

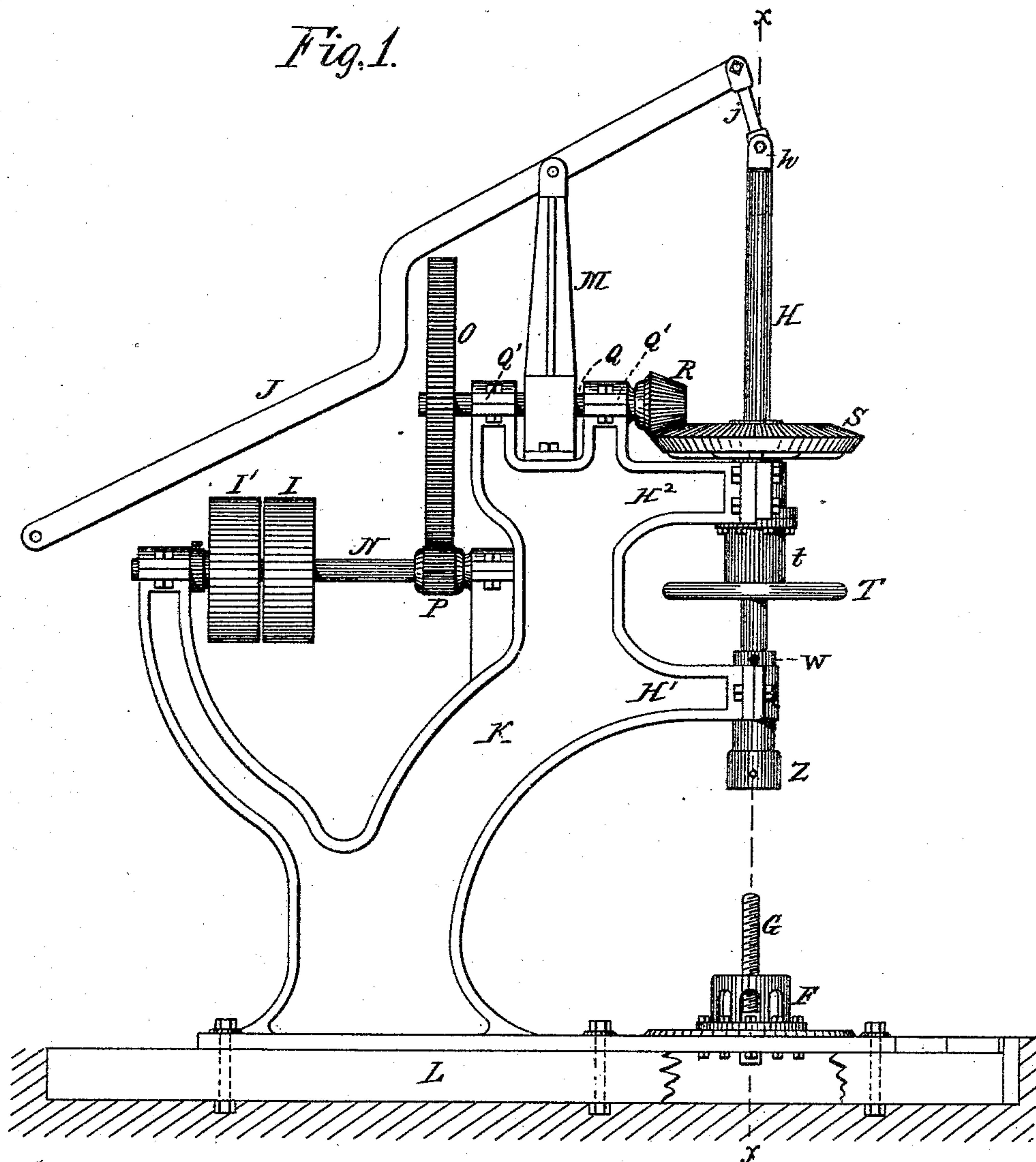
(No Model.)

4 Sheets—Sheet 1.

J. R. BROWNELL.  
FLANGING MACHINE.

No. 411,780.

Patented Oct. 1, 1889.



Witnesses:  
*H. Smith.*  
*G. M. Paver*

Inventor:  
*John R. Brownell*  
per *Wm. Hubbell Fisher,*  
*Attorney.*

(No Model.)

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Fig. 2.

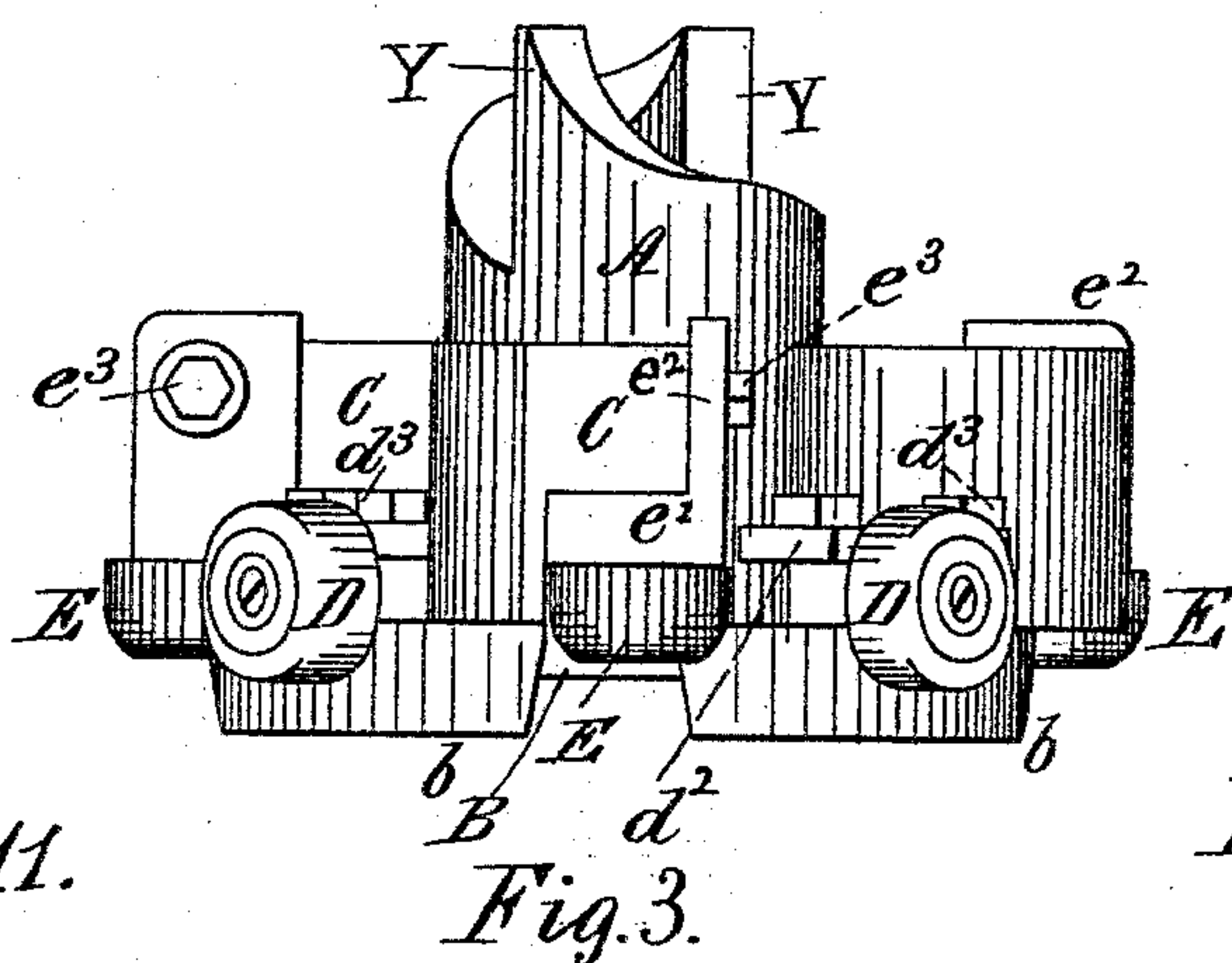


Fig. 11.

