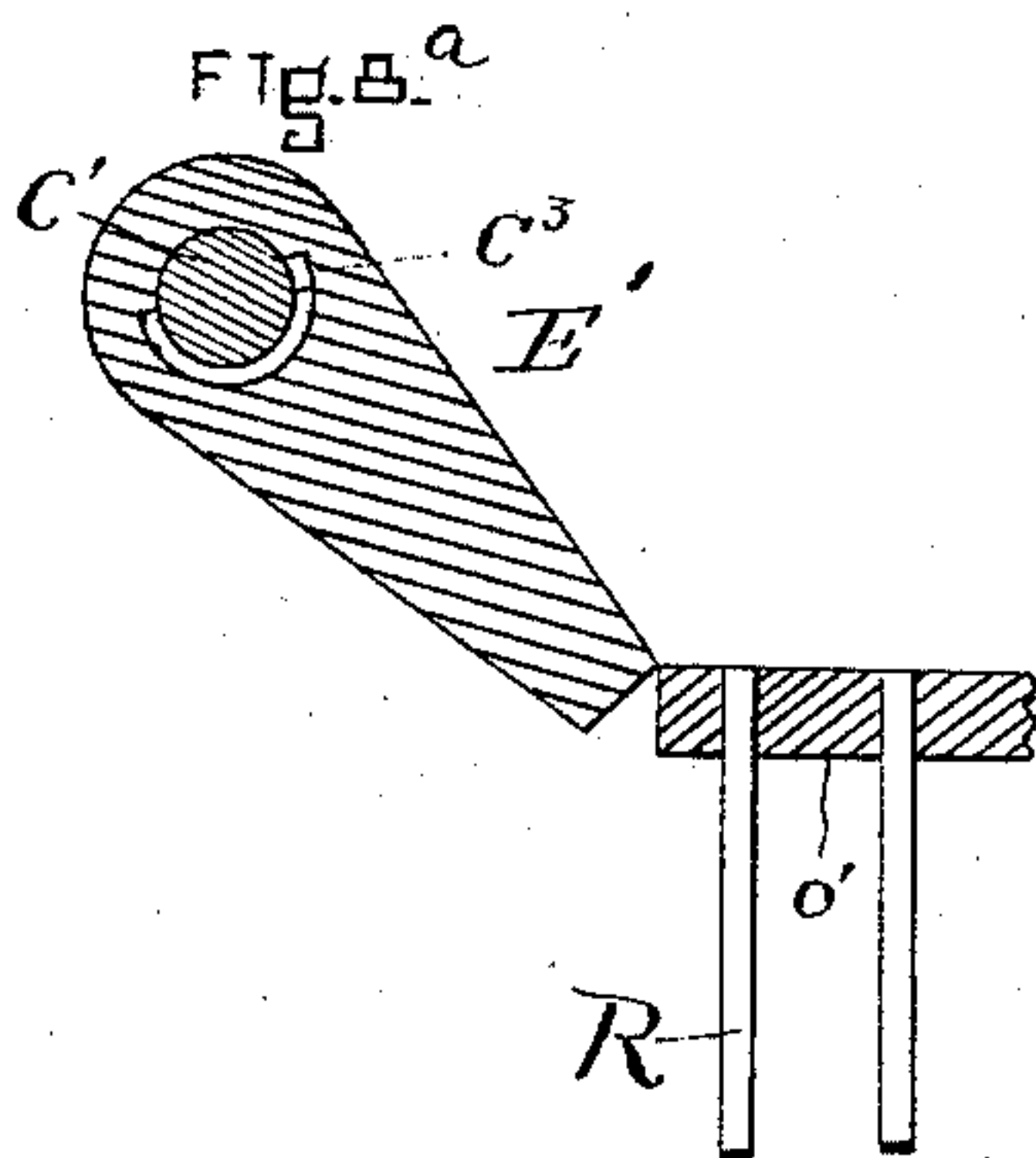


Fig. 6.



