

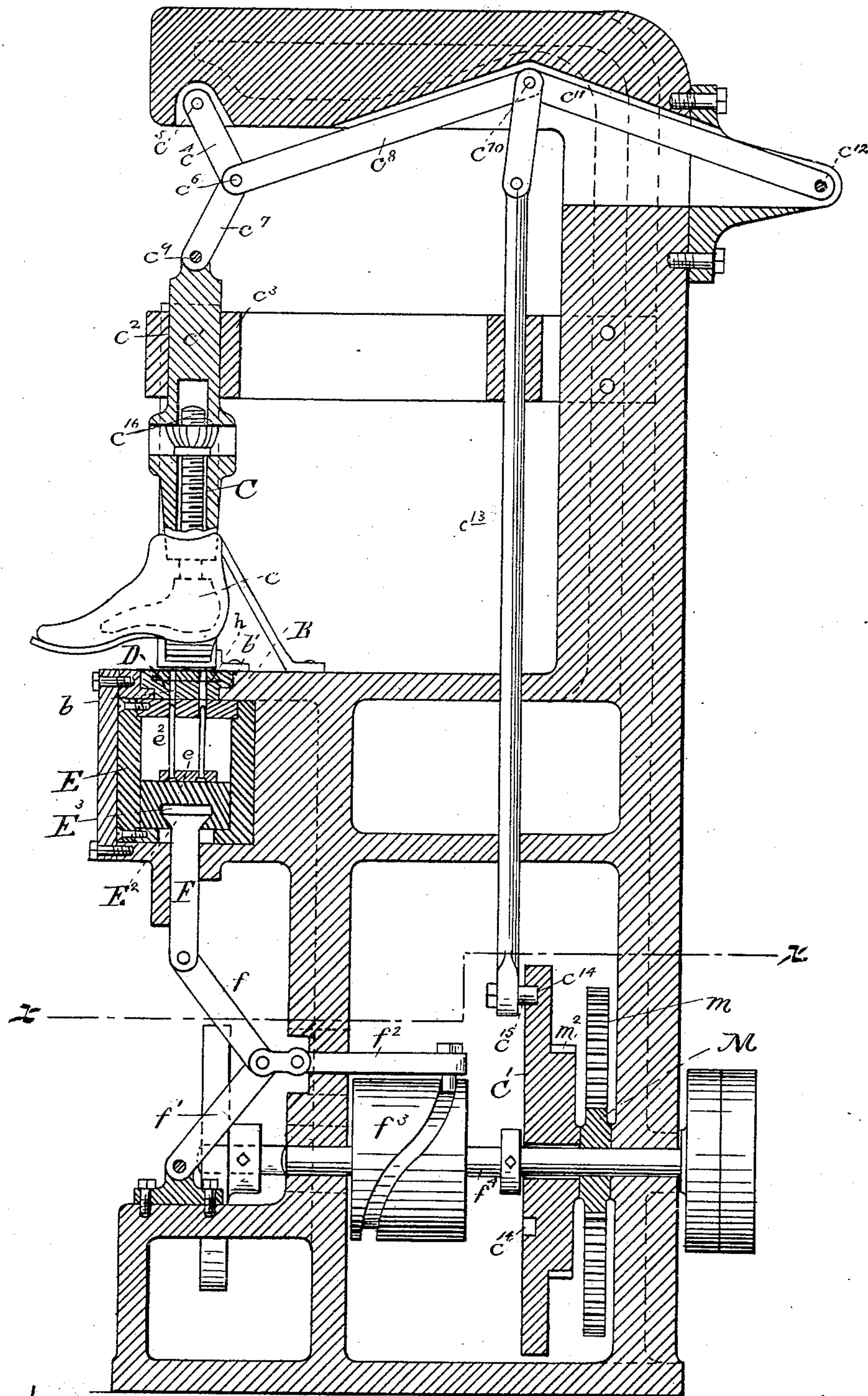
(No Model.)

4 Sheets—Sheet 1.

F. F. RAYMOND, 2d.  
HEEL NAILING MACHINE.

No. 341,689.

Patented May 11, 1886.



WITNESSES

J. W. Dolan  
Fred. B. Dolan

Fig. 1.

