

(No Model.)

3 Sheets—Sheet 1.

F. F. RAYMOND, 2d.  
HEELING MACHINE.

No. 474,407.

Patented May 10, 1892.

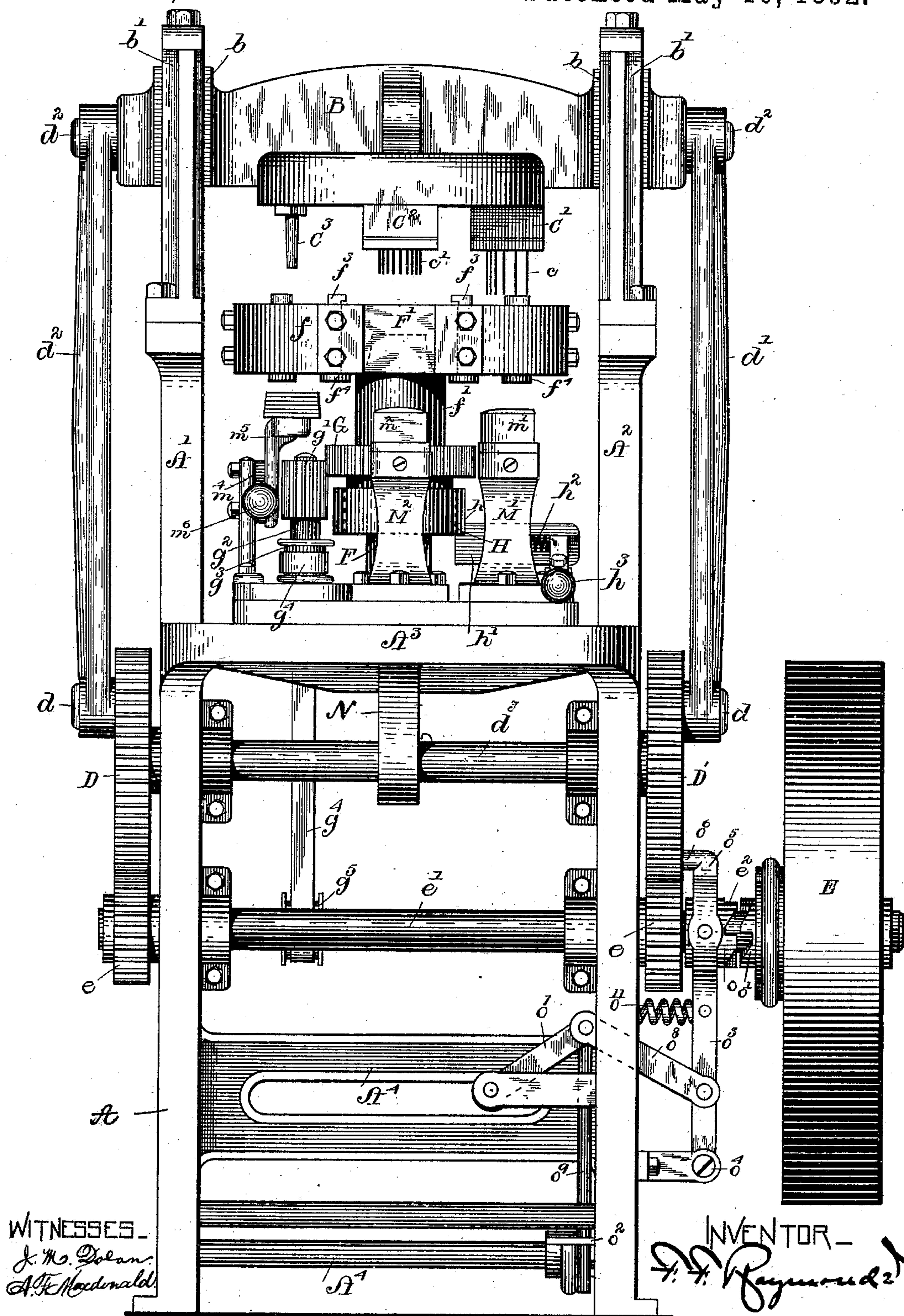