WITNESSES  
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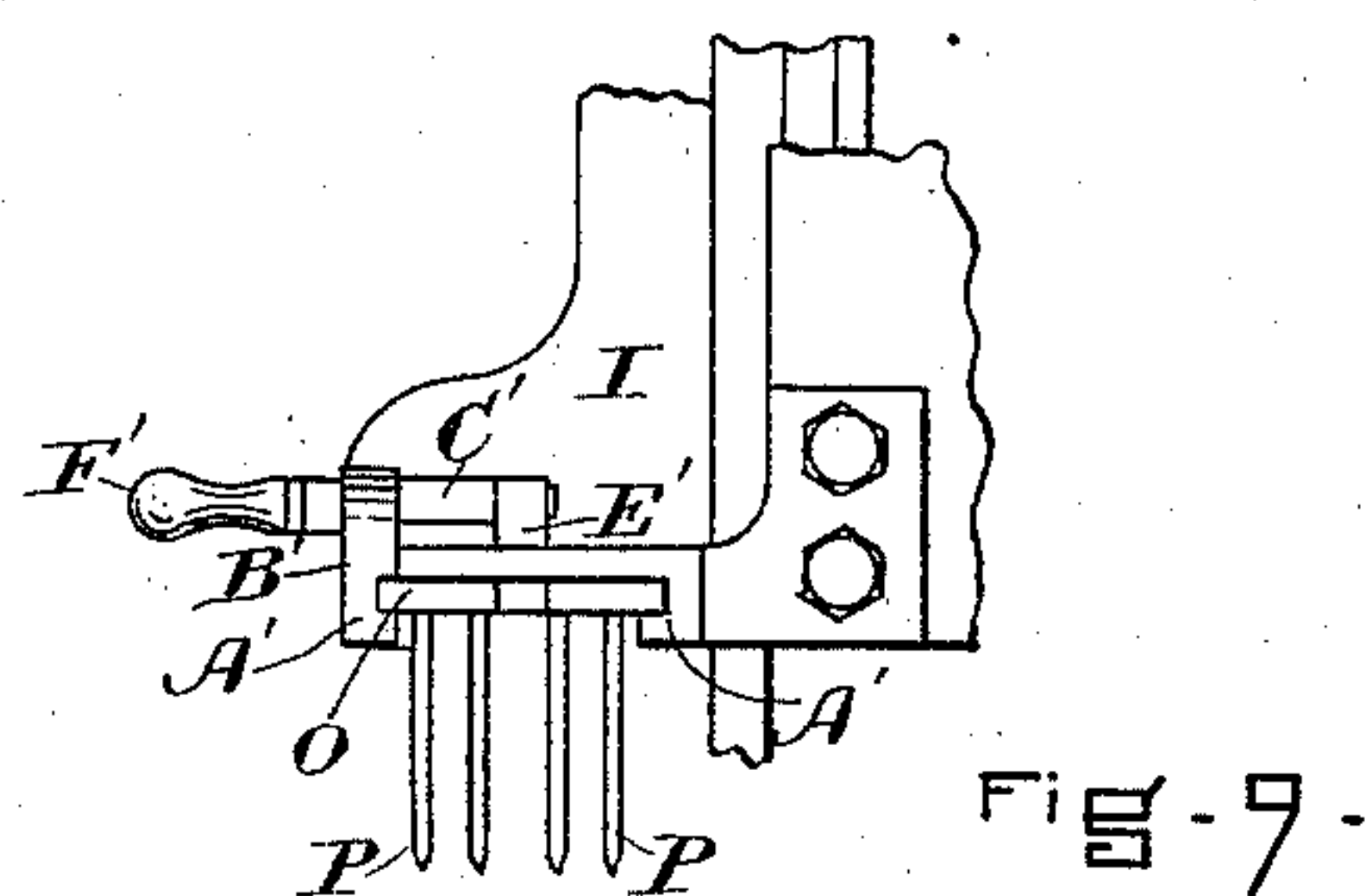
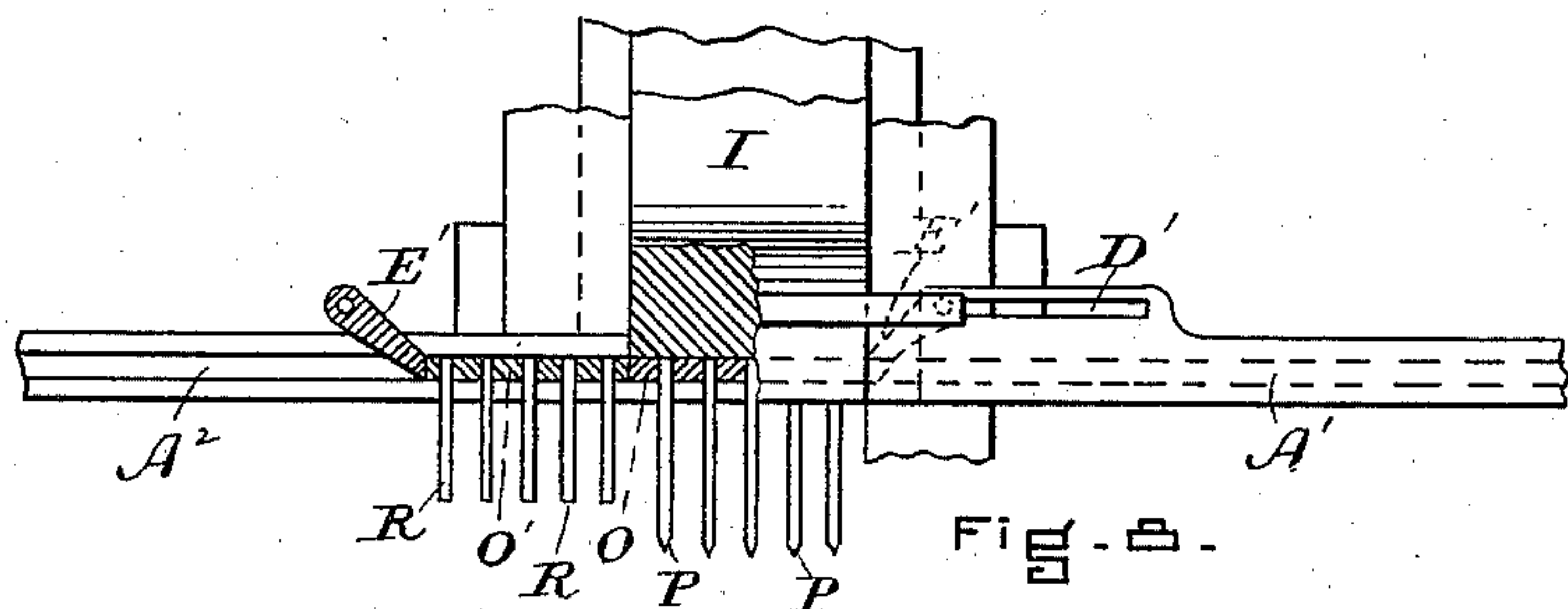
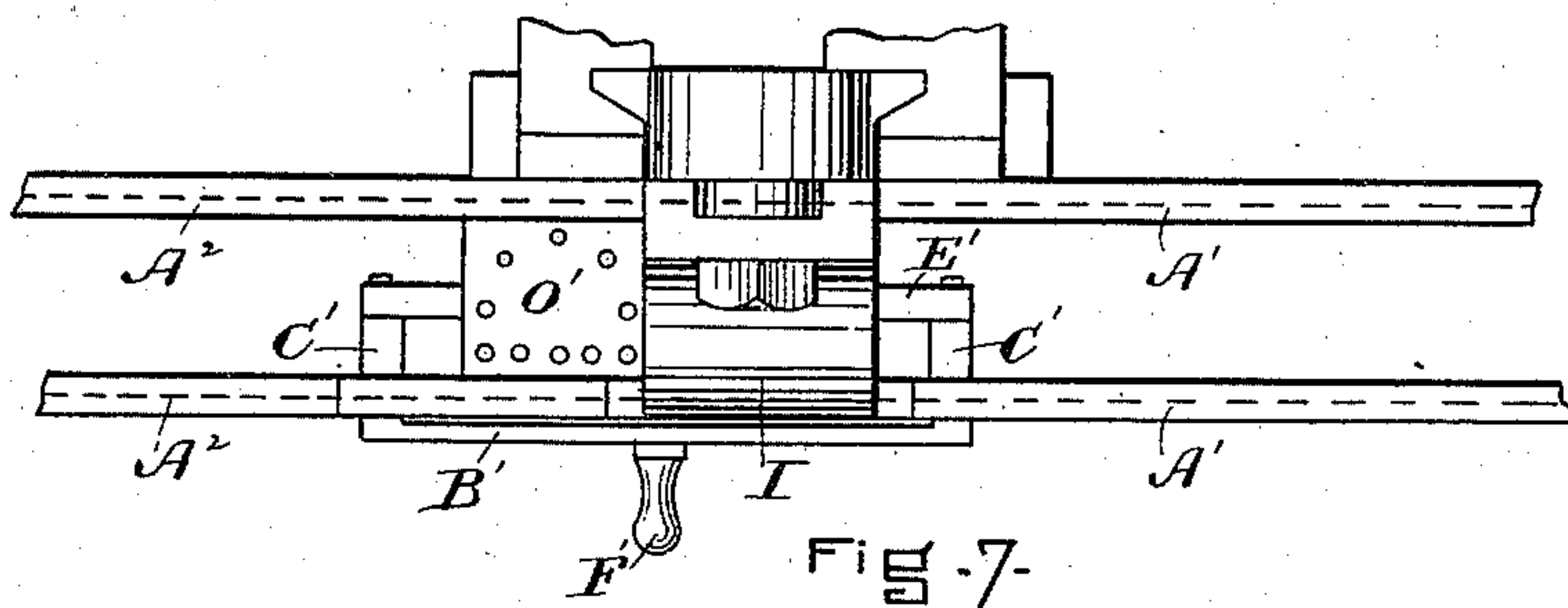
(No Model.)