INVENTOR  
F. F. Raymond

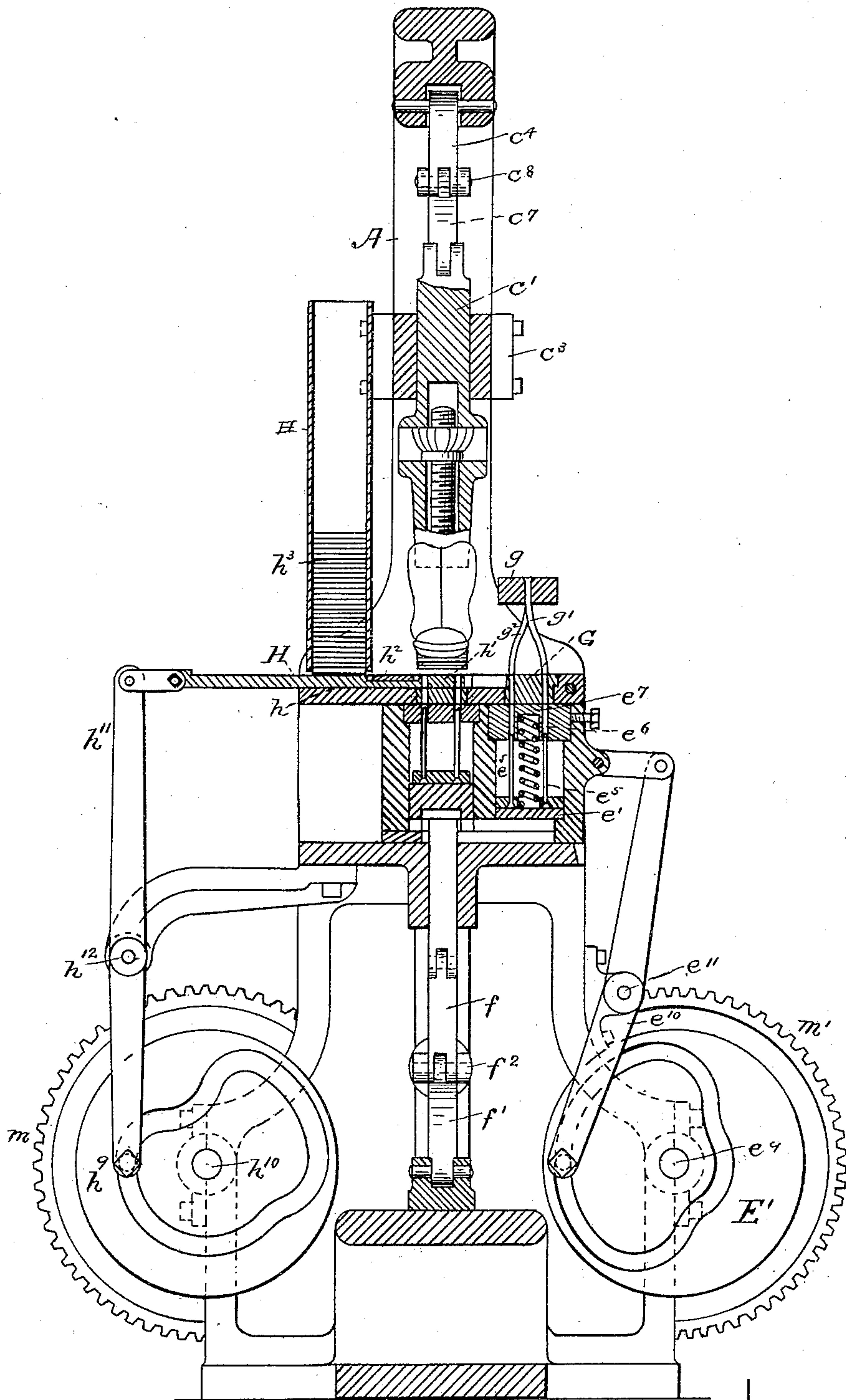
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FIG. 2.

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(No Model.)

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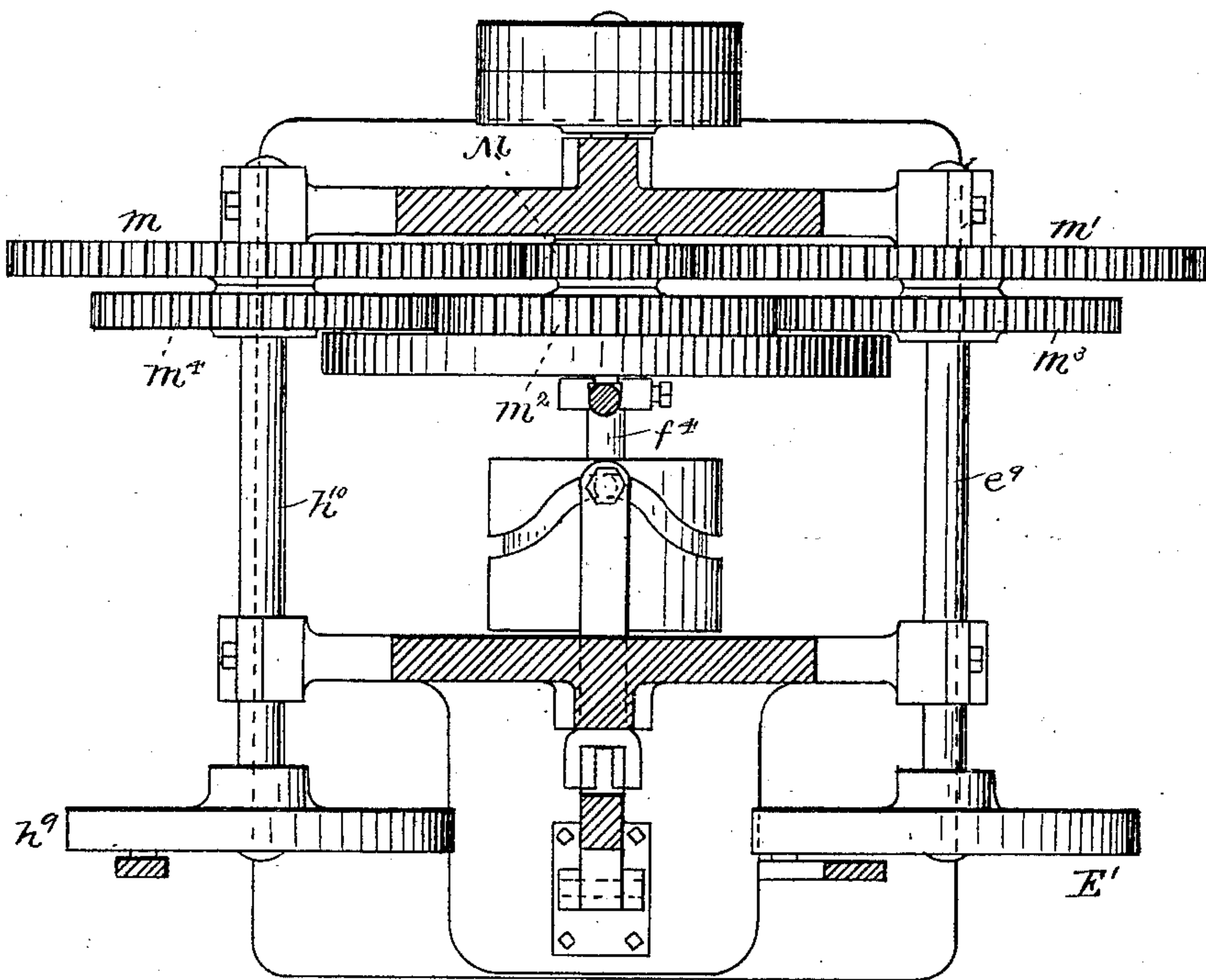


