

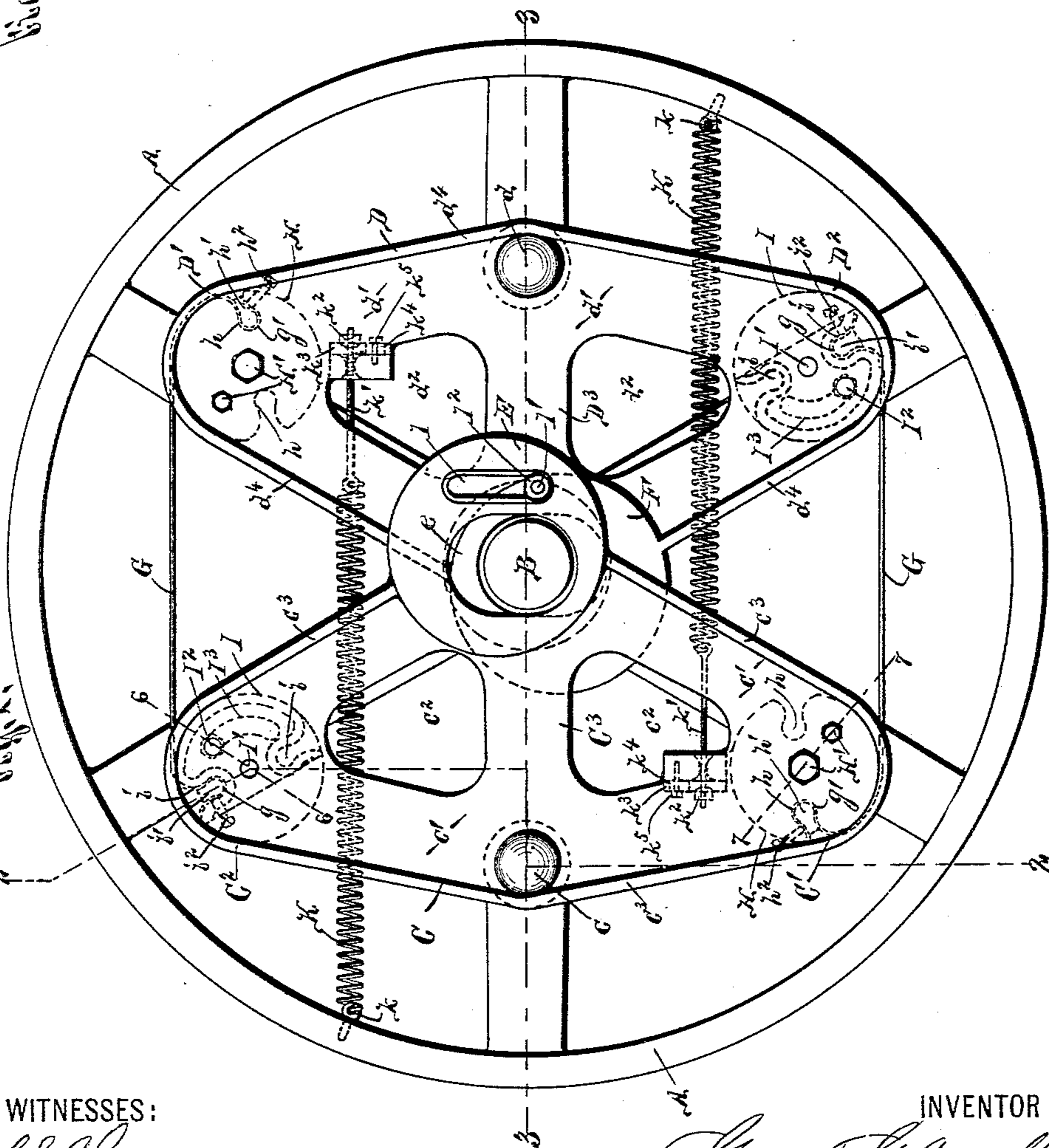
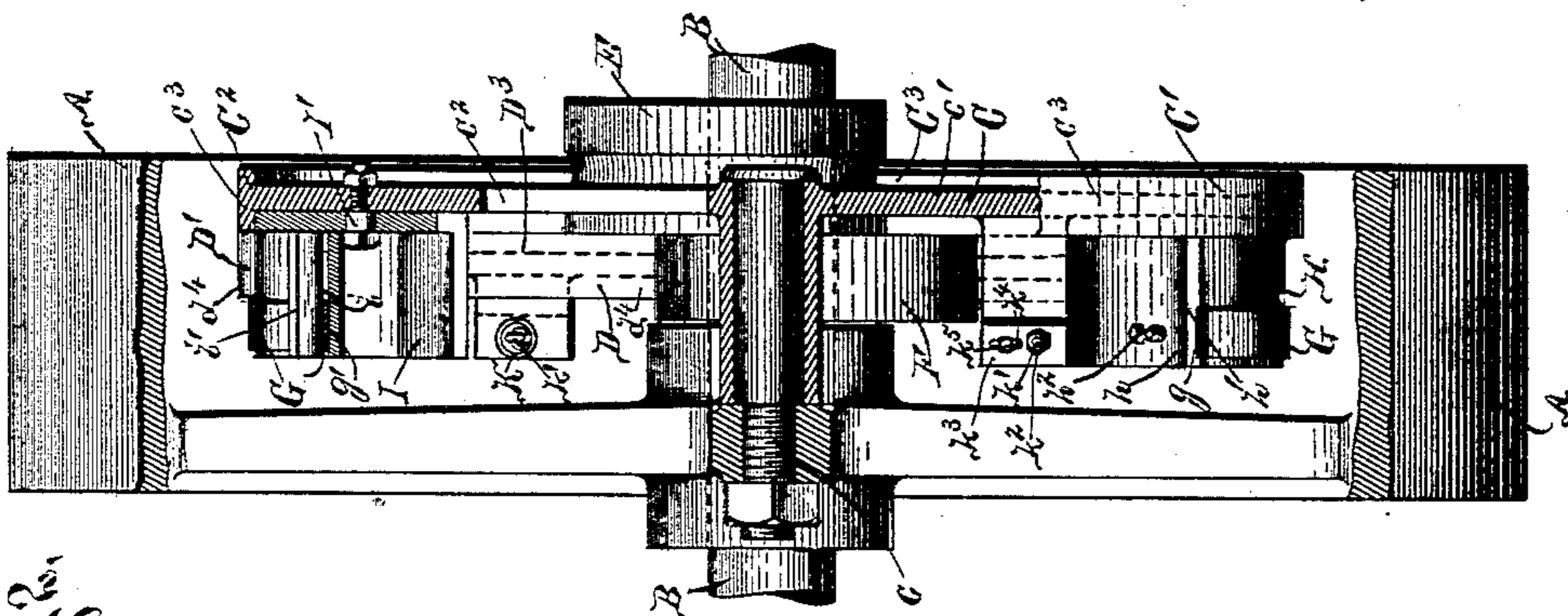
(No Model.)

