

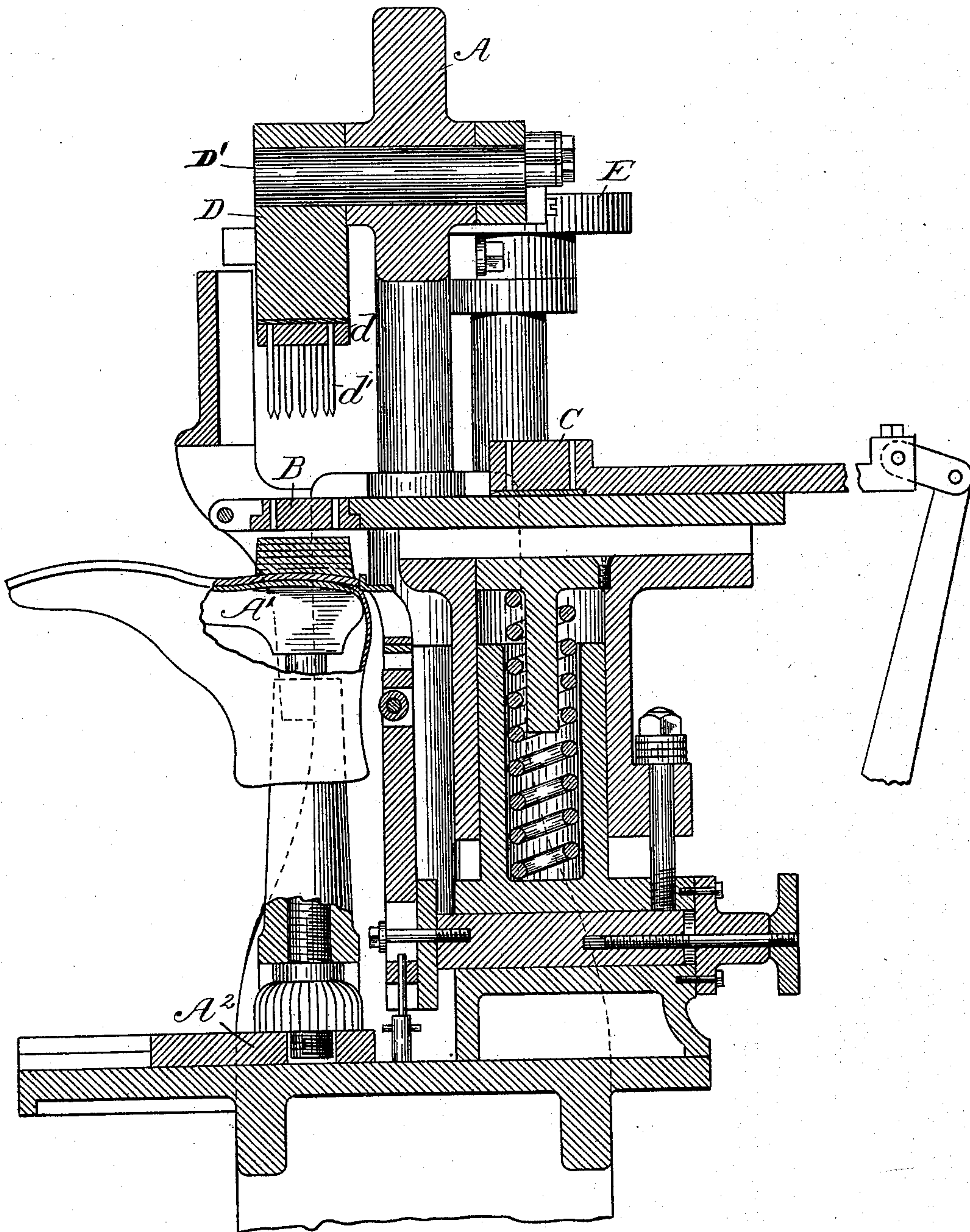
(No Model.)

9 Sheets—Sheet 1.

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

No. 410,194.

Patented Sept. 3, 1889.



WITNESSES.

FIG. 1.

INVENTOR.

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Fred. B. Dolan

F. F. Raymond.

(No Model.)

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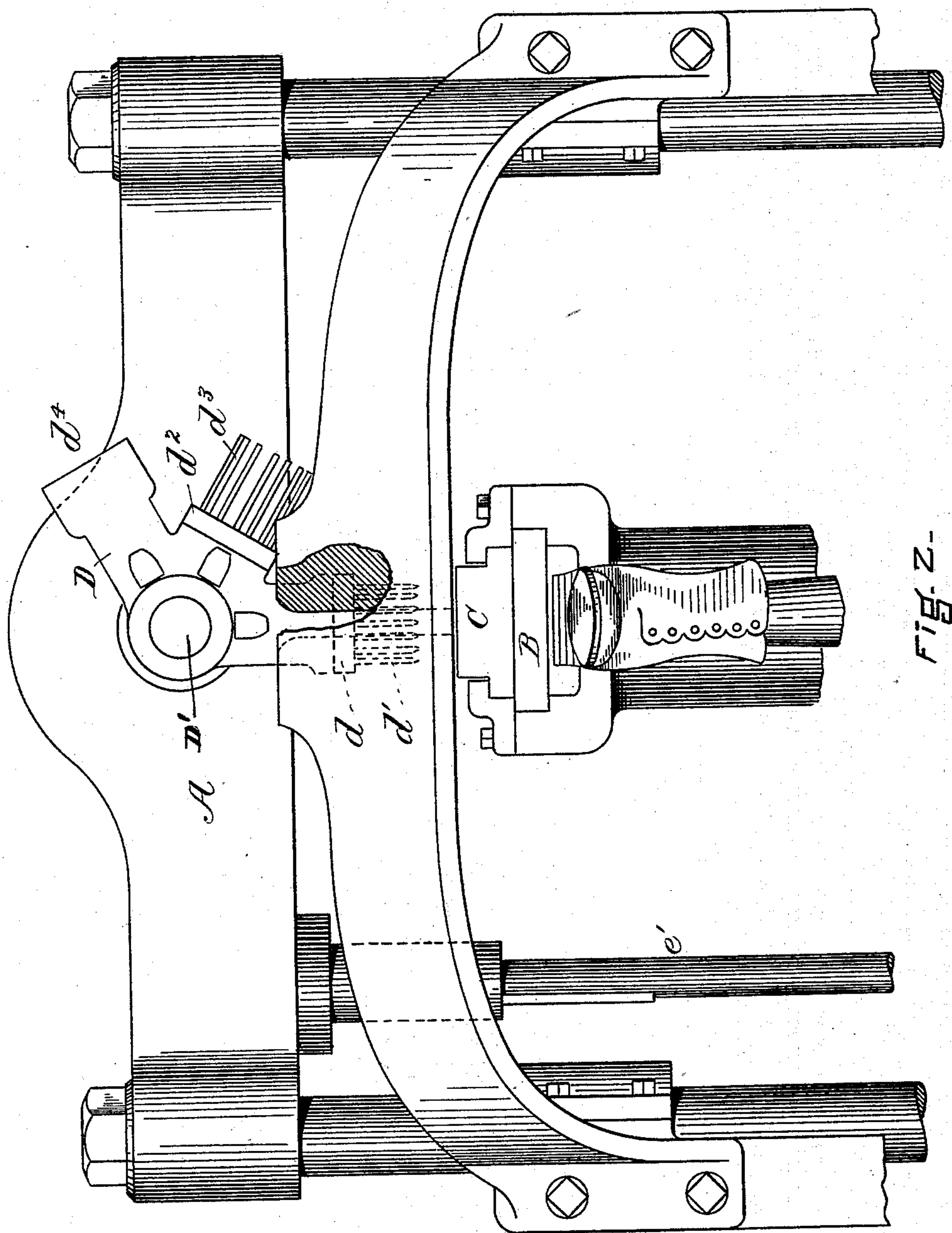