FIG. 3.

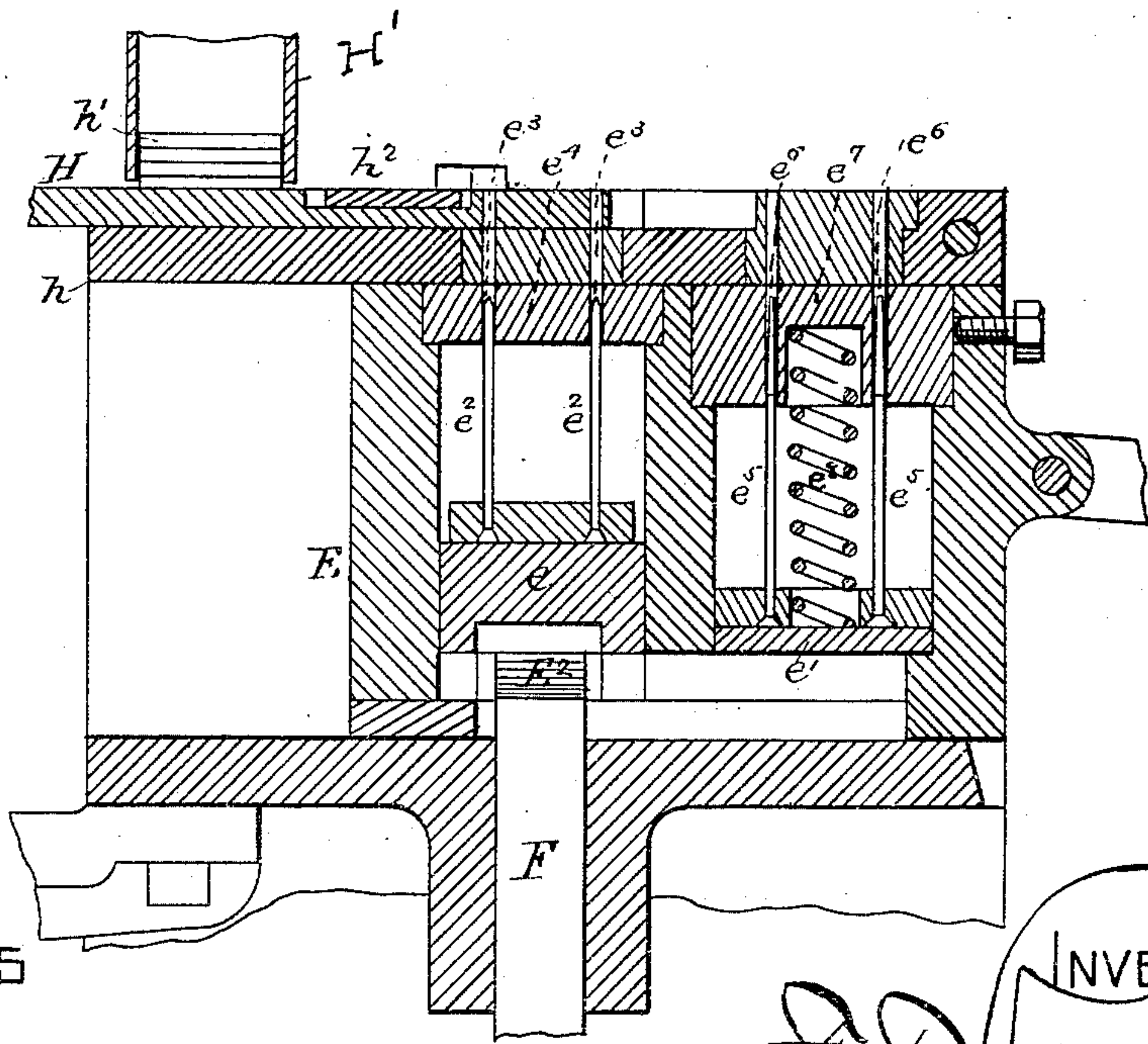


FIG. 4.