2 Sheets—Sheet 1.

G. G. ANNABLE.  
GOVERNOR.

No. 476,356.

Patented June 7, 1892.



WITNESSES:

*H. C. Chaie,*  
*W. H. Randall*

INVENTOR

*George G. Annable*  
BY  
*Wm. Wilkinson Parsons*  
ATTORNEY, S.

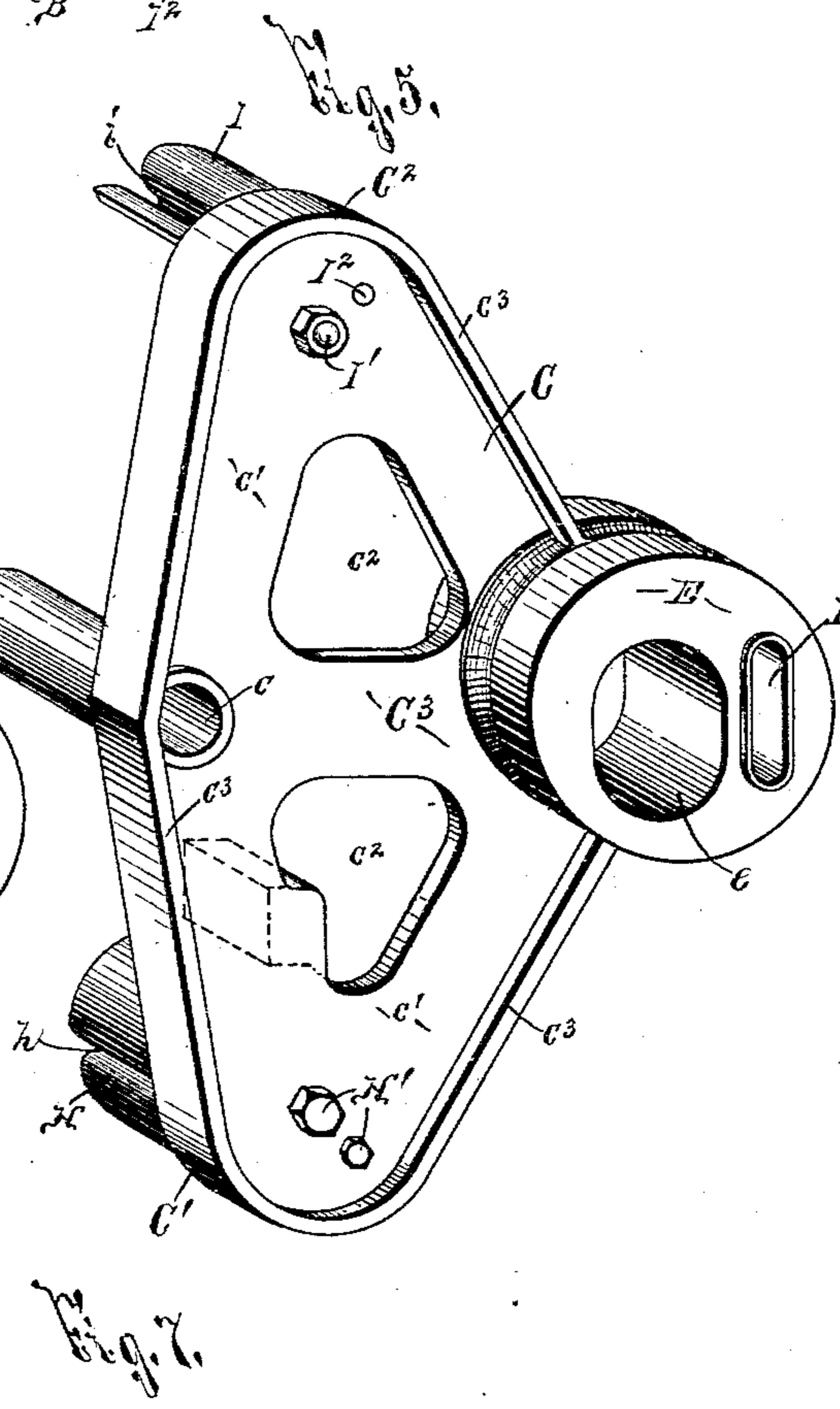