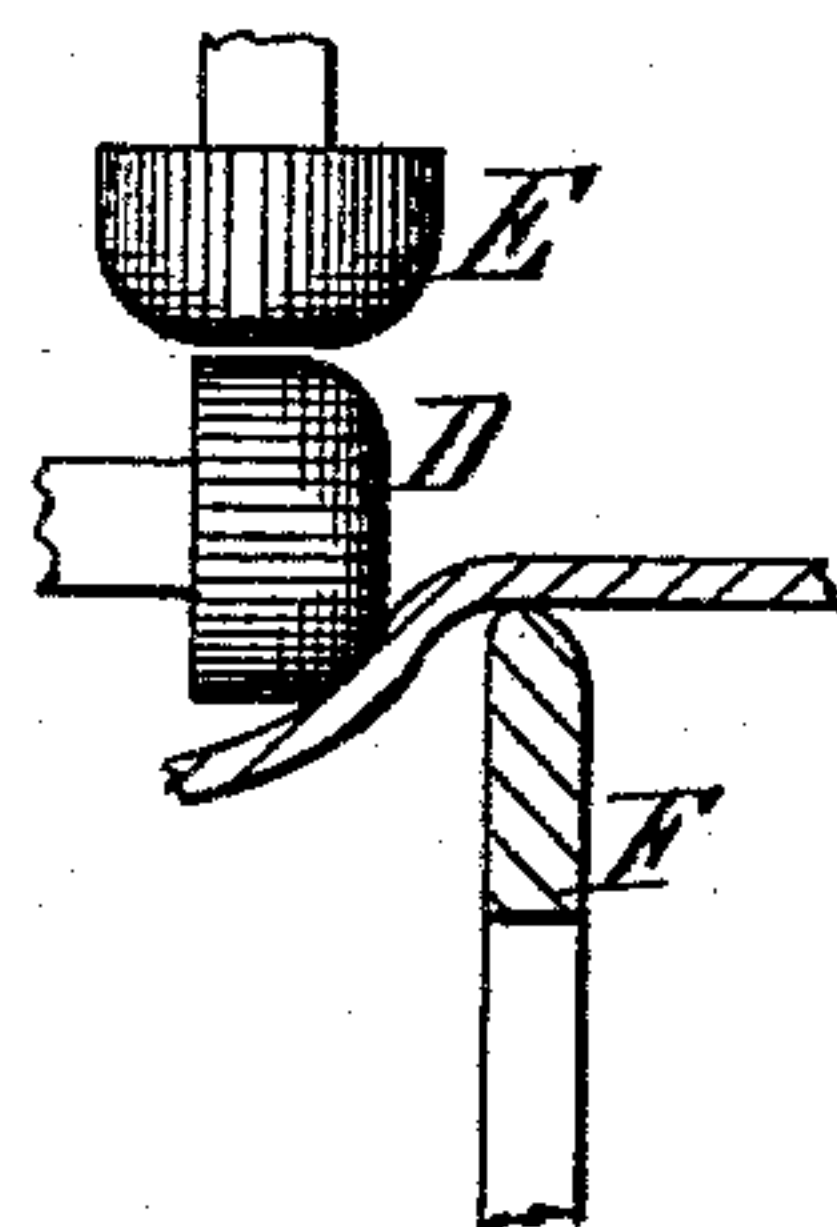


Fig. 3.