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(No Model.)

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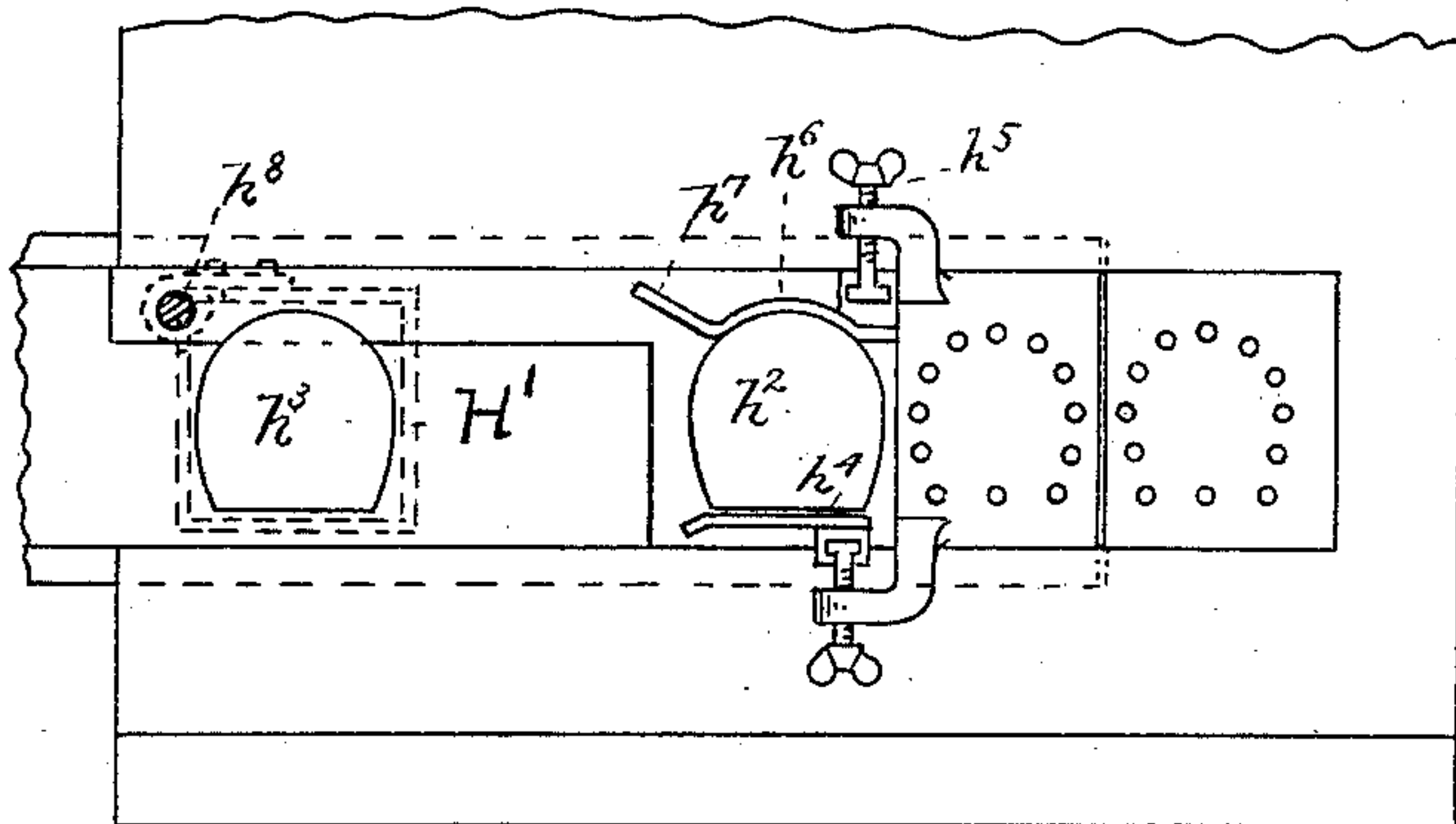


Fig. 5.