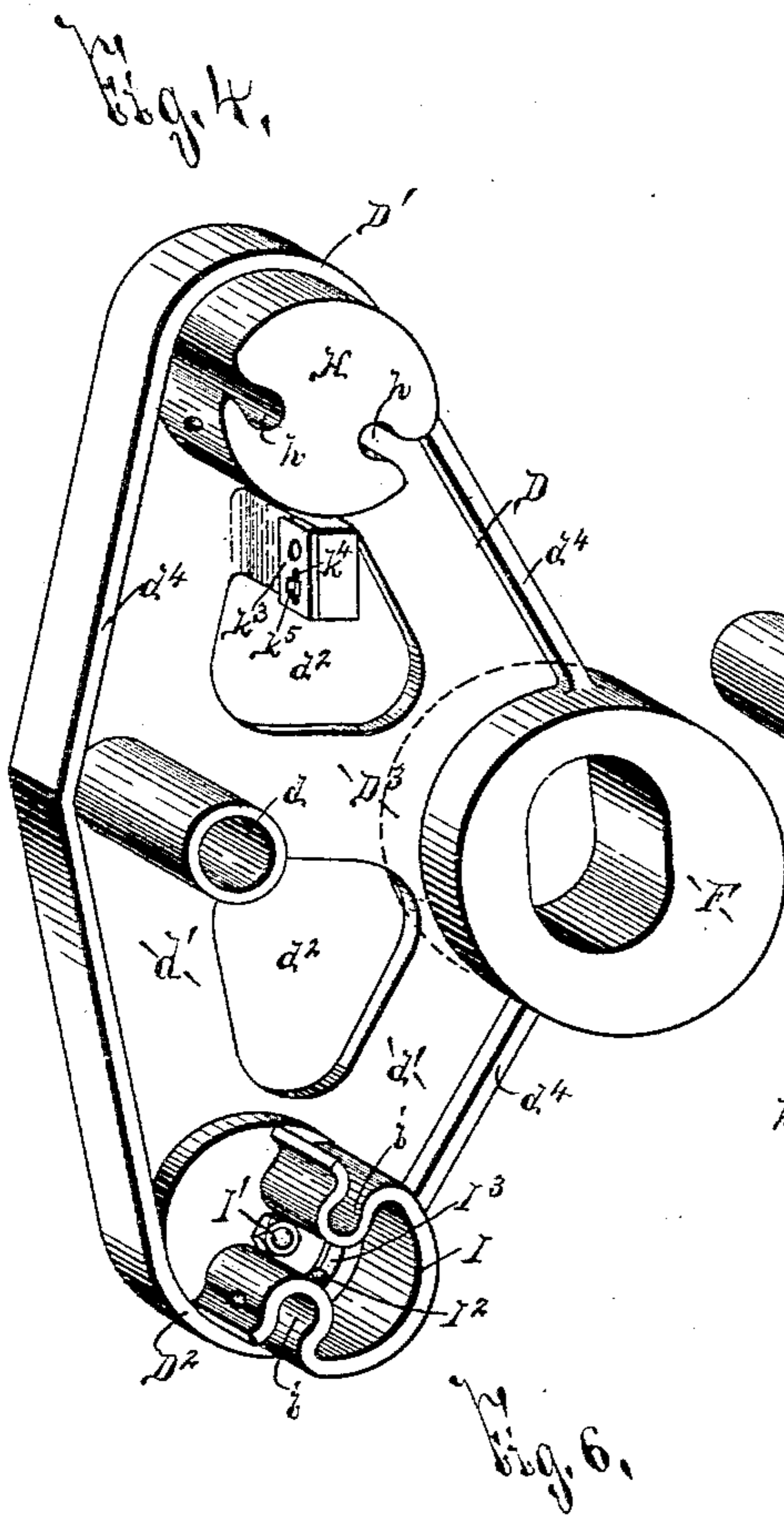
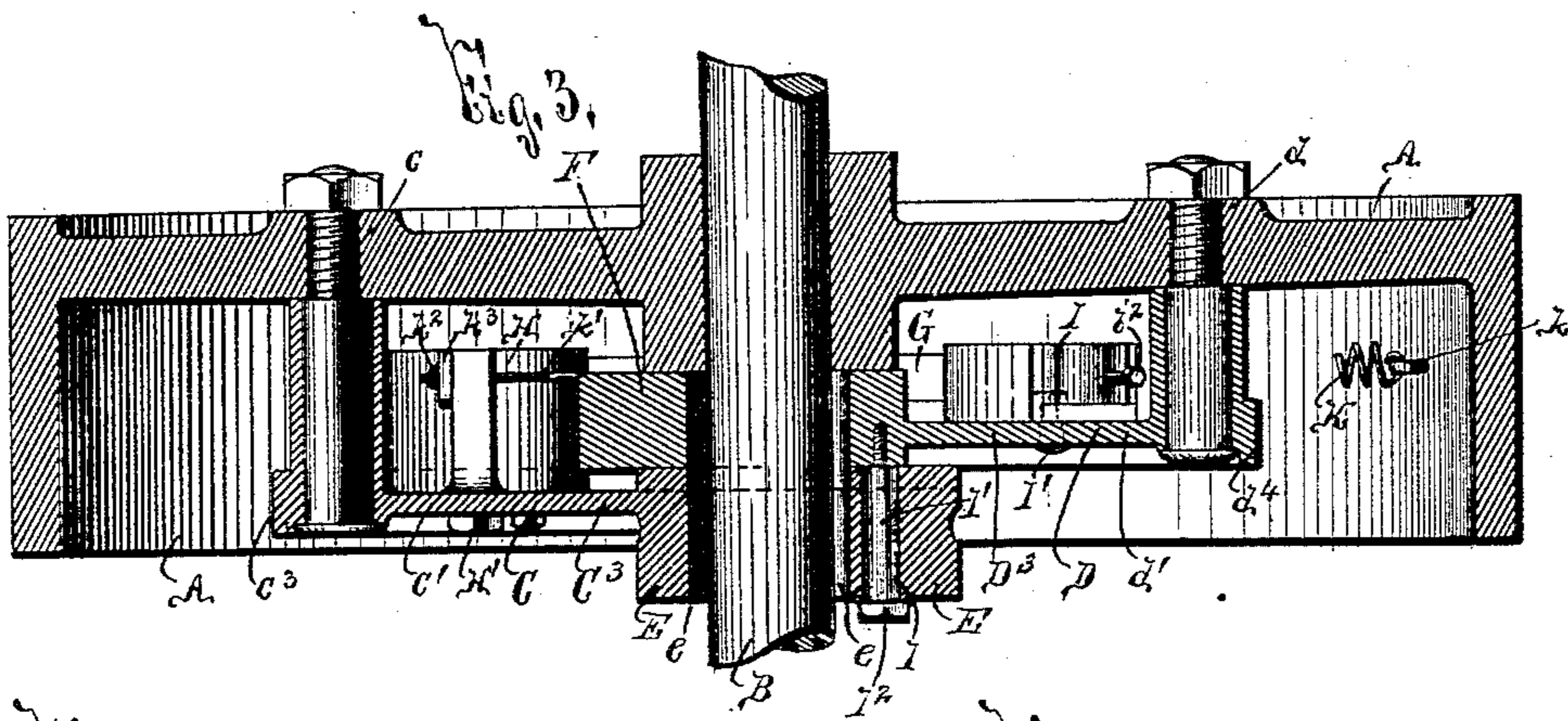
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2 Sheets—Sheet 2.