FIG. 2-

WITNESSES.

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F. F. Raymond.



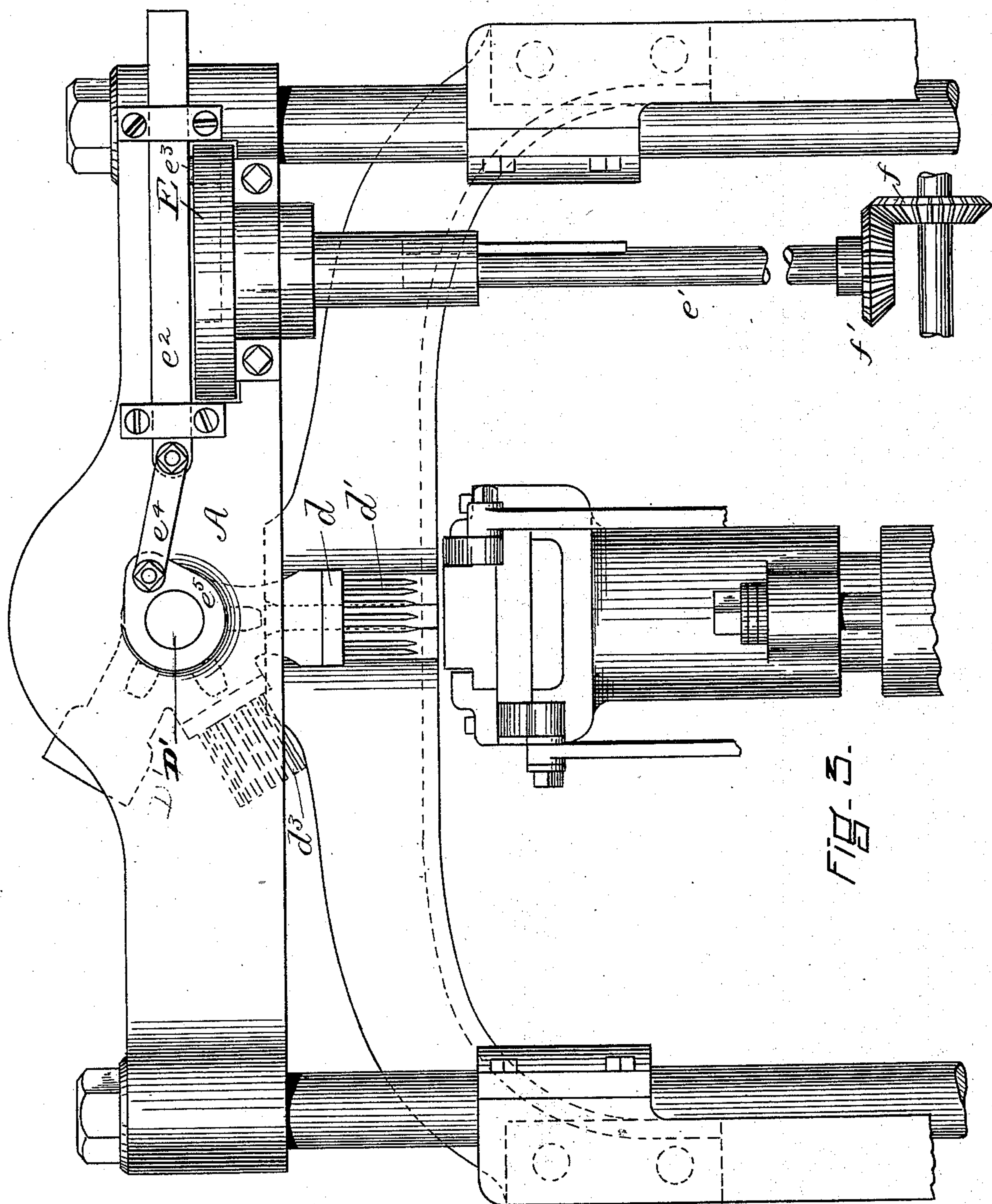
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WITNESSES

