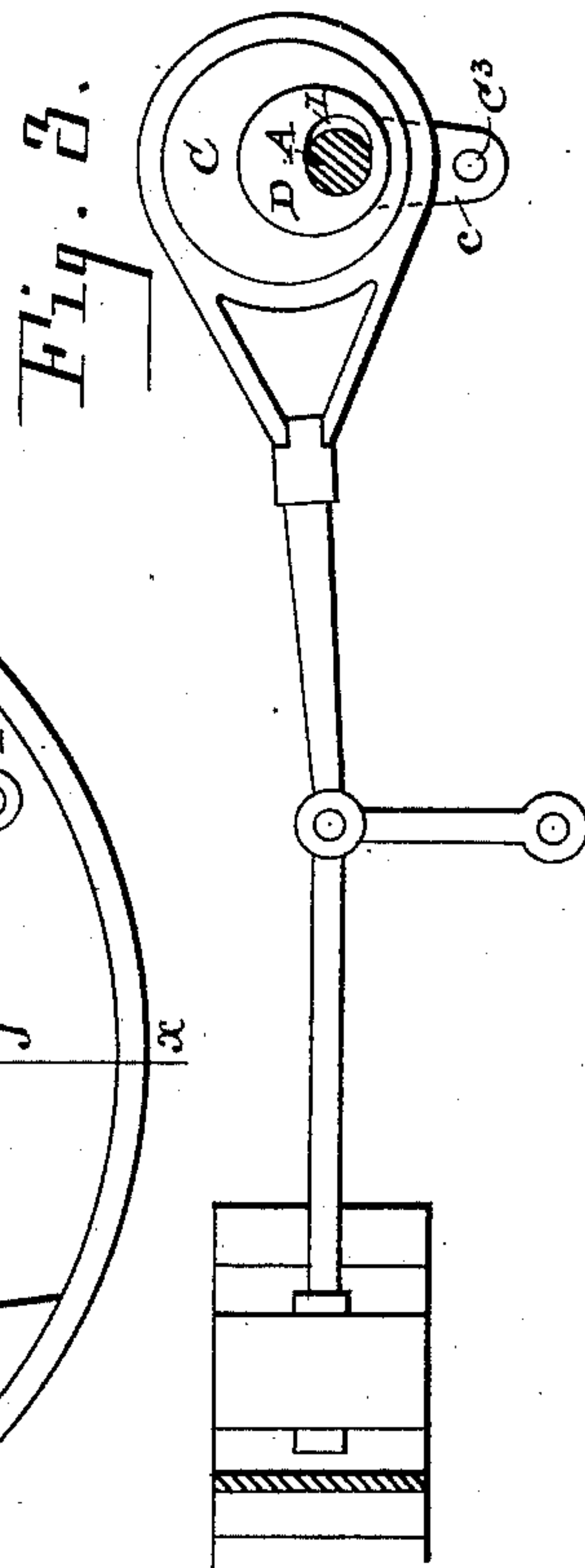
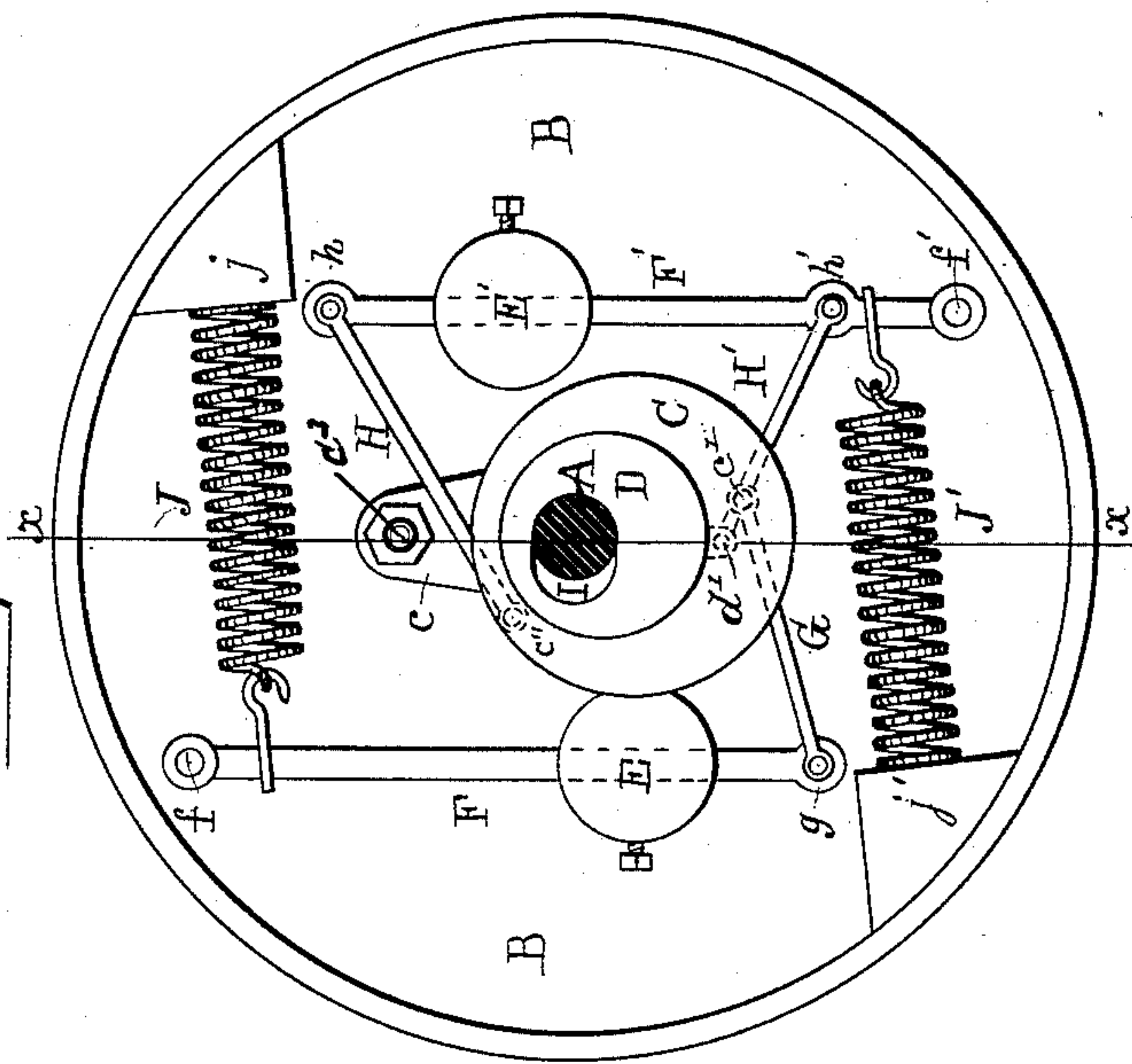
