

(No Model.)

2 Sheets—Sheet 1.

J. L. HEALD.
ENGINE GOVERNOR.

No. 305,816.

Patented Sept. 30, 1884.

Fig: 1.

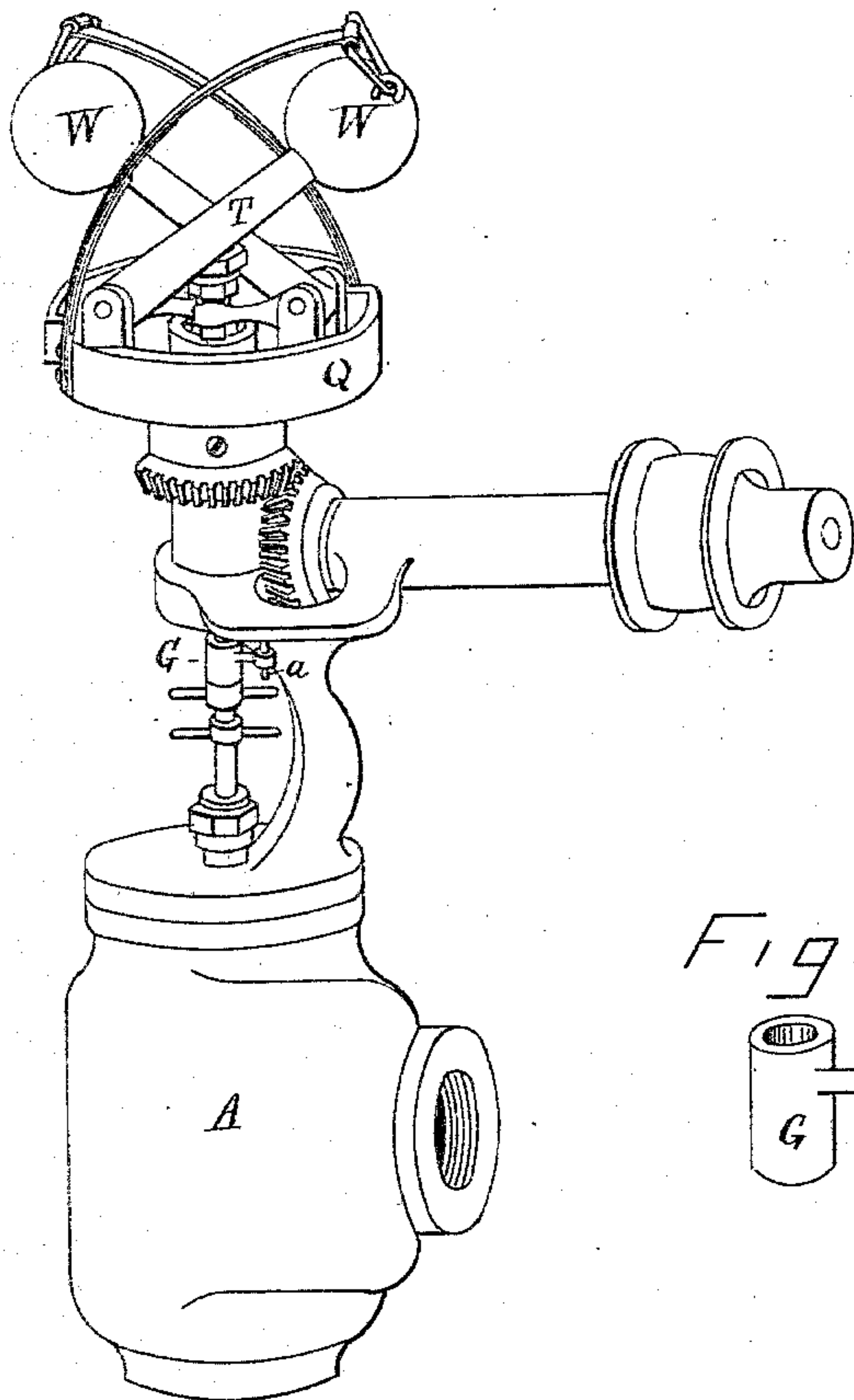


Fig: 2.