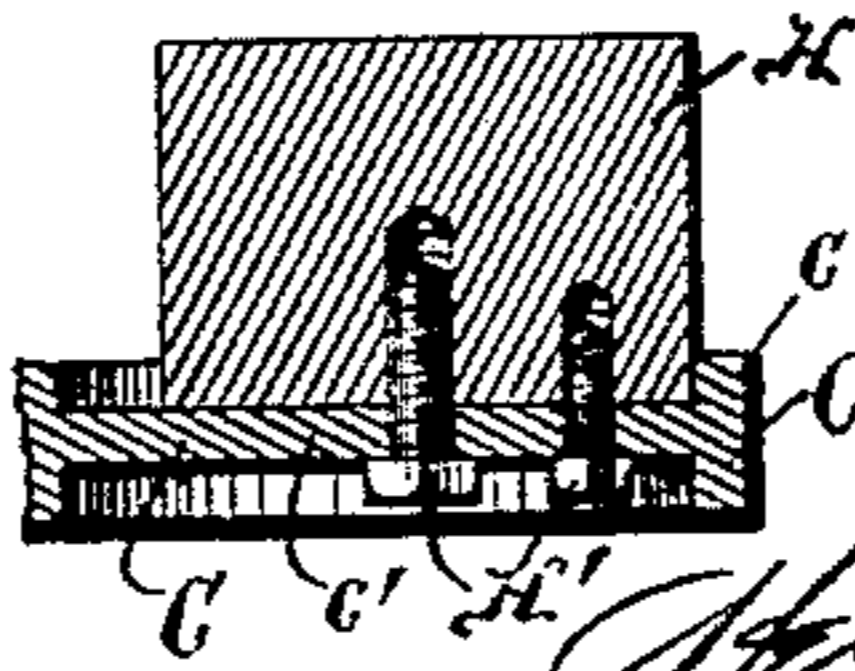
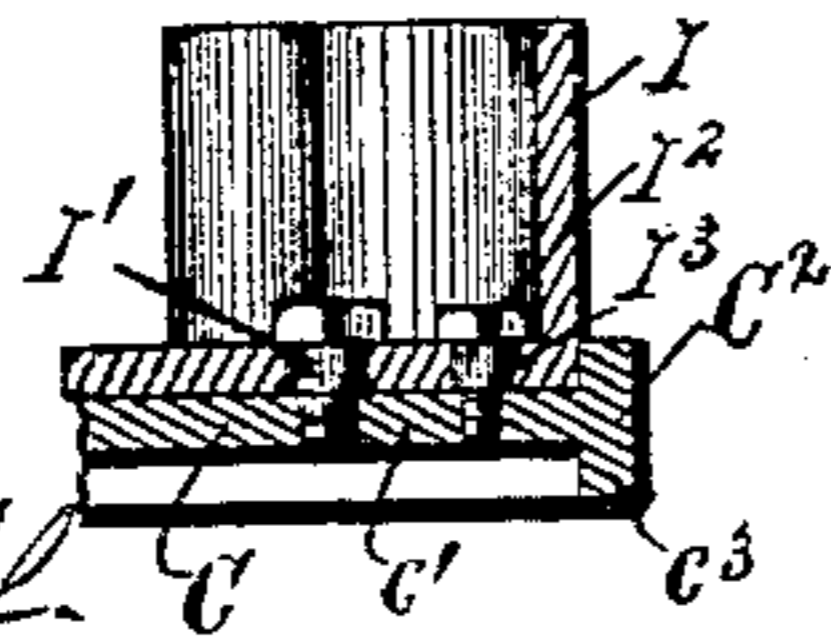
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WITNESSES:  
H. C. Chase,  
W. H. Randall.