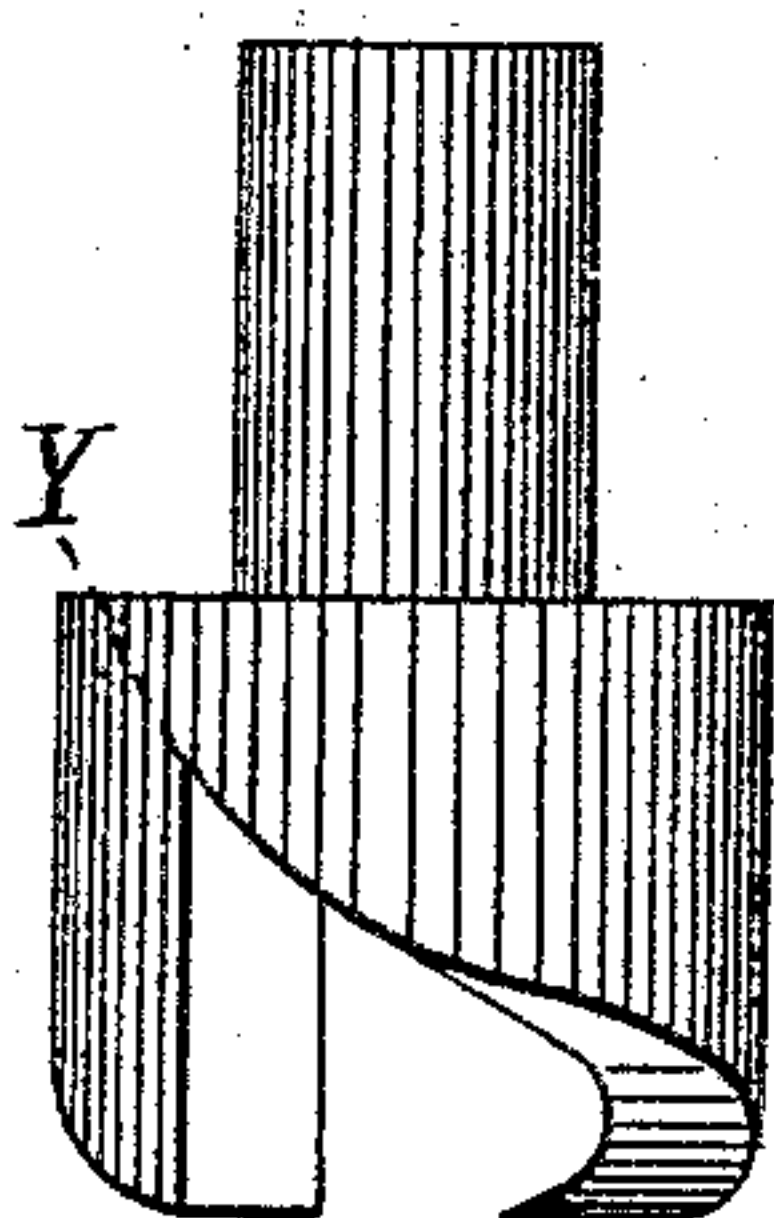
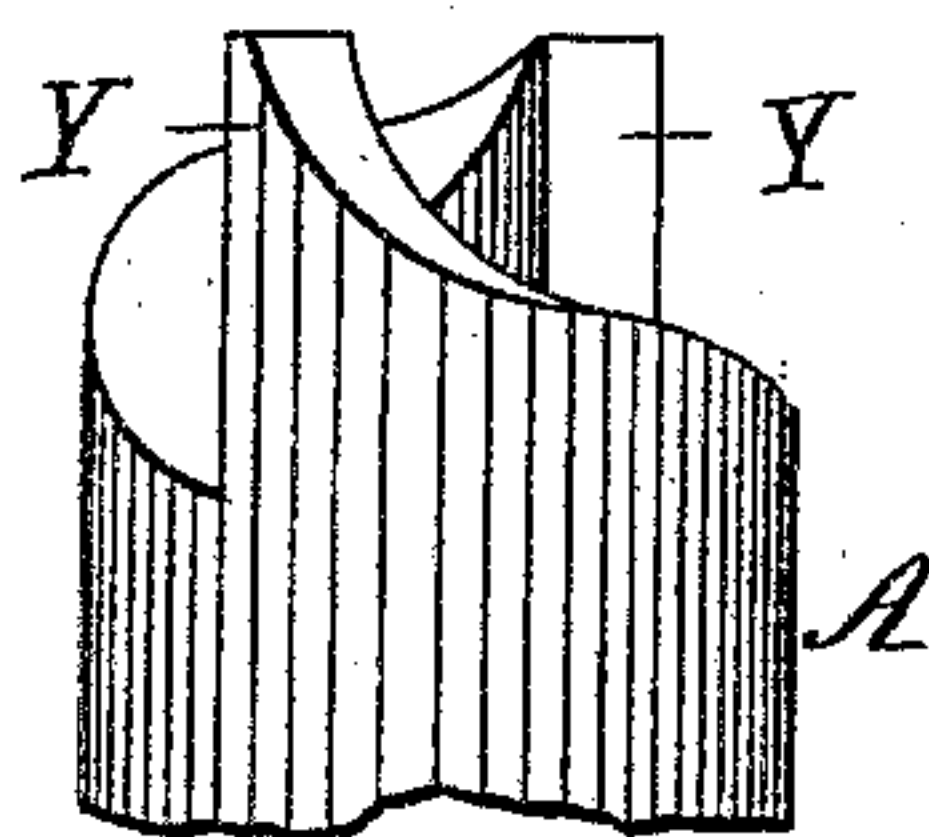
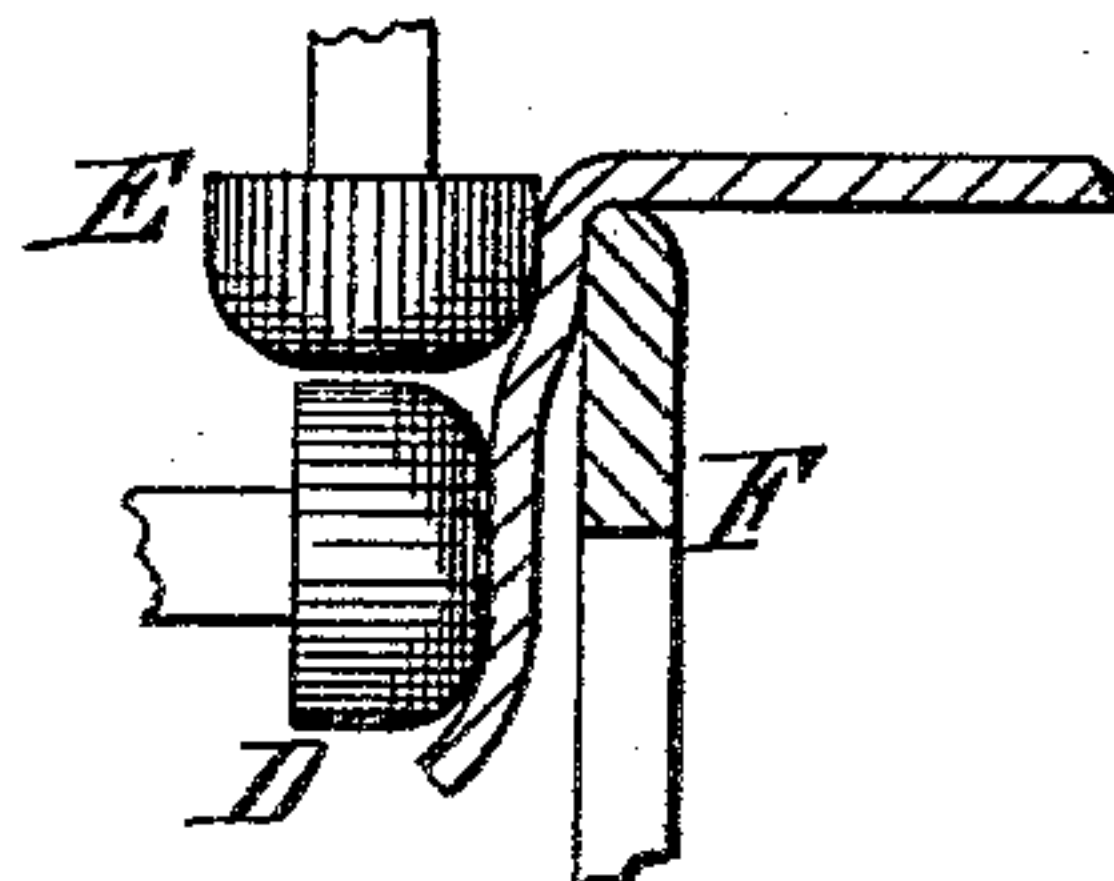


Fig. 12.