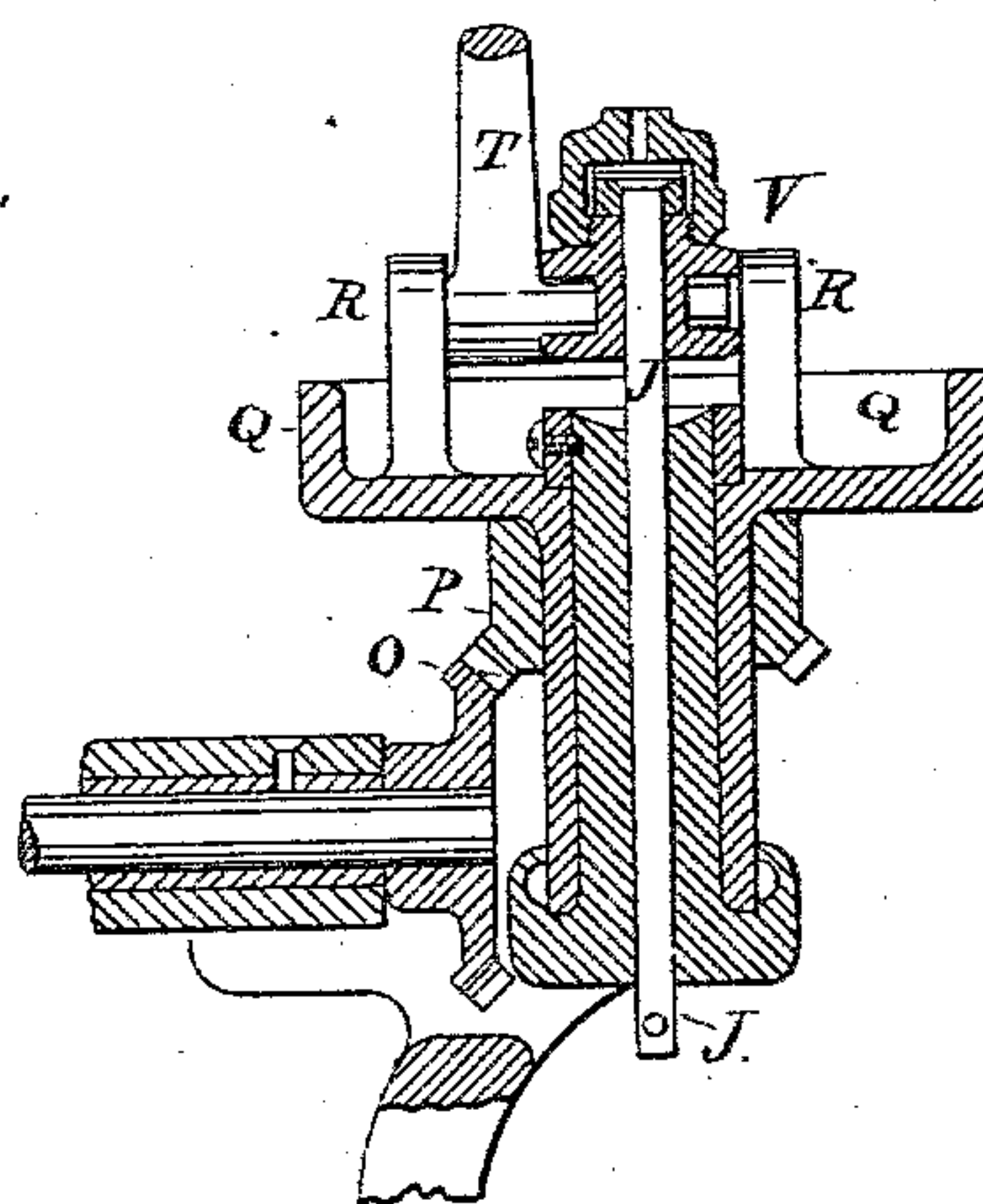


Fig: 3.

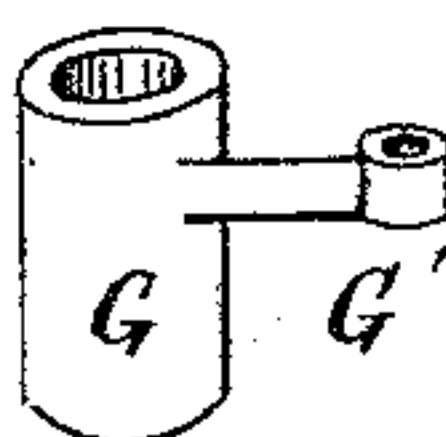


Fig: 4.

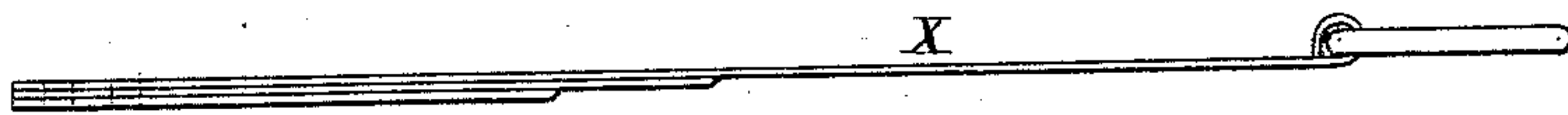
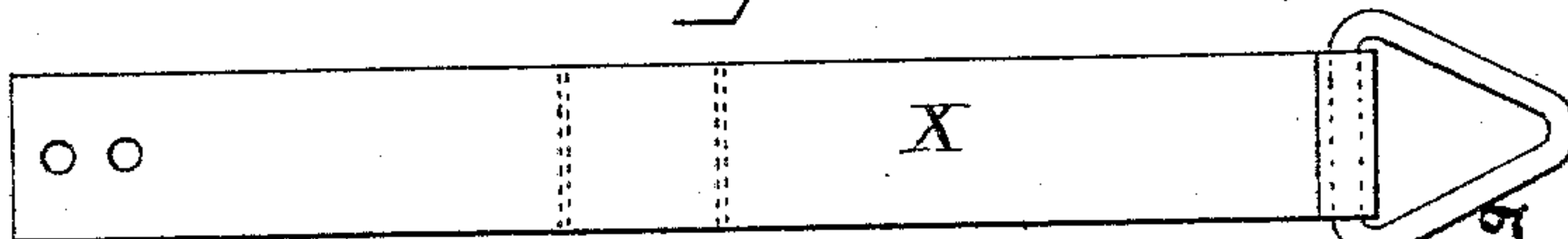


