

(No Model.)

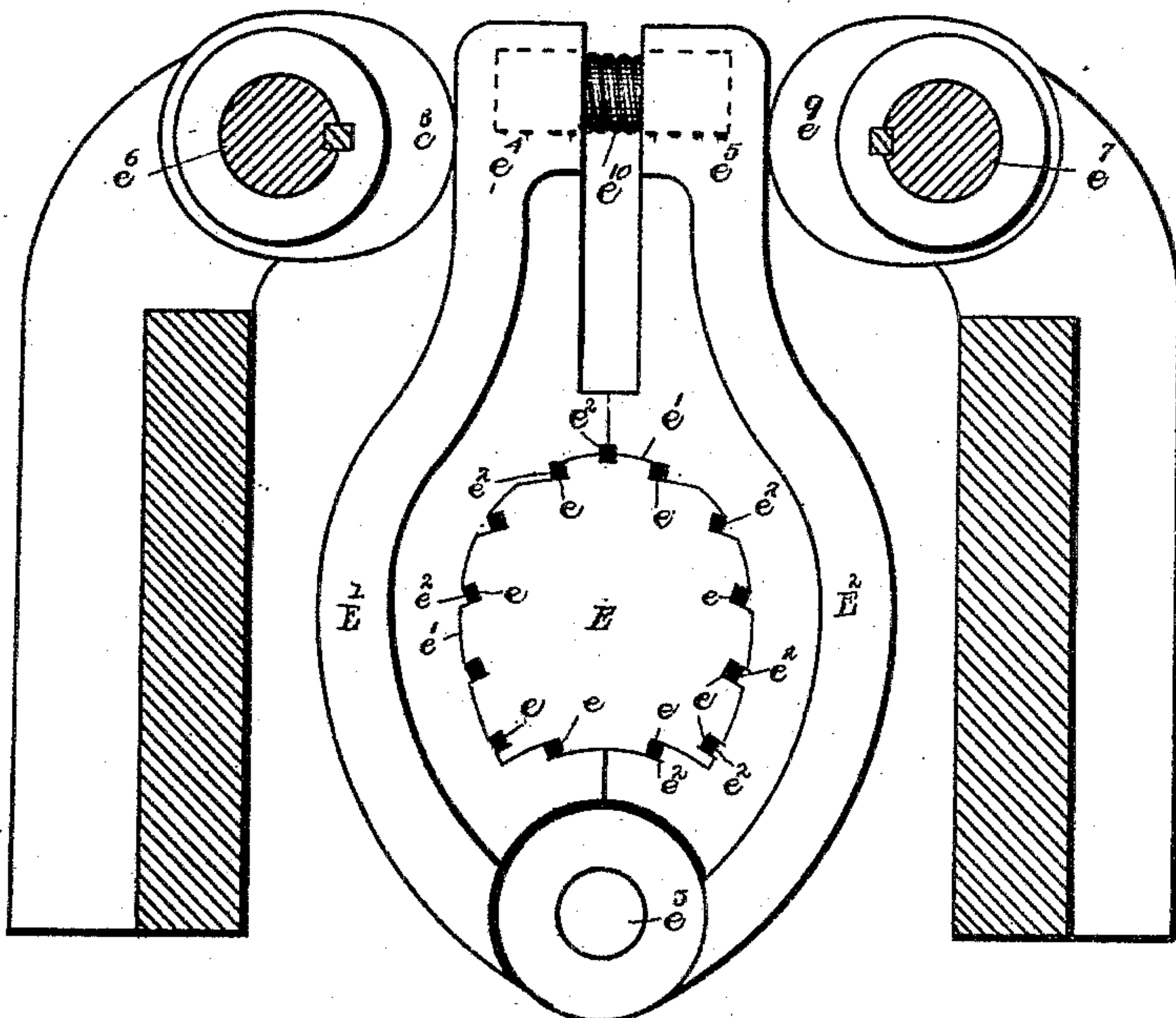
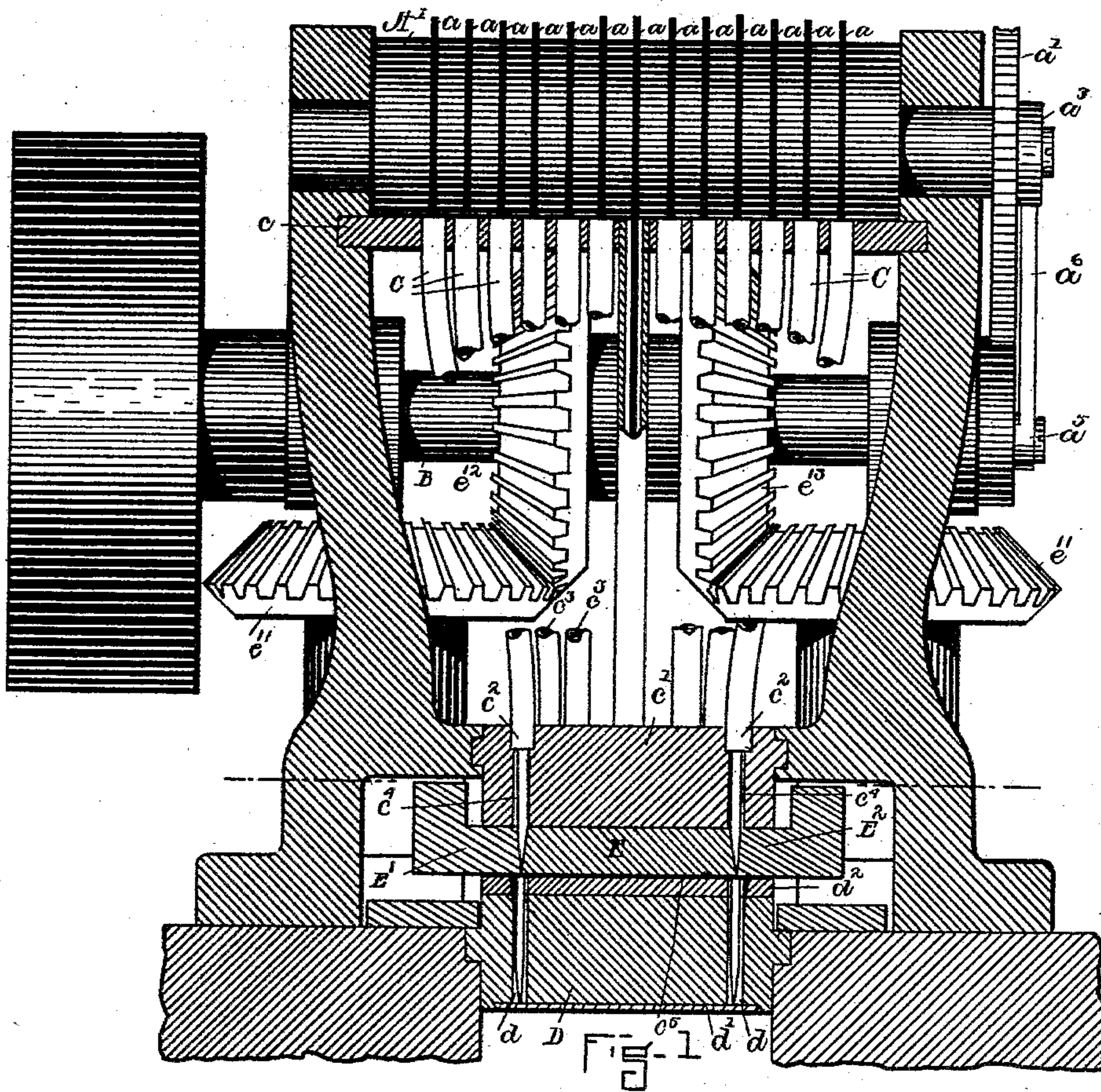
5 Sheets—Sheet 1.

F. F. RAYMOND, 2d.

NAIL MAKING, DISTRIBUTING, AND DRIVING MACHINE.

No. 414,582.

Patented Nov. 5, 1889.



WITNESSES.  
J. H. Dolan  
H. H. Merrill.

INVENTOR.  
F. F. Raymond.

FIG. 2



(No Model.)