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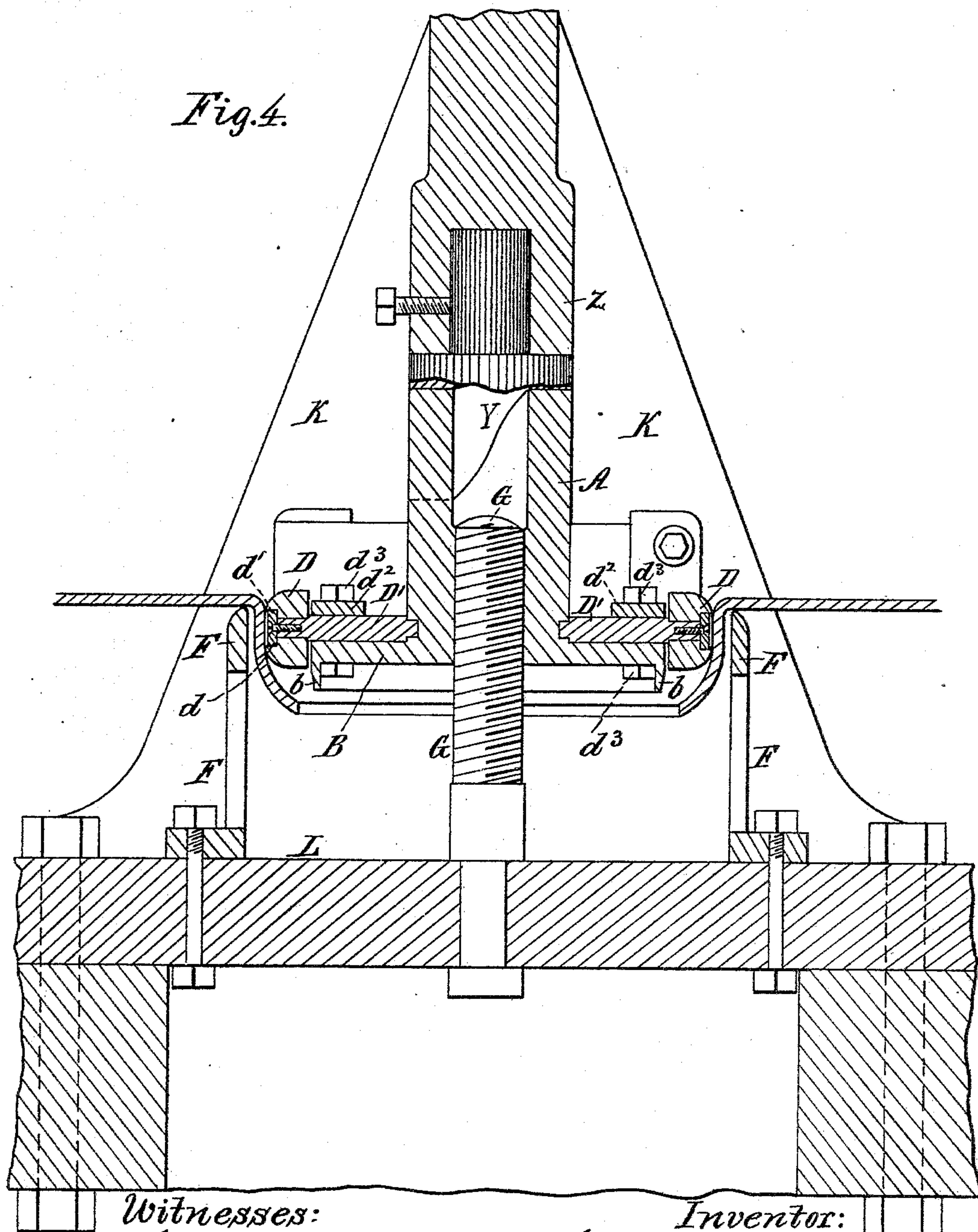
(No Model.)

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No. 411,780.

Patented Oct. 1, 1889.



Witnesses:

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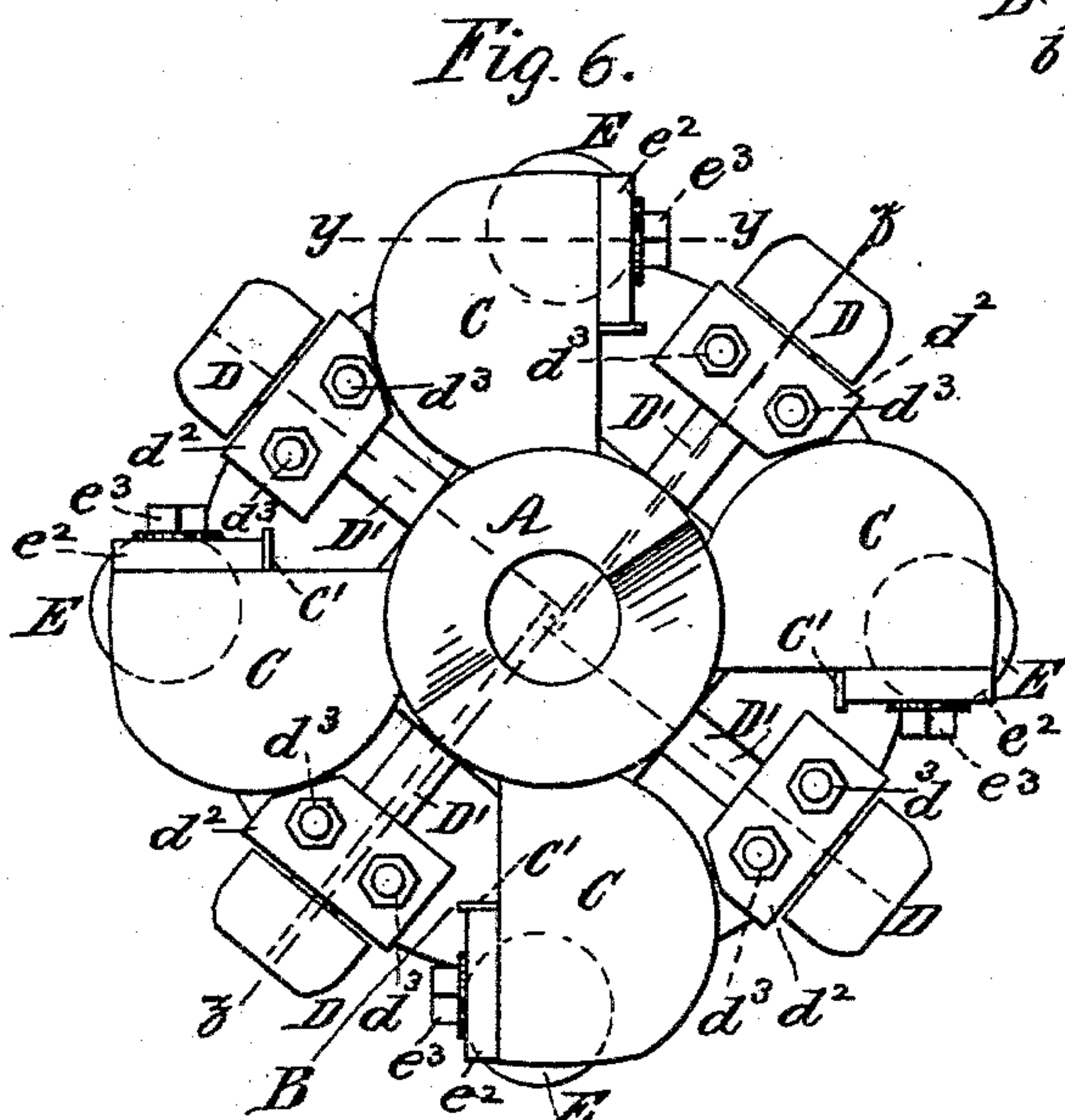
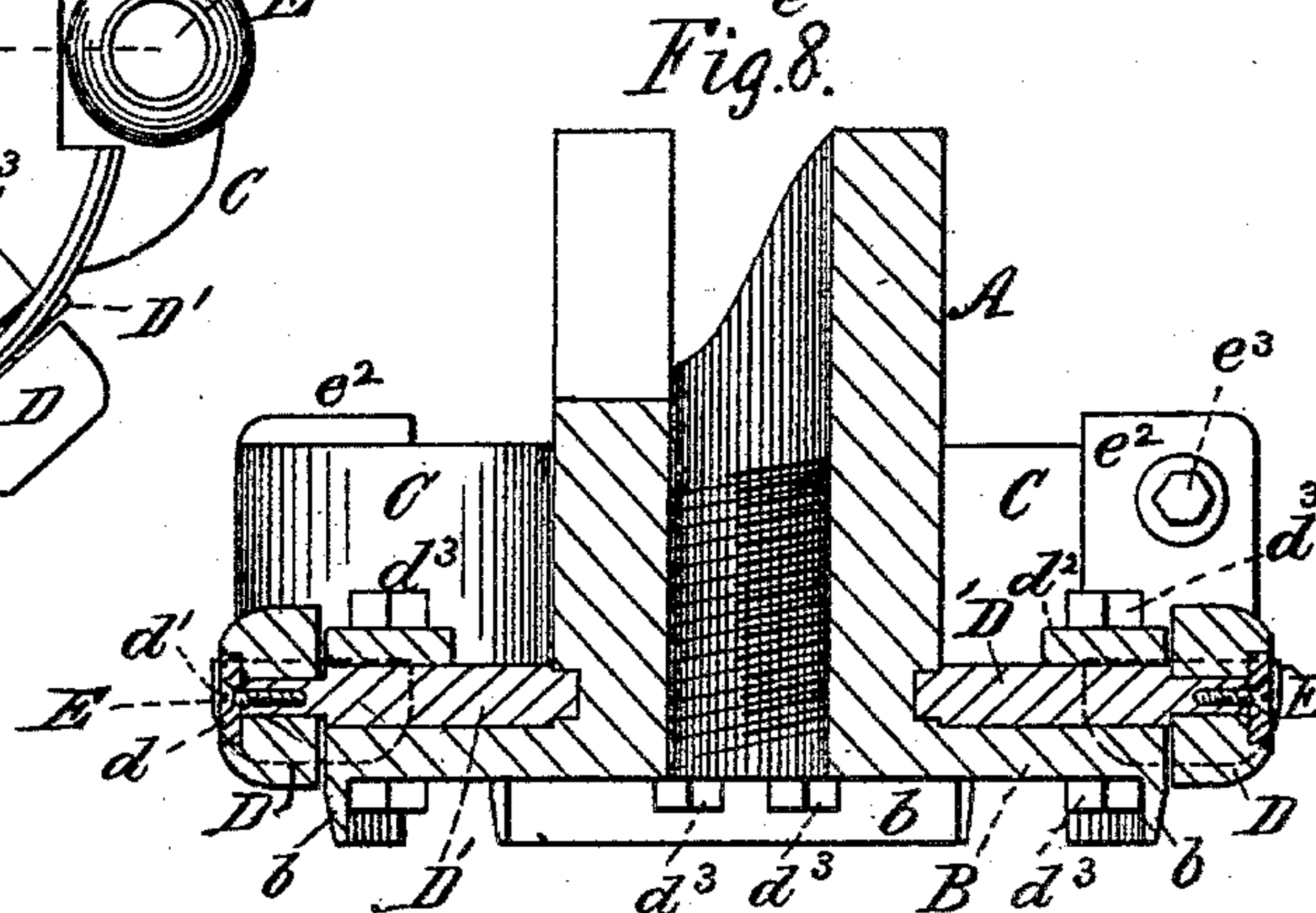
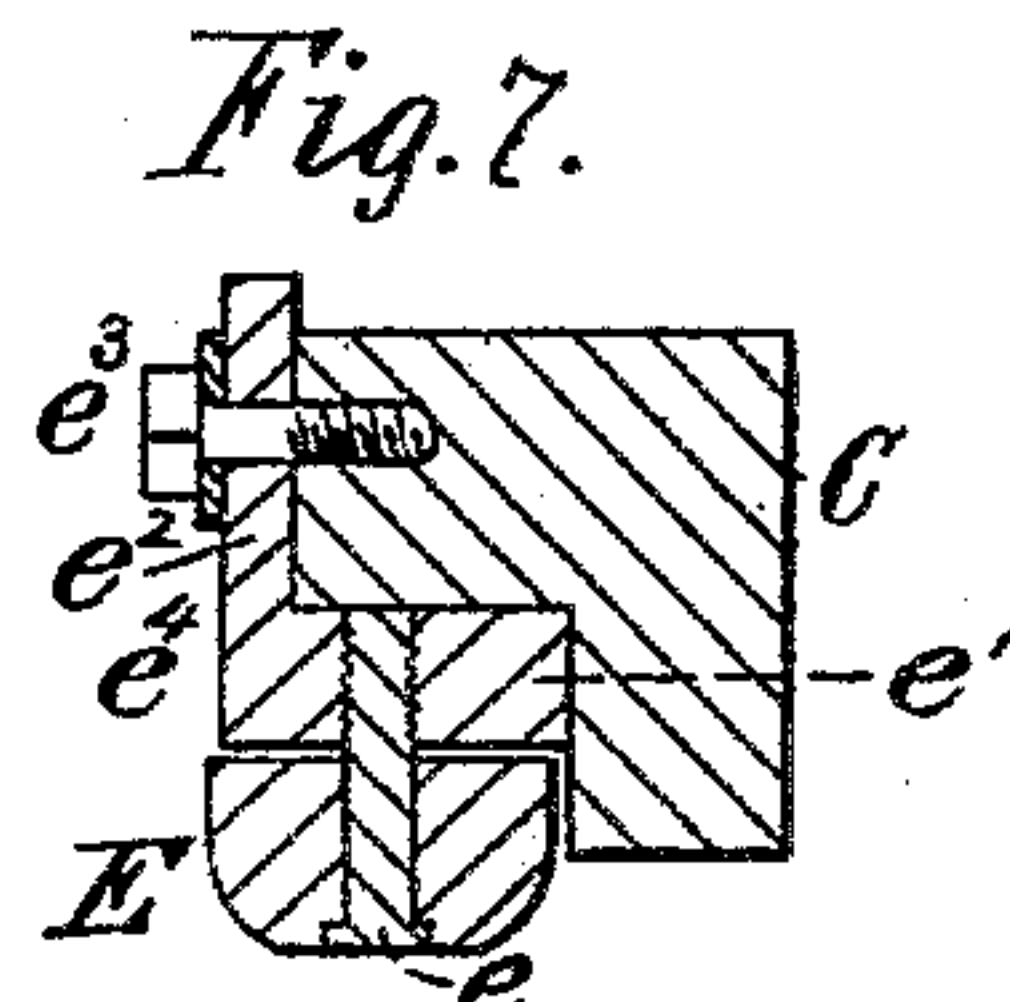
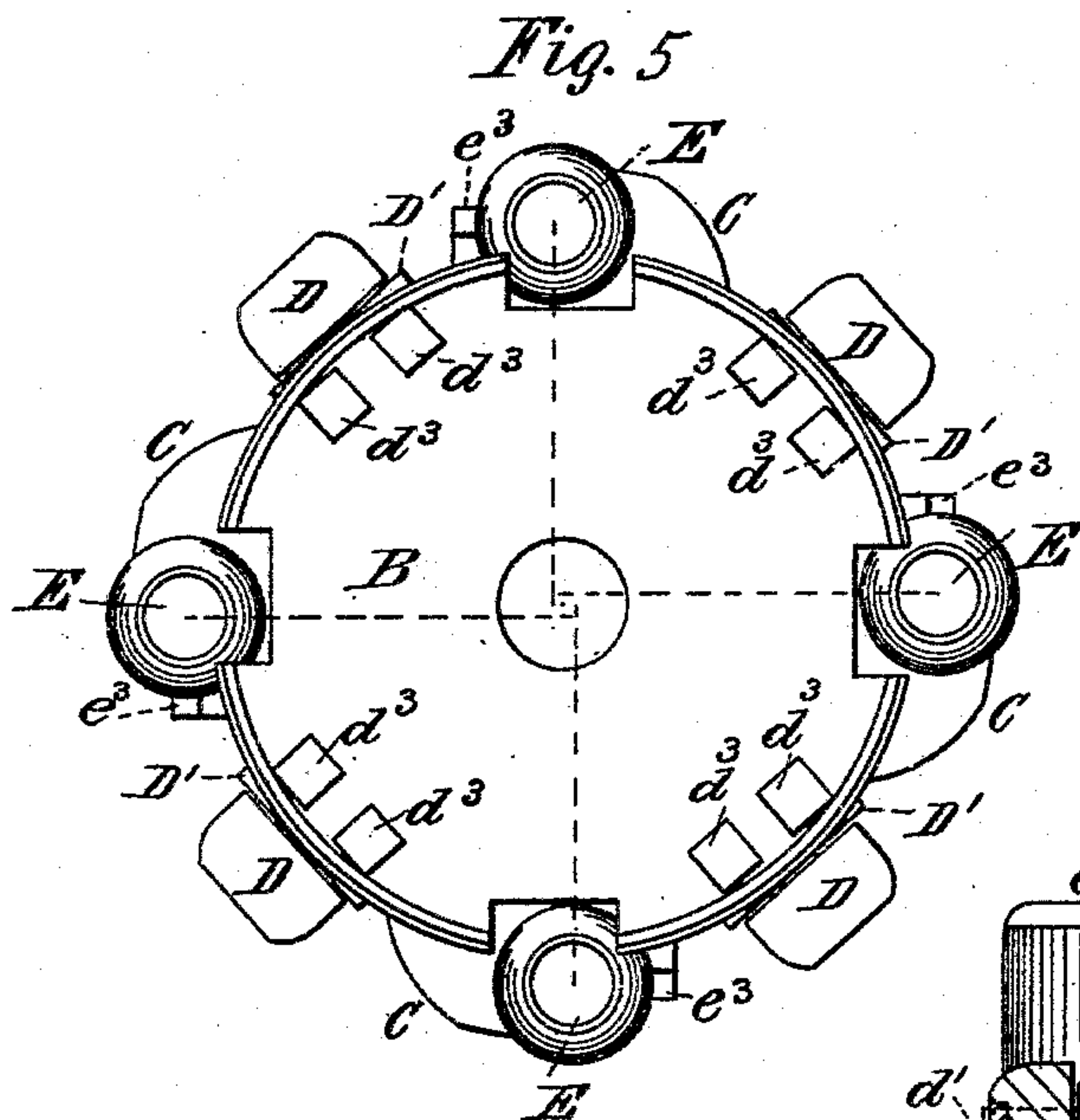