J. W. Dolan  
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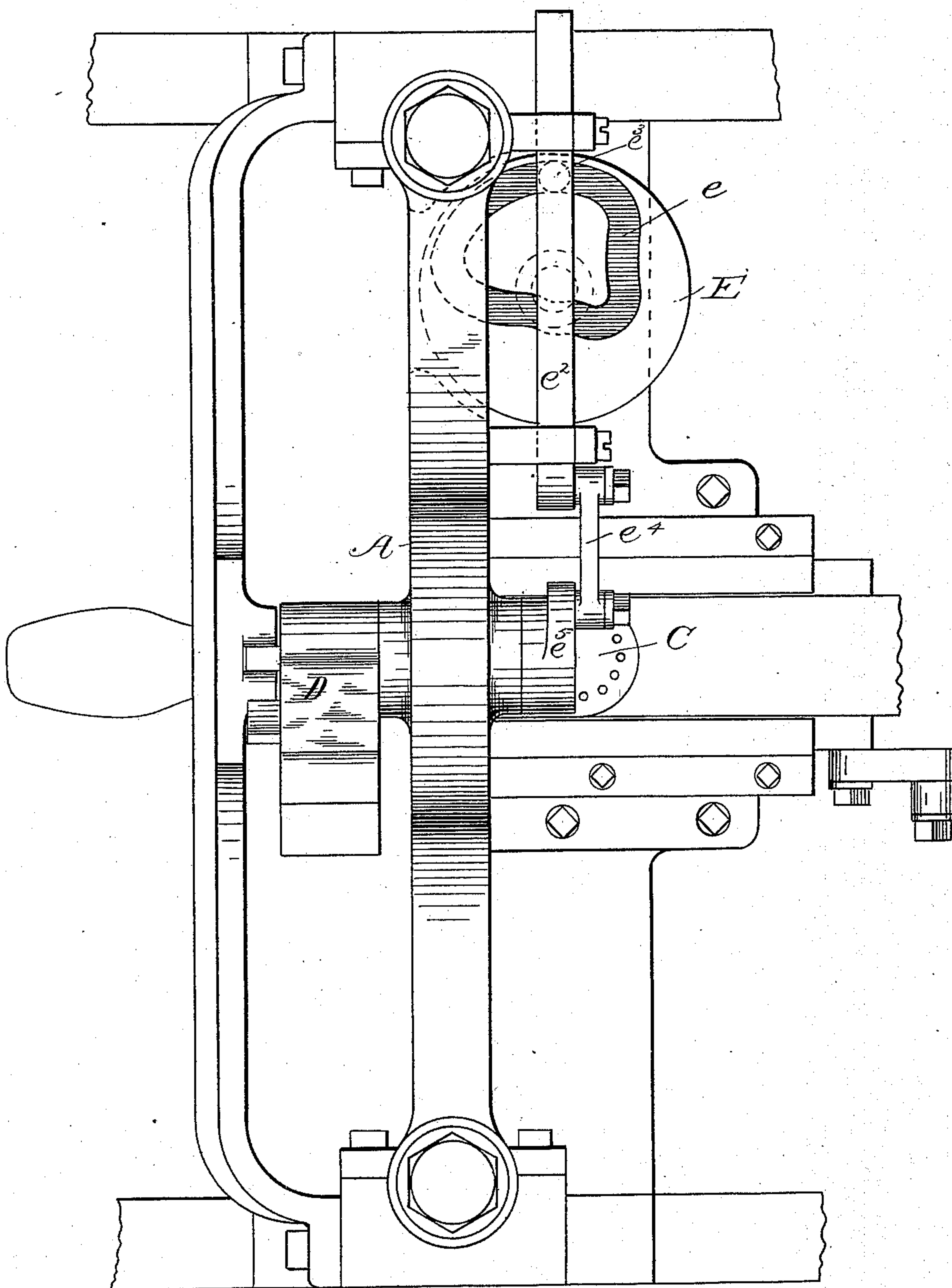
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WITNESSES

J. W. Dolan

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FIG-4-

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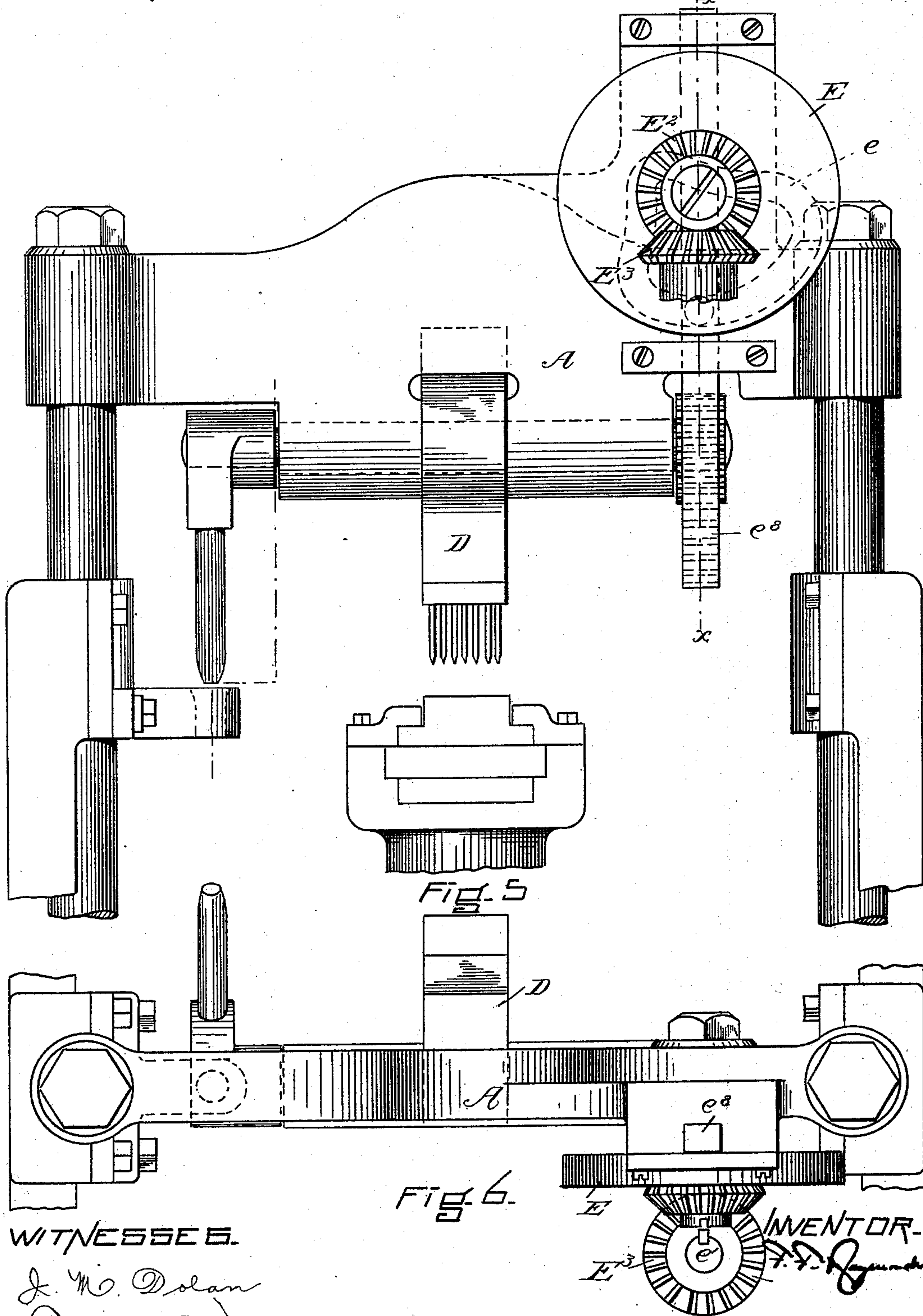
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Patented Sept. 3, 1889.



WITNESSES.