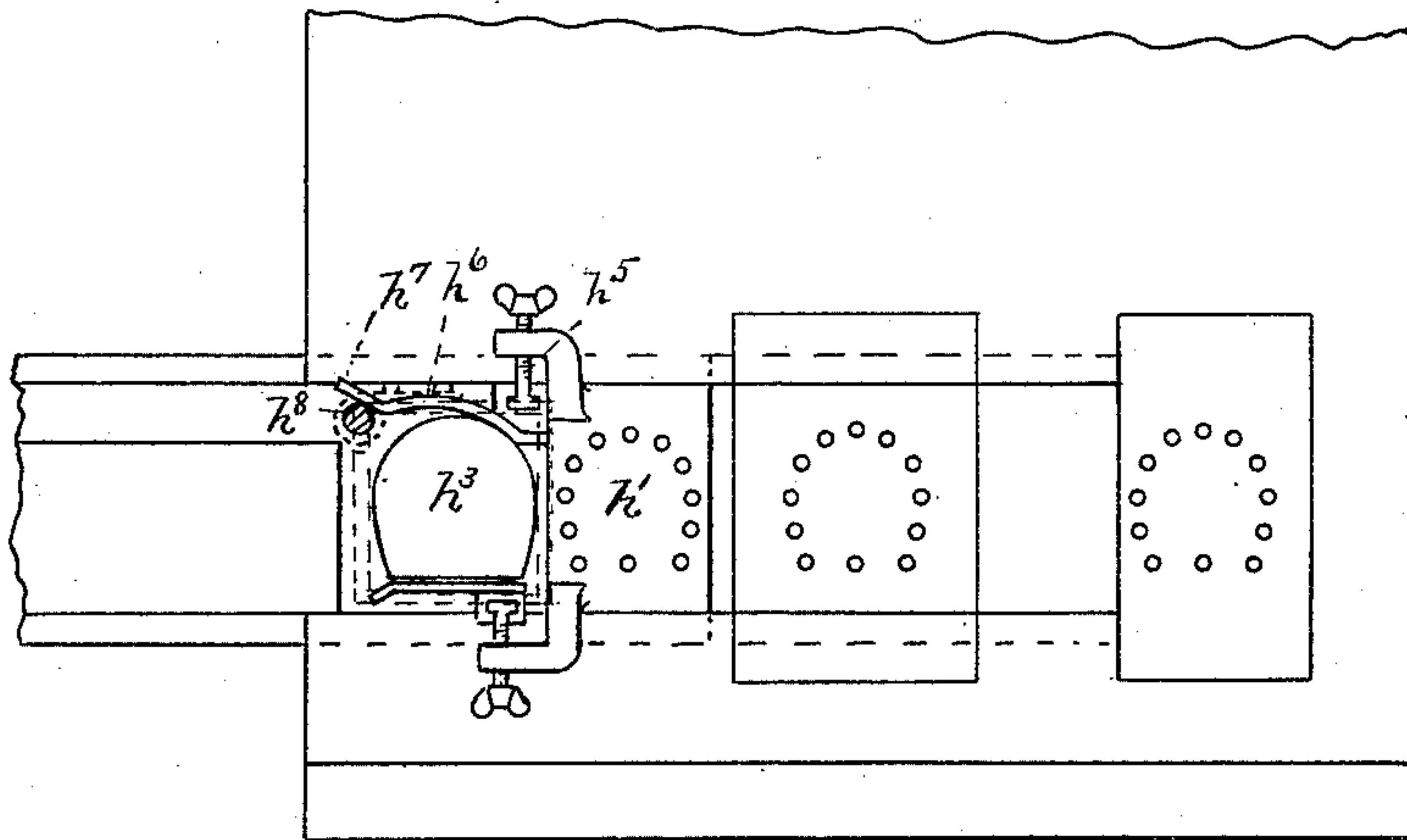


Fig. 6.