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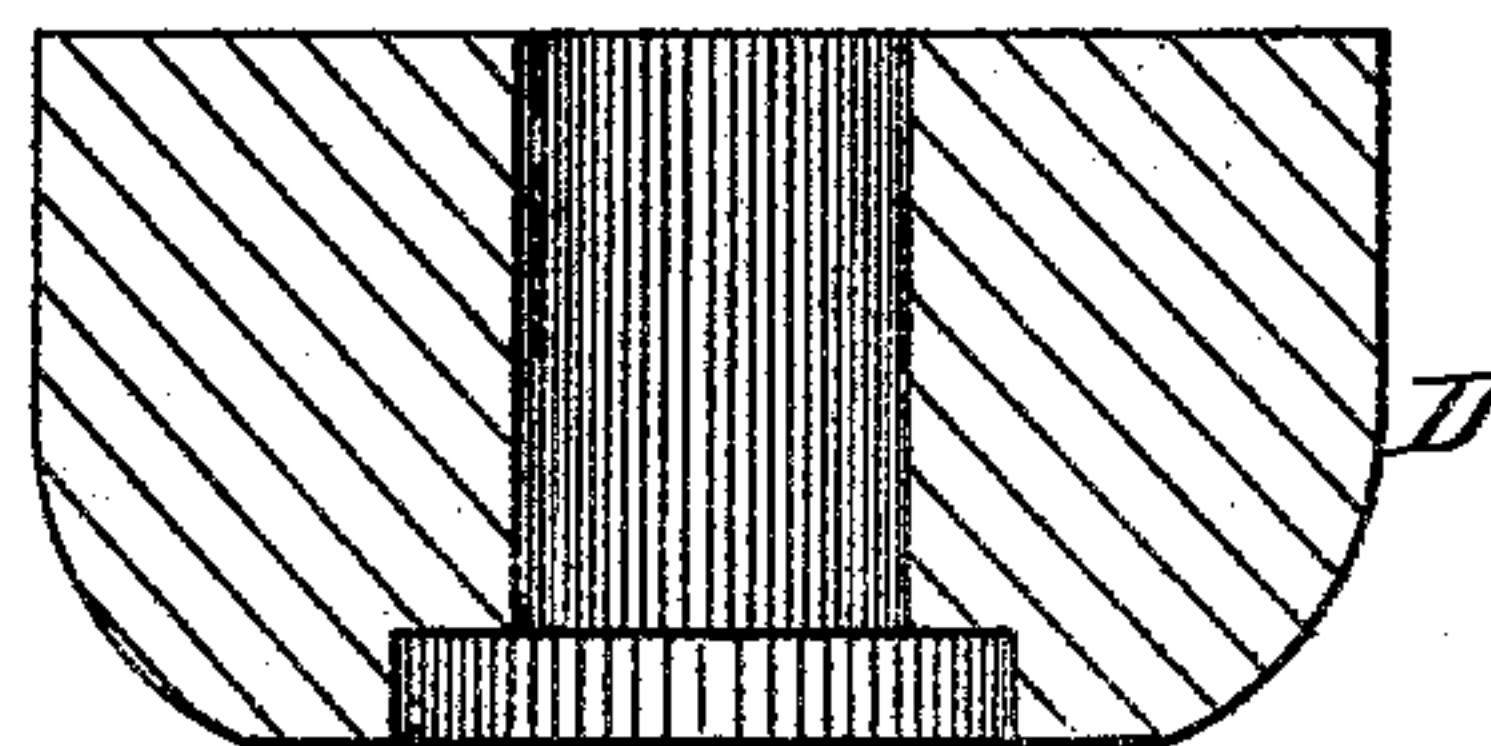
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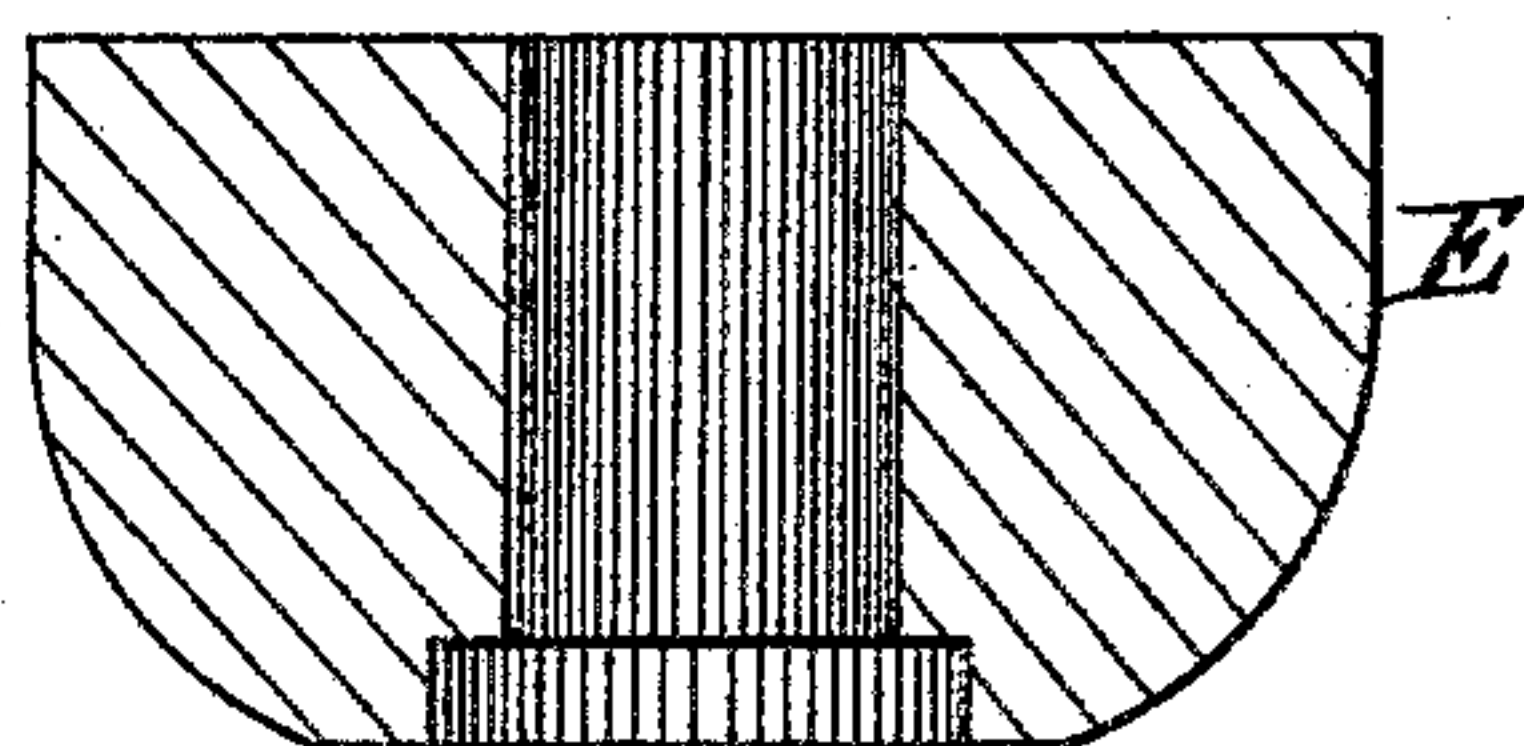
Patented Oct. 1, 1889.



