

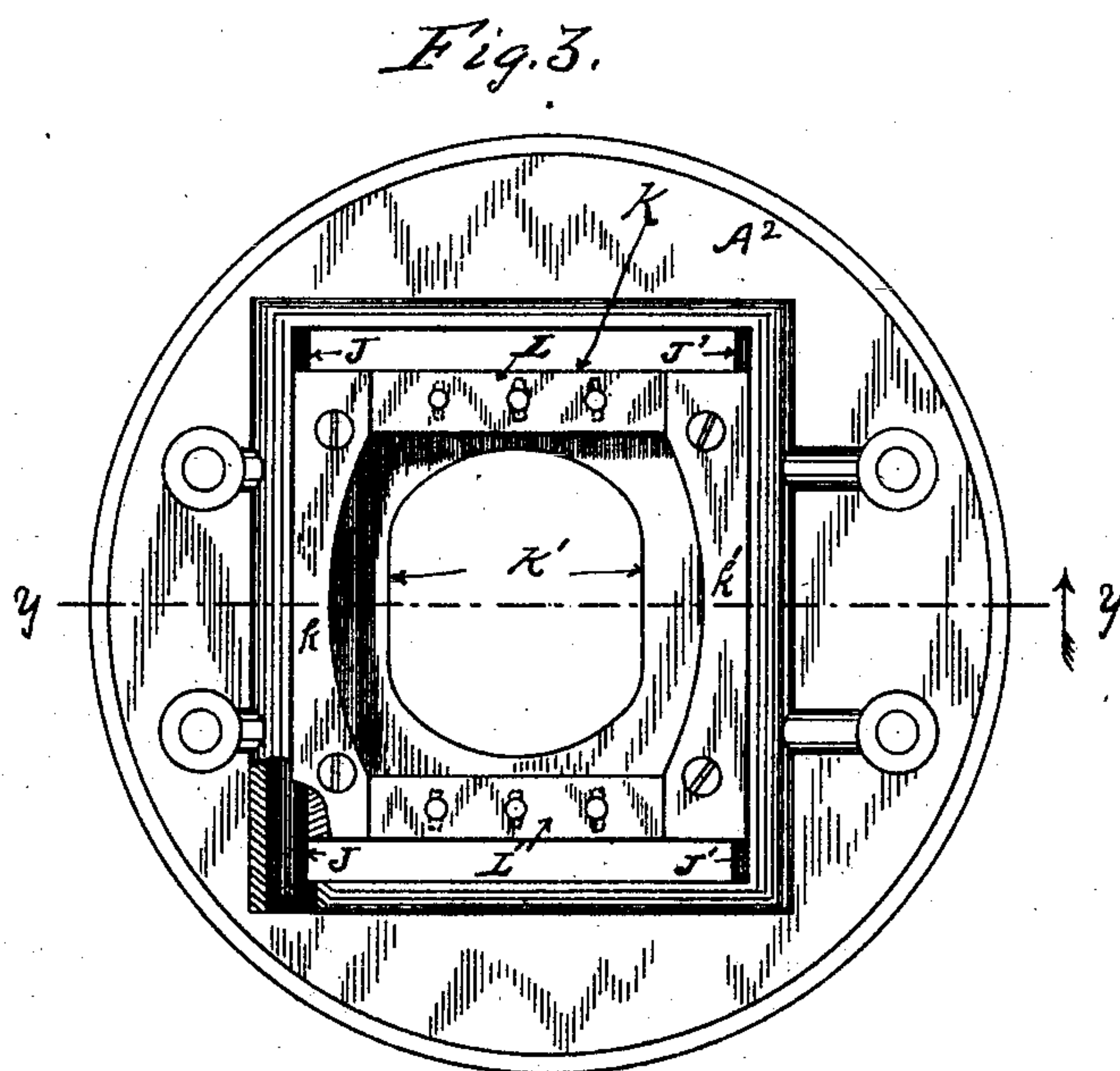
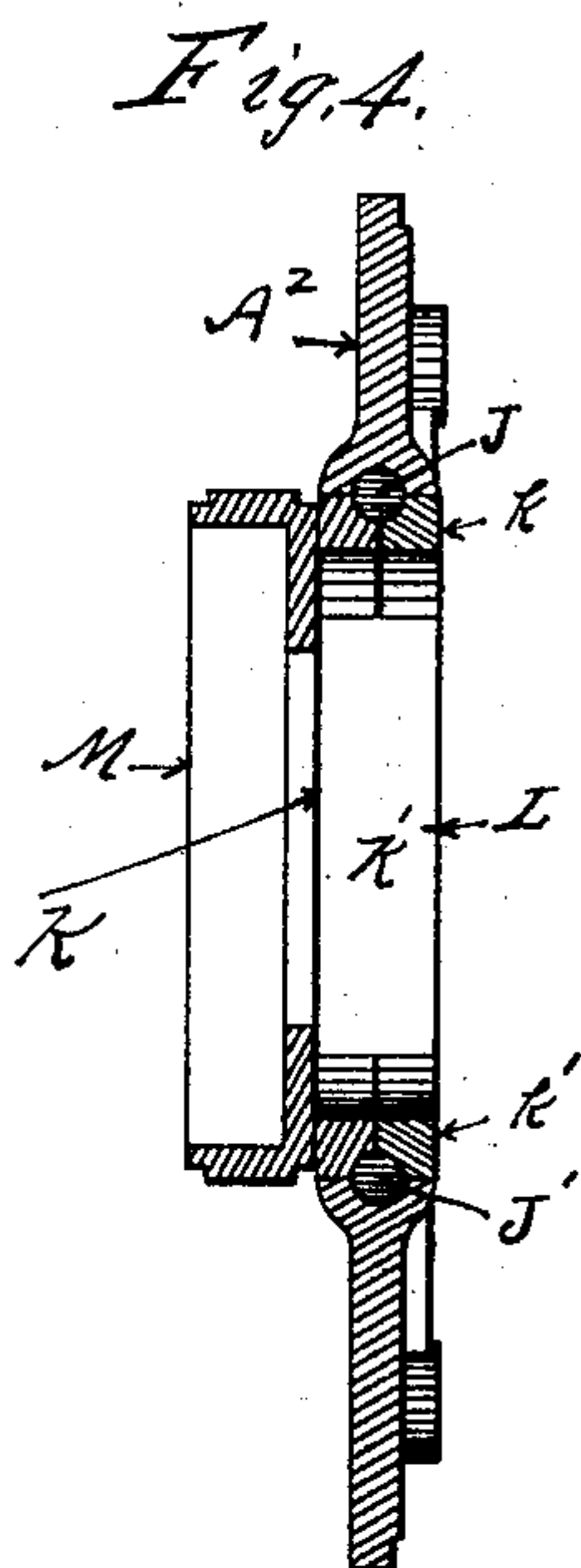