5 Sheets—Sheet 4.

M. A. TYLER.  
HEEL NAILING MACHINE.

No. 305,723.

Patented Sept. 23, 1884.



WITNESSES  
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(No Model.)

5 Sheets—Sheet 5.

M. A. TYLER.  
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Patented Sept. 23, 1884.

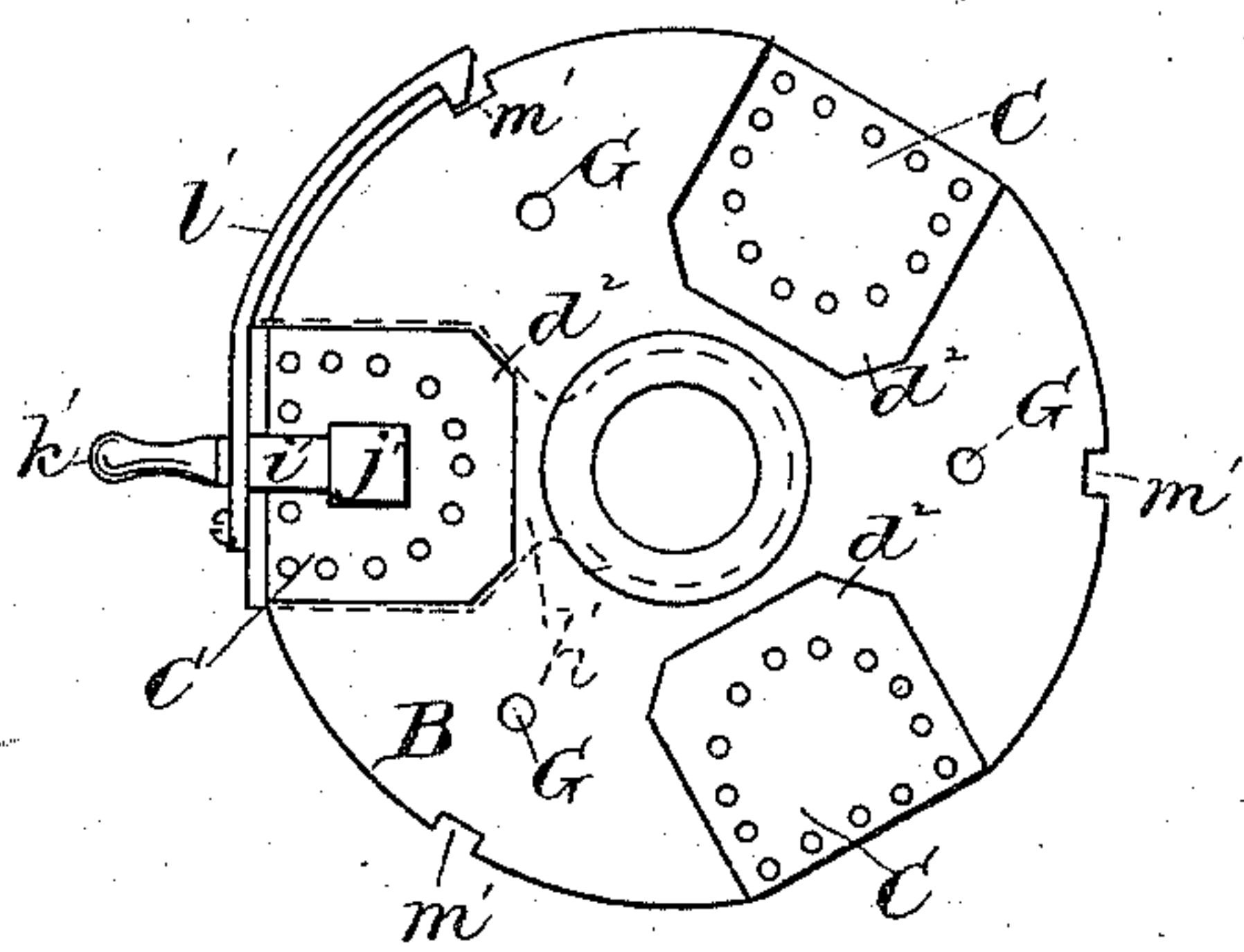


Fig. 10.