*Fig. 9.*



*Fig. 10*



Witnesses:

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# UNITED STATES PATENT OFFICE.

JOHN R. BROWNELL, OF DAYTON, OHIO.

## FLANGING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 411,780, dated October 1, 1889.

Application filed June 19, 1888. Serial No. 277,546. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN R. BROWNELL, a citizen of the United States, and a resident of the city of Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Flanging-Machines, of which the following is a specification.

The several features of my invention and the advantages arising from their use, conjointly or otherwise, will be apparent from the following description.

My invention relates in general to machines for forming flanges at or out of the edge of holes in metal plates, and is more particularly intended for forming such flanges upon boiler-heads.

The particular portion of such a flanging-machine, to which my improvement more particularly relates, is what is known as the "flanging-head."

My invention is applicable to various descriptions of flanging-machines; but for the purposes of illustrating the application and operation of my improvement I have shown it in connection with one of the common and well-known descriptions of flanging-machines.

In the accompanying drawings, forming part of this specification, Figure 1 is a side elevation of a drill-press or flanging-machine adapted for use with my improved flanging-head. Fig. 2 is a side elevation of my improved flanging-head. Fig. 3 illustrates a convenient form of clutch for enabling the main vertical operating-shaft to engage in the flanging-head and to rotate the latter. Fig. 4 is a view of the flanging-head in position in the machine and of the sheet being flanged, the said figure being partly in vertical section and partly in elevation. Fig. 5 is a view of the under surface of the flanging-head. Fig. 6 is a top view of the flanging-head. Fig. 7 is a section taken at the line  $yy$ , Fig. 5. Fig. 8 is a section taken at the line  $zz$ , Fig. 5. Fig. 9 is a central section of one of the vertical rollers (that is to say, whose axis of revolution is horizontal) of the flanging-head. Fig. 10 is a central section of one of the horizontal rollers (that is to say, whose axis of revolution is vertical) of the flanging-head. Fig. 11 illustrates the shape and position of

the metal sheet to be flanged as the lower or first roll is operating upon it. Fig. 12 illustrates the shape and position of the same sheet as the upper or finishing roll is acting upon it, while the lower or first roller is acting upon the lower portion of the flange. In these views (Figs. 11 and 12) the rollers are shown in elevation, while the sheet to be flanged and the upper edge of the cylinder  $F$ , or equivalent support, are shown in section, and for the purpose of better illustrating the operation of the upper and lower series the lower or horizontal roll is shown apparently directly beneath the vertical roll  $E$ .

The frame of the flanging-head consists of a hollow central stem  $A$ , a base portion or plate  $B$ , and a series of heavy radial lugs  $C$ , the stem, plate, and lugs being preferably cast or welded in one piece. The beveled flanges  $b$  project down from the plate  $B$  and serve as guides, first entering the opening in the plate to be flanged. For the purposes of perspicuity it may be here remarked that each of these rolls or rollers which rotate around a horizontal axis or around an axis extending in a direction substantially horizontal is termed a "horizontal" roll or roller, and that each of those rolls or rollers which rotate around a vertical axis or around an axis extending in a direction substantially vertical is termed a "vertical" roll or roller. A series of horizontal rolls  $D$  is attached to the plate  $B$  in the spaces between the lugs  $C$ . Each roll is mounted on the end of an arm  $D'$ , to which it may be attached in any desired manner, the preferred means being a disk  $d$ , counter-sunk in the face of the roller, and a screw  $d'$ , passing through the disk into the arm  $D'$ . The arms  $D'$  rest on the top of the plate  $B$ , and their inner ends are, for the purpose of being more efficiently braced, preferably received in recesses in the stem  $A$ . They are held in place by plates  $d^2$ , which are clamped down onto the arms by the bolts and nuts  $d^3$ , one on either side of each arm. The rollers  $D$  thus held in place are capable of a certain amount of adjustment to and from the center stem.

By reference to Fig. 5 it will be seen that the axes of the rollers  $D$  do not correspond exactly with the radii of the plate  $B$ , but run parallel to the radius and in advance of the



center of the flanging-head. This arrangement tends to prevent the arms holding the rollers from being dragged out of place, and also tends to prevent such a pressure upon the rollers as would tend to drag them off their respective shafts or arms on which they (the rollers) respectively revolve. Being set ahead, they perform their work ahead; hence the metal which is being flanged does not crowd onto them.