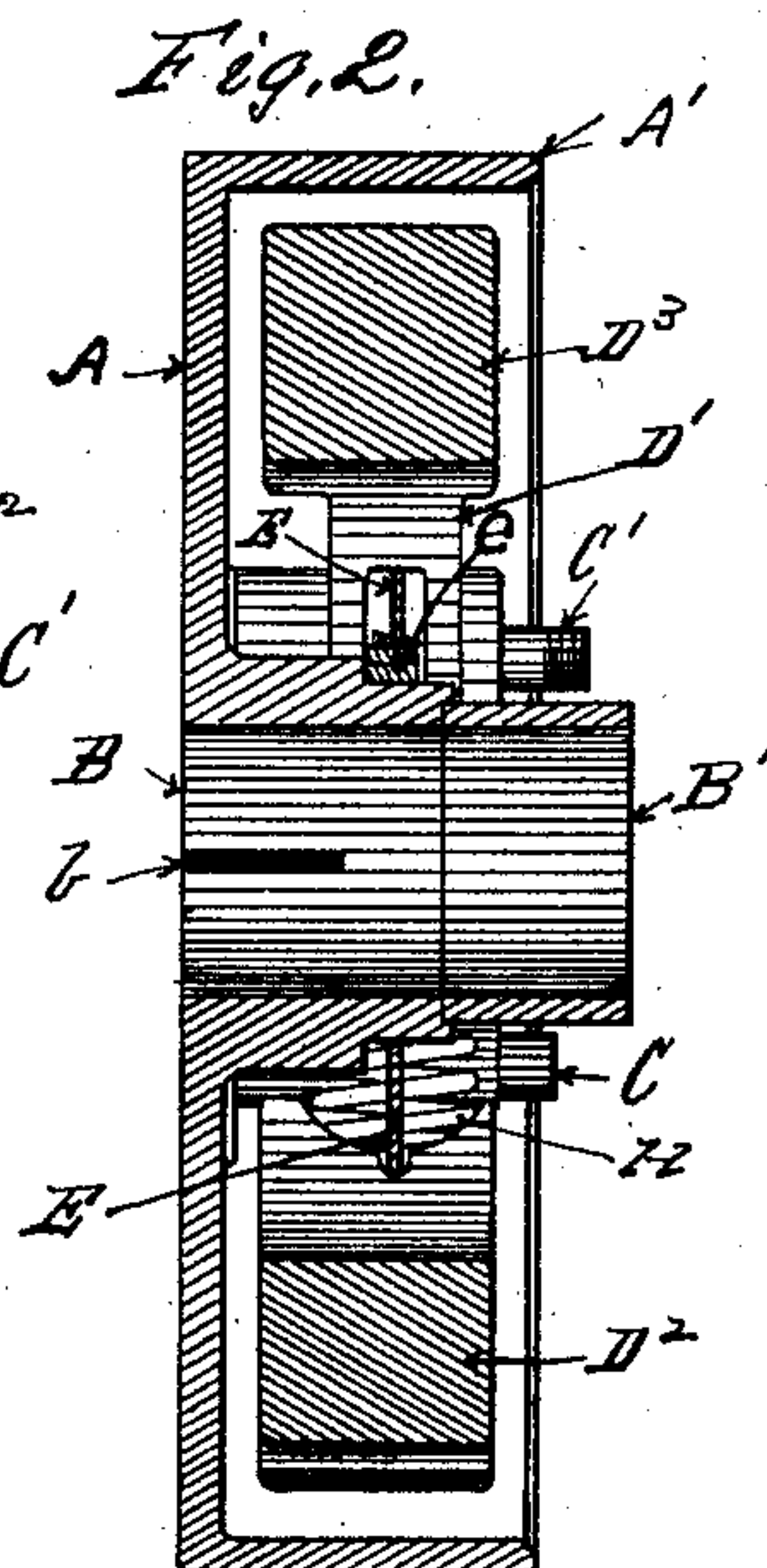
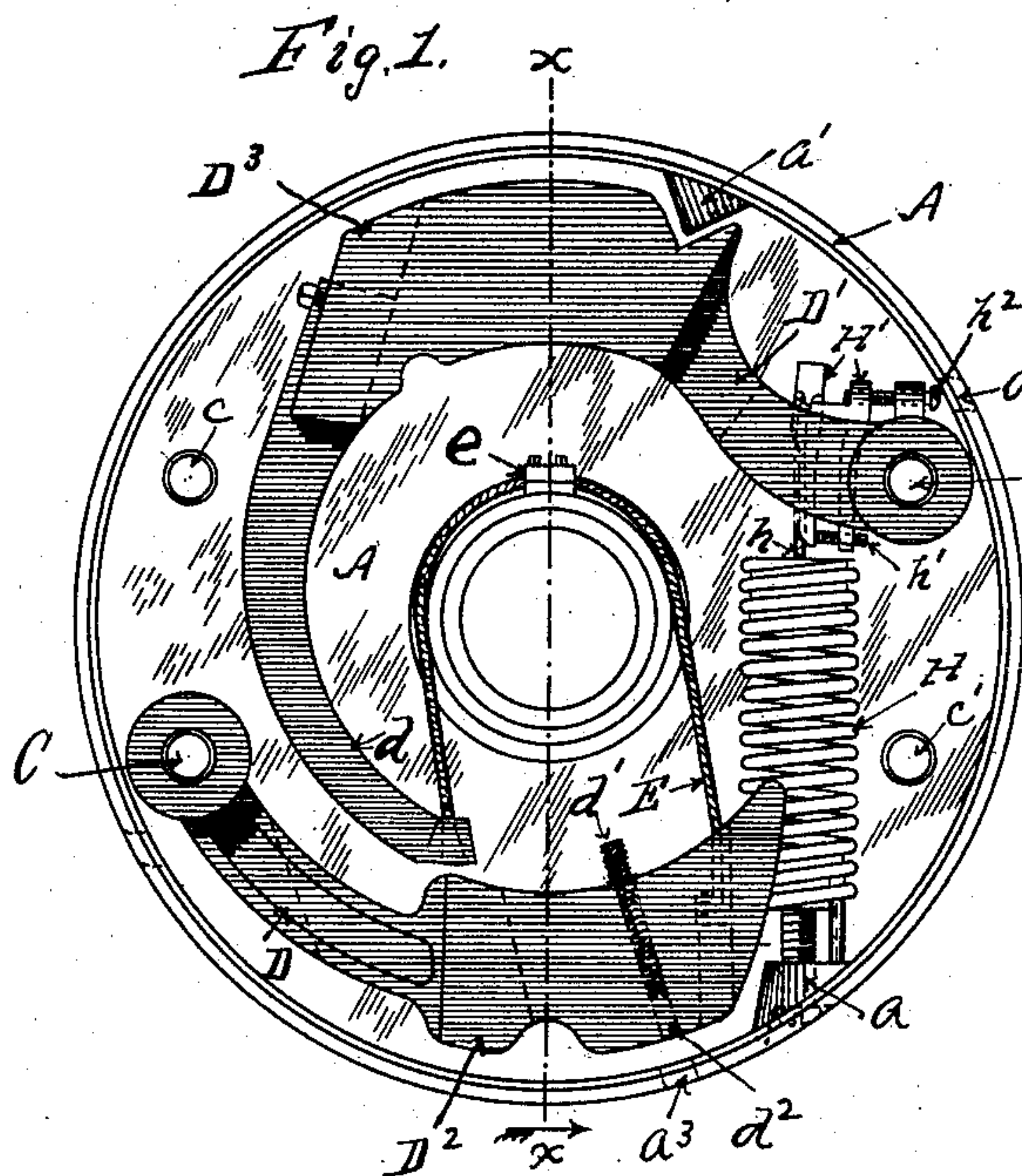
(No Model.)