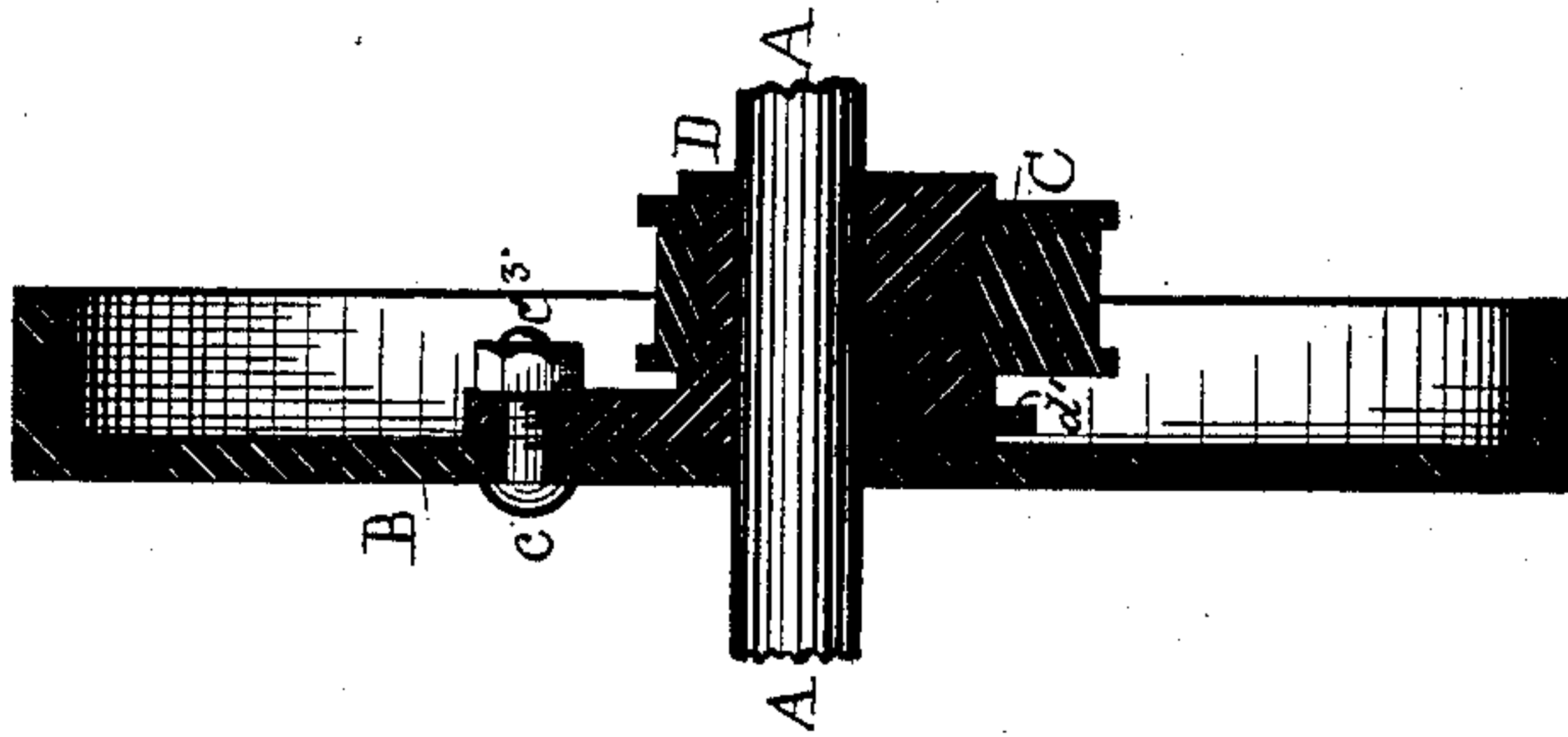