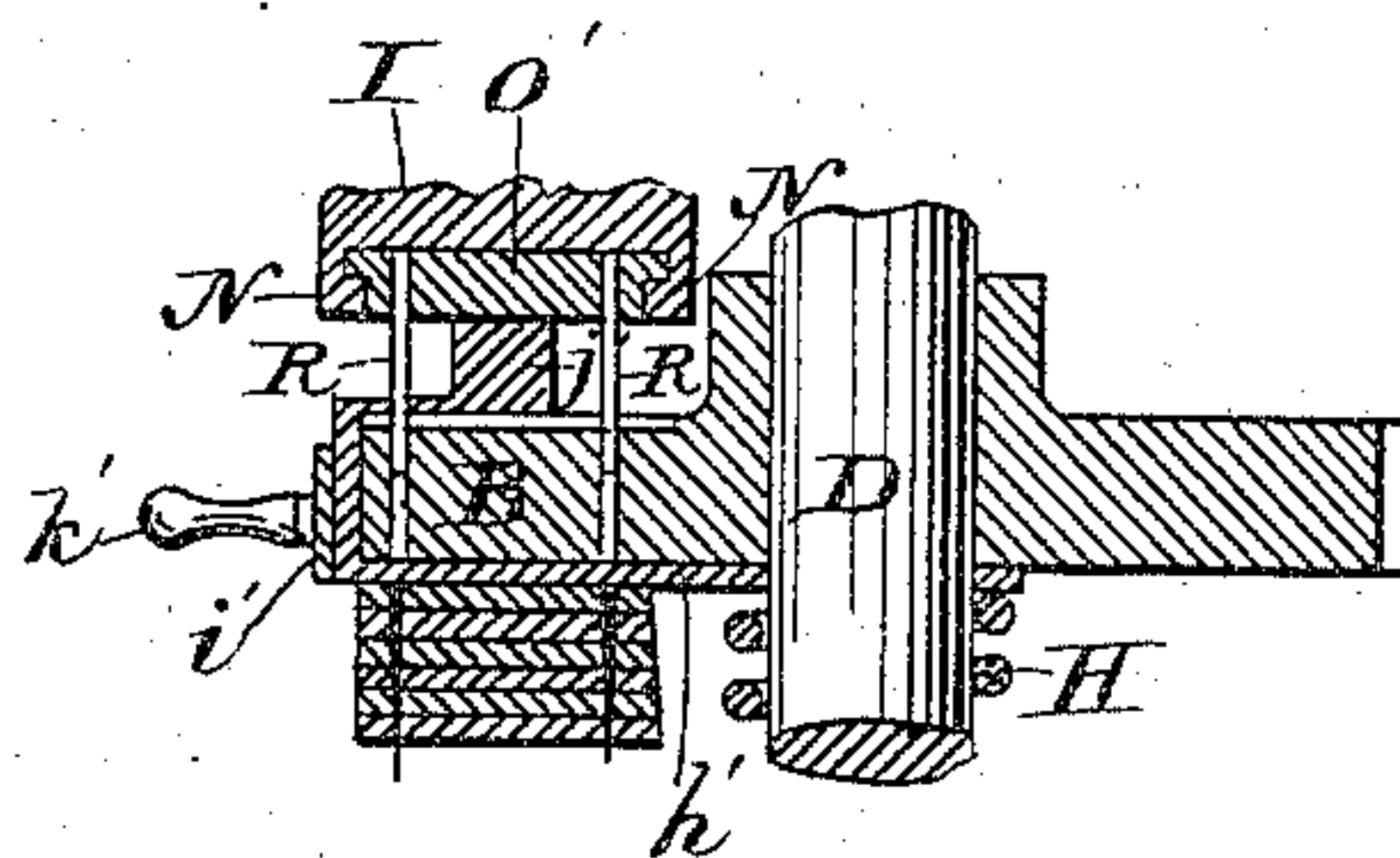


Fig. 11.

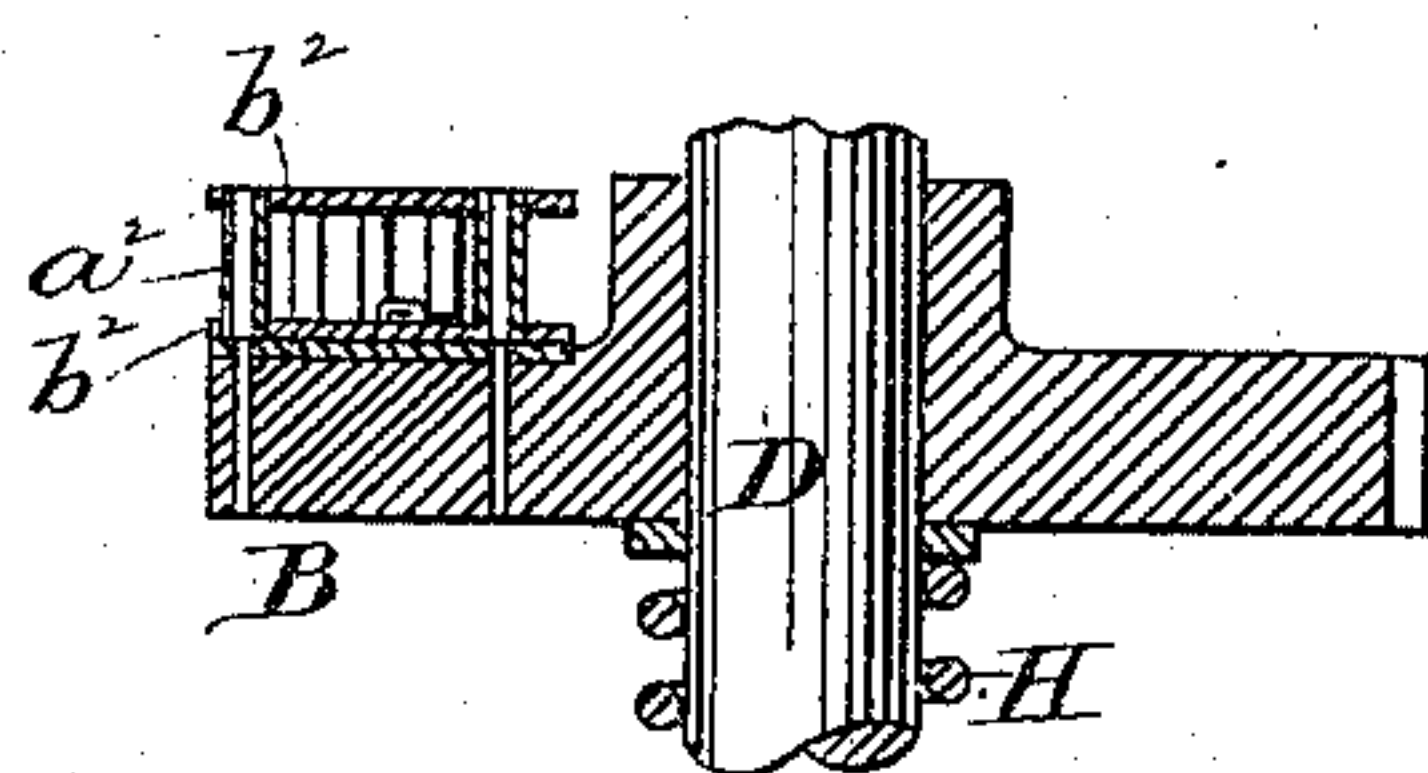


Fig. 12.