2 Sheets--Sheet 1.

C. M. GIDDINGS.  
ENGINE GOVERNOR.

No. 603,829.

Patented May 10, 1898.



**WITNESSES:**

Fred Einfeldt  
 F. J. Bassett

INVENTOR

Charles M. Giddings

BY

BY *H. Sturgeon*

ATTORNEY

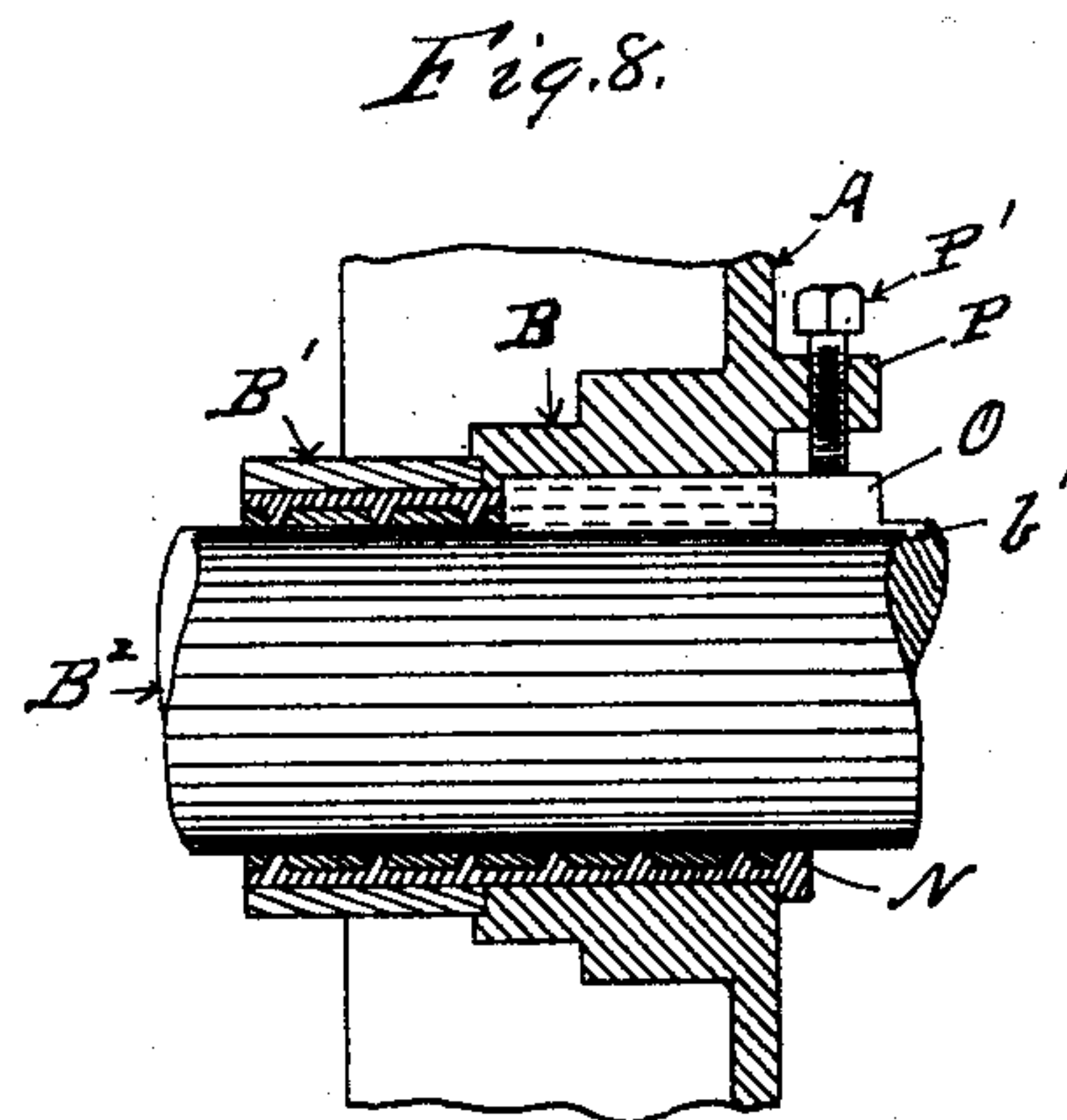
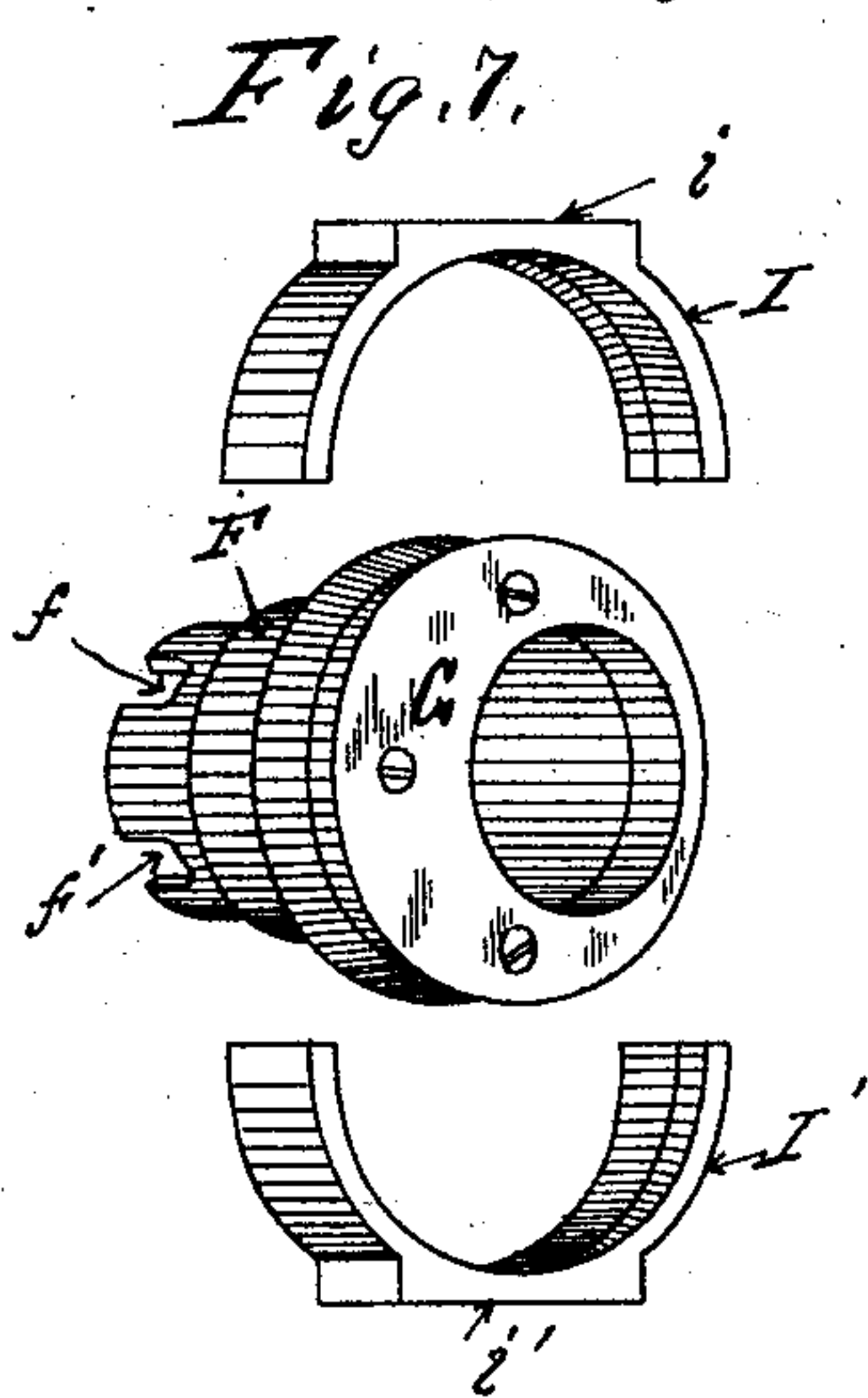