Fig. 1—

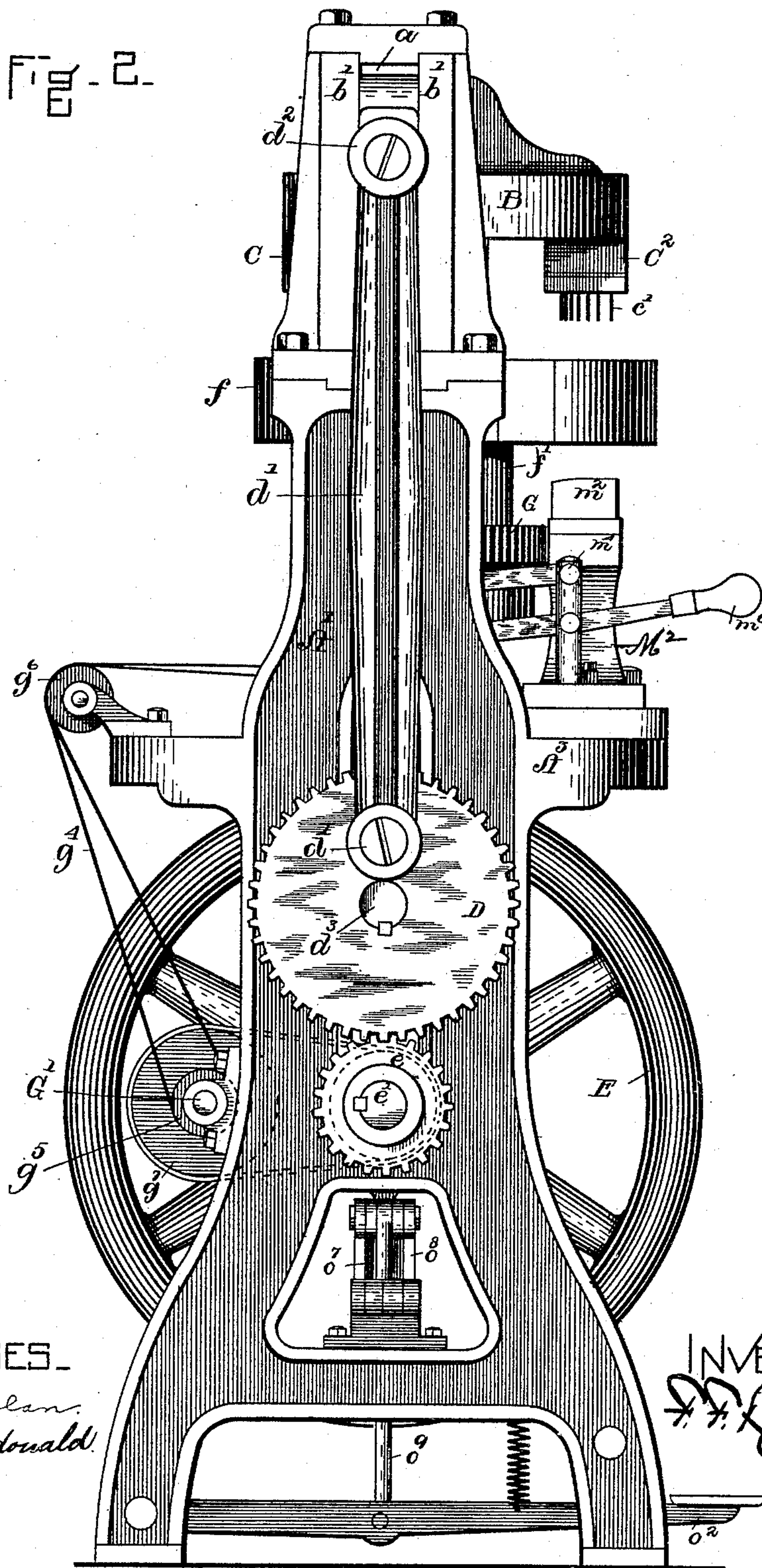
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WITNESSES.