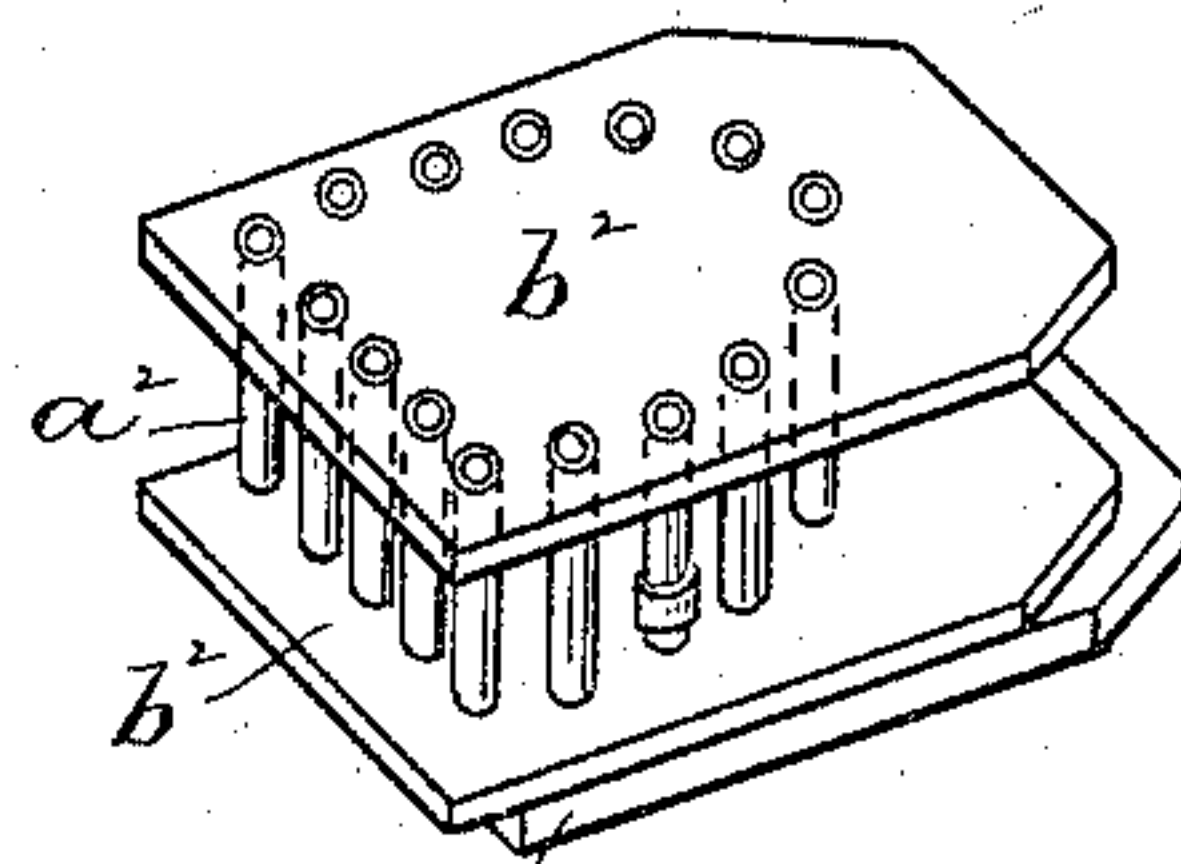


Fig. 13.

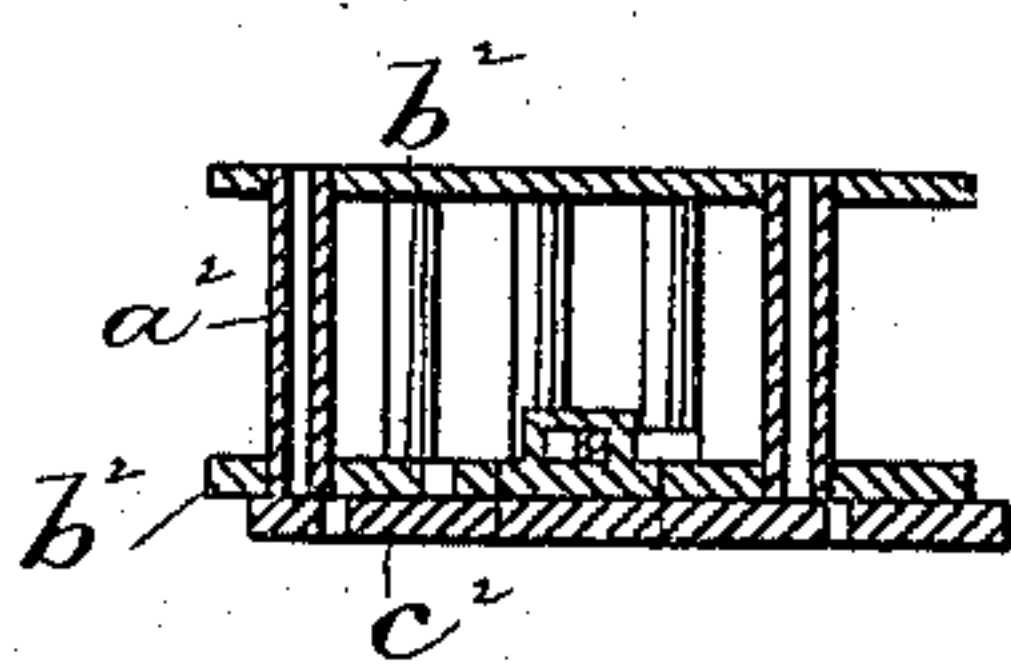


Fig. 14.

WITNESSES  
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# UNITED STATES PATENT OFFICE.

MERRILL A. TYLER, OF NORTH EASTON, ASSIGNOR OF TWO-THIRDS TO  
SWEETSER & MERRITT, OF BROCKTON, MASSACHUSETTS.

## HEEL-NAILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 305,723, dated September 23, 1884.

Application filed October 12, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, MERRILL A. TYLER, of North Easton, in the State of Massachusetts, have invented certain Improvements in Heel-Nailing Machines, of which the following is a specification.

This invention has for its object to provide certain improvements in heel-nailing machines, whereby, first, a heel may be pricked or perforated, nailed, and provided with a blind-lift at one jacking; and, secondly, different sizes of boots or shoes can be treated in the same machine.

The invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a vertical central section of my improved machine on line *x x*, Fig. 2. Fig. 2 represents a front elevation of said machine. Figs. 3, 4, 5, 6, 7, 8, 8<sup>a</sup>, 9, 10, 11, 12, 13, and 14 represent detail views.

The same letters of reference indicate the same parts in all the figures.