J. W. Dolan  
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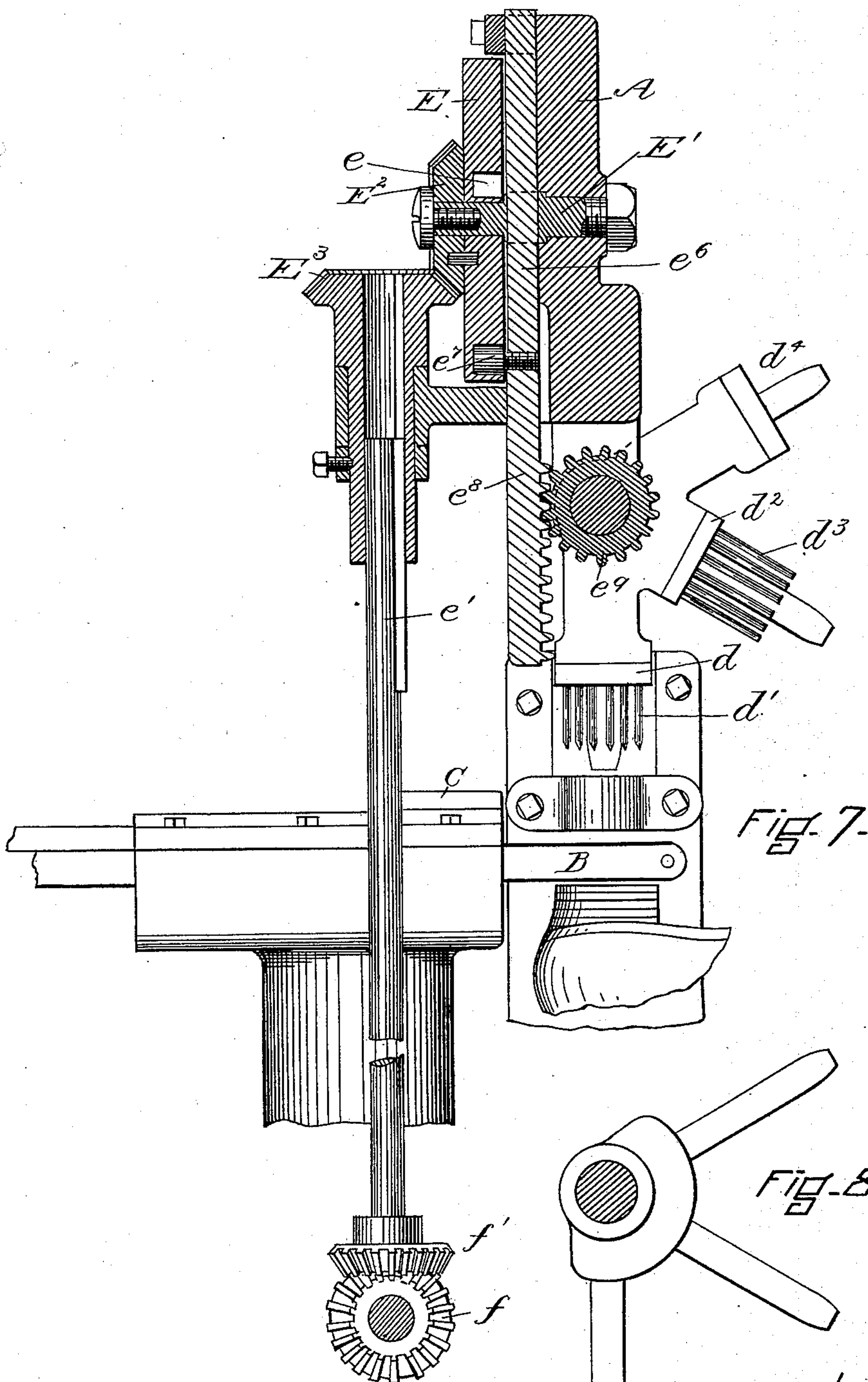
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F. F. RAYMOND, 2d.  
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WITNESSES

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(No Model.)

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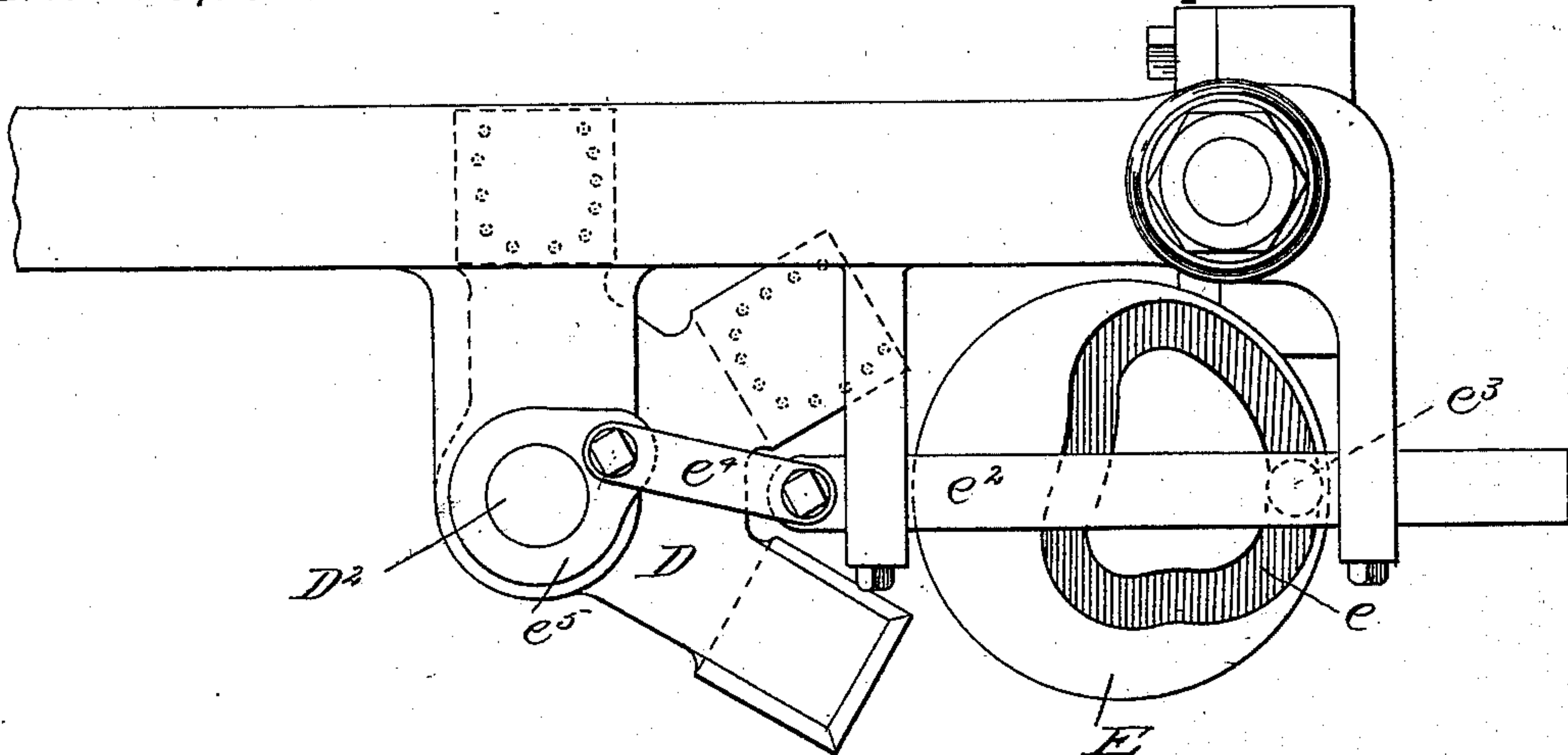