Fig: 5.



Witnesses,
Geo. H. Strong.
J. H. Brown.

Inventor,
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(No Model.)

2 Sheets—Sheet 2.

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No. 305,816.

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Fig: 6.

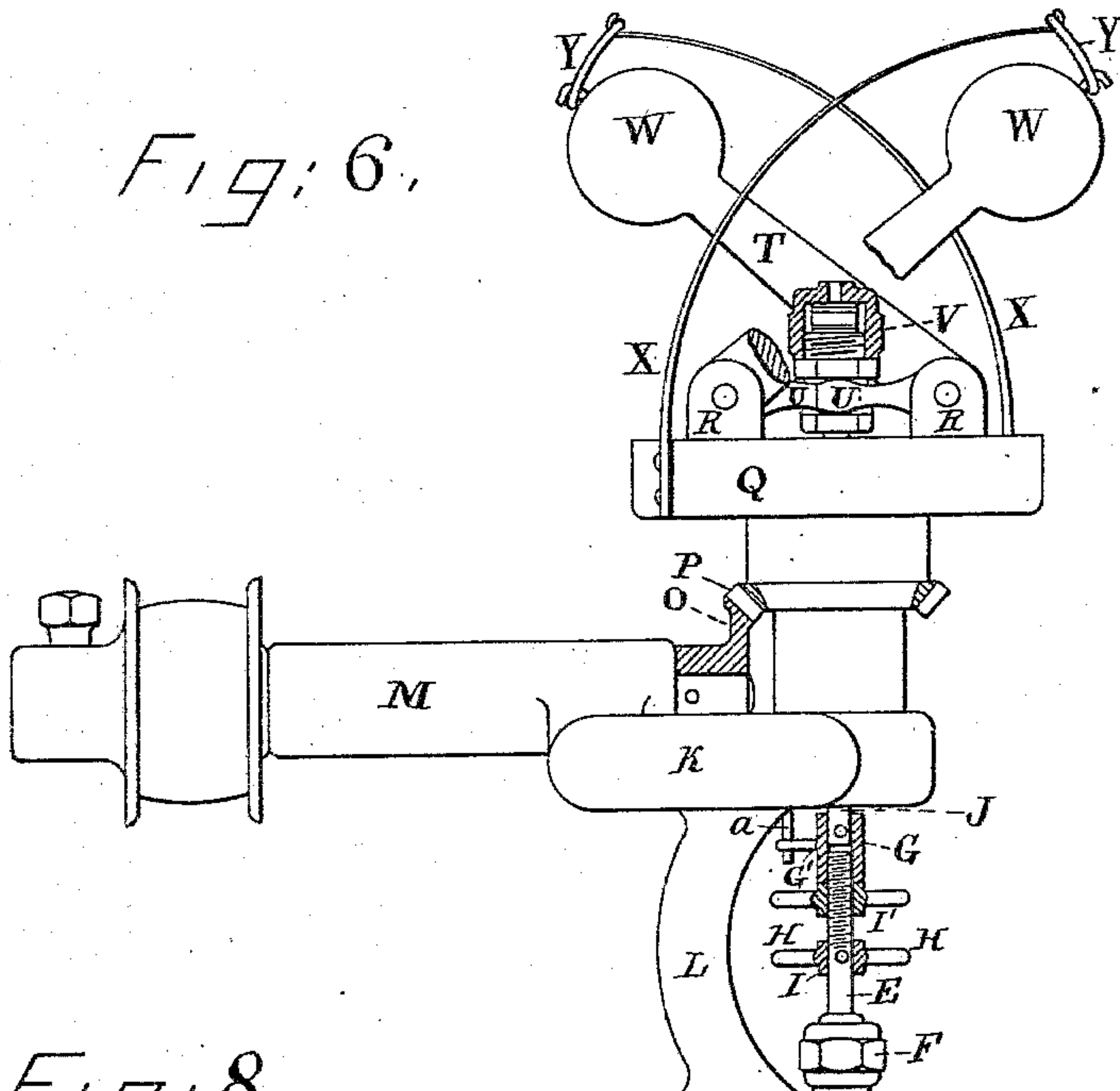


Fig: 8.