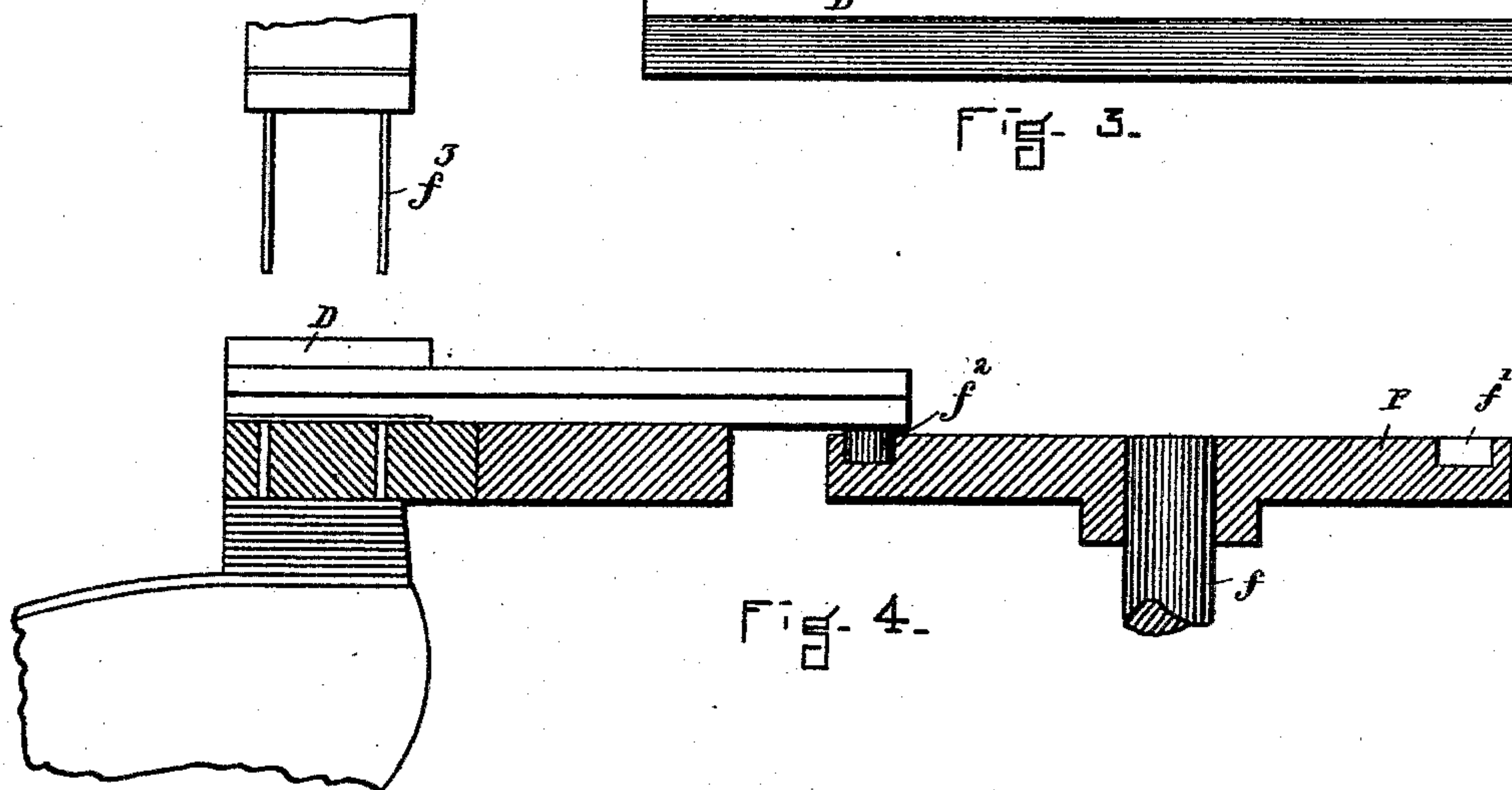
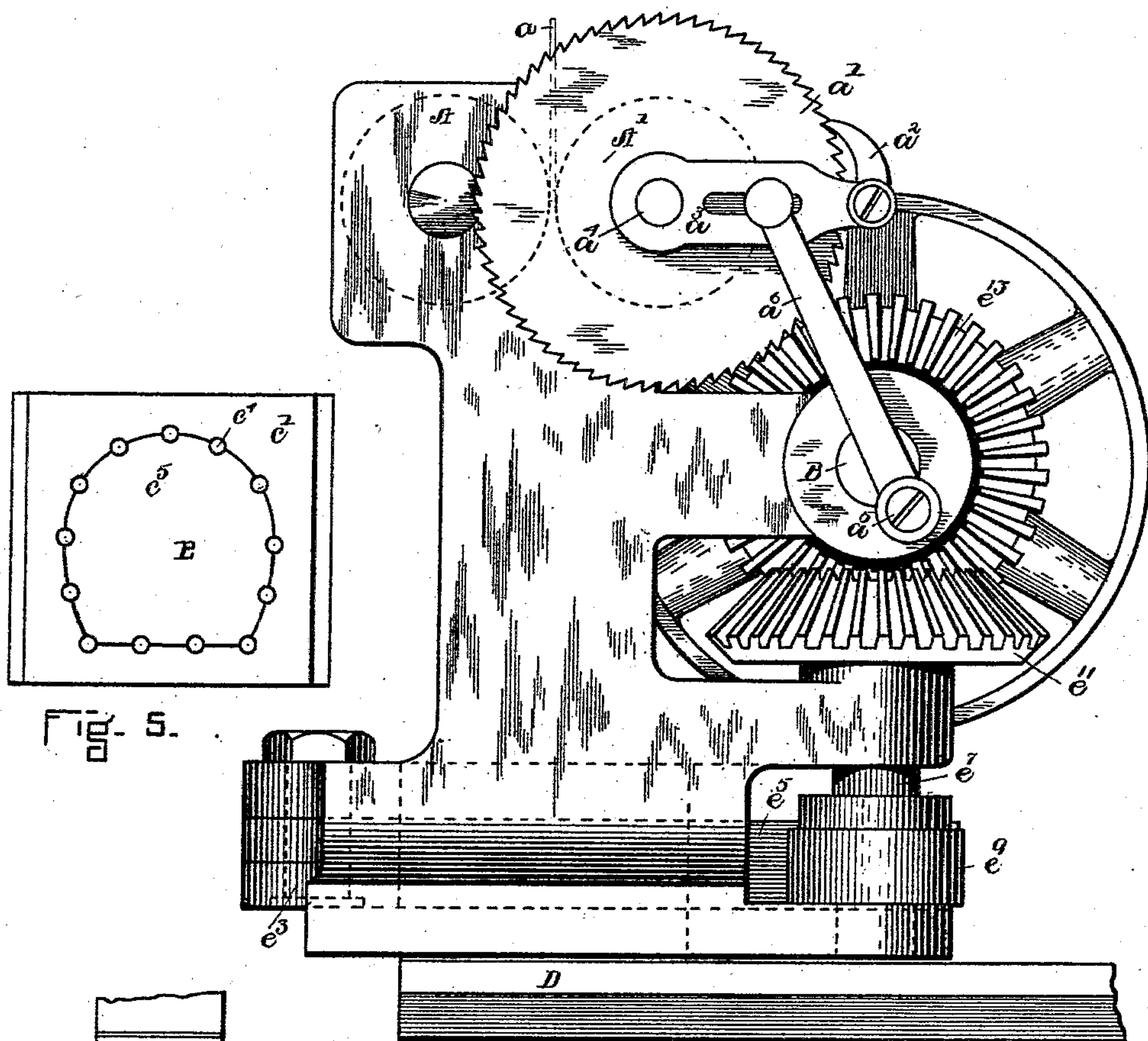
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WITNESSES.

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(No Model.)

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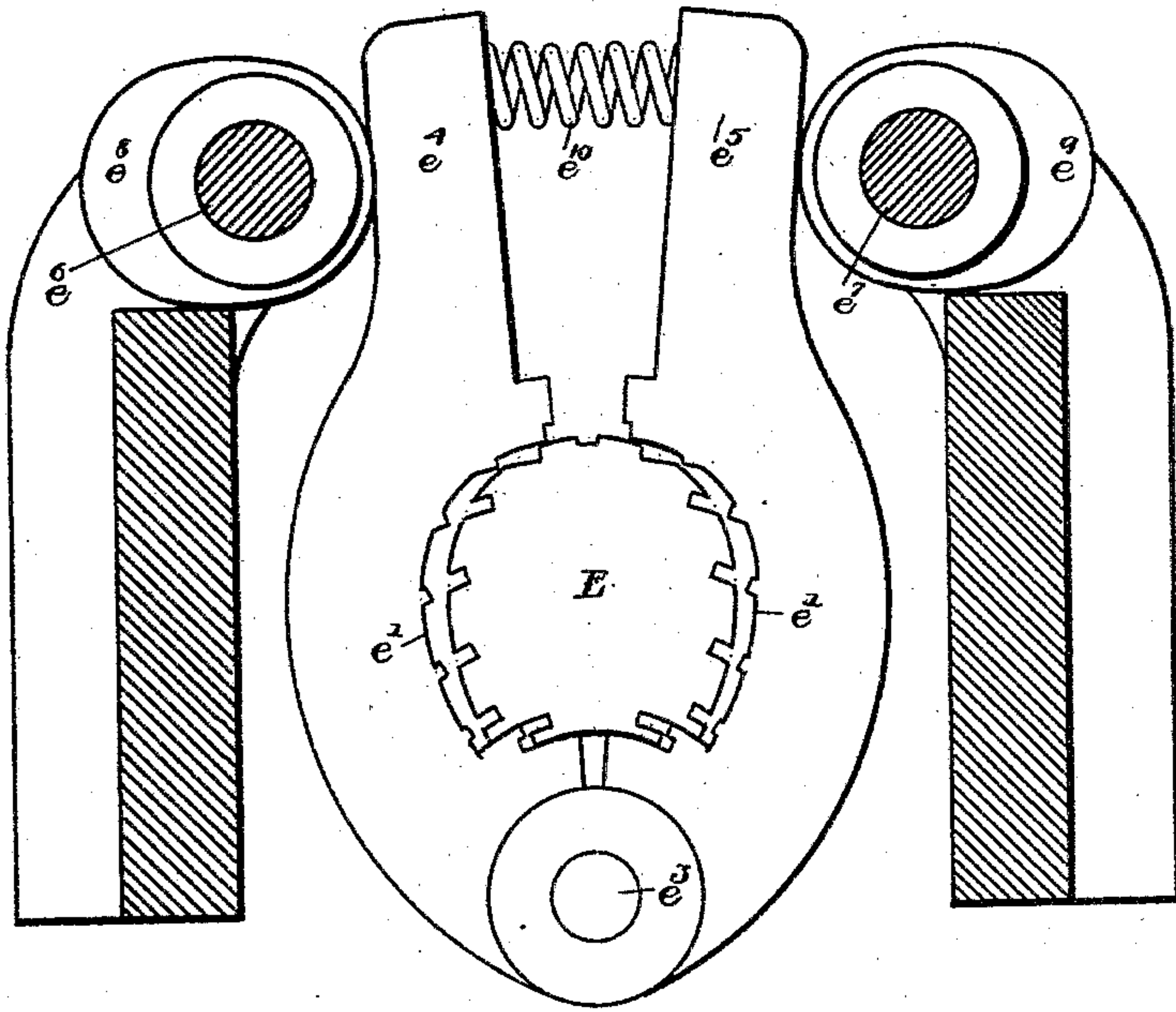


Fig. 6.