Fig-9

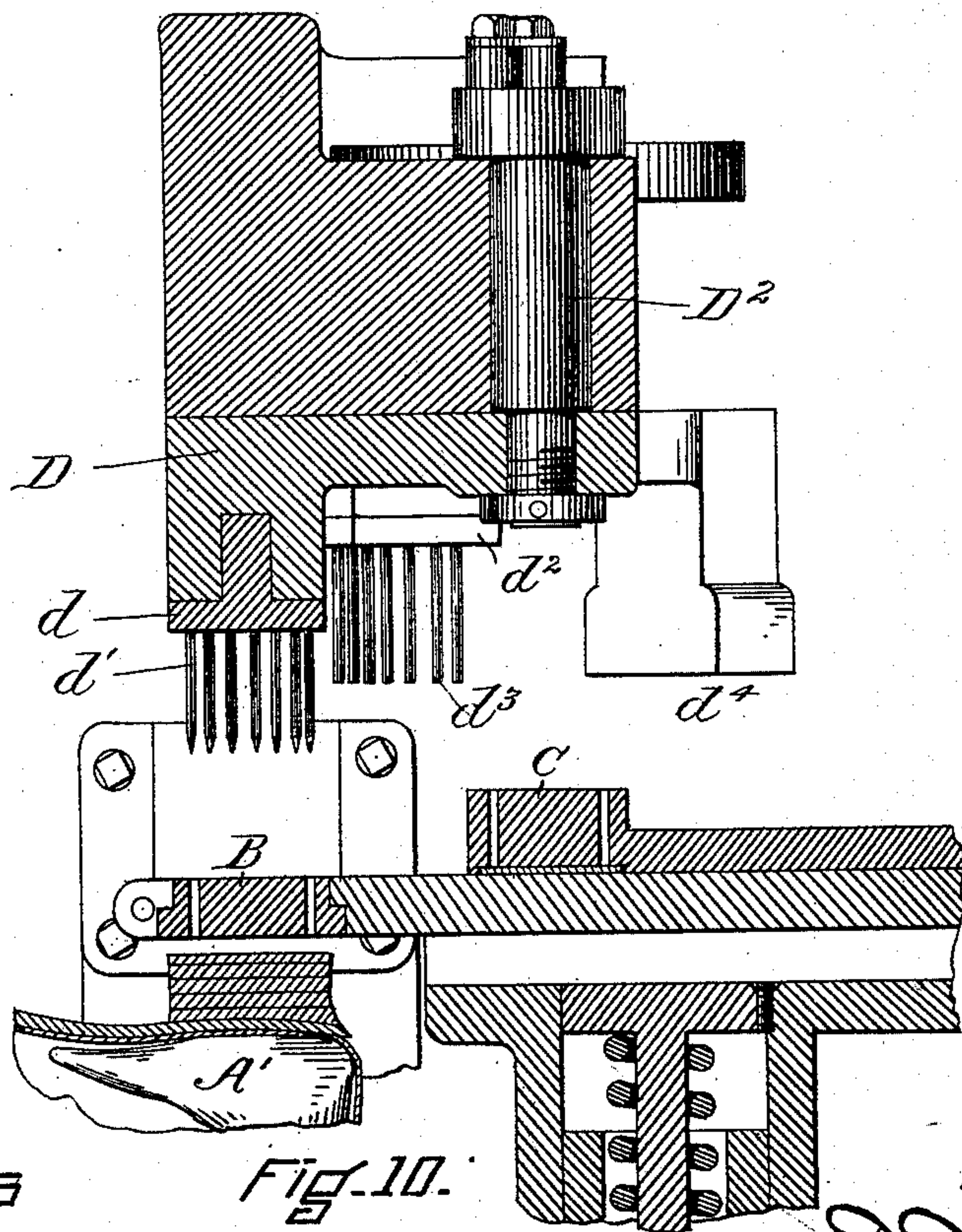


Fig-10.

WITNESSES

J. M. Dolan

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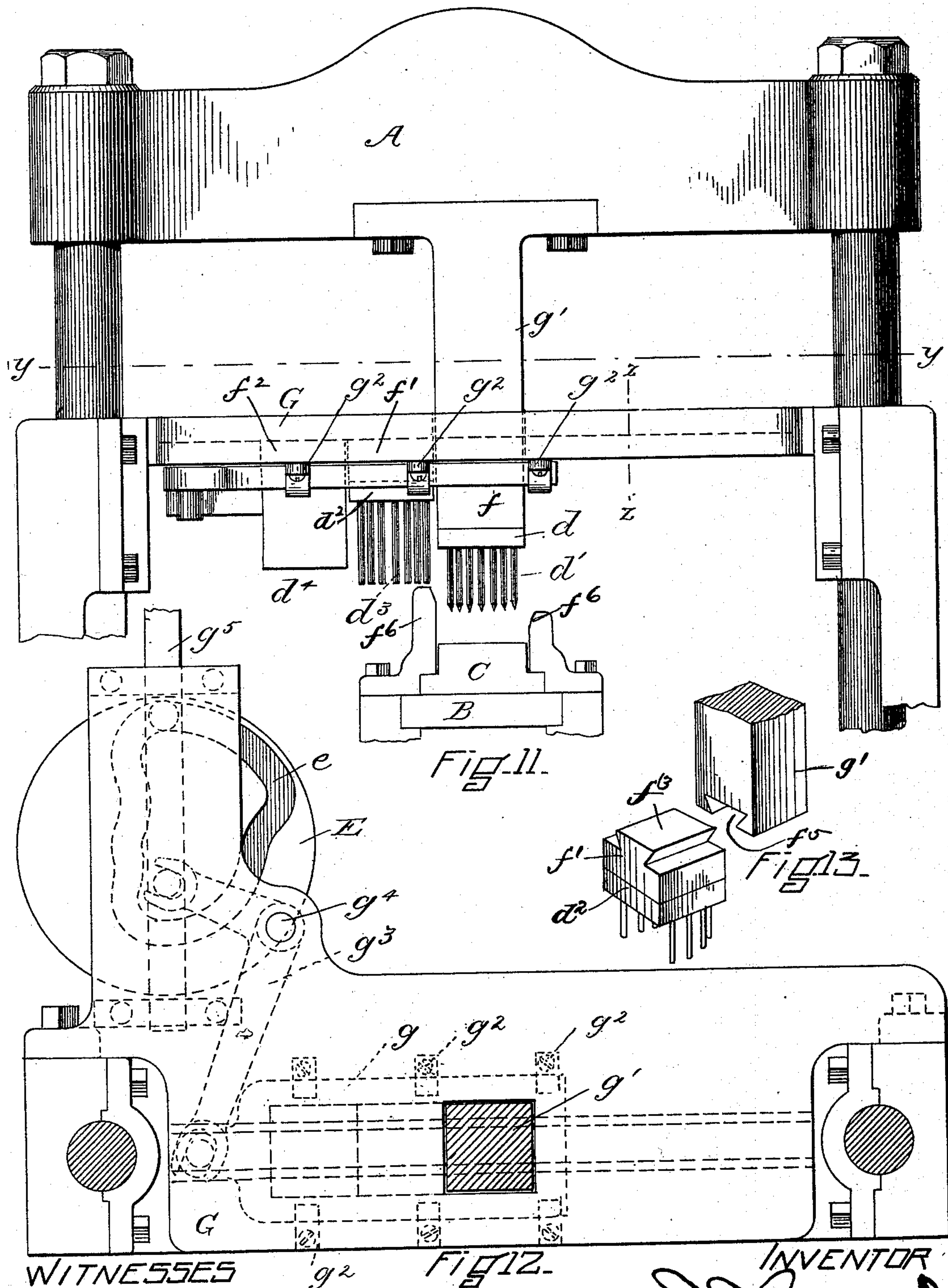
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No. 410,194.