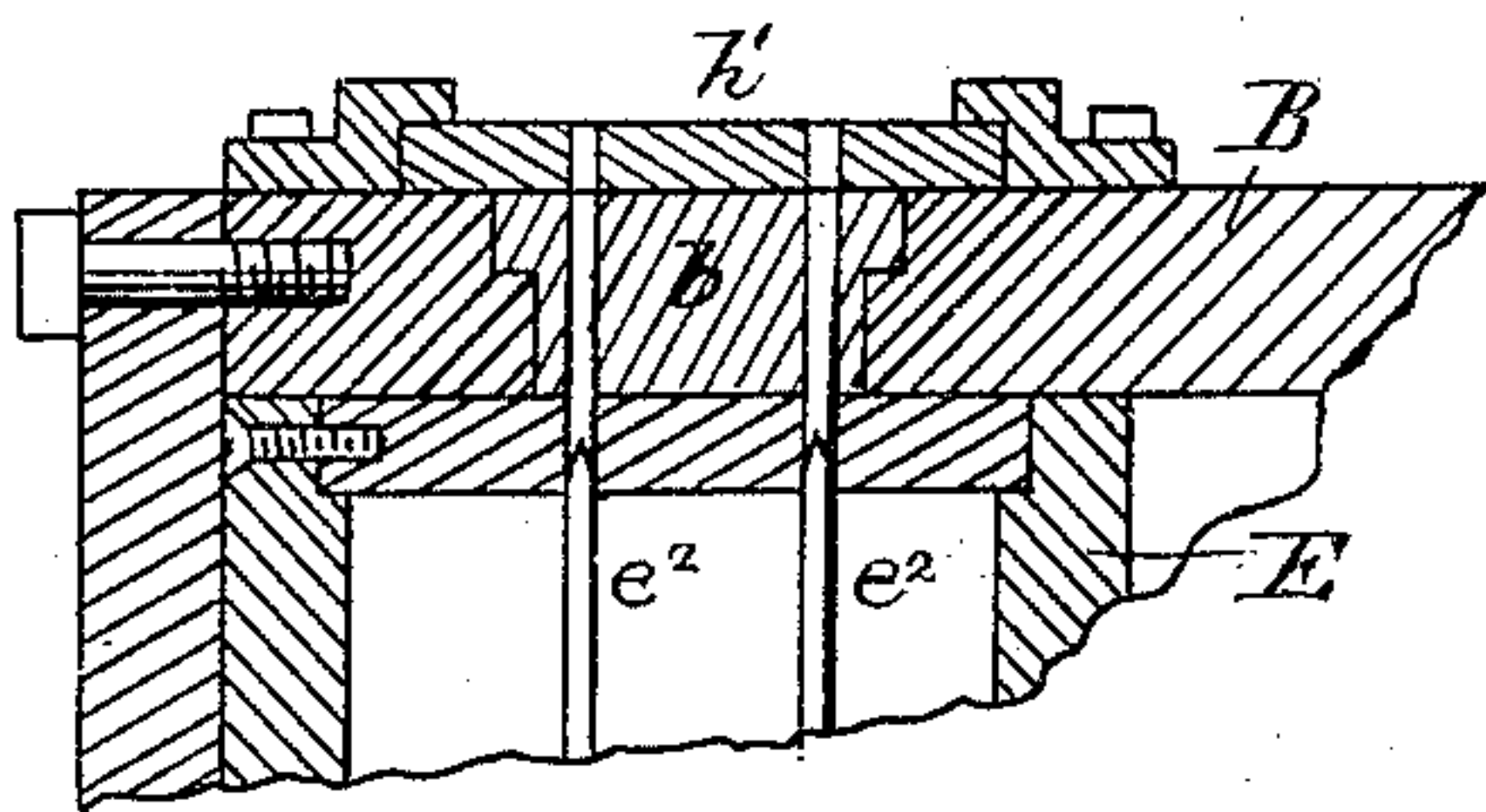


Fig. 7.

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# UNITED STATES PATENT OFFICE.

FREEBORN F. RAYMOND, 2D, OF NEWTON, MASSACHUSETTS.

## HEEL-NAILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 341,689, dated May 11, 1886.

Application filed January 12, 1886. Serial No. 188,337. (No model.)

*To all whom it may concern:*

Be it known that I, FREEBORN F. RAYMOND, 2d, of Newton, in the county of Middlesex and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Heel-Nailing Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The invention relates to mechanism for holding a boot or shoe upon the last or heel support in an upright position and for forcing the same vertically downward against a plate, for the purpose of compressing the heel-blank or heel against the surface of the outsole of the boot or shoe before it is attached.

It further comprises means for pricking holes in the said compressed heel-blank for feeding the attaching-nails automatically thereto, and for driving them through the compressed heel into the outer and in soles.

It further relates to mechanism for automatically feeding and attaching top lifts to the attached heel; also, to devices for automatically supplying the attaching-nails.

It further comprises devices whereby upon one movement of the operating-treadle the various operations above alluded to are successively and automatically performed.

Referring to the drawings, Figure 1 is a vertical central section of a heel-nailing machine having the features of my invention. Fig. 2 is a cross vertical section. Fig. 3 is a horizontal section upon the line  $x x$  of Fig. 1 and a plan view of the parts below it. Fig. 4 is an enlarged section of a portion of the mechanism operating the awls and drivers and feeding the nails. Figs. 5, 6, and 7 are detail views.

A represents the frame of the machine; B, a stationary bed or table. C is the jack-post, which supports the last or work support  $c$ .

The jack-post C is attached to a block,  $c'$ , which is vertically movable in the bearing  $c''$ , formed in the bracket or arm  $c^3$ , extending horizontally from the frame A. This block is moved vertically and held locked by means of a compound toggle operated by a cam. The toggle comprises the link  $c^4$ , pivoted at  $c^5$  to the head of the frame A and at  $c^6$  to the links

$c^7 c^8$ . The link  $c^7$  is pivoted at  $c^9$  to the movable block or head  $c'$ . The link  $c^8$  is pivoted at  $c^{10}$  to the link  $c^{11}$ , which in turn is pivoted at  $c^{12}$  to the frame A. The links  $c^{11} c^8$  are also pivoted at  $c^{10}$  to the slide-rod  $c^{13}$ , and this rod is moved vertically by means of the cam C', which has a cam-groove,  $c^{14}$ , for the reception of a cam-pin,  $c^{15}$ , extending laterally into the same from the rod  $c^{13}$ . This cam C' is timed first to move the head  $c'$  downward to compress the heel-blank upon the sole of the boot or shoe and the heel-support, and to hold it so compressed while the awls are being reciprocated, the attaching-nails fed, and the drivers reciprocated to drive them. The head  $c'$  is then lifted, with the jack and the shoe thereon, by the operation of the cam, and the top lift fed automatically into place, when the cam C' again operates to move downward the block  $c'$ , and consequently the heel-support, to spank on the top lift, and the head is then immediately lifted by the cam to its original position, unless a heel-trimming device is used, in which case the cam does not operate to lift the head  $c'$  until after the heel-trimming mechanism has been operated. The jack-post C is provided with a screw,  $c^{16}$ , for adjusting the jack-spindle and boot or shoe support vertically.

The bed B is provided with a recess or hole,  $b$ , having a shoulder,  $b'$ , for receiving the templet-plate D. This templet-plate also has a shoulder to bear against the shoulder  $b'$ , and it is fastened in place by a set-screw, or in any other desirable way. It is provided with the perforations or holes which correspond in number and arrangement with the member and arrangement of the nails to be driven into the heel to be attached, and it is made removable from the bed B, in order that blocks having other arrangements of holes may be substituted therefor. There is arranged below said bed B a horizontally-sliding carriage, E, which supports two vertically-movable blocks,  $e e'$ . The block  $e$  supports a gang or group of awls,  $e^2$ , the upper ends of which enter the holes  $e^3$  in the cross-plate  $e^4$ , attached to the carriage E. The block  $e'$  supports the drivers  $e^5$ , the upper ends of which extend into the holes  $e^6$  of the block  $e'$ , which is also attached to the carriage. The driver-



holder block  $e'$  is moved and held away from the block  $e'$  by means of a spring,  $e^8$ . There is arranged below the carriage and in line with the jack-post and templet the head F, which is reciprocated, as hereinafter described, first, to move the awl-block vertically, and, second, to move the driver-block vertically as they are moved successively over the head.