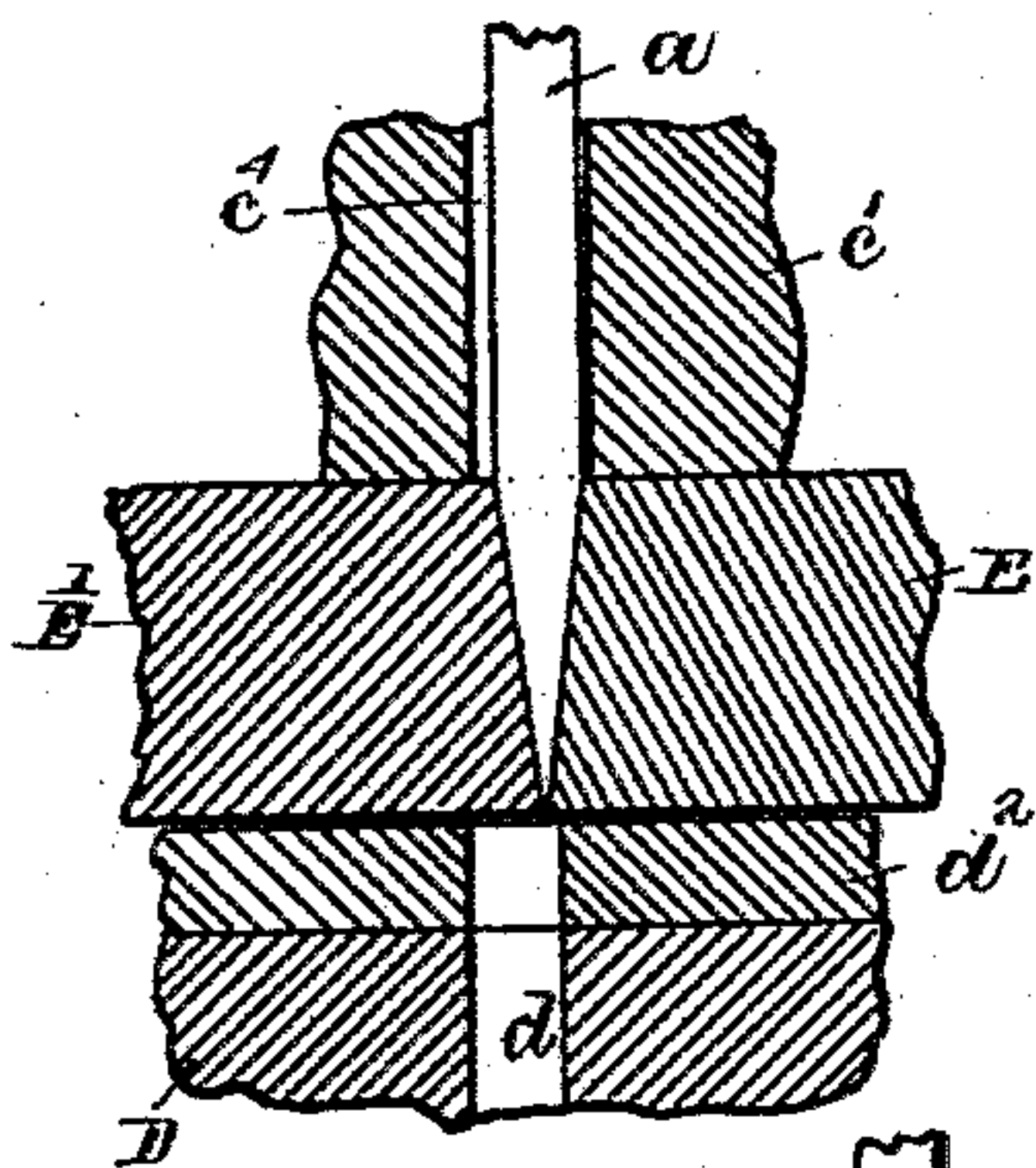


Fig. 7.

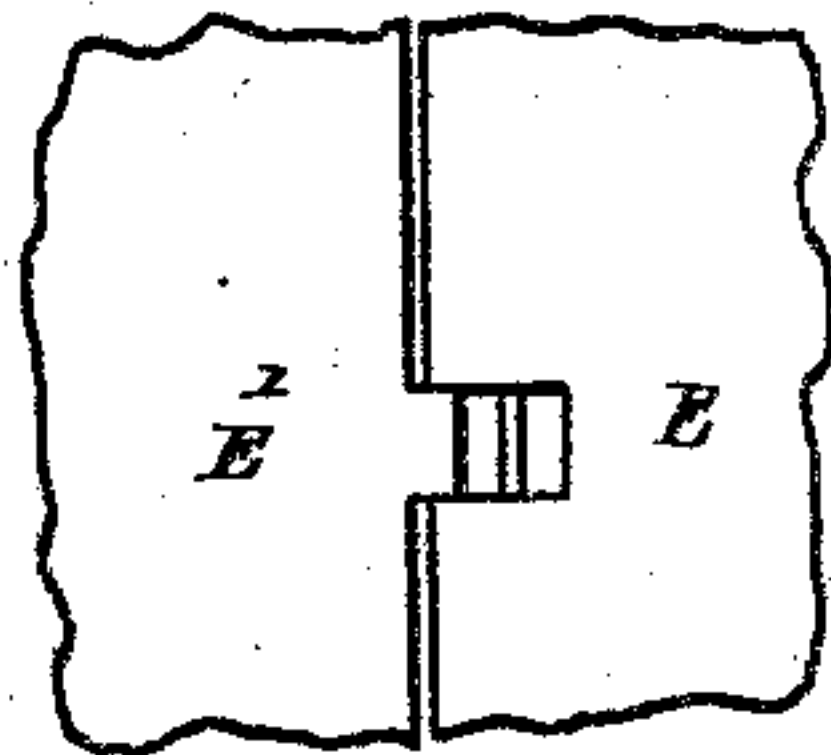


Fig. 8.