Patented Sept. 3, 1889.



WITNESSES

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FIG 12.

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(No Model.)

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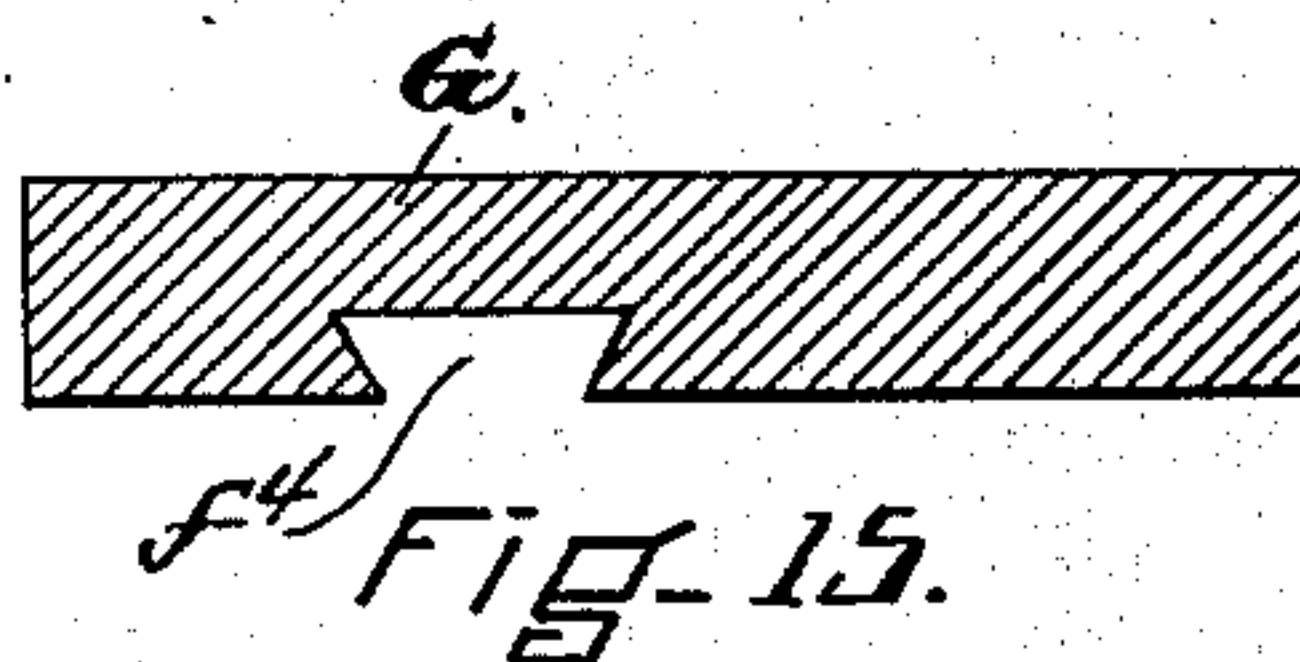
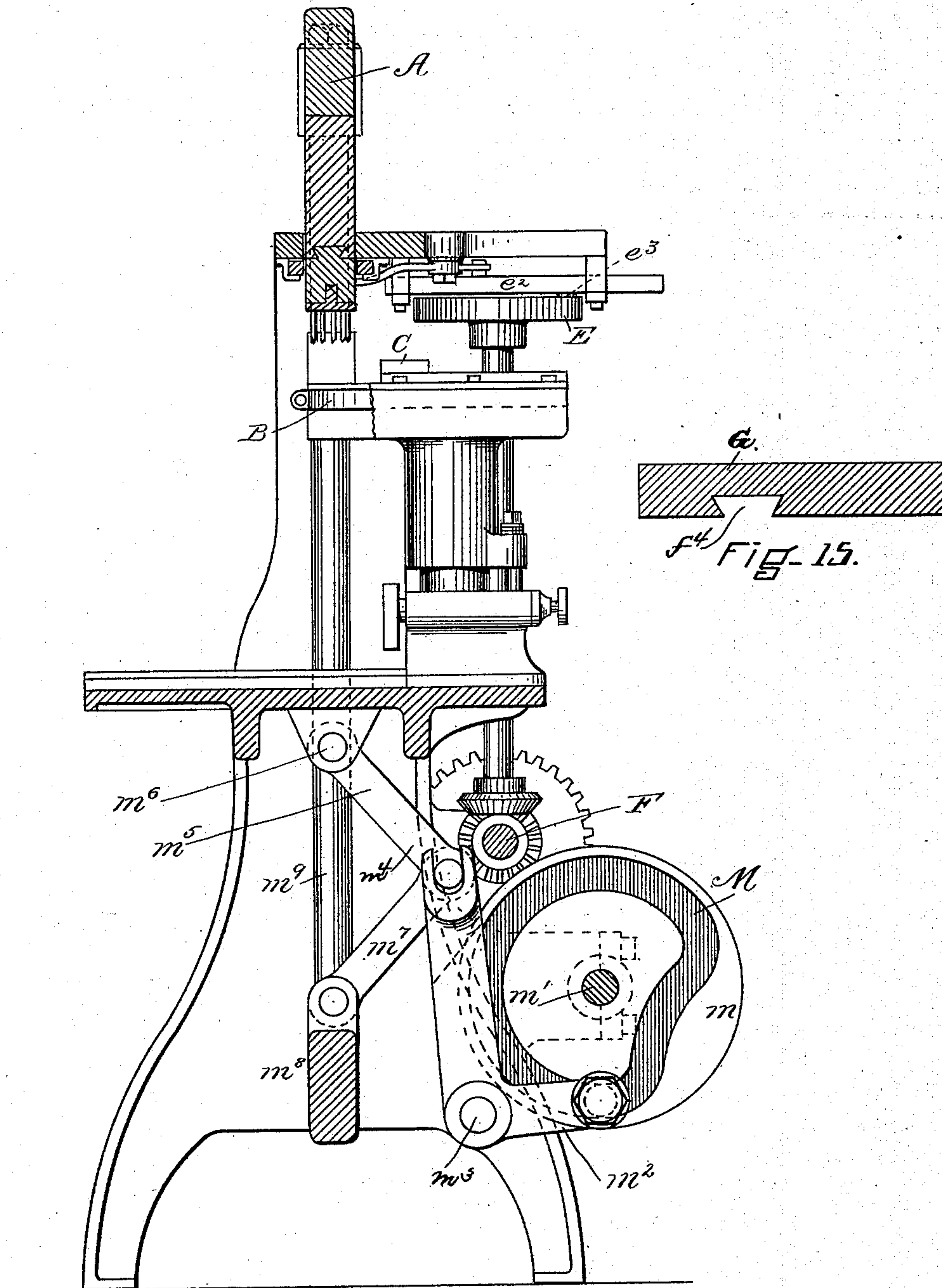