INVENTOR

George G. Annable  
BY  
H. C. Chase & W. H. Randall  
ATTORNEYS.

# UNITED STATES PATENT OFFICE.

GEORGE G. ANNABLE, OF SYRACUSE, NEW YORK, ASSIGNOR OF ONE-HALF  
TO HENRY LACY, OF SAME PLACE.

## GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 476,356, dated June 7, 1892.

Application filed October 8, 1891. Serial No. 407,898. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE G. ANNABLE, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Governors, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to improvements in speed-governors for engines and like devices, and has for its object the production of a simple, accurate, and effective device which is economically manufactured and durable in use.

To this end the invention consists, essentially, in a supporting-frame, as the fly-wheel of the engine, a pair of levers hinged to said frame, an eccentric on one lever, a counter-balance for the eccentric on the other lever, and a strap connecting said levers, whereby they operate simultaneously.

The invention furthermore consists in the detail construction and arrangement of the parts, all as hereinafter more particularly described, and pointed out in the claims.

In describing this invention reference is had to the accompanying drawings, forming a part of this specification, in which like letters indicate corresponding parts in all views.

Figure 1 represents a face view of my improved invention shown as operatively mounted upon an engine fly-wheel. Fig. 2 is a transverse vertical sectional view taken on line 2 2, Fig. 1. Fig. 3 is a transverse horizontal sectional view taken on line 3 3, Fig. 1. Figs. 4 and 5 are isometric perspectives of opposite sides of the oppositely-arranged levers of my governor, and Figs. 6 and 7 are detail sectional views taken on the respective lines 6 6 and 7 7, Fig. 1.

A represents the fly-wheel of any desirable form, size, and construction, and B the driving-axle of the engine.

C and D represent oppositely-arranged levers forming the essential part of my governor and pivoted at points *c* and *d*, arranged substantially diametrically opposite to each other. As preferably constructed, the respective ends *C'* *C*<sup>2</sup> and *D'* *D*<sup>2</sup> of these levers C and D are arranged on opposite sides of the respective pivot-points *c* and *d*, and said

levers are formed with inwardly-projecting arms *C*<sup>3</sup> and *D*<sup>3</sup>, having their free ends lapped one upon the other.