R. L. EDMOND.  
CUT-OFF GOVERNOR.

Patented Nov. 23, 1886.



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By his Attorney W. P. Bell

# UNITED STATES PATENT OFFICE.

R. LEE EDMOND, OF RICHMOND, VIRGINIA.

## CUT-OFF GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 353,126, dated November 23, 1886.

Application filed August 23, 1886. Serial No. 211,628. (No model.)

*To all whom it may concern:*

Be it known that I, R. LEE EDMOND, of Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in Automatic Cut-Off Governors; and I do hereby declare that the following is a full, clear, and exact description of the invention, which 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, which form part of this specification.

My invention relates to rotary governors for automatically varying the lead or throw of the valves of steam-engines; and the object of my invention is to insure a perfect equilibrium in the various parts of the governor, so that said governor shall possess the utmost sensitiveness to variations in speed, and thereby effect the most exact variations in the lead of the valve in accordance with the rapidity of movement of the engine.

To the above purposes my invention consists in certain peculiar and novel features of construction and arrangement, as hereinafter described and claimed.

In order that my invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

Figure 1 is a side elevation of my improved governor in operative position upon the crank-shaft of an engine. Fig. 2 is a sectional view of the same on the line  $x x$  of Fig. 1; Fig. 3, a partial view of my invention, showing its connection with the valve.