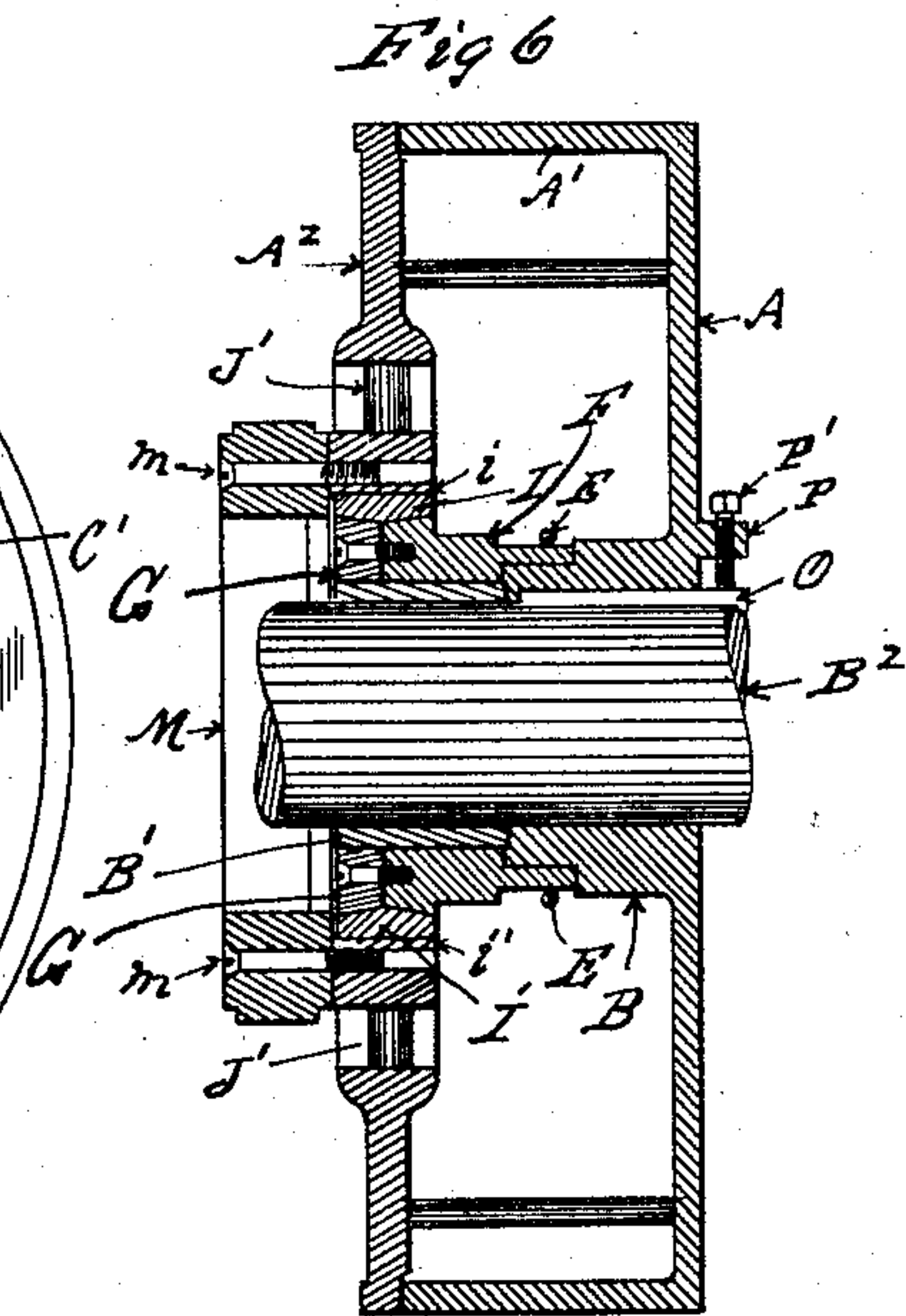
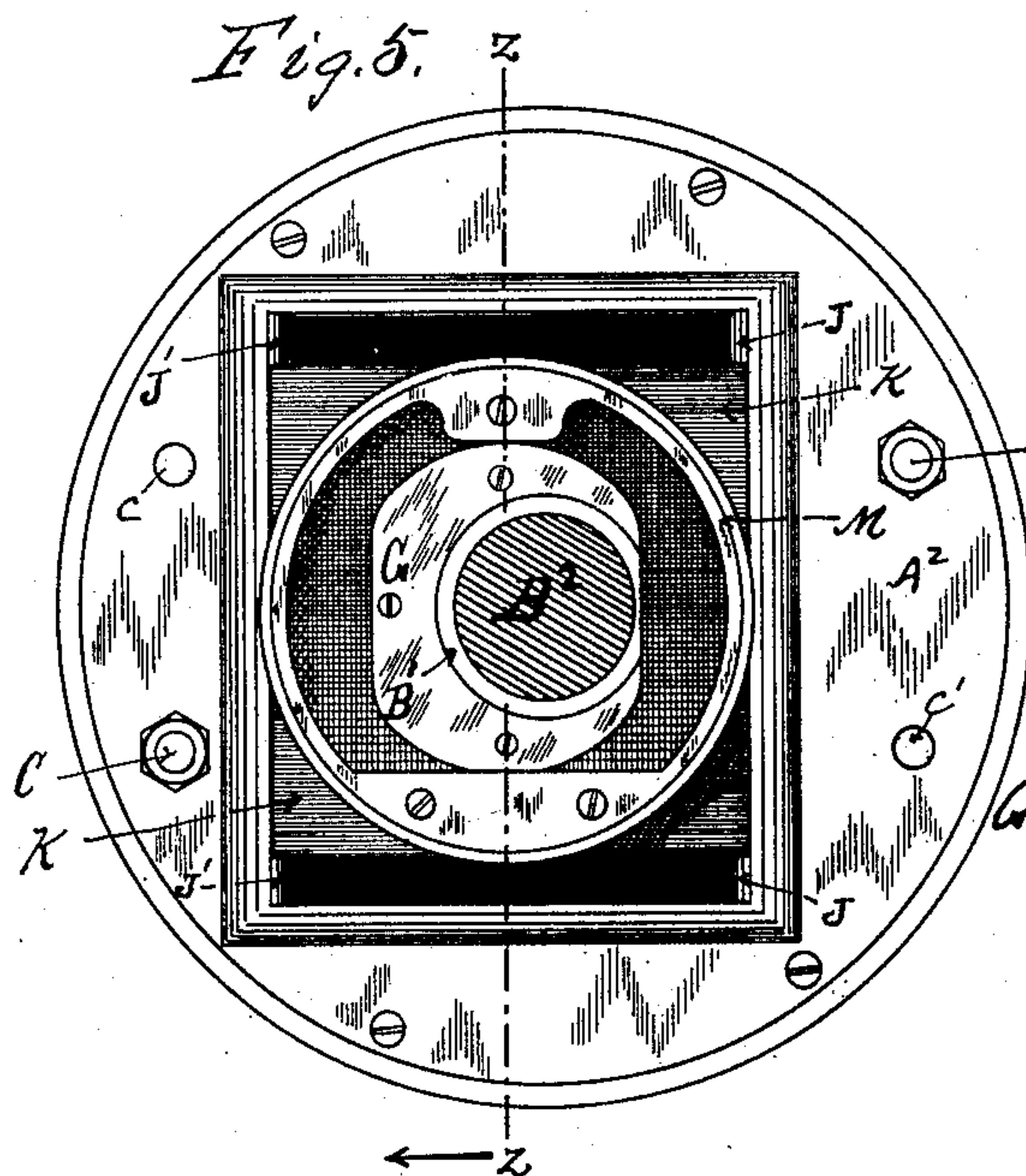
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# UNITED STATES PATENT OFFICE.