The levers C and D preferably consist of thin webs *c'* *d'*, suitably perforated at *c*<sup>2</sup> and *d*<sup>2</sup> for the sake of lightness, and provided with strengthening-ribs *c*<sup>3</sup> and *d*<sup>4</sup>.

Formed integral with or suitably secured to the inner end of one of the levers, as C, is the eccentric E, adapted to be connected in any suitable manner for operating the valve-gear of the engine and formed with a slot *e* to permit the eccentric to oscillate on the shaft. For the purpose of counterbalancing this eccentric the adjacent end of the opposite arm *D*<sup>3</sup> is provided with a weight F, which equals that of the eccentric and entirely obviates any jar or "pound" of the governor when the fly-wheel A is revolved in operation.

G G are straps formed of flexible steel or other suitable material adapted to connect together the adjacent ends of the levers C and D for causing both to move simultaneously a corresponding distance. These straps are preferably so secured that their length may be suitably adjusted for effecting the required approximation of the adjacent ends of the levers C and D. The straps G G are preferably secured at one extremity to centrifugally-operating weights H H, presently described, carried by substantially diametrically-opposite arms of the levers C and D, and are secured at their opposite extremities to movable or swinging supports I I, carried by the opposite extremities of said levers. The ends of the straps G G are passed around a portion of the periphery of said weights H, and moving supports I are then looped at *g* and *g'* and inserted into recesses *h* and *i*, formed, respectively, in the outer peripheral wall of the weights H and supports I. Wedge-shaped keys *h'* and *i'* are inserted into the respective loops *g* and *g'*, and set-screws *h*<sup>2</sup> and *i*<sup>2</sup> are then operated to clamp said keys and loops in position.

The moving or swinging supports or adjusters I are preferably pivoted at *I'* and held in position by set-screws *I*<sup>2</sup>, secured to the web of the respective levers C and D, and registered with slots *I*<sup>3</sup> in said supports or ad-

justers, whereby after the ends of the straps G are securely fastened in position the respective supports may be rocked on the pivots I' and then firmly clamped in position by the screws I<sup>2</sup>, as best seen at Fig. 6. The centrifugally-operating weights H H are of equal weight, and, as previously stated, are secured at the extremity of substantially diametrically-opposite arms of the levers C and D by means of suitable screws or clamps H'. When the speed of the fly-wheel is increased, these weights constantly force said arms outward against the action of suitable springs K and rock inward the opposite arms of said levers, thus operating the eccentric to vary the amount of steam permitted to pass to the engine, and also varying the position of the eccentric counter-balance to the same extent as that of the eccentric, whereby the governor in its revolution is perfectly balanced and all jarring or pounding entirely obviated.

The springs K are preferably of spiral construction, and are arranged with one end secured to an eyebolt *k*, fastened in the rim of the fly-wheel, and the other secured to one end of an adjustable bolt *k'*, having its opposite end passed through a lug on the web of the levers C and D and provided with a shoulder *k*<sup>2</sup>, formed with a rounding face bearing against a movable plate *k*<sup>3</sup>. The plate *k*<sup>3</sup> is formed with a slot *k*<sup>4</sup>, through which passes a bolt *k*<sup>5</sup> for securing the plate in position and limiting its movement.

To guide the levers C and D in their movement, one of them, as the lever C, is provided with a slot or guideway *l* and the other with a pin or projection *l'* movable therein and provided with a shoulder *l*<sup>2</sup>, and as both levers rock at the same time this slot *l* is preferably disposed in a plane at substantially right angles to a perpendicular to the pivot *c*, and is of slightly-greater width than the diameter of the pin *l'*, in order to permit easy movement of the parts.

When desired to reverse the engine, my governor may be quickly and easily rendered applicable by removing the weights D D and movable strap-supports I I and reversing their position, so that the weights D D are in the spaces now occupied by the movable supports. It will be understood, however, that both said weights and supports are formed with oppositely-arranged recesses *h* and *i* for the reception of the straps.