Fig. 14.

WITNESSES

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INVENTOR

F. F. Raymond



# UNITED STATES PATENT OFFICE.

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

## HEEL-NAILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 410,194, dated September 3, 1889.

Application filed April 16, 1887. Serial No. 234,986. (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 is an improvement upon that described in Patent No. 287,472, dated October 30, 1883, and it relates especially to a head, block, or support adapted to be oscillated or reciprocated automatically to bring into operative position in successive order a block carrying a gang or group of awls, another block carrying a gang or group of drivers, and another block carrying a heel spanker or leveler, or any two of these devices.

It also relates to various features of construction and organization.

I have represented the invention as applied to a machine having many of the features of the "National Heel-Nailing Machine," and I have shown it embodied in a number of different forms, all of which contain the same essential elements.

Referring to the drawings, Figure 1 is a view in vertical section of the central and upper parts of a heel-nailing machine provided with my invention. Fig. 2 is a view in front elevation of the central and upper parts of such machine, a portion of the cross-piece forming or providing a guide being broken out to show a portion of the guiding-recess. Fig. 3 is a view in rear elevation of the parts of the machine shown in Figs. 1 and 2. Fig. 4 is a plan view thereof. Fig. 5 is a view in rear elevation of the central and upper parts of a machine, representing my invention as applied in a somewhat different form from that represented in Figs. 1 to 4, inclusive. Fig. 6 is a plan view of the form represented in Fig. 5. Fig. 7 is a vertical section upon the line  $x x$  of Fig. 5. Fig. 8 is a detail view to illustrate the centering mechanism employed with the construction shown in Figs. 5, 6, and 7. Fig. 9 is a view in plan, and Fig. 10 in section, of another embodiment of the invention. Fig. 11 is a view in front elevation to represent the application to a

heel-nailing machine of another form of the invention. Fig. 12 is a section upon and in plan below the dotted line  $y y$  of Fig. 11. Fig. 13 is a view in perspective of a part of the reciprocating head and of the movable block supporting the block carrying the drivers, to illustrate the manner of connecting said block with the head. Fig. 14 is a view in vertical section of a complete nailing-machine having the form of my invention shown in Figs. 11, 12, and 13. Fig. 15 is a vertical section upon the dotted line  $z z$  of Fig. 11.

A is the reciprocating head of the machine.

A' is the last or work support. A<sup>2</sup> is the jack supporting it.

B is the templet; C, the nail-carrier.

The cross-head A carries a movable support or head D, which may be secured thereto by a horizontal pivot or shaft D', as represented in Figs. 1 to 6, inclusive, or by a vertical pivot or shaft D<sup>2</sup>, as represented in Figs. 9 and 10. This head or support D has the block  $d$ , carrying a gang or group of awls  $d'$ ; also the block  $d^2$ , carrying a gang or group of drivers  $d^3$ , and the block  $d^4$ , the surface of which forms a heel-spanker, and which may have top-lift-grasping devices attached to it. The head or support D is oscillated or reciprocated intermittently in one direction to move the awls, drivers, and spanker successively into operative position, and in the other direction its movement is continuous and brings the awls, drivers, and spanker into place to be again intermittently advanced. This intermittent advancing and continuous return movement, oscillation, or reciprocation is provided by a cam E, having the cam-groove  $e$ . This cam is represented in all the figures, excepting Figs. 11, 12, and 14, as secured or mounted upon the cross-head A, to be reciprocated or moved therewith. In Figs. 1, 2, 3, 4, 9, and 10 the cam E is represented as mounted upon the vertical shaft  $e'$ . In Figs. 5, 6, and 7 the cam is represented as mounted upon the horizontal shaft E', which has bearings in the cross-head A and is connected with the shaft  $e'$  by means of the bevel-gear E<sup>2</sup> and E<sup>3</sup>. In Figs. 1, 2, 3, 4, 9, and 10 the cam is represented as connected with the shaft of the head D by means of a slide-bar  $e^2$ , which has a cam-pin  $e^3$  entering the cam-groove  $e$ , has



suitable bearings in the brackets or arms extending horizontally from the head A, and is connected with the said head-shaft by means of the link  $e^4$  and arm  $e^5$ , which extends from the head-shaft and is rigidly fastened thereto. In Figs. 5, 6, and 7 the movement of the cam is communicated to the shaft of the head D by means of a rack-bar  $e^6$ , which has a cam-pin  $e^7$  entering the cam-groove  $e$  of the cam E. This rack-bar is in every essential respect like the slide  $e^3$ , and instead of being joined to the shaft of the head D by a link it is connected therewith by means of the rack-teeth  $e^8$  and the segment-gear  $e^9$ , which is fastened rigidly to the shaft. The driving-shaft  $e'$  is connected with the shaft F by means of the bevel-gears  $f f'$ . As the cross-head A and cam E, in every form of construction except that shown in Figs. 11, 12, and 14, is moved vertically, the connections between the end of this shaft and the cam E, as in Fig. 1, or the bevel-gear, as in Fig. 6, is provided by making the cam or bevel gear movable upon the shaft  $e'$ , and connecting them therewith by means of a fast feather, so that they may be continuously rotated. In Figs. 11, 12, and 14 the cam E is not attached directly to the cross-head A, but to the cross-plate G below it. It is operated, however, by the shaft  $e'$ , and it is connected with a slide-plate  $g$ , which is adapted to be moved upon the plate G forward intermittently, to present the awl-holding block, the driver-holding block, and the spanker-block, successively, to the arm  $g'$  on the reciprocating head. This slide-plate  $g$  is secured to the plate G by means of the caps  $g^2$ , (see Fig. 11,) and the plate is connected with the cam E by means of the bent lever  $g^3$ , which is pivoted at  $g^4$ , when one arm of which is connected with the plate  $g$  and the other with the slide-plate  $g^5$ , which has a cam-pin  $g^6$  entering the groove  $e$  in the cam E. Each of the blocks  $d d^2 d^4$  is supported by a separate block—the block  $d$  by the block  $f$ , the block  $d^2$  by the block  $f'$ , and the block  $d^4$  by the block  $f^2$ . These blocks  $f f' f^2$  each have a dovetail  $f^3$ , which fits the dovetail recess  $f^4$  upon the cross-plate G, and also the dovetail  $f^5$  upon the reciprocating arm  $g'$ , so that upon the movement of the slide-plate  $g$  they are moved into the groove  $f^4$  of the plate G successively into the groove  $f^5$  of the arm  $g'$ . The surface of the arm  $g'$  preferably should be made somewhat smaller than the surface of each of the blocks, and when this form of construction is employed I prefer to use the guides  $f^6$ , extending upward from the table carrying the templet, which preferably are inclined somewhat at their upper ends, and which are adapted to receive each of the blocks  $f f' f^2$  as they are successively moved downward and guide them during their vertical movement. These guides must be of a length sufficient to receive the blocks before the awls or drivers enter the holes in the templet and nail-carrier, respectively. The