CHARLES M. GIDDINGS, OF ROCKFORD, ILLINOIS.

## ENGINE-GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 603,829, dated May 10, 1898.

Application filed January 18, 1897. Serial No. 619,561. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES M. GIDDINGS, a citizen of the United States, residing at Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in Engine-Governors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, forming part of this specification.

My invention relates to improvements in shaft-governors for engines; and it consists, primarily, in so constructing the governor that it is adapted to be manufactured as a commercial commodity adapted to be placed on any ordinary steam-engine.

Another feature of this invention is that of constructing the governor in a self-contained case or housing the cover of which forms a material and substantial element of the governor, whereby I am enabled to locate the valve-rod eccentric and the governing-eccentric closely adjacent to each other, so as to bring the operative parts of the eccentric nearly in line with each other.

The other features of this invention will readily be understood from the following description, together with the accompanying drawings, illustrating the invention, in which—

Figure 1 is a view in elevation of my improved governor with the cover and eccentric mechanism thereof removed. Fig. 2 is a sectional view of the same on the line  $x x$  in Fig. 1, looking in the direction of the arrow. Fig. 3 is a view in elevation of the inside of the cover, showing the eccentric guide mechanism thereon. Fig. 4 is a transverse section of the same on the line  $y y$  in Fig. 3, looking in the direction of the arrow. Fig. 5 is a view in elevation of the outside of the governor, showing the cover and valve-rod eccentric and guide mechanism mounted thereon. Fig. 6 is a sectional view of the governor with the weight and spring mechanism left out on the line  $z z$  in Fig. 5, looking in the direction of the arrow. Fig. 7 shows a perspective view of the governing-eccentric and

the sleeve to which it is secured and also the separable eccentric-strap operating on said eccentric. Fig. 8 shows a sectional view of a system of bushings adapting the governor mechanism to be fitted to different-sized shafts.

In the drawings, A represents a disk provided with a hub B, adapted to fit and be secured to an engine-shaft, and with an annular rim A', adapted to form the periphery of an inclosed case.

A<sup>2</sup> is a disk adapted to fit against the edge of the annular rim A' and forms the removable cover of an inclosed case, within which I place the parts constituting the actuating mechanism of the governor.

To the inside of the disk A are secured studs C C', which extend through holes in the cover A<sup>2</sup> and are provided with nuts on the outside of the cover A<sup>2</sup>, so as to secure it firmly in place. These studs C C' are adapted to be placed in other openings  $c c'$  in the disk A, as and for the purpose hereinafter set forth. On these studs C C' are pivoted the arms D D' of weights D<sup>2</sup> D<sup>3</sup>, which weights are operated by centrifugal force in one direction and by spring mechanism in the other direction to actuate the eccentric mechanism hereinafter described.