The carriage E is automatically horizontally moved, to bring the awls and drivers successively in register with the holes in the templet-block D by the cam  $E'$  on the shaft  $e^9$  and the lever  $e^{10}$  pivoted at  $e^{11}$ .

The head F is operated by a toggle,  $f f'$ , slide-bar  $f^2$ , and cam  $f^3$  on the main shaft  $f^4$ . The cam is timed to move the toggle and the head upward when the awl block has been brought into position over it, and the awls are forced through the holes in the templet into the heel-blank, and upon the downward movement of the head the awl-block is drawn down by the head. The carriage E is then moved to bring the driver-block over the head. The next upward movement of the head forces the driver-block upward and drives the nails through the holes in the templet and into the heel or sole of the boot or shoe. The head F then comes to rest, and the movement of the carriage E is reversed, and the awl-holder block moved into line for operation upon the next wheel.

In order that the head F may operate to draw the awl-holding block downward, I have formed a dovetail projection,  $E^2$ , at its upper end, which fits the dovetail recess  $E^3$  in the awl-block, the projection and recess being arranged so that the awl-holding block can be moved on and off the projection, while upon the downward movement of the head F the awl-block is caused to be drawn down.

To feed the attaching nails automatically, I have arranged on one side of the bed B a nail-holding block, G, which has holes corresponding in number and arrangement with the holes in the block  $e'$ , and it may or may not have a covering-plate similar to that described in the Patent No. 316,894, according to the time of the discharge of the nails into the holes in the block  $e'$ . This block  $e'$  is made thick enough to provide holes of sufficient depth for receiving the nails from this nail-holder, and also the upper ends of the drivers. The holes in the nail-holder block are connected with the perforated block  $g$  by the tubes or passages  $g'$ , and the block  $g$  is supplied with nails automatically by devices similar to those described in the Patent No. 317,199, or in the application of Towns and myself, filed November 27, 1885, Serial No. 184,048. The only difference between the devices described in the said patents for making, cutting, or delivering nails to the nail holder when organized to operate as therein described and when organized to operate in connection with the mechanism herein specified is that when pointed nails are used the nails must be delivered to

the nail-carrier block with their points uppermost, and in the machines where the nails are made from wire this result is obtained by simply reversing the cutters.

When the heel is blind-nailed—that is, provided with a top lift spanked upon the heads or ends of the nails left projecting from the under surface of the heel—I form in the bed above the templet a recess or ways,  $h$ , in which is reciprocated a top-lift-feeding plate, H. This plate has two parts, the part  $h'$ , which forms a portion of the templet, in that it is provided with perforations in continuance of the perforations in the holes of the templet-block D, and a portion,  $h^2$ , which is imperforate, and which is adapted to carry from a stack of top lifts,  $h^3$ , the undermost one to a position to be attached or spanked to the heel. It has a gage-plate,  $h^4$ , which is movable transversely upon the plate by the screw  $h^5$  and the spring-arm  $h^6$ , the end  $h^7$  of which is moved backward by a pin,  $h^8$ , as the plate is moved beneath the stack of top lifts  $h^3$ . The stack of top lifts is held in a box, which may have adjustable sides for limiting the size, similar to those described in my Patent No. 289,857, and it has a vertically-movable gate similar to the one therein described for limiting or adjusting the size of the opening through which the undermost top lift is moved by the plate  $h^2$ . The plate H is reciprocated at proper intervals by the cam  $h^9$  on the shaft  $h^{10}$  and lever  $h^{11}$ , pivoted at  $h^{12}$ .

The main shaft  $f^4$  is connected with the shaft  $e^9$  by the gear M  $m$ , and with the shaft  $h^{10}$  by the gear  $m m'$ . The cam C' has a bearing upon the shaft  $f^4$ , but is not revolved thereby. It is provided with a gear,  $m^2$ , which meshes with gears  $m^3$  and  $m^4$  upon the shafts  $h^{10}$  and  $e^9$ , by which it is revolved.

The mechanism for starting and stopping the machine is similar to that described in Letters Patent No. 287,472, and need not further be described here. When nail making or feeding devices like those above referred to are used, the mechanism employed is automatically set in operation to deliver nails to the nail-holder by the heel-nailing machine, and by means substantially as described in said Patent No. 317,199.

Any form of heel support or last may be used, and probably the one used in the "McKay heeling-machine," so called, will answer for this purpose as well as any.