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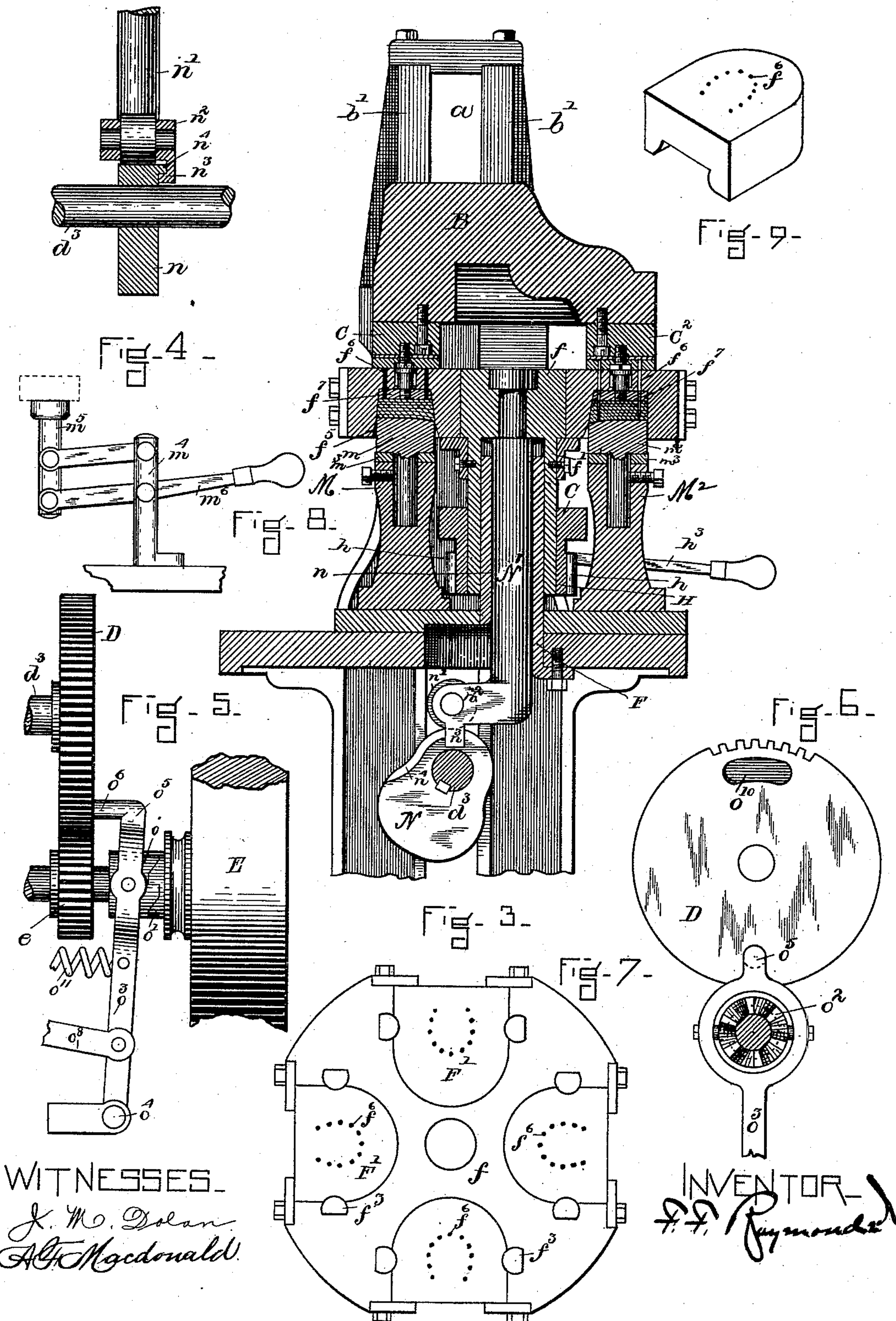
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# UNITED STATES PATENT OFFICE.

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

## HEELING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 474,407, dated May 10, 1892.

Application filed February 11, 1889. Serial No. 299,510. (No model.)