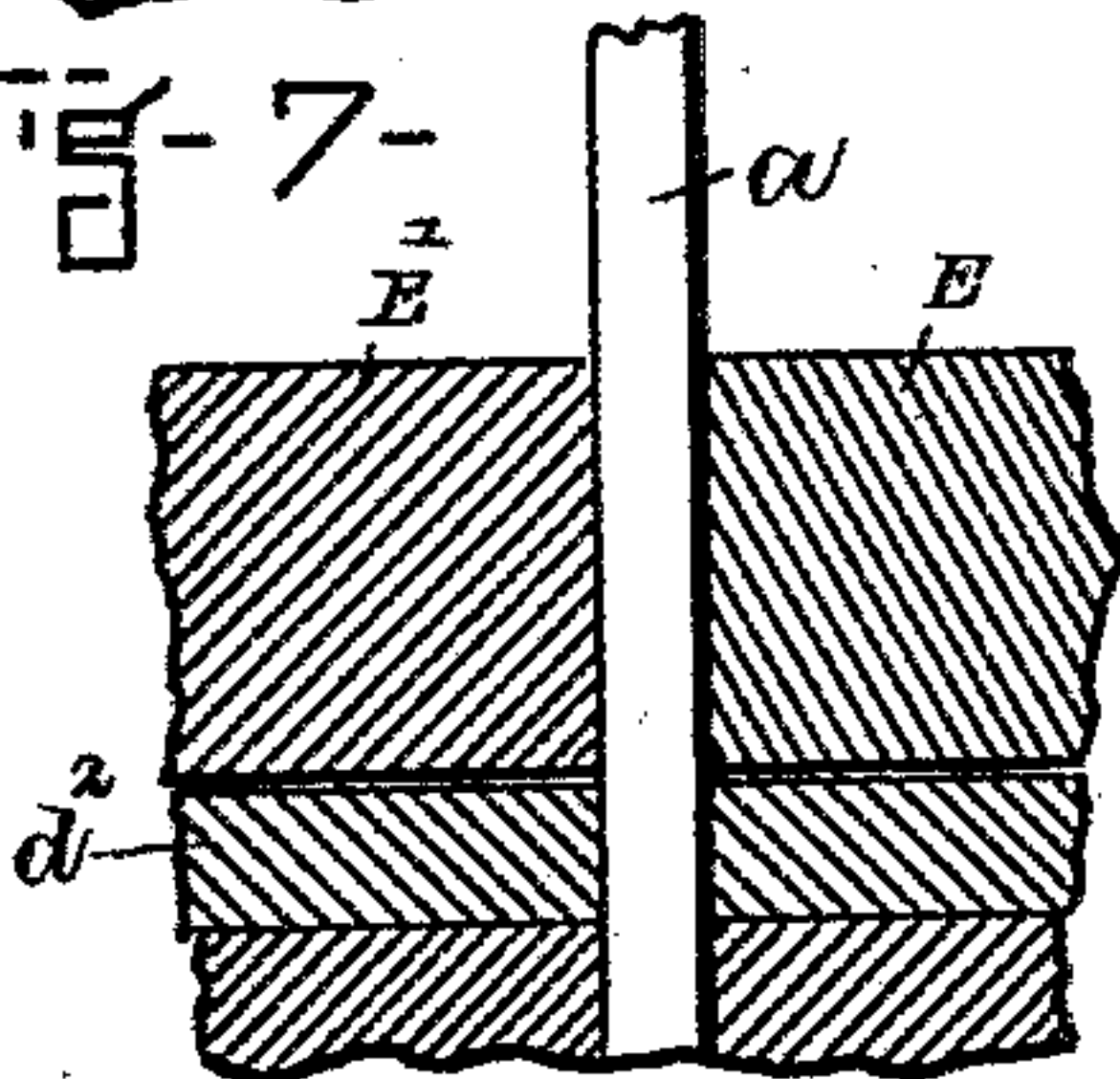


Fig. 9.

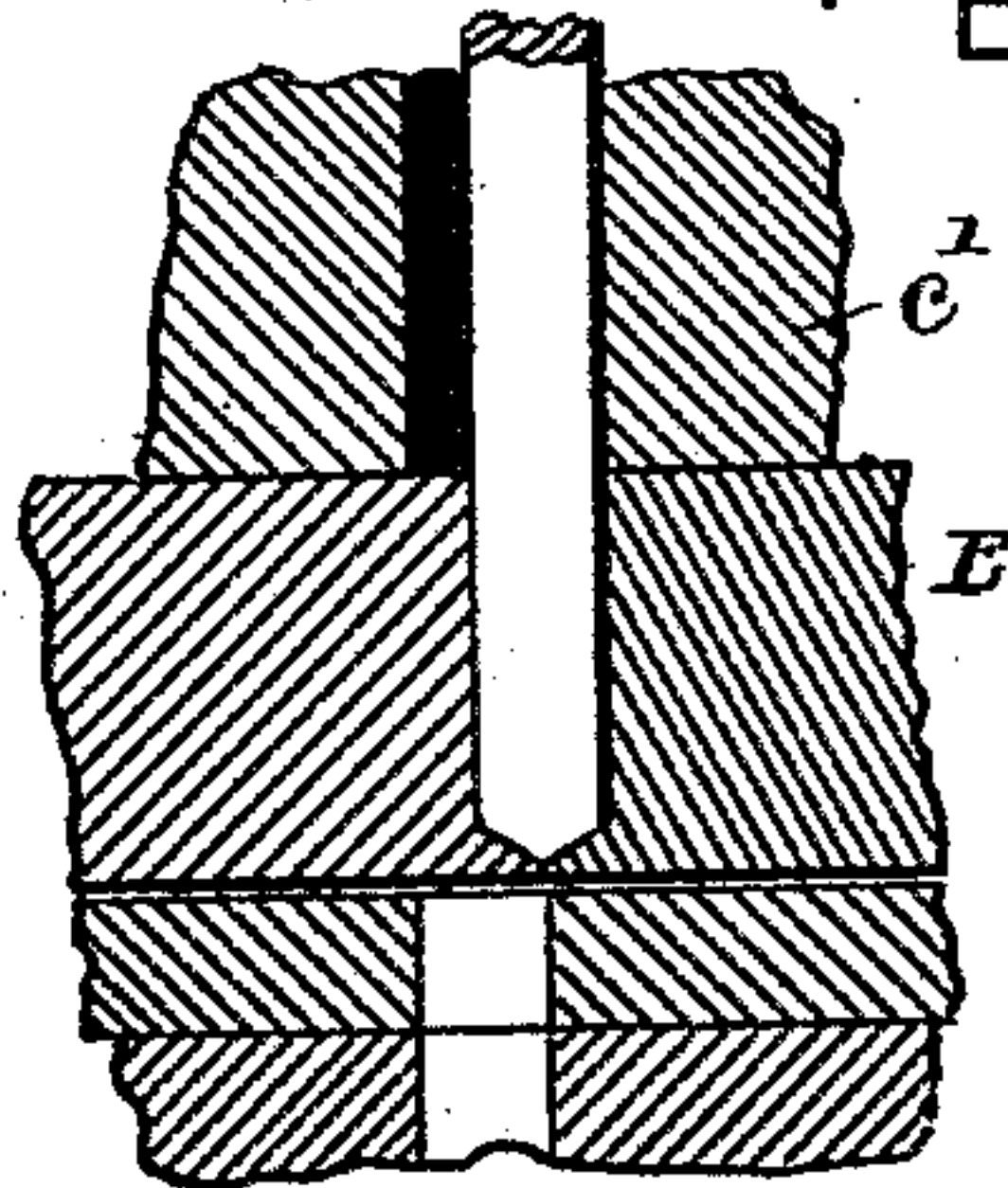


Fig. 10 - INVENTOR.

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(No Model.)

5 Sheets—Sheet 4.

F. F. RAYMOND, 2d.

NAIL-MAKING, DISTRIBUTING, AND DRIVING MACHINE.

No. 414,582.

Patented Nov. 5, 1889.

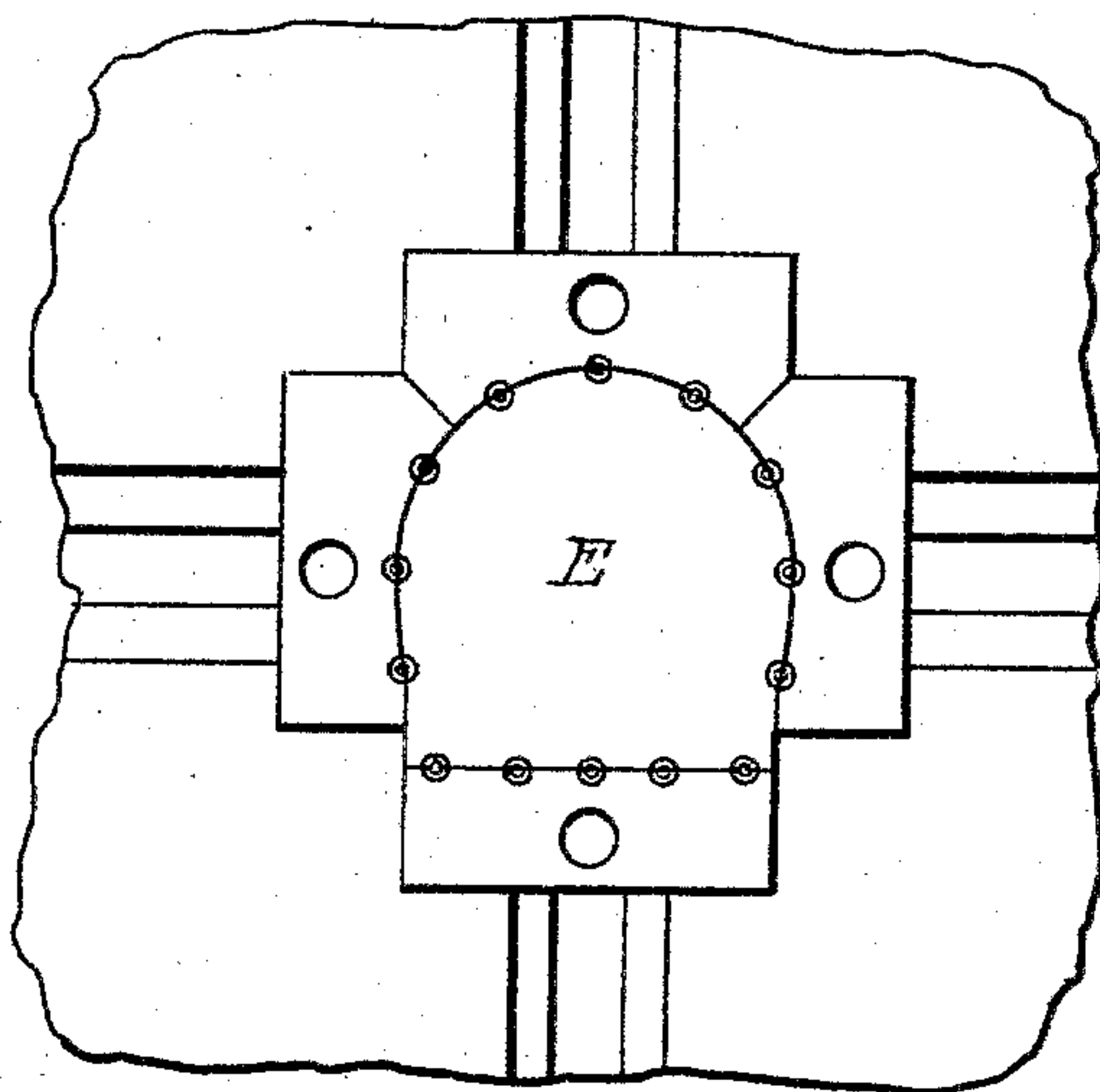


Fig. 11.