cam E provides these blocks with an intermittent forward movement to bring them successively beneath the plunger or arm  $g'$  and a continuous backward movement. When the awls, drivers, and spanker are thus moved upon the stationary supporting-plate into position beneath a reciprocating plunger, it is necessary that the plunger be given an interval of rest at the time the cam E operates to move the blocks successively into position, and this is accomplished by operating the cross-head A by means of a cam-groove M in the cam-disk  $m$  on the shaft  $m'$ , the said cam-groove being connected by means of the lever  $m^2$ , pivoted at  $m^3$ , with the toggle  $m^4$ . The upper link  $m^5$  of this toggle is pivoted at  $m^6$  to the bed of the machine, and the lower link  $m^7$  at its lower end to the lower movable cross-head  $m^8$ , which is connected by means of the rods  $m^9$  with the upper head A. Each rotation of this cam-disk M reciprocates the head A, and also provides it with a period of rest at the end of its upward movement. The cam M may be connected directly with the lower cross-head  $m^8$  or with the rods  $m^9$ , if desired, instead of through the connecting-lever and toggle described.

In operation the boot or shoe is placed upon the last, the heel placed in position, and the machine is set in operation. The stop-motion may be so arranged as to stop it at the end of each reciprocation of the cross-head A, or to provide it with two, three, or more continuous reciprocations and then stop it. The cam E is so timed that upon the first reciprocation the gang of awls is brought into position to be reciprocated immediately before or upon the downward movement of the head A, and is moved out of position by said cam upon the upward movement of the head A, and at the same time the gang of drivers is brought into position, and upon the next reciprocation of the head, the nails having been fed to the holes which were formed by the awls in the heel-blank, they are driven into the heel-blank and soles of the boot or shoe and are withdrawn and moved out of operative position by the cam E during the upward movement or at the end of the upward movement of the cross-head A, the spanker being at the same time brought into position, and it is then reciprocated, the temple-plate having been moved out of the way. The spanker may have a top-lift holder, if desired. Upon the upward movement, or at the end of the upward movement or third reciprocation of the head A, the spanker, driver, and awls are moved backward, preferably by continuous movement, to bring the awls again into a position to be operated to prick the next heel in order. I would say that this manner of automatically moving the awls, drivers, and spanker, or any two of them, into operative position may be used with any heel-compressing mechanism.

Having thus fully described my invention,



I claim and desire to secure by Letters Patent of the United States—

1. In a heel-attaching machine, a reciprocating head, in combination with a block carrying a gang or group of awls, and a block carrying a gang or group of drivers, and a heel-spanker, or any two of them, and a rotating cam having a slide connecting with said blocks for moving them automatically into and out of operative position, substantially as described.

2. In a heel-attaching machine, a block or arm carrying a gang or group of awls, a block or arm carrying a gang or group of drivers, and a block or arm carrying or supporting a heel-spanker, or any two of said blocks or arms, with a rotating cam having a slide connecting with said block or arms and adapted to move said awls, drivers, and spanker, or any two of them, successively into operative position, as and for the purposes described.

3. In a heel-attaching machine, an arm or block supporting a gang or group of awls, an arm or block supporting a gang or group of drivers, and an arm or block carrying or supporting a top-lift spanker, or any two of them, having the slide of a rotary cam in connection therewith and said cam to produce automatic intermittent movement in one direction to bring the said devices successively into operative position, and a continuous automatic return movement, as and for the purposes described.

4. The combination, in a heel-attaching machine, of a reciprocating head, a rotating cam having a slide-arm and an arm or block supporting a gang or group of awls, an arm or block supporting a gang or group of drivers, and an arm or block supporting a heel-spanker, or any two of them, connected with the said slide-arm of the cam to be moved thereby successively into operative position, and vertical guides with which said arms are successively brought into contact or engagement to direct and govern the course of their vertical movement in relation to the work, substantially as described.

5. The combination of a rotating shaft carrying at its upper end a cam E, with said cam,

and a block or arm supporting a gang or group of awls, a block or arm supporting a gang or group of drivers, and a block or arm supporting a spanker, and a slide-connection for connecting said arms or blocks with said cams, whereby the movement of the cam is communicated to said arms or blocks, as and for the purposes described.

6. In a heel-attaching machine, the combination of a last or work-support, a templet, a nail-carrier, a reciprocating head, a block or arm carrying a gang or group of awls, a block or arm carrying a gang or group of drivers, and a block or arm supporting a top-lift spanker, or any two of them, connected together and to the slide-arm of a rotary cam, to be simultaneously moved to bring them successively into operative position, with a rotating cam E and slide-arm connected therewith and adapted to provide them with an intermittent movement to bring them into operative position successively in relation to said templet, as and for the purposes described.

7. The combination, in a heel-attaching machine, of a cross-head A, having a plunger  $g'$ , with the plate or support G, carrying a slide-plate supporting a block carrying a gang or group of awls, a block carrying a gang or group of drivers, and a block carrying a spanker, or any two of them, and a cam E and its connecting slide-arm for moving said arms or blocks successively into position to be engaged and reciprocated by said plunger, substantially as described.

8. The combination, in a heel-attaching machine, of the cross-head, the awls, drivers, and spanker, or either of them, carried thereby, with the lower cross-head  $m^3$ , connected with the upper cross-head A, a lever  $m^2$ , operated by a cam M, said cam, and the toggle  $m^4$ , as and for the purposes described.

FREEBORN F. RAYMOND, 2D.

Witnesses:

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FRED. B. DOLAN.