To the outer end of the weight D<sup>3</sup> is adjustably secured an arm  $d$ , the outer end of which is adapted to pass through a slot in the weight D<sup>2</sup> and its arm D, as shown in dotted lines in Fig. 1, as the weights D<sup>2</sup> and D<sup>3</sup> move toward each other, and to the outer end of the arm  $d$  is secured a flexible wire rope or chain E, which passes around the periphery of the hub B of the disk A and is secured in the outer end of the weight D<sup>2</sup>, in a groove therein, as shown in dotted lines in Fig. 1. By means of this flexible connection E the weights D<sup>2</sup> and D<sup>3</sup> are moved in unison with each other. On the rope or chain E, I secure a lug or projection  $e$ , adapted to enter a slot  $f$  or  $f'$ , as desired, in the sleeve F, upon which the governing-eccentric G, hereinafter described, is secured, (see Fig. 7,) so that the movement of the weights D<sup>2</sup> and D<sup>3</sup> in and out operates to rotate the sleeve F and eccentric G thereon around the shaft, as hereinafter described. The arm  $d$  being adjustable in the end of the



weight  $D^3$ , any slack in the flexible rope or chain E can be adjusted and taken up, as desired. In the weight  $D^2$  there is a set-screw  $d'$ , which passes through a screw-threaded opening  $d^2$  (shown in dotted lines) in the weight. This screw is adapted to be adjusted in and out by means of a screw-driver inserted through an opening  $a^3$  in the rim  $A'$  and is adapted to contact with the hub B to limit the inward travel of the weights and thereby adjust the travel of the eccentric mechanism actuated thereby. For moving the weights toward each other I secure one end of a spiral spring H to the lug  $a$  on the inside of the annular rim  $A'$ , and to the other end of said spring I secure a flexible connection  $h$ , which passes through a slot (shown in dotted lines) in the arm  $D'$  of the weight  $D^3$  and is attached to an adjustable sector-block  $H'$ , adapted to be adjusted in and out on the arm  $D'$  by means of set-screws  $h'$  and  $h^2$ , so as to vary the tension of the spring H, and operates as a speed-regulator for the governor, this result being accomplished by turning the set-screw  $h^2$  in or out, as desired, by inserting a screw-driver through an opening  $a^2$  (shown in dotted lines) through the rim  $A'$ , thereby varying the length of the short lever-arm, while the leverage of the spring H upon the weight-arm  $D'$  may be uniformly varied and gradually increased or decreased by turning the set-screw  $h'$  in or out, as desired.

In Fig. 7 I show the sleeve F, which slips down over a bushing  $B'$ , preferably made of brass, which extends from the end of the hub B through the sleeve F and eccentric G. The end of the sleeve F also extends over the inner end of the hub B to a shoulder  $b'$  thereon, one of the slots  $f$  therein receiving the projection  $e$  on the flexible rope or chain E, so that the same thereby connects the flexible rope or chain E with the sleeve F and communicates the movement of the weights  $D^2$  and  $D^3$  thereto, so as to rotate the sleeve F and the eccentric G, secured thereto, around the engine-shaft  $B^2$ . Around the eccentric G, I place a separable eccentric-strap consisting of two parts  $I I'$ , which fit in a V-groove around the periphery of the eccentric G, which groove is adapted to be adjusted to take up the wear thereon. On the halves I and  $I'$  of this eccentric-strap are flat faces  $i$  and  $i'$ , parallel to each other, as and for the purpose hereinafter set forth.

In the cover  $A^2$ , I make a rectangular opening provided at its sides with parallel guides  $J J'$ , preferably central in the cover  $A^2$ . These guides I preferably make of rods babbitted into place, so that all difficult machine-work thereon is avoided, and upon these guides  $J J'$  is mounted a rectangular plate or frame K, having a central opening  $K'$  therein to permit it to move across the engine-shaft on the guides  $J J'$ . The parts  $k k'$  on the inside face of this plate or frame K, which form portions of the slides thereon operating on the guides

$J J'$ , are made so that they can be adjusted to and from the guides  $J J'$ , so as to take up any wear thereon. On the inside face of the plate or frame K, at right angles to the slides  $k k'$  thereon, are projections  $L L'$ , which are adapted to engage the faces  $i i'$  of the separable strap  $I I'$  on the governing-eccentric G, so that the rotation of the governing-eccentric G operates to move the plate or frame K on the guides  $J J'$  directly across the shaft  $B^2$ . Upon the face of the plate or frame K, I adjust a valve-rod eccentric M and then secure the same thereon by means of screws  $m$ , by means of which feature I am enabled to so locate the eccentric upon the face of the plate or frame K as to adapt the governor to the varying travel and lap of the valves of different makes of engines, as I am enabled thereby to increase or diminish the throw of the eccentric, as may be required, the eccentric being carried across the shaft  $B^2$  by the movement of the plate or frame K on the guides  $J J'$  in the cover  $A^2$ , which plate or frame K is in turn actuated by the governing-eccentric G through the eccentric-strap  $I I'$ , this eccentric G being rotated by the movement of the weights  $D^2$  and  $D^3$ , communicated thereto through the flexible rope or chain E and the lug  $e$  thereon.

It will be observed that in this construction the removable cover  $A^2$  of the inclosed case forms a support for the valve-rod-eccentric mechanism and in this regard becomes a material part of the structure, and it enables me to bring the valve-rod eccentric nearly into line with the governing-eccentric mechanism, and thereby contributes very materially to the stability of the structure.

In the description heretofore I have not referred to the fact that the parts of this structure are adapted to be reversed, so that the governor can be at will arranged to run in the opposite direction. In the disk A are a set of holes  $c c'$ , adapted to receive the weight-bearings  $C C'$ , and on the rim  $A'$  there is a boss  $a'$ , adapted to receive the end of the spring H when reversed, and in the end of the eccentric-sleeve F there is an extra slot  $f'$ , adapted to engage the lug  $e$  on the rope or chain E. Now in case it is desired to reverse the action of the governor the studs  $C C'$  are placed in the holes  $c c'$ . The weight-arm D is then mounted on the stud in the hole  $c$  and the weight-arm  $D'$  on the stud in the hole  $c'$  and the end of the spring H secured to the boss  $a'$ . The sleeve F is then put in place with the slot  $f'$  on the lug  $e$ . The parts then being bolted together and adjusted, the governor is adapted to run in the opposite direction from that first hereinbefore described.