In the said drawings, A designates the crank-shaft, to which the connecting-rod of a stationary or other engine is attached, said connecting-rod being suitably attached to a piston-rod through the medium of a cross-head or otherwise, as the case may be.

B designates a disk, which may either constitute the balance-wheel or an attachment thereto, as preferred.

C designates the main eccentric, which is not mounted directly upon the shaft A, but is mounted upon the eccentric D, which is pivoted at  $c^3$  upon one side of the disk B, at the outer end of an arm,  $c$ , which extends radially from said eccentric D. The pitman from the

slide-valve is supposed to be connected by a strap or otherwise to this main eccentric, and said pitman is reciprocated to a greater or less extent, in accordance with the varying speed of revolution of the crank-shaft A. An auxiliary governing-eccentric, D, upon which the main eccentric is journaled, serves to vary the lead or throw of the main eccentric in the manner hereinafter described.

F F' designate two arms or levers, which are pivoted at  $f f'$ , respectively, upon the disk B, the said pivotal points of said arms or levers being opposite to each other, as shown. The free end of the arm or lever F is connected by a link, G, to the main eccentric C, one end of said link G being pivoted to the free end of the arm or lever F, as shown at  $g$ , and the opposite end of said link being pivoted at  $c'$  to the free end of the main eccentric C.

H designates a link, which connects the free end of the arm or lever F' with the main eccentric C, one end of said link being pivoted at  $h$  to the free end of the lever F', and the opposite end of said link being pivoted at  $c''$  to the main eccentric C at a point just below and to one side of the pivotal point  $c^3$  of said main eccentric.

H' designates a link, which is connected at one end by a pivot,  $d'$ , to the inner or auxiliary eccentric D, and the opposite end of which is pivoted at  $h'$  to the arm or lever F'.

$j j'$  designate two abutments, which are formed upon or secured to opposite points upon the margin of the disk B, and to which are secured the fixed ends of two coiled springs, J J', respectively. The spring J is secured at its outer end to the lever F, while the outer end of spring J' is secured to the lever F' near its pivot  $f'$ ; the outer ends of said springs J J' being so secured to the arms F F' as to slide upon said levers, as shown.

Upon the lever F is secured a weight, E, and upon the lever F' is secured a weight, E', the said weights being arranged to slide centrifugally upon the arms F F'.

From the above description it will be seen that as the shaft A revolves and rotates the disk B the weights E E' will fly outward upon the arms F F', so as to spread the free ends of said arms away from each other, and thus vary the position of the inner eccentric, D, relative



to the shaft A, and move the main eccentric against the inertia of the same produced by the links G H, and also against the resistance of the springs J J'. Thus the governor is rendered not only sensitive, but extremely regular in its action, responding equally to degrees of speed both beyond and within the maximum.

The auxiliary eccentric D is formed with a slot, I, which permits said eccentric to be moved transversely to the shaft A by the arms F F', in order to vary the position of the main eccentric.

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

1. In a rotary governor, the combination of an auxiliary eccentric suspended to the disk on the main shaft, and a main eccentric journaled upon the auxiliary eccentric, with means, substantially as shown and described, for actuating both eccentrics.

2. A rotary governor composed of an auxiliary eccentric suspended to the disk of the main shaft, a main eccentric journaled upon the auxiliary eccentric, a pair of pivoted and weighted

arms pivoted upon said disk, a pair of springs confining the free end of the arms to the disk, and three links, two of which connect opposite points of the main eccentric with the opposite arms, and the remaining one of which links connects one of said arms near to its pivot with the auxiliary eccentric.

3. The combination, with the shaft A, carrying the disk B, of the arms F F', carrying the weights E E', the springs J J', connecting said arms to the disk, the auxiliary eccentric D, suspended to disk B, the links G H, connecting the main eccentric to the arms, the main eccentric C, journaled upon the auxiliary eccentric, and the link H', connecting said auxiliary eccentric to the arm F', substantially as set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

R. LEE EDMOND.

Witnesses:

ROBT. M. BELL,  
JAMES H. GRIDLEY.