In the drawings, A represents the general supporting-frame of the machine. B represents a horizontal bed or table, of circular shape, (see Fig. 10,) having any desired number of gangs of nail-holders C, each holder being an orifice extending through the bed and of suitable size to receive a nail, and each gang being a group of such orifices arranged like nails in a heel. Said gangs are of different sizes, each being adapted to a different sized heel. In the present instance the bed has three gangs, and is adapted to rotate on a fixed standard, D, Figs. 1, 10, 11, and 12, attached to the frame A. Each gang is thus adapted to be brought to the front of the machine—that is, to a position over the jack and under the awls and drivers, hereinafter described. The bed B is locked in as many positions as there are gangs of nail-holders by a vertical bolt, E, adapted to slide in the frame A, and engaging with perforations G in the bed. The bed B is adapted to slide vertically on the standard D, and is supported by a spring, H, which enables the bed to have a yielding movement under downward pressure, the vertical arrangement of bolt E enabling the bed

to be depressed to a limited extent without being disengaged from said bolt.

I represents a plunger adapted to slide between vertical guides J J (see Fig. 2) on the frame A, and is reciprocated vertically by a driving-shaft, K, having a cam, L, connected by a connecting-rod, M, with the upper end of said plunger. On the horizontal bottom surface of the plunger I are formed two parallel shouldered guides, N N, adapted to receive between them and thus support a plate, O, having a gang of awls, P, or a plate, O', having a gang of drivers, R. Said plates O O' are placed side by side, and are adapted to slide in corresponding shouldered guides, A' A' A<sup>2</sup> A<sup>2</sup>, affixed to the frame A at opposite sides of the plunger I, and coinciding with the guides N N of the latter when the plunger is raised, as shown in Figs. 1, 2, 8, and 9, the guides A', N, and A<sup>2</sup> being then continuous, so that said plates, or either of them, can slide from the guides A' to the guides N, or from the guides N to the guides A<sup>2</sup>, or the reverse. The plates O O' are disconnected from each other, and each, when it is supported by the guides N N, virtually becomes a part of the plunger, and rises and falls therewith; hence, when it is desired to prick or perforate a heel, the plate O, with its awls, is engaged with the guides N N of the plunger, the plate O', with the drivers, remaining at rest in the guides A<sup>2</sup>, as shown in Figs. 2, 7, and 8. The awls are then operated by the plunger. When it is desired to drive the nails into the heel, the plate O is moved into the guides A', and the plate O', with its driver, into the guides N, the drivers being then operated while the awls remain at rest. The awls and drivers are thus made interchangeable.

It will be seen that as many awl and driver carrying plates may be employed as there are gangs of nail-holders in the bed B, the plates not in use being held by the guides A' or A<sup>2</sup>. Each gang of awls and its companion gang of drivers corresponds in size with one of the gangs of nail-holders; hence the machine is adapted to as many sizes of heels as there are gangs of nail-holders.

I prefer to couple together each pair of awl and driver holding plates by a bar, B', which is provided with arms or studs C' C', project-



ing through slots D' D' in the outer guides, A' A', said arms having on their inner ends pivoted dogs E' E', which bear against the exposed ends of the plates O and O', as shown in Figs. 7 and 8, said dogs being supported in any suitable manner, as by stops C', on the studs C', so that they cannot drop below the position shown in Figs. 8 and 8', but are free to swing upwardly. The dogs may be beveled at their swinging ends, as shown in Fig. 8', so that they may be raised without binding on the plate O O'. The bar B' is provided with a handle, F', which enables it to be moved back and forth. The slots D' are of such length and are so arranged that they limit the movement of the bar B' and the plate to the exact length required to bring one plate under the plunger I, and leave the other at one side thereof, so that the plunger will not bear on the plate which is to remain at rest.

A suitable locking device should be provided to engage each plate O or O' with the plunger, so that when the plunger is in motion the plate carried thereby will not be liable to accidental displacement.

T represents the jack on which the boot or shoe is supported. Said jack is pivoted at U to ears on a slide or carriage, U<sup>2</sup>, which is connected by a vertical pivot, U<sup>3</sup>, with a slide, U<sup>4</sup>, and adapted to move horizontally toward and from the front of the machine between guides V, supported by a vertically-movable frame or cross-head W, which slides in vertical guides a a, attached to the frame of the machine. The cross-head W is provided with a vertical screw-threaded rod, b, projecting downwardly, and entering a socket which is not threaded in a lower cross-head, W', which is adapted to slide in guides a' a'. The threaded rod b connects the cross-heads W and W', so that both will rise together when upward pressure is applied to the lower cross-head. The lower cross-head is provided with a journaled nut, c, adapted to rotate in its upper end and receiving the threaded rod b. Said nut is formed as a gear-wheel or pinion at its periphery, its teeth meshing with the teeth of a pinion, e, on a shaft, f, having a pinion, e', and journaled in suitable bearings on the frame of the machine, and rotated in either direction, as the operator may desire, by means hereinafter described, and thus rotating the nut or pinion c. It will be seen that the rotation of said nut or pinion in one direction will raise the rod b, upper cross-head, W, and jack T, the lower cross head remaining at rest, supported by a treadle, h, which is pivoted at i to the frame A. The shaft f or nut or pinion c are rotated by means of a counter-shaft, j, journaled in bearings on the frame A, and having a pinion, e<sup>5</sup>, and two loose pulleys, k k, driven in opposite directions, the one by a crossed and the other by a straight belt running on pulleys on a suitable driving-shaft. (Not shown.)