The operation of my invention is obvious from the foregoing description and upon reference to the drawings, and it will be noted that the parts move simultaneously and are perfectly balanced when forced to any position by the action of the centrifugally-operating weights D D, thus rendering the operation of my invention extremely positive and effective. Moreover, the parts are simple in construction, and consequently durable in wear, and in practical operation permit of much less variation than the type of governors set forth

in my previous patent, No. 412,158, issued October 1, 1889.

It is evident that the detail construction and arrangement of the parts of my invention may be somewhat varied from those shown and described herein without departing from the spirit thereof. Hence I do not herein specifically limit myself to such construction.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a governor, the combination of a supporting-frame, a pair of levers hinged to said frame, an eccentric on one lever, a counter-balance for the eccentric on the other lever, and a strap connecting said levers, whereby they operate simultaneously, substantially as and for the purpose described.

2. In a governor, the combination of a supporting-frame, a pair of levers hinged to said frame at points substantially diametrically opposite to each other and formed with arms extending inwardly to the center of said support, an eccentric on one of said inwardly-extending arms, and a counter-balance for the eccentric on the other of said arms, substantially as and for the purpose specified.

3. In a governor, the combination of a supporting-frame, a pair of levers hinged to said frame at points substantially diametrically opposite to each other and formed with inwardly-extending arms, an eccentric mounted on one of said arms, an eccentric counter-balance mounted on the other of said arms, and straps connecting the opposite extremities of said levers, whereby they operate simultaneously, substantially as and for the purpose described.

4. In a governor, the combination of a supporting-frame, a pair of levers hinged to said frame at points substantially diametrically opposite to each other and formed with extremities projecting beyond said hinge-points, centrifugally-operating weights mounted on said projecting extremities and arranged substantially diametrically opposite to each other, and a strap connecting said levers, whereby they operate simultaneously, substantially as set forth.

5. In a governor, the combination of a supporting-frame, a pair of levers hinged to said frame, an eccentric on one lever, a counter-balance for the eccentric on the other lever, a strap connecting said levers for operating them simultaneously, and a movable adjuster for said strap, substantially as and for the purpose specified.

6. In a governor, the combination of a supporting-frame, a pair of levers hinged to said frame, centrifugally-operating weights arranged on said levers at points substantially diametrically opposite to each other, an eccentric on one of the levers, a counter-balance for the eccentric on the other lever, and a strap connecting said levers, whereby they

operate simultaneously, substantially as and for the purpose described.

7. In a governor, the combination of a supporting-frame, a pair of levers hinged to said frame, centrifugally-operating weights arranged on said levers at points substantially diametrically opposite to each other, an eccentric on one of the levers, a counter-balance for the eccentric on the other lever, a strap connecting said levers, whereby they operate simultaneously, and an adjusting-support for the end of said strap, substantially as and for the purpose set forth.

8. In a governor, the combination of a supporting-frame, a pair of levers hinged to said frame, an eccentric on one lever, a counter-balance for the eccentric on the other lever, a slot in one lever, and a projection on the other lever movable in said slot, substantially as and for the purpose set forth.

9. In a governor, the combination of a supporting-frame, a pair of levers hinged to said frame, centrifugally-operating weights on the levers, a strap having one extremity secured to one lever, and a rocking support on the other lever adapted to be secured to the op-

posite extremity of said strap, substantially as and for the purpose specified.

10. In a governor, the combination of a supporting-frame, a pair of levers hinged to said frame and formed with their extremities projecting beyond their hinge-point and with inwardly-extending arms, centrifugally-operating weights secured on substantially diametrically-opposite arms of said levers, movable supports on the other arms of said levers, straps having one extremity secured to said supports and the other to the adjacent end of the opposing lever, an eccentric on the inner arm of one lever, and a counter-balance for the eccentric on the inner arm of the other lever, substantially as and for the purpose set forth.

In testimony whereof I have hereunto signed my name, in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 26th day of September, 1891.

GEORGE G. ANNABLE.

Witnesses:

CLARK H. NORTON,  
L. M. BAXTER.