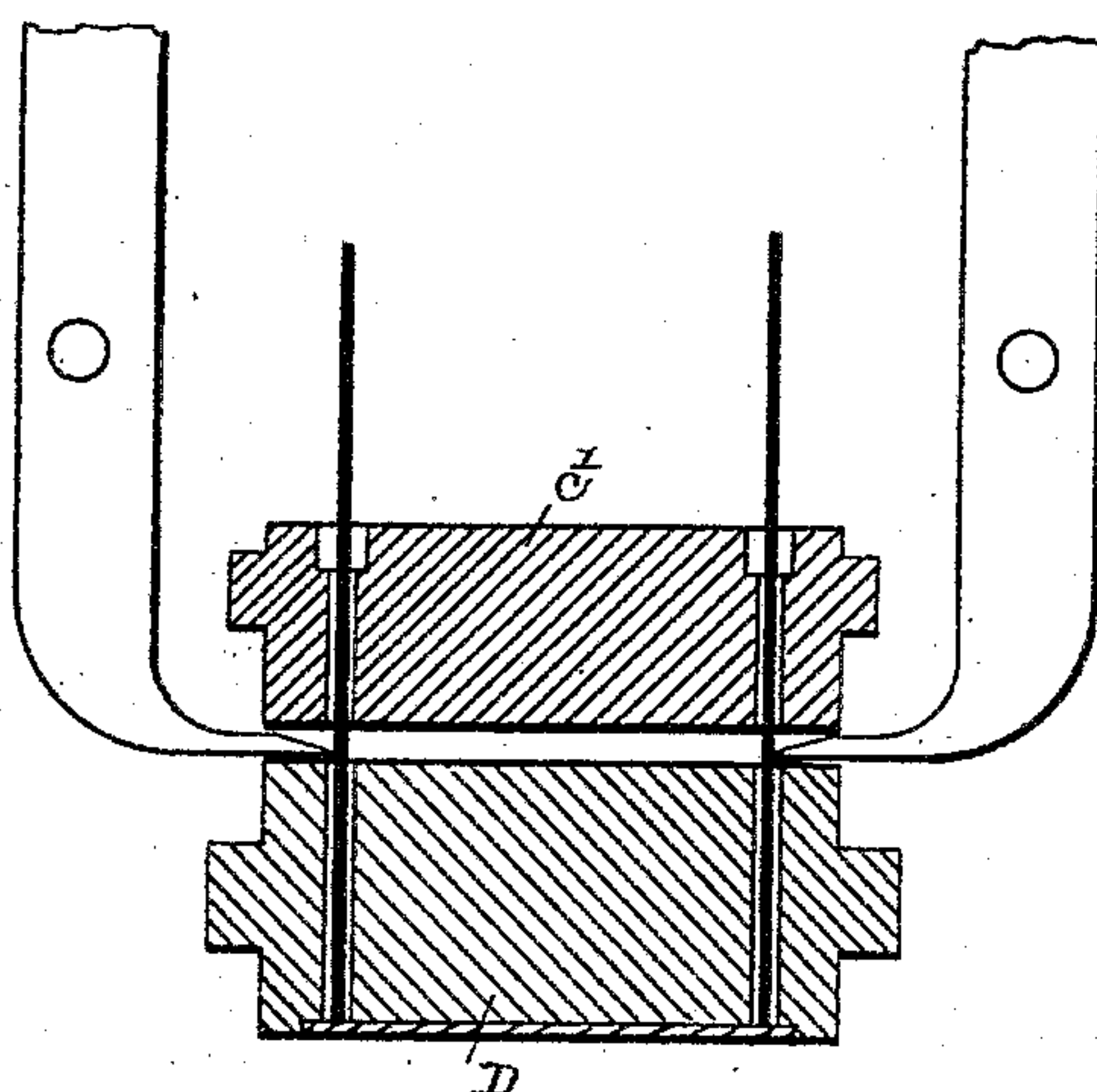


Fig. 12

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(No Model.)

5 Sheets—Sheet 5

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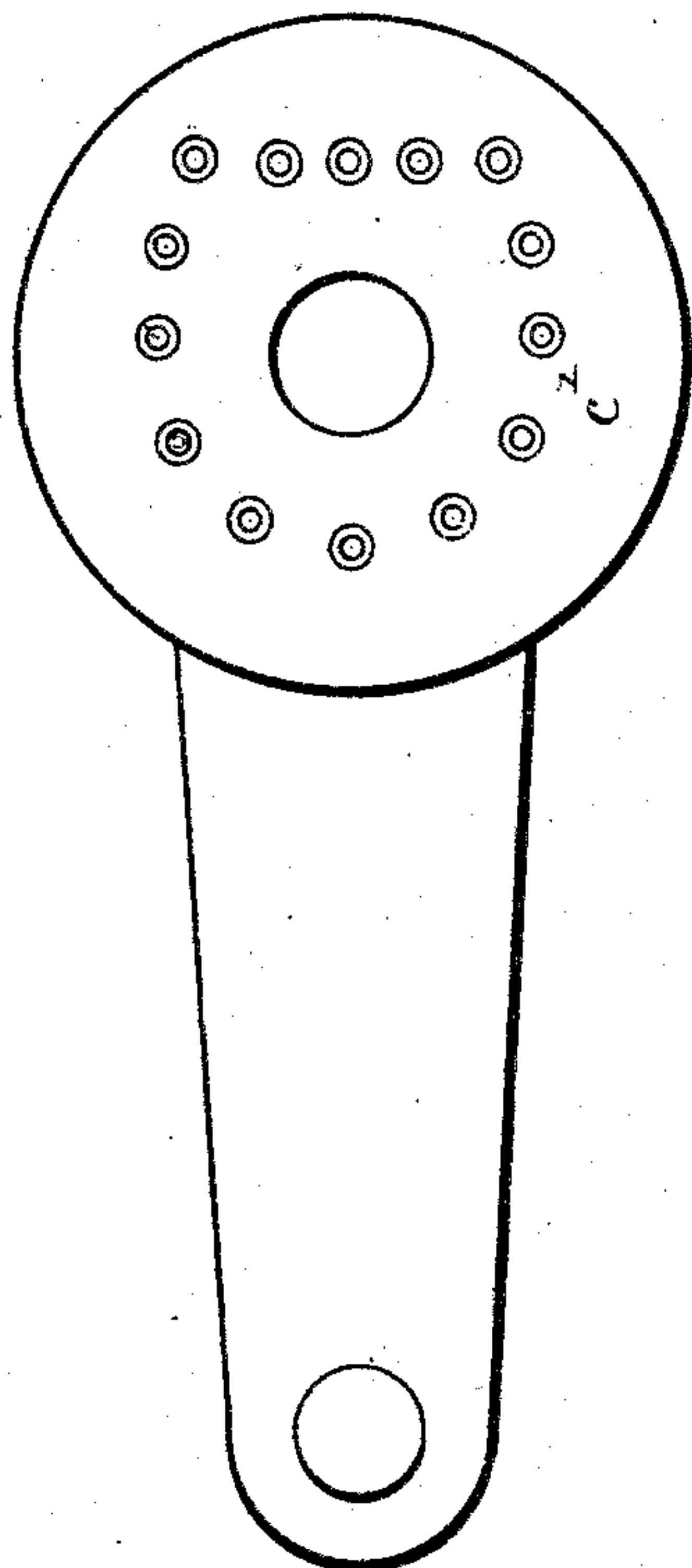


Fig. 13.