Between the pulleys k k is a friction-clutch, l, engaged with the counter-shaft j by a feather

and groove, so that it rotates with the shaft, and is capable of sliding, so as to engage with either of the pulleys k k. The clutch l is operated by means of a fork or shipper, m, pivoted at n to a bracket on the frame A, and projecting into a peripheral groove in the clutch l, and a lever, o, rigidly attached to said shipper and extending to the front of the machine, as shown in dotted lines in Fig. 1, its outer end being bent upwardly and provided with a handle, p. It will be seen that by moving the lever o in one direction or the other the clutch l will be engaged with one pulley k or the other, according to the direction in which the counter-shaft is to be rotated. The jack is enabled by the pivot U to oscillate slightly in a plane parallel with the front of the machine—that is to say, from one side of the operator to the other, as he stands in front of the machine, and not toward and from him.

q q represent levers pivoted at r r to the base or support to which the jack is pivoted, and adapted to oscillate in the same direction as the jack, said levers being at opposite sides of the jack, as shown in Fig. 2. The levers q q are provided at the inner sides of their upper ends with jaws or offsets adapted to bear against the opposite sides of the jack or against a boot or shoe upper placed thereon. Against the outer sides of the levers q q bear rollers s s, journaled on slides t t', which are adapted to move horizontally between guides u u (see Fig. 3) affixed to the frame A. Said slides are moved simultaneously in opposite directions by means of a two-armed lever, v, pivoted at w to a fixed support, and connecting-rods a' a', connecting the arms of said lever, respectively, with the slide t and the slide t', as clearly shown in Fig. 3. When the lever v is turned in one direction, the slides t t' are moved simultaneously toward each other, and their rollers are caused to press the levers q q against the jack or the boot or shoe upper thereon and force the same to a central position—that is, to the exact position which the boot or shoe should assume with relation to the heel pricking and nailing devices before described. The weight of the lever v tends to turn it in such direction as to press the levers q q against the jack; hence the latter is centered automatically, the operator grasping the lever only to remove the levers q q from the jack.

b' b' represent jaws located above the upper end of the jack T and its centering-levers q q, and attached to slides c' c', which are adapted to move horizontally in guides secured to the frame A. The jaws b' b' are formed to hold a heel between their proximate surfaces, as shown in Fig. 4, and are moved simultaneously in opposite directions by devices like those employed for moving the slides t t'—viz., a two-armed weighted lever, d', pivoted at e', and connecting-rods f' f', connecting the arms of said lever with said slides c' c'. (See Fig. 3.)

The jaws b' b' are adapted to hold a heel in



the proper position relatively to the nail-holders in the bed B and to the centered jack.

h' represents a top-lift spanker or plate pivoted to the rod D so as to swing horizontally thereon. Said plate is in contact with the under surface of the bed B, and is of such size as to cover a gang of nail-holders, as shown in dotted lines in Fig. 10. An arm, i', projects upwardly from the outer edge of the plate or spanker, and is bent over the upper surface of the bed, and provided with a block, j', which serves as a bearing for the plunger I when a top lift is being applied, as described hereinafter. The spanker is provided with a handle, k', and with a spring-dog, l', adapted to engage automatically with either one of a series of notches, m', in the periphery of the bed B, to hold the spanker in position for operation.

The operation of the above-described machine is as follows: The plunger I is first provided with an awl-bearing plate, O, the top-lift spanker is moved away from the gang of nail-holders under the plunger, a heel is placed between the jaws b' b', and grasped by the inward pressure of said jaws caused by the gravitation of the lever d', the top lift of the heel bearing against the under surface of the bed B. The jack is moved out, as shown in Fig. 1, to receive the boot or shoe, and is then moved inwardly, so that its heel-seat comes under the heel and is centered by the action of the levers q q and their operating-lever v, as above described, the jack being as yet depressed so that the boot or shoe thereon is separated from the heel, the lower cross-head, W', resting on a step or shoulder, 2, of the treadle-lever h. The operator now engages a depending dog, o', which is pivoted to an arm, p', on the upper cross-head, W, with a hook, q', on the treadle-lever h, as shown in dotted lines in Fig. 1. The operator next, by a movement of the lever o, engages the clutch l with the pulley k, which rotates in the direction required to raise the rod b and upper cross-head, W, through the pinion-nut c and the described intermediate mechanism. The cross-head W and jack T are thus raised by the driving-power until the heel seat of the boot or shoe is pressed firmly against the heel, and the latter is compressed between the heel-seat and the bed B. While the jack and the cross-head W are thus rising, the dog o', by its engagement with the hook q' of the treadle-lever h turns the latter on its pivot, so as to bring a second step, 3, on said lever under the cross-head W', so that when the jack is raised as far as possible by the power applied through the counter-shaft (which fact is indicated by the slipping of the driving-pulley on the friction-clutch or of the belt on the driving-pulley) the operator can, by applying his weight to the outer end of the treadle-lever, turn the latter sufficiently to bring a third step, 4, on said lever under the cross-head W', thus giving both cross-heads and the jack an additional upward press-

ure, which gives the heel a suitable compression. The step 4 being now directly over the pivot of the lever h, said lever has no tendency to turn on its pivot, and so supports the cross-heads and jack, and maintains the compression of the heel. The shaft K is now started and depresses the plunger I, causing the awls to pass through the nail-holders and perforate the heel. When the plunger rises, a plate, P', with a gang of drivers, is slipped into the space between the guides N N of the plunger; the plate P, with its awls, being at the same time removed. The nail-holders are next supplied with nails, preferably by means of a "loader," such as is shown in Figs. 12, 13, and 14, the same being composed of a series of tubes, a<sup>2</sup>, set in plates h<sup>2</sup> b<sup>2</sup>, the lower ends of the tubes being normally covered by a sliding spring-plate, c<sup>2</sup>, perforated to coincide with the tubes a<sup>2</sup>. The loader is supplied with nails and moved into a recess, d<sup>2</sup>, in the upper surface of the bed B (the gang of nail-holders opening into the said recess) until the rear end of the plate c<sup>2</sup> strikes the rear end of said recess and is arrested thereby, so that its perforations coincide with the tubes a<sup>2</sup>, and allow the nails to drop into the nail-holders C. The loader is then removed, and the plunger is again depressed, the drivers being thus caused to drive the nails into the heel. The normal position in which the bed B is held by the spring H may be varied by means of adjustable stops inserted in the frame A, and forming bearings for the upper surface of the bed. The bed may therefore be adjusted so that the plunger in its descent will press the bed downwardly and compress the heel while the nails are being driven. If such compression is not desirable, the bed should be lowered, so that the plunger will not bear upon it. The plunger in its descent presses down the bed B, which it is permitted to yield by its spring H, and therefore presses the bed downwardly upon the heel and additionally compresses the latter while the nails are being driven. If the heel is to be supplied with a blind-lift, a part of the nails are allowed to project from the heel by shortening some of the drivers. The jack is lowered by turning the lever h on its pivot, so as to bring the lowest step, 2, under the cross-head. The blind-lift is then placed between the jaws b' b', which before held the heel, and the top-lift spanker is moved to place between the top lift and the bottom of the bed B. The plunger I is then forced down by the driving-shaft; but the block j', interposed between the driver-holding plate at the bottom of the plunger and the upper surface of the bed B, prevents the drivers of the plunger from passing through the bed, as shown in Fig. 11, the downward pressure of the plunger being applied to the block j' and through the latter pressing the yielding bed downwardly upon the heel, thereby pressing the blind lift firmly to its place on the heel, the jack being meanwhile rigidly supported by the lever.