*To all whom it may concern:*

Be it known that I, FREEBORN F. RAYMOND, 2d, a citizen of the United States, and a resident of Newton, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Heel Loading and Compressing 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 my application for Letters Patent of the United States filed November 28, 1887, Serial No. 256,297, and comprises various details of organization and construction whereby the machine is simplified, cheapened, and made more efficient.

In the drawings, Figure 1 is a view in front elevation of a machine having the features of my invention. Fig. 2 is a view in side elevation thereof. Fig. 3 is a view in vertical central section of the central and upper parts of the machine. Figs. 4, 5, 6, 7, 8, and 9 are detail views, to which reference is hereinafter made.

A represents the frame of the machine. It is practically integral or in one casting, and it comprises the side frames or sections A' A<sup>2</sup>, the bed A<sup>3</sup>, and the connecting or bracing plates or dowels, or both, A<sup>4</sup>.

B is a head, which is a cross-head, which has the bearing or guide-section *b* near each end and which slides in the perpendicular recesses *a* in the guides *b'*, which are bolted to the tops of the side frames or sections A' A<sup>2</sup>. The cross-head carries upon its under surface a pressure-block C, a block C', having a gang or group of awls *c*, a block C<sup>2</sup>, having a gang or group of drivers *c'*, and an ejector C<sup>3</sup>. The cross-head is reciprocated by means of the crank-pins *d* upon gears D D', there being one upon the outside of each side frame. The connecting-rods *d'* and the pins or studs *d*<sup>2</sup> upon the ends of the cross-head are either integral therewith or attached thereto, as may be desired. The gears D are mounted upon a shaft *d*<sup>3</sup>, and power is communicated to them by means of the pinions *e* upon the main shaft *e'*, the said shaft having suitable bearings on the frame of the machine and carrying a heavy fly-wheel E, which also serves as

a pulley, and a clutch *e*<sup>2</sup>. There is mounted upon the table A<sup>3</sup> a column F, which carries or supports a die-carriage *f*. This die-carriage *f* has a sleeve *f'*, which fits the post, and the die-receiving recesses *f*<sup>2</sup>, which receive the dies F', which are adapted to have a slight vertical movement in relation to the carriage, the extent of which is limited by the stops *f*<sup>3</sup> *f*<sup>4</sup>. The dies F' preferably are of the kind known as "solid dies"—that is, they are made from one piece of metal—have the die-cavity *f*<sup>5</sup> opening downwardly, and the perforations or holes *f*<sup>6</sup>, in which the awls and drivers operate, and an ejector-plate *f*<sup>7</sup>.

The die-carriage not only has a vertical movement upon the post or column, but it also has a rotary movement. This rotary movement may be communicated to it by hand or by power. I have represented it as moved by power by means of a spur-gear G, mounted upon its sleeve, a pinion *g'*, mounted upon a shaft *g*<sup>2</sup> in a position to engage the spur-gear and operated or turned by means of the pulley *g*<sup>3</sup>, belt *g*<sup>4</sup>, and pulley *g*<sup>5</sup> on the shaft G', the belt passing over guiding-pulleys *g*<sup>6</sup>. There may be a clutch interposed between the pulley *g*<sup>5</sup> and the pinion *g'*, if desired.

To lock the die-carriage in position to register with the pressure-block, awls, and drivers, I employ an index H, attached to the sleeve of the carriage and having the latching-recesses *h* and the latch *h'*, the end of which is held against the dial by a spring *h*<sup>2</sup> in a manner to force it into a recess in the dial when one comes in line therewith, and a lever *h*<sup>3</sup> is connected with the latch to move it outwardly or in opposition to the spring. This lever may also be connected with a clutch between the pulley *g*<sup>5</sup> and the pinion *g'*, whereby upon the movement of the lever to disengage the latch from a latching-recess the clutch shall be caused to engage the driven pulley *g*<sup>5</sup> and the pinion to cause the rotation of the pinion, and therefore of the carriage, and upon the reverse movement of the lever or the engagement of the latch with the latching-recess to disengage the driven pulley from the pinion.