It will also be observed that the construction of my improved governor hereinbefore described enables me to readily adjust it to operate valves of varied lap and travel, so that I can utilize it upon an engine already constructed by simply adjusting the parts of



the mechanism to accord with the travel and lap of the valve of the engine upon which it is placed.

In Fig. 8 I show a system of bushings adapted to be placed in the hub B, so as to fit the hub of any particular-sized shaft. In this case I use a long bushing N, extending through the hub B, and brass bushing B' and then make a groove therein to take in the key O, which fits in grooves in the hub and shaft in the usual manner, and in Figs. 6 and 8 I show a lug P, through which a set-screw P' passes down upon the end of the key O, so that it is firmly held in place.

In the foregoing description of my invention I have described a structure embodying my invention as shown in the drawings. It is obvious, however, that many parts thereof may be varied without departing from the spirit of the invention. Therefore I do not desire to limit myself to the exact construction shown and described; but

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

1. The combination in an engine-governor, of a governing-eccentric, concentric with the shaft upon which the governor is mounted, weight-and-spring mechanism communicating with and rotating said governing-eccentric, a fixed disk or plate adjacent to and in substantially the same plane with the governing-eccentric, and a valve-rod eccentric mounted on guides supported by said disk or plate and actuated by said governing-eccentric, substantially as and for the purpose set forth.

2. The combination in an engine-governor, of a disk or plate adapted to be secured to an engine-shaft and adapted to form one side of an inclosed case, weights mounted on studs on said disk adapted to be moved outward by centrifugal force and inward by a spring or springs, means connecting said weights so that they will move in and out in unison, a governing-eccentric adapted to be rotated around the shaft by the movement of said weights, a plate or cover adapted to be secured to said first-named plate or disk in substantially the same plane as the governing-eccentric and forming the other side of an inclosed case, guides in said plate or cover, a valve-rod eccentric supported by and operating on said guides, and means connecting said governing-eccentric with said valve-rod eccentric, and moving it back and forth across the shaft according to the movement of said governing-eccentric, substantially as and for the purpose set forth.

3. The combination in an engine-governor, of a disk or plate adapted to be secured to an engine-shaft, so as to form one side of an inclosed case, an annular rim thereon forming the periphery of such inclosed case, a plate or disk A<sup>2</sup> adapted to be secured to said first-named plate or disk and the rim thereof so

as to form the other side of such inclosed case, a governing-eccentric in substantially the plane of the plate or disk A<sup>2</sup>, centrifugal weights, springs within said inclosed case for actuating said governing-eccentric, guides on said disk or plate A<sup>2</sup>, a plate or frame operating on said guides, a valve-rod eccentric mounted on said plate or frame, and a separable eccentric-strap on said governing-eccentric having flat faces on opposite sides of its periphery which contact with the valve-rod-eccentric plate or frame, substantially as and for the purpose set forth.

4. The combination in an engine-governor, of a governing-eccentric, governing mechanism actuating said eccentric, a reciprocating plate or frame traveling on guides substantially in the same plane with the governing-eccentric and actuated by said eccentric-governing mechanism, and a valve-rod eccentric adapted to be adjusted on said reciprocating plate or frame, and secured thereto so as to adapt the governor to the varying travel and lap of the valves of different makes of engines, substantially as and for the purpose set forth.

5. In an engine-governor, a governing-eccentric, a disk or plate having a rectangular opening therein, on substantially the same plane with the governing-eccentric, guide-rods babbitted in the sides of said opening, a sliding plate or frame reciprocating on said guide-rods, and means for adjusting said plate or frame to said guide-rods so as to take up wear, substantially as and for the purpose set forth.

6. In an engine-governor, a disk or plate A<sup>2</sup> having a rectangular opening therein, a sliding plate or frame reciprocating in said opening and supporting a valve-rod eccentric, a governing-eccentric connected with and operating the plate carrying the valve-rod eccentric, and mounted in substantially the same plane with the disk or plate A<sup>2</sup>, centrifugally-operating governing-weights, a flexible connection between said weights and said governing-eccentric, substantially as and for the purpose set forth.

7. The combination in an engine-governor, of centrifugally-operating weights, an adjustable arm *d* on one of said weights, and a flexible connection E between said arm and the outer end of the other weight, substantially as and for the purpose set forth.

8. The combination in an engine-governor, of a centrifugally-actuated weight, a spring for moving said weight inward, a sector-block adapted to be moved inward and outward on the weight-arm consisting of two sections, one of which is adjustable upon the other, and a flexible connection between said spring and the adjustable section of said sector-block, substantially as and for the purpose set forth.

9. The combination in an engine-governor, of a centrifugally-actuated weight, a spring



for moving said weight inward, a sector-block,  
one section of which is adapted to be moved  
back and forth on the weight-arm for adjust-  
ing the speed of the governing mechanism, a  
5 flexible connection between said spring and  
said sector-block, an adjustable quadrant-clip  
operating against the flexible connection be-  
tween the spring and sector-block, and a

means for adjusting said quadrant-clip, sub-  
stantially as and for the purpose set forth. 10

In testimony whereof I affix my signature  
in presence of two witnesses.

CHARLES M. GIDDINGS.

Witnesses:

FRED EINFELDT,

H. J. CURTZE.