In operation the boot or shoe is adjusted upon the last, and the heel-blank placed upon the upper surface of the templet portion  $h'$  of the plate H, which may have devices for holding it by its edge thereon. The machine is then started, the last is moved downward by the compound toggle upon the heel-blank, compressing it upon the heel end of the sole between the upper surface of the templet and the under surface of the last. The awls are immediately forced upward through the holes in the templet and withdrawn, the carriage



E moved forward, to bring the drivers and attaching-nails in line with the holes in the templet, and the drivers are immediately reciprocated by the movement of the head F, to drive the nails through the templet into the heel and sole of the boot or shoe. The last is then immediately lifted, and the top-lift-carrying plate moved to bring the top lift beneath the heel, when the last is again moved forcibly downward by the compound toggle, to spank a top lift onto the ends of the nails which may have been left protruding from the heel-blank to receive it. The last is immediately raised again to permit the removal of the boot or shoe, the top-lift plate returned to its normal position to receive another top lift from the stack, and the carriage E moved to bring the awls into position for operation upon the next heel to be attached. This movement of the carriage brings the nail-carrying block  $e'$  beneath the nail-holder, and it then automatically receives a load of nails therefrom, and the nail-feeding devices are set in operation, to make or feed and arrange in the nail-holder another load for subsequent delivery to the block  $e'$ .

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a heel-nailing machine, the combination of the bed B, the stationary templet D, the last or work-support  $c$ , the head  $c'$ , and the compound toggle  $c^1 c^7 c^8 c^{11}$ , operated by a cam and connecting-rod, to forcibly move the last or work-support downward, all substantially as described.

2. The combination of the bed B, templet D, the carriage E, supporting the vertically-movable awl-holding block, and the vertically-movable driver-holding block, the reciprocating head F, and devices for automatically moving said carriage to a position to be operated by said reciprocating head, all substantially as described.

3. The combination of the bed B, the templet D, the movable driver-supporting block  $e'$ , and nail-carrying block  $e'$ , and devices for supplying said block with nails, all substantially as described.

4. In combination with a heel-nailing machine, the bed B, the templet D, the last or work support  $c$ , and devices for moving it in relation to the templet, as described, with a gang or group of awls and a gang or group of drivers horizontally movable beneath said templet, and means for reciprocating them successively, all substantially as set forth.

5. The combination of the bed B, the templet D, the last or work support  $c$ , devices for moving it automatically vertically downward to compress the heel-blank, a gang or group of awls, a gang or group of drivers, and a nail-carrier plate arranged beneath said bed B, devices for moving them automatically into position in relation to the templet D, and a reciprocating head for reciprocating first the

awls and then the drivers, all substantially as and for the purposes described.

6. The combination of the bed B and stationary templet D, the last  $c$ , and devices, substantially as set forth, for moving it vertically downward to compress the heel, and to apply the top lift with the top-lift-carrying plate H, all substantially as described.

7. The combination of the bed B, templet D, the last  $c$ , and devices for moving it vertically downward to compress the heel-blank with the movable plate H, having the perforated portion  $h'$  and the imperforate lower top-lift-holding section  $h^2$ , all substantially as described.

8. The combination of the bed B, the templet D, the last or work support  $c$ , and devices for moving it forcibly downward, with the movable plate H, having the top-lift-supporting surface  $h^2$ , and a box for holding top lifts in stack for delivery to said top-lift holding and carrying plate, all substantially as described.

9. The combination of the bed B, templet D, the last  $c$ , and devices for moving it forcibly downward, the box for holding top lifts in stack, a top-lift plate H, the cam  $h^9$ , and lever  $h^{11}$ , for operating the same, all substantially as described.

10. The combination of the bed B, the templet D, with the movable plate H, having the perforated section  $h'$  and the imperforate section  $h^2$ , the top-lift-centering device carried upon the upper surface of said imperforate section, all substantially as described.

11. The combination of the bed B, templet D, the plate H, having the perforated section  $h'$ , and the imperforate top-lift-supporting section  $h^2$ , the cam  $h^9$ , lever  $h^{11}$ , for moving said plate, the heel-support or last  $c$ , the sliding head  $c'$ , the toggle for operating the same, and the cam C' and connecting-rod  $c^{13}$ , all substantially as and for the purposes described.

12. The combination of the reciprocating plate H, having the gage  $h^4$ , and the movable clamping jaw  $h^6$ , having the incline  $h^7$ , with the box holding top lifts in stack, and the pin  $h^8$ , all substantially as and for the purposes described.

13. The combination of the templet D, the nail-carrying block  $e'$ , adapted to be moved automatically below the bed into position below the templet, and devices for feeding nails to said block and for driving them therefrom through the templet into the heel, all substantially as described.

14. The combination of the shaft  $f^4$ , operating the reciprocating head F, the shaft  $e^9$ , the cam E', the carriage E, and the cam C', having a bearing upon the shaft  $f^4$ , and operated as described, all substantially as set forth.

15. The combination of the shaft  $f^4$ , the cam  $f^3$ , the toggle  $f f'$ , the head F, reciprocated thereby, the shaft  $h^{10}$ , the connecting-gear M, cam  $h^9$ , lever  $h^{11}$ , and the plate H, all substantially as described.

16. The combination of the bed B, the templet D, the last or work support  $c$ , the sliding

carriage E, supporting a gang or group of awls and a gang or group of drivers, and the nail-carrier, the main shaft  $f^1$ , and intermediate connecting and operating mechanism, substantially as specified, for automatically moving the last, the carriage E, and the head F upon one movement of the operative treadle, all substantially as described.

17. The combination of the stationary tem-

plet D, the last  $e$ , the cam  $C'$ , constructed to move the last, as described, and the intermediate toggle and slide-head, all substantially as set forth.

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Witnesses:

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