M M' M<sup>2</sup> represent stands mounted upon the bed A<sup>3</sup>, upon which are mounted the heel-formers *m m' m*<sup>2</sup>. These heel-formers are represented as provided with spindles entering holes in the stands and as adjustable verti-



cally by means of the removable gage-blocks  $m^3$ . There is also arranged upon the bed  $A^3$  a heel-blank lifter  $m^4$  for forcing heel-blanks into each die as it is moved successively into position over it, and this heel-blank lifter is mounted upon a slide  $m^5$ , which is moved vertically by means of the lever  $m^6$ . It is desirable that the die-carriage and dies should be movable vertically in relation to the heel-formers  $m m' m^2$ , in order that the dies may be lifted from the formers sufficiently to be rotated and also in order that the heels in the dies may be seated upon their formers before the pressure-block comes in contact with the upper surface of its die and the awls and nails are forced into their respective heel-blanks, and it is also desirable that the carriage and dies be held during some portion of the upward movement of the cross-head positively, in order that the awls may be withdrawn from the heel-blank, and I have represented these movements as provided the carriage and dies by means of a cam  $N$  upon the shaft  $d^3$  and a connecting-rod  $N'$ , connecting the cam with the carriage, which extends upward through the hole  $n$  in the column or post and is connected with the die-carriage in a manner to permit the rotation of the carriage in relation thereto. I prefer that the cam be an edge-cam and that the rod have a roll  $n'$  to bear against the same; also, that the rod have in addition a piece  $n^2$ , in the form of a yoke, the end  $n^3$  of which is arranged to extend beneath the projection  $n^4$ , extending from the side of the cam when it is desired to hold the carriage and dies against the upward draft of the awls. The cam preferably is constructed to permit the carriage and the dies to move downward slightly in advance of the downward movement of the cross-head and to then either hold the carriage down during the first part of the upward movement of the cross-head, or while the awls are being withdrawn from the heel, or at some point in the upward movement of the cross-head to hold the carriage stationary sufficiently to permit the awls to be withdrawn and then to move it to its highest position. The length of stroke or movement of the carriage is not as great as that of the cross-head, it being necessary only to lift it enough to enable the dies to affect the formers.

If desired, in lieu of the former  $m^2$  a jack for holding a last or heel-support may be employed, and the nails, instead of being partly driven into the heel-blank by the drivers, may be driven through the same to attach it to the soles of the boot or shoe. When the machine is so used, a die similar to that represented in Fig. 9 and provided with a front opening suitable to receive the shank of the shoe is employed. The machine is represented as adapted to make but one reciprocation and then stop.

The clutch comprises the member  $o$ , which slides on the main shaft, and the member  $o'$ , which is one of the hubs of the fly-wheel. The member  $o$  is moved into engagement with the

member  $o'$  by means of a treadle  $o^2$  and connecting-lever  $o^3$ , which, pivoted at  $o^4$ , connects as a yoke with the movable member  $o$  of the clutch, and has an upward extension  $o^5$ , provided with the bent end  $o^6$ . The lever is connected with the treadle by means of the toggle-links  $o^7 o^8$ , and a rod  $o^9$  connecting the toggles with the lever. The bent end  $o^6$  bears against the face of the gear-wheel  $D'$  during the rotation of the wheel after the starting of the machine, and the member  $o$  of the clutch is thus kept in engagement with the member  $o'$ . To release the member  $o$  from the member  $o'$ , there is formed in the wheel  $D'$  a hole or recess  $o^{10}$ , into which the bent end  $o^6$  of the lever  $o^3$  is drawn by the spring  $o^{11}$  at the end of the upward movement of the cross-head, and to disengage the section  $o$  of the clutch from the part  $o'$  the links  $o^7 o^8$  of the toggle should be of a length and should be so pivoted as not to be moved into a straight position by the treadle—that is, at the end of the downward movement of the treadle they should still be bent, in order that they may not move to lock the lever  $o^3$  with the two members of the clutch engaged. The treadle and its connections are well represented in Figs. 1, 2, 5, and 6.