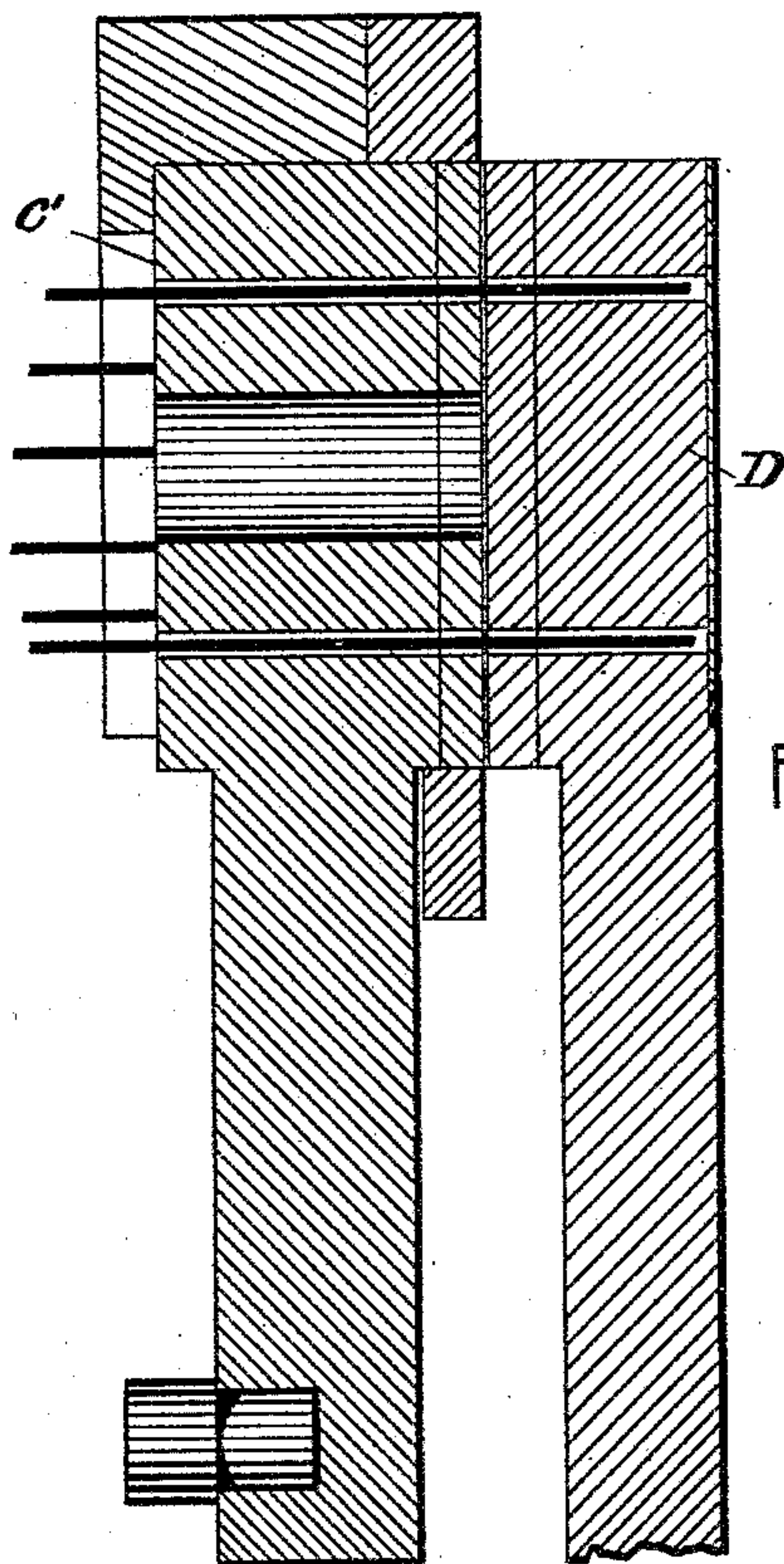


Fig. 14.

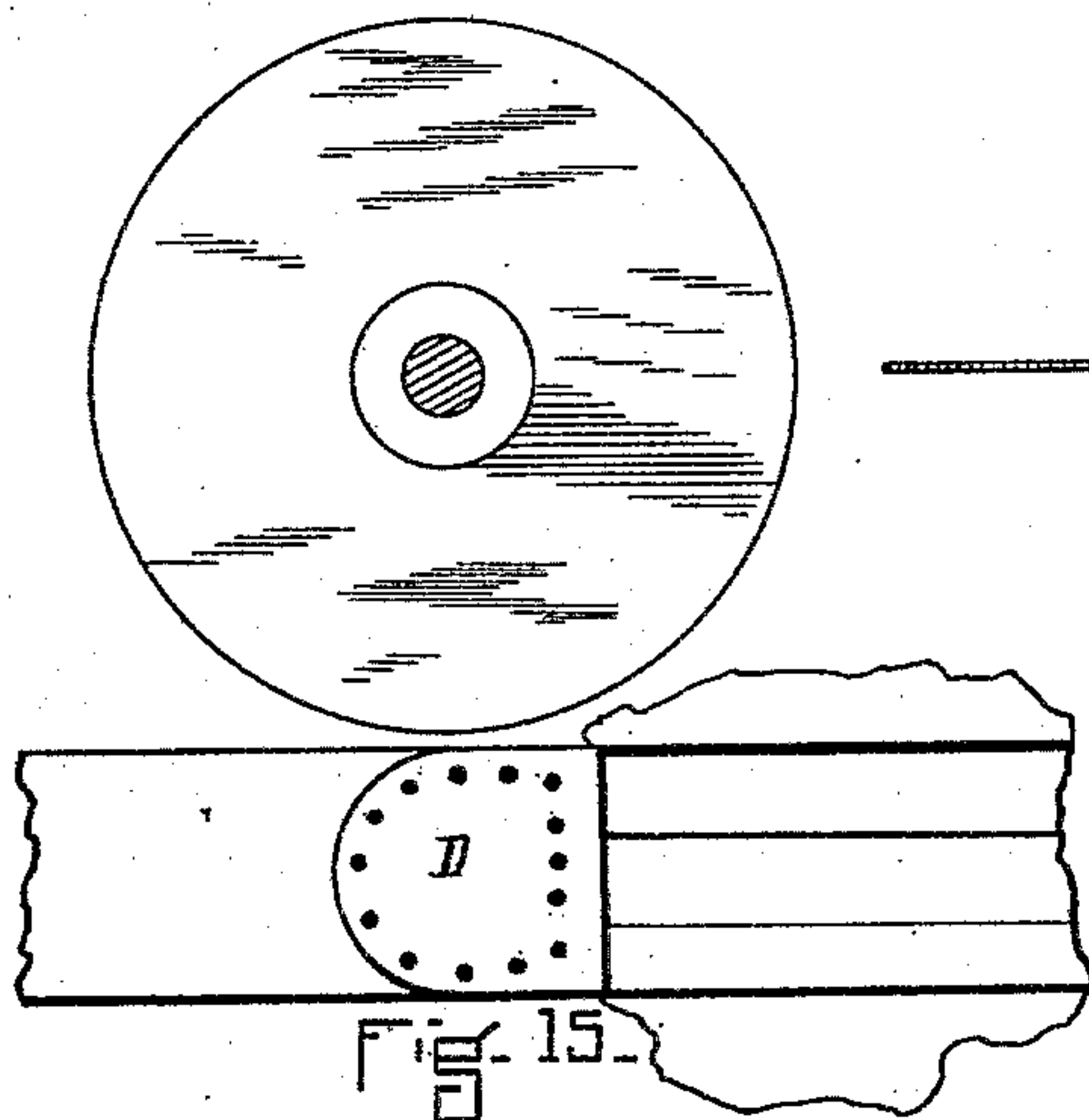


Fig. 15.

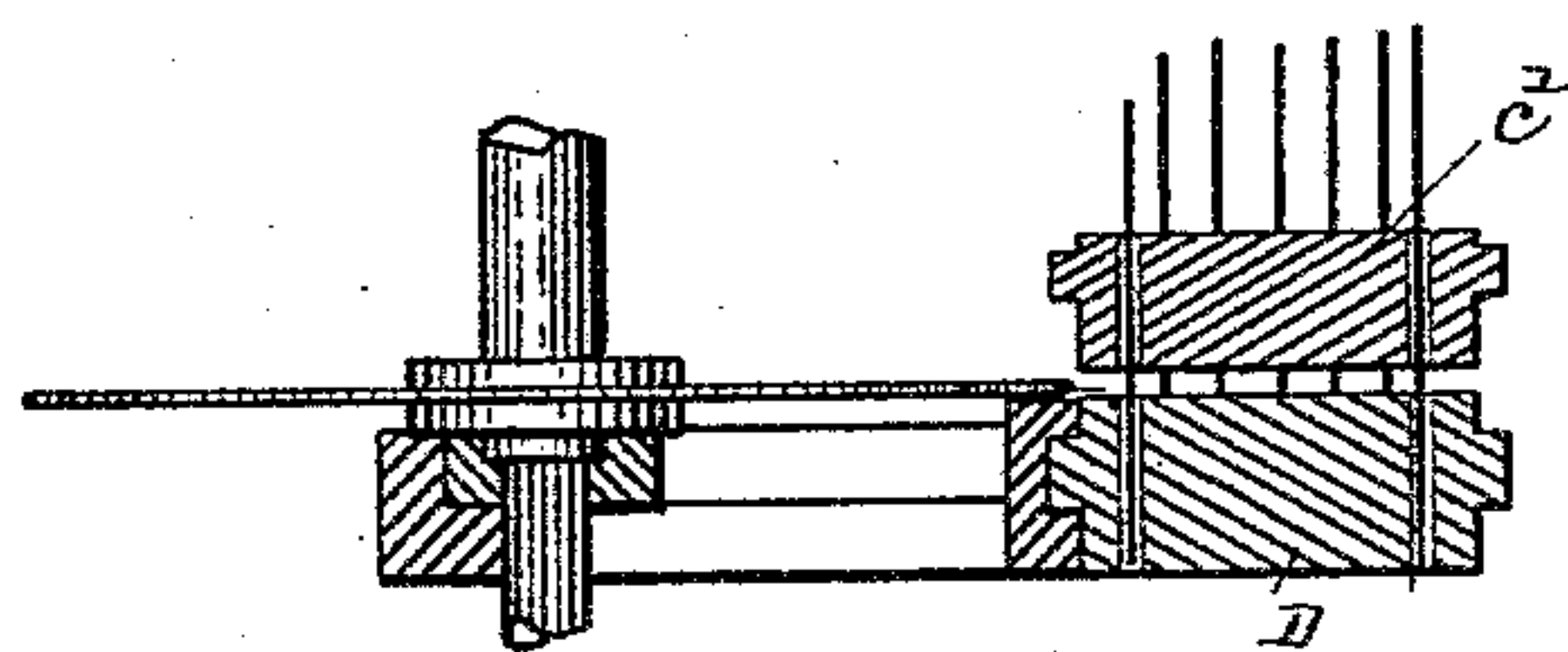


Fig. 16.