After this the plunger is raised, allowing the bed B to be also raised by its spring, and the jack with the boot or shoe is removed.

It will be seen that all the described operations—viz., pricking and nailing the heel and applying the blind-lift—are performed with one jacking of the boot or shoe—that is to say, the boot or shoe remains continuously on the jack while all of said operations are being performed.

If desired, the nails may all be driven entirely in, and the operation of supplying a blind-lift omitted.

The connection of the plate or carriage  $U^2$ , supporting the jack, to the slide  $U^4$ , by means of the vertical pivot  $U^3$ , enables the carriage  $U^2$  and the jack to be turned slightly on said pivot to adapt the jack to rights or lefts, a right boot or shoe requiring to stand at a slightly-different horizontal inclination from a left boot or shoe.

I claim—

1. In a heel-nailing machine, the combination of a bed or table having a gang of nail-holders, a jack located under said bed, mechanism for pressing the jack upwardly, and thereby pressing the heel against the bed, a vertically-reciprocating plunger above said bed, provided with plate-holding devices, two separate and independent plates provided, respectively, with a gang of awls and a gang of drivers, and adapted to be moved edgewise into and out of engagement with the holders of the plunger, and separate fixed supports adapted to hold said plates in position for engagement with the plunger when the latter is raised, as set forth.

2. In a heel-nailing machine, a vertically-reciprocating cross-head having parallel guides on its bottom surface adapted to receive and support awl or driver carrying plates, combined with separate fixed guides adapted to support similar plates and coinciding with the guides on the plunger when the latter is raised, as set forth.

3. In a heel-nailing machine, a vertically-reciprocating cross-head having parallel guides on its bottom surface, adapted to receive and support awl or driver carrying plates, combined with separate fixed guides, also adapted to support said plates when not in use, and a sliding device or carrier adapted to move a pair of said plates in said guides, and means, substantially as described, for limiting the movement of said sliding carrier, as set forth.

4. In a heel-nailing machine, the combination, with a vertically-reciprocating plunger provided with guides or holders on its bottom surface, coinciding with separate fixed guides or holders when the plunger is raised, interchangeable plates provided with differently-sized gangs of awls and drivers, adapted to slide into and out of the holders on the plunger, a pivoted rotary bed having differently-sized gangs of nail-holders, and adapted to present either gang to the corresponding gang

of awls or drivers on the plunger; a spring supporting said bed, and enabling it to yield vertically, and the vertically-arranged elongated bolt in the frame of the machine, and corresponding devices in the bed, whereby said bed may be locked with either gang of nail-holders in position, and is permitted to move vertically without being unlocked, as set forth.

5. The combination of a vertically-reciprocating plunger provided with guides or holders on its bottom surface, coinciding with separate fixed guides when the plunger is raised, interchangeable plates provided with differently-sized gangs of awls and drivers, adapted to slide into and out of the holders on the plunger, a jack adapted to support a heel under said drivers, a fixed vertical standard, D, behind the plunger and jack, an interposed bed or table containing differently-sized gangs of nail-holders, and adapted to move vertically and rotate on said standard, and thereby bring either gang of nail-holders into operative position, a spring, H, normally supporting said bed, and permitting it to yield to the downward pressure of the plunger, whereby the plunger and bed are enabled to compress the heel, and locking devices, substantially as described, whereby the bed may be locked with either gang of nail-holders in position, and may also be depressed without being unlocked, as set forth.

6. In a heel-nailing machine, the combination of the vertically-reciprocating plunger I, having means for driving nails, as described, the jack T, means for supporting the jack, the bed B, having a gang or gangs of nail-holders, and the top-lift plate or spanker under said bed, adapted to be moved to a position over the jack, and provided with an arm,  $i'$ , and block  $j'$  over said bed, as set forth.

7. The combination of the bed B, pivoted on a central standard, and provided with a gang or gangs of nail-holders, and the top-lift spanker, pivoted independently on the said rod, as set forth.

8. The combination of the plunger adapted to interchangeably hold a gang of awls and a gang of drivers, the bed B, having a gang of nail-holders, the jack adapted to be moved vertically toward and from said bed, and pivoted to oscillate laterally, the centering-levers  $q$   $q$ , adapted to bear against opposite sides of the jack, and mechanism, substantially as described, for adjusting or moving said levers simultaneously in opposite directions, as set forth.

9. The combination of the bed B, having a gang of nail-holders, the jack adapted to be moved vertically toward and from said bed, the heel-clamping jaws  $b'$   $b'$ , and mechanism, substantially as described, for adjusting or moving said jaws simultaneously in opposite directions, as set forth.

10. In a heel-nailing machine, the combination of the jack, supporting devices therefor,



substantially as described, adapted to slide vertically, and the treadle having a series of steps of different heights, located under the supporting devices, and adapted to hold said supporting devices and jack at different heights, as set forth.

11. The combination of the jack, the supporting-treadle having a series of steps, intermediate devices composed of the cross-heads  $W$   $W'$ , and the connecting-screw  $b$ , nut  $c$ , and mechanism, substantially as described, whereby the upper cross-head and screw are raised with the jack before the treadle is brought into action, as set forth.

12. The combination of the jack  $T$ , the upper cross-head,  $W$ , the screw  $b$ , the lower cross-head,  $W'$ , the supporting-treadle  $h$ , the pinion-nut  $c$ , journaled in the lower cross-head, the shaft  $f$ , having pinions  $e$   $e'$ , the counter-shaft  $j$ , having pinion  $e''$  and loose pulleys  $k$   $k'$ , the friction-clutch  $l$ , and the shipper and its

operating-lever, all arranged and operated substantially as described.

13. In a heel-nailing machine, the combination, with the heel-perforating, nail-holding, and nail-driving devices, of the slide  $U^1$ , adapted to move horizontally under the nail-holders, the plate or carriage  $U^2$ , connected to the slide  $U^1$  by a vertical pivot,  $U^3$ , and the jack connected to said plate  $U^2$  by a horizontal pivot,  $U$ , whereby the jack is adapted to be adjusted laterally, the vertical pivot  $U^3$  enabling the jack to be adjusted to right and left boots or shoes, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 7th day of July, 1883.

MERRILL A. TYLER.

Witnesses:

C. F. BROWN,  
A. L. WHITE.