The shaft  $G'$ , which carries the pulley operating the belt  $g^4$ , must be continuously rotated, and I have represented it as so rotated by means of a belt extending from a pulley thereon to a groove on the hub of the fly-wheel  $E$ . (See Figs. 1 and 2.)

The advantages of the construction arise largely from its simplicity, which enables the machine to be very strongly constructed, and from its organization, which permits it to be very efficient in use.

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

1. In a heeling-machine, a cross-head carrying a non-rotative gang of drivers, awls, and pressure-blocks, in combination with an automatically-revolving die-carriage having a vertical movement and pitmen connecting the cross-head and the actuating mechanism which moves the carriage vertically, substantially as described.

2. The combination, in a heel compressing and loading machine having a non-rotative vertically-reciprocating gang of drivers, awls, and pressure-blocks, of the die-carriage  $f$ , the dies supported thereby, a post or support for said carriage, upon which it is vertically movable, and a cam engaging the lower end of said post or support for imparting to it a vertical movement, substantially as described.

3. The combination, in a heel compressing and loading machine having a non-rotative vertically-reciprocating gang of drivers, awls, and pressure-blocks, of the post or support for the die-holding carriage, the die-holding carriage vertically movable thereon, the dies supported by the carriage and vertically movable therein, and stops for limiting the extent



of said vertical movement, and a cam engaging the lower end of said post or support for imparting or permitting a vertical movement of the die-carriage and dies, substantially as described.

4. The combination, in a heel compressing and loading machine having a non-rotative vertically-reciprocating gang of drivers, awls, and pressure-blocks, of the post or support for the die-carriage, the die-carriage vertically movable in relation thereto, the cam N, engaging the lower portion of said post or support, and connecting-rod N', substantially as described.

5. The combination, in a heel compressing and loading machine, of the die-carriage post or support F, the die-carriage mounted thereon, a connecting-rod N', having a latch  $n^3$ , the projection  $n^4$ , and a rotary cam or latch-block to engage said cam-pin or latch to hold the table stationary or practically stationary relatively to the movement of the cross-head, and a reciprocating cross-head, substantially as described.

6. The combination, in a heel compressing and loading machine, of the die-carriage  $f$ , dies  $F'$ , carried thereby, a latch or lock for holding the dies in operative position, and a positively-operated pinion and gear for turning the die-carriage upon the release of the latch or lock, substantially as described.

7. The combination, in a heel compressing and loading machine, of the die-carriage and dies supported thereby, the gear G, mounted thereon, the pinion  $g'$  to engage the gear, pulley  $g^3$ , belt  $g^4$ , and pulley  $g^5$ , substantially as described.

8. The combination, in a heel compressing and loading machine, of the die-carriage  $f$ , the dies supported thereby, the dial H, having the latching-recesses  $h$ , the spring bolt or lock  $h'$ , lever  $h^3$ , gear G, and its operating-pinion  $g'$ , substantially as described.

9. The combination, in a heel compressing and loading machine, of the die-carriage  $f$  and the dies carried thereby, its post or support, a cam engaging said post or support for vertically moving the die-carriage, and a connection between the cam and the die-carriage, and a loose or swiveling connection whereby the carriage is permitted to be turned or rotated, substantially as described.

10. The combination, in a heel compressing and loading machine, of the rotary die-carriage, the dies supported thereby, the stationary heel-formers  $m$   $m'$   $m^2$ , and the vertically-movable heel-lifter  $m^4$ , substantially as described.

11. The combination, in a heel compressing and loading machine, of the cross-head carrying a compressing-block, gang of awls and gang of drivers adapted to be simultaneously operated, the shaft  $d^3$ , gears D, cam-pins  $d$ , connecting-rods  $d'$ , main shaft  $e'$ , pinions  $e$  thereon, meshing with the gears D, the die-carriage  $f$ , the dies supported or carried thereby, a post or support upon which it is vertically movable, and its actuating-cam N, substantially as described.

FREEBORN F. RAYMOND, 2D.

In presence of—

J. M. DOLAN,

A. F. MACDONALD.