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# UNITED STATES PATENT OFFICE.

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

## NAIL MAKING, DISTRIBUTING, AND DRIVING MACHINE.

SPECIFICATION forming part of Letters Patent No. 414,582, dated November 5, 1889.

Application filed June 24, 1889. Serial No. 315,320. (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 Nail Making, Distributing, and Driving 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 a machine for distributing, making, and driving nails as a gang or group; and it comprises devices for feeding a number of nail-forming rods or wires into a nail-carrier or templet, the holes of which are arranged in the order or form in which the nails are driven as a gang or group.

The invention also relates to means for guiding or directing the gang or group of nail-making wires or rods from the feeding devices to the said holes in said templet or nail-carrier.

The invention further relates to mechanism for cutting or severing the ends of the wires or rods into the length of the nails desired after the wires or rods have been arranged in the order or form into which it is desired that the nails be driven, and which severing or cutting mechanism preferably is arranged immediately above the templet or nail-carrier.

It further relates to the employment, in connection with or as forming a part of said nail-severing devices, of dies which act to form reduced sections in the wires or rods by the severing of the previously-pointed ends of the wires or rods becoming the pointed ends of the next nails in order, and which point-forming devices preferably co-operate with the nail-severing devices.

It further relates to the association, in an organized machine, of nail feeding and making devices of the character specified with the nail-driving devices.

It further relates to various details of organization and construction, all of which will hereinafter be described.

In the drawings, Figure 1 is a view, part in elevation and part in cross vertical section, of a machine having the features of my invention. Fig. 2 is a detail view to illustrate

a portion of the mechanism for severing the nails from the ends of the nail-forming wires or rods. Fig. 3 is a view in side elevation of the nail-making devices. Fig. 4 represents the association of said devices with nail-driving devices; and Fig. 5 is a view in plan of the block through which the wires or rods are fed, and to which reference will hereinafter be made. Figs. 6, 7, 8, 9, and 10 are detail views. Figs. 11, 12, 13, 14, 15, and 16 represent modifications, to which reference will be hereinafter made.

The wires or rods *a* (see Figs. 1 and 3) are carried upon suitable reels, and are fed simultaneously by the feed-rolls *A A'*. (See Fig. 1 and in dotted lines Fig. 3.) The feed-roll *A'* carries a ratchet-wheel *a'*, which is engaged by a feed-pawl *a<sup>2</sup>*, carried by the lever *a<sup>3</sup>*, having its fulcrum *a<sup>4</sup>* upon the end of the feed-roll shaft, and the lever *a<sup>3</sup>* is reciprocated by means of the crank *a<sup>5</sup>* upon the pulley-shaft *B* and the connecting-rod *a<sup>6</sup>*. (See Fig. 3.) From a point immediately below the converging point of the feed-rolls there extend a number of tubes *C*, the upper ends of which are held in a cross-plate *c*, and the lower ends of which extend into the block *c'*. These tubes are curved or bent to bring their lower ends *c<sup>2</sup>* into any desired form or arrangement in which it is intended that the nails shall be driven, and each tube contains a guiding hole or passage *c<sup>3</sup>*, and receives one of the nail-making wires or rods *a*, and the wires are fed by the feed-rolls *A A'* through the passages of said tubes, and are guided by said tubes, each wire in a separate tube, to the holes *c<sup>4</sup>* in the block *c'*. Below the block *c'* is the nail-carrier or templet *D*, which has nail-receiving holes *d*, and which, when a nail-carrier, may also have the sliding hole-covering plate *d'*, which is held closed until the nails are delivered to the templet or to a driving position, when it is opened to permit them to be delivered or to be driven. The upper part of the block *D* is faced with the steel plate *d<sup>2</sup>*. Between this steel plate and the lower surface *c<sup>5</sup>* of the block *c'*, I have arranged the nail severing and pointing devices. They are illustrated as comprising a block *E*, fastened to the block *c'*, and which is stationary, and the jaws *E' E<sup>2</sup>*, which are horizontally movable in relation to the block *E*. The



block E has formed in its edge sections of holes or dies  $e$ , which form a continuation of the holes  $c^4$  of the block  $c'$ , and each jaw  $E'$   $E^2$  has its edge  $e'$  shaped to conform to the edge of the block E, and also has sections  $e^2$  of holes or dies which are also, when closed, in line with portions of said holes  $c^4$ .

In operation, the jaws  $E'$   $E^2$  being open and the wires having been fed through the holes of the block  $c'$  into the holes  $d$  of the nail-carrier or templet, the jaws are closed upon the wires, and they may act in these capacities: First, they may serve to tightly clamp or hold the wires in the holes  $e$   $e^2$ , the said holes being of a shape and form to act as clamping-jaws, while the nail-carrier or templet D, by a horizontal movement in relation to the jaws, acts as a cut-off block in severing the ends of the nail-forming wires or rods while they are held clamped or grasped by the jaws and upon a line between the upper surface of the steel plate  $d^2$  and the lower or under surface of the jaws, or the jaws may act to partially sever or cut the nail-forming wires or rods, in which case the surfaces of the holes  $e$   $e^2$  are shaped to make the deepest indentation or cut in the wires or rods upon a line with the under surface thereof, and in which event the nail-holder block or templet D will also act as a severing device, and is operated to sever the ends of the wires after they have been thus reduced in section or weakened by the jaws, or the jaws may serve to form point-forming sections, in addition to partially severing them, or at the same time partly severing or cutting through the same, substantially as represented in Fig. 1, where the sections  $e$  are represented as parts of point-forming dies, and the sections  $e^2$  as the other or companion parts thereof, the two sections acting to make point-forming sections in the wire and at the same time to reduce the thickness thereof, so that previously-pointed sections fed into the holes  $d$  of the nail-carrier or templet D are either completely severed or very nearly severed, so that the horizontal movement of the nail-carrier or templet completes the cutting or severing of the previously-pointed nails from the pointed ends of the wires or rods which are held in the point-forming dies.

In Fig. 7 I have represented an enlarged view of the point forming and severing dies.

The jaws  $E'$   $E^2$  are represented as pivoted at  $e^3$ , and the jaw  $E'$  has the arm  $e^4$ , and the jaw  $E^2$  the arm  $e^5$ . These arms extend between the vertical shafts  $e^6$   $e^7$ . The shaft  $e^6$  bears a wiper-cam  $e^8$ , and the shaft  $e^7$  a wiper-cam  $e^9$ , and the rotation of the shafts serves to bring these cams in contact with the edges of the arms  $e^4$   $e^5$  and to move them toward each other, and the two members  $ee'$  of each severing device or pair of dies into contact with each other. (See Fig. 2.) The jaws are opened or moved apart from each other, and the block E by a spring  $e^{10}$  interposed between the two arms  $e^4$   $e^5$ . (See Fig. 2.) The shafts  $e^6$   $e^7$  each have a bevel-gear  $e^{11}$ , (see

Figs. 1 and 3,) which engage, respectively, with bevel-gears  $e^{12}$   $e^{13}$  upon the pulley-shaft B.

The nail-carrier D is represented in Fig. 4 as movable in relation to the wire feeding and severing devices by means of a cam F upon a vertical shaft  $f$ , having a cam-groove  $f'$ , in which a cam-pin  $f^2$  on the nail-carrier plate extends. This cam serves to move the nail-carrier or templet from the wire-severing devices to a position under the gang of drivers  $f^3$ .

I would say that I do not confine myself to the especial form of the severing devices herein specified, the essential feature of this part of the invention being that the nail-forming rods or wires, either pointed or unpointed, are fed into the holes of the nail-carrier or templet preferably in a form or arrangement for driving before they are severed, as by this means the nails are fed positively and directly by the feed of the nail wires or rods into the order or arrangement for driving, and into the holes of a block from which they are directly driven, or from which they are directly delivered to the templet, from which they are driven.

It is obvious that the machine is operative without the guiding-tubes C, as wires can be fed by the feed-rolls directly from the holes of the block  $c'$ ; but for some reasons I prefer to use the tubes.

In operation the nail-forming wires are fed by the wire-feeding rolls through the holes of the guiding-block into the holes of the nail-carrier or templet, and this is immediately followed by the closing movement of the grasping, cutting, or pointing devices and the lateral movement of the nail-holder or templet. Upon the delivery and driving of the nails the nail-holder or templet is returned to its original position, the severing devices are opened to permit the feeding of the wires or rods, and the wires or rods are then fed, and the operation proceeds as before.