The vertical rollers E are mounted on the stems or axes *e*, preferably secured to the head by a screw-thread, as shown. (See Fig. 7.) These stems *e* are preferably attached to the horizontal arms *e'* of the angle-irons *e''*, thereby securing the vertical rollers to said angle-irons. These angle-irons *e''* are secured to the lugs C by screws *e'''* passing through their vertical arms *e'''*.

As shown in Fig. 5, the angle-irons *e''* are attached to the sides of the lugs C, and their lower horizontal arms *e'*, with the rollers E, are received in recesses cut in the bottoms of the lugs C, as shown in Fig. 7. This arrangement distributes the strain so that very little of it is brought to bear on the screws *e* and *e'''*. When desired, the lugs C may be provided with the guide-flanges C'. (Shown in Fig. 6.) The vertical rollers E preferably project horizontally beyond the horizontal rollers D, and the bottoms of the horizontal rollers D are lower than the bottoms of the vertical rollers E. The lower or horizontal rollers D are not quite so much beveling or rounded as are the upper or vertical rollers E. In other words, the vertical rollers E preferably have a little more bevel than the lower or horizontal rollers D. The object of thus beveling the vertical rollers E is that they shall not strike the sheet so abruptly as they otherwise would do. The lower end of the stem A has a central opening screw-threaded interiorly for engaging the screw-thread of the screw G. The upper end of the stem A is provided with the clutch-teeth Y, to engage with the clutch A' in the end of the rotating shaft H of the press or machine proper.

Immediately under the rotating arm of the press a cylinder F, of the size of the flange to be made, is secured, and through it, centrally located, a screw G projects upwardly and is securely fastened to the bed-plate below. In flanging a plate it is placed on the cylinder so that the center of the opening to be flanged corresponds with the center of the cylinder. The flanging-head is now screwed onto and by means of the screw G down onto the plate, the flanges *b* passing through the opening therein and the rollers D resting on the plate. Power is now applied through the medium of the press, the shaft H is so rotated, and the flanging-head screwed down, forming a flange on the plate as it descends. In this operation the horizontal rollers first turn or break down the flange, and the vertical rollers finish the opening of proper size and impart a finish to the inner surface of the flange or boiler-head

and of the opening in the sheet. The head keeps on beveling until the head of the rollers or rolls passes clear through the nozzle—that is, through the flanged opening in the boiler-head or other piece of metal.

The general construction of the machine illustrated to operate my improved flanging-head is as follows, viz:

K is a suitable frame, one portion of which supports in a suitable journal-bearing the shaft N, carrying the tight and loose pulleys I and I', and also the pinion P, fixed to said shaft. This pinion P meshes with the gear-wheel O, fixed on shaft Q, the latter being suitably supported in journal-bearings Q' Q' in said frame and carrying a bevel-pinion R, fixed to said shaft Q. This pinion R engages with bevel-gear S, splined to shaft H. This shaft H is journaled in the bearing H', and is also journaled in the bearing H'', substantially as shown. The lower end of shaft H is provided with a head Z, which has a rectangular hole, into which the square end of the upper half of the clutch is inserted and held.

The shaft H is capable of vertical movement, and such movement is imparted to it and controlled by the operator through the agency of the lever J, fulcrumed in support M of the frame K and provided at its upper end with link *j*, the latter being pivoted at one end to lever J and at its other end to the head *h*, whose lower end *k* is inserted in the upper end of shaft H and allows the shaft H to rotate around it and yet prevents the shaft from slipping off from it. This describes all of the mechanism necessary to operate the flanging-head.

In operation, the flanging-head being placed as aforementioned upon the boiler-head or other metal to be flanged, the lever J is operated to depress the shaft H and its clutch Y'. The latter in descending engages the clutch Y upon the flanging-head, power being communicated to the tight pulley I, the shaft H rotates the flanging-head, and by means of the screw G screws down the flanging-head and flanges the metal, as aforementioned. The hand-wheel T, with sleeve *t*, and the collar W, with its screw W', for setting it on the shaft H, all have to do with using the same machine as a drill-press in place of a flanging-machine, and as their construction and mode of operation are well known and as they are unnecessary to the operation of my invention further mention of them is omitted.

The clutch Y may be omitted and other means of connecting the flanging-head to mechanism for rotating it may be employed. So also the screw G may be omitted and other means be employed to guide and steadily force the flanging-head through the opening in the boiler-head or other metal.

While the various features of my invention are preferably employed together, one or more of said features may be employed without the remainder, and in so far as applicable



one or more of said features may be used in connection with flanging devices other than those herein specifically specified.

What I claim as new and of my invention, and desire to secure by Letters Patent, is—

1. A flanging-head having two series of rollers, a lower series describing a lesser circle and an upper series describing a larger circle, substantially as and for the purposes specified.

2. A flanging-head having a series of rollers mounted horizontally and a series of rollers mounted vertically, substantially as and for the purposes specified.

3. A flanging-head having two series of rollers, the upper series projecting out farther than the lower series, substantially as and for the purposes specified.

4. A flanging-head having two series of rollers, the lower series describing a smaller circle and the upper series describing a larger circle, the rollers of the upper series being more beveled or rounded than those of the lower series, substantially as and for the purposes specified.

5. A flanging-head provided with the vertical rollers D and the horizontal rollers E, substantially as and for the purposes specified.

6. A flanging-head having the stem A, plate B, arms D', rollers D, and clamps holding the arms D' in place, substantially as and for the purposes specified.

7. A flanging-head having the stem A, plate B, arms D', received in recesses in the stem A, rollers D, and clamps holding the arms D' in place, substantially as and for the purposes specified.

8. A flanging-head having the stem A, plate B, arms D', received in recesses in the stem A, rollers D, plates  $d^2$ , and bolts  $d^3$ , substantially as and for the purposes specified.

9. A flanging-head having the stem A, plate

B, lugs C, and vertical rollers E, attached to lugs C, substantially as and for the purposes specified.

10. A flanging-head having the stem A, plate B, lugs C, angles  $e^4$ , provided with arms  $e'$  and  $e^2$  and attached to lugs C, and rollers E, pivoted to arm  $e'$ , substantially as and for the purposes specified.

11. A flanging-head having the stem A, plate B, arms D', rollers D, the axes of said rollers being set in advance of the radii of the plate B and parallel to the said radii, and clamps holding arms D' in place, substantially as and for the purposes specified.

12. In a flanging-machine, the head having rollers D, whose respective axes are placed in advance of the radii or diameter of said head and parallel thereto, substantially as and for the purposes specified.

13. In a flanging-machine, the head having rollers E, whose axes are respectively located in advance of the diameter of said head and parallel thereto, substantially as and for the purposes specified.

14. In a flanging-machine, the head having rollers D and E, whose axes are respectively located in advance of the diameter of said head and parallel thereto, substantially as and for the purposes specified.

15. In a flanging-machine, the head having stem A, plate B, lugs C, angles  $e^4$ , rollers E, arms D', rollers D, and clamps for arms D', substantially as and for the purposes specified.

16. In a flanging-machine, the combination of the flanging-head provided with a female screw and the two series of rollers, the screw G, and support F, substantially as and for the purposes specified.

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Attest:

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