It will be seen that the upper end of the rod  $a^6$  is connected with the pawl-lever  $a^3$  in a manner to permit it to be moved radially in relation to the center of the shaft  $a^4$ , and this construction permits the stroke of the lever  $a^3$  to be varied, and consequently the feed of the wires, so that they may be varied or adjusted to provide nails varying in length.

It will be seen that where the cutters or dies  $e$   $e^2$  serve to either point and partially sever or to partially or entirely sever, that portions of the stationary sections  $e$  of the dies extend into the line of the holes  $c^4$   $d$ , and that when this is the case the holes are enlarged or made oblong upon the side opposite the stationary dies or cutters in order to give room for the proper feeding of the wires from the holes  $c^4$  past or by the said sections of the cutters or dies into the holes  $d$ .

I have represented the jaws  $E$   $E'$  as swinging on an arc of a circle. I would say, however, that I do not confine myself to this



movement, as they may have a straight sliding movement toward and from each other. I have represented also the employment of but two movable jaws. There may be used, however, a larger number—that is, three or four—according to the motion which the jaws have imparted to them. For instance, if the movement is a sliding movement, then four jaws would be desirable, one to act against each side of the stationary jaw, and one against the back end thereof, and another against the front end. (See Fig. 11.)

In Fig. 7 I have shown in enlarged section the jaws and pointing-dies and the relation which they bear to the holes of the block  $c'$  and nail-carrier when closed upon the wire.

Fig. 8 is a view in plan of the jaws  $E E'$ , to represent the box form of pointing-die.

Fig. 9 is a view illustrating the jaws  $E E'$  simply acting as clamps for holding the wire, the carrier then acting as a severing device. This would form a nail without a point.

Fig. 10 represents the jaws as having dies provided with cutters, which sever or partially sever the wire before the movement of the nail-carrier.

It will be observed that where the inner jaw  $E$  is stationary the holes in the block  $c'$  and in the carrier are made somewhat larger to allow the feeding of the wire, especially where the dies similar to those represented in Figs. 7 and 10 are used.

I would say that in lieu of jaws for severing the wires there may be used any other cutting or severing instrument.

Fig. 11 represents the pointing-jaws as arranged to operate between the block  $c'$  and the nail-carrier  $D$ , acting, as the jaws  $e$  act, in connection with the part  $E$ , excepting that they have straight horizontal movements toward and from said part, instead of being movable upon a circular path.

In Fig. 12 I have represented the cutting devices as formed upon the ends of two or more levers, and as consisting of sharpened thin blades adapted to be moved between the two blocks  $c'$  and  $D$  to sever the wires.

Figs. 13 and 14 represent the fastenings as severed by a rotary movement of the upper block  $c'$  in relation to the lower block  $D$ , the upper block being supported to be turned and having an arm or handle by which it is partially rotated after the wires have been fed into the holes of the block  $D$ —that is, the block  $D$  and the block  $c'$  act as shears. Both block  $c'$  and the block  $D$  have opposing steel plates.

In Figs. 15 and 16 I have represented the fastenings as separated from the ends of the wire by means of a saw passed and movable across the space between the two blocks  $c'$  and  $D$ ; the saw represented in the drawings is a circular saw.

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

1. The combination of feed-rolls for feed-

ing a number of wires or rods, a block having holes or passages arranged in the order or form in which the nails are to be driven, a templet or nail-holder having holes of the same form or arrangement as that of the block, and interposed jaws arranged between the said block and the nail-holder or templet to act upon the wires or rods, as specified, as and for the purposes described.

2. The combination of the block  $c'$ , having holes or passages  $c^4$  arranged in the order in which the nails are to be driven, a laterally-movable nail-carrier or templet  $D$ , having holes  $d$ , and jaws arranged between the block  $c'$  and the nail-holder or templet  $D$  to grasp and sever or partially sever the wire and hold the same, as and for the purposes specified.

3. The combination of nail rod or wire grasping-jaws adapted to clamp or clamp and sever or partially sever a series of nail-forming wires or rods above their ends, arranged in the order in which the nails formed therefrom are to be driven, with a laterally-movable nail-holder or templet  $D$ , the holes  $d$  of which correspond to the severing or forming devices of the jaws, substantially as described.

4. The combination of the templet or nail-holder  $D$ , having the holes  $d$  arranged in the order in which nails are to be driven, a feeding device—such as a pair of long feed-rolls—intermittently operated for simultaneously feeding the ends of a group or gang of nail wires or rods to said holes  $d$ , and wire clamping, pointing, or severing devices—such as the jaws  $E E' E^2$ —arranged above the said nail-carrier or templet to sever or partially sever the ends or nails from said rods or wires after they have been fed and located in the holes of said nail-carrier or templet, substantially as described.

5. The combination of a block having the holes  $c^4$  of the arrangement and form in which the nails are to be driven, nail wire or rod feeding devices—such as the rolls  $A A'$ —for simultaneously feeding a number of said wires or rods through said holes, and jaws located or arranged beneath said block to operate, substantially as specified, upon said wires, as and for the purposes described.

6. The combination of the feed-rolls  $A A'$ , the tubes  $C$ , having passages  $c^3$ , the upper ends of which are upon the same line and the lower ends of which are arranged in the form in which the nails are to be driven, a block  $c'$ , having holes  $c^4$  in continuation of the passages of said tubes, the jaws  $E E' E^2$  for operating upon the wires, as specified, and the laterally-movable nail-holder or templet  $D$ , having holes  $d$ , substantially as described.

7. In a nail making and distributing machine, in combination with devices for holding the ends of a group of wires in the form or arrangement in which the nails or fastenings severed therefrom are to be driven, a series of wire grasping, severing, or pointing



cutters or dies movable across or upon said wires while so held, as and for the purposes described.

8. The combination, with a multiple wire-feed and wire-guide for holding a series or number of wires in the order in which the nails are to be driven, of the block E, having sections  $e$  of cutters or dies, the jaws  $E'$   $E^2$ , having the sections  $e^2$  of cutters or dies, and the laterally-movable nail-carrier or templet D, substantially as described.

9. The combination of the block E, having the sections  $e$  of dies or cutters, and the jaws  $E'$   $E^2$ , having the sections  $e^2$  of dies or cutters, substantially as described.

10. The combination of the block E, having sections  $e$  of dies or cutters, the jaws  $E'$   $E^2$ , having the sections  $e^2$  of dies or cutters, and the arms  $e^4$   $e^5$  and the jaw-cams  $e^8$   $e^9$ , for closing said jaws, substantially as described.

11. The combination of the block E, having sections  $e$  of dies or cutters, the jaws  $E'$   $E^2$ , having the sections  $e^2$  of dies or cutters, and the arms  $e^4$   $e^5$  and the spring  $e^{10}$ , for opening said jaws, substantially as described.

12. The combination of the block E, having sections  $e$  of dies or cutters, the jaws  $E'$   $E^2$ , having the sections  $e^2$  of dies or cutters, and the arms  $e^4$   $e^5$  and the jaw-cams  $e^8$   $e^9$ , for closing said jaws, and the spring  $e^{10}$ , for opening said jaws, substantially as described.

13. The combination of the main shaft B, the feed-rolls A A', one of which is connected with the crank  $a^5$  by means of the ratchet  $a'$ , pawl  $a^2$ , lever  $a^3$ , and connecting-rod  $a^6$ , the block  $c'$ , having the holes  $c^4$ , the jaws  $E'$   $E^2$ , the nail-holder or templet D, having the holes  $d$ , the bevel-gear  $e^{11}$   $e^{13}$  and  $e^{11}$   $e^{12}$ , the shafts  $e^6$   $e^7$ , the cams  $e^8$   $e^9$ , substantially as described.

14. The combination, with a gang or group of nail-drivers, of a nail-holder or templet, a wire-feed for feeding nail-forming wires into the holes of said templet, and wire grasping or severing jaws to simultaneously or substantially simultaneously act upon said wires to sever or partly sever the nails from the ends thereof and arranged immediately above the said templet or nail-carrier, where-

by the wires are first fed to the holes of said templet before the nails are severed therefrom; substantially as described.

15. The combination of the nail-driving devices, a wire-feed for simultaneously feeding a gang or group of wires with their lower ends in the order or form in which nails are to be driven to the holes of the nail-carrier or templet, a cam for moving said nail-holder or templet laterally, and wire-severing jaws or devices arranged immediately above said templet or nail-carrier to operate to sever or partially sever the nails from the ends of the wires or rods after they have been fed to the holes of the templet or nail-carrier, substantially as described.

16. In a nail making and distributing machine, the wire grasping, severing, or pointing dies having their grasping, severing, or pointing cutters or dies arranged thereon to operate upon the wires in the order or form in which the nails are to be driven, substantially as described.

17. The method of distributing and forming fastenings or fastening-blanks, comprising the feeding of a series of wires or nail-rods to a form having holes of the arrangement or order in which the fastenings or fastening-blanks are to be driven or used and then severing from the ends of such assembled wires or rods the said fastenings or fastening-blanks in the order in which they are to be driven or used, substantially as described.

18. The method of supplying a nail or fastening carrier or block with nails or fastenings arranged in the order in which they are to be driven or used, comprising the feeding of a series of wires or rods to the holes of said carrier arranged in the order in which said nails or fastenings are to be used and then severing from said wires or rods lengths in said holes which form nails or fastenings, substantially as described.

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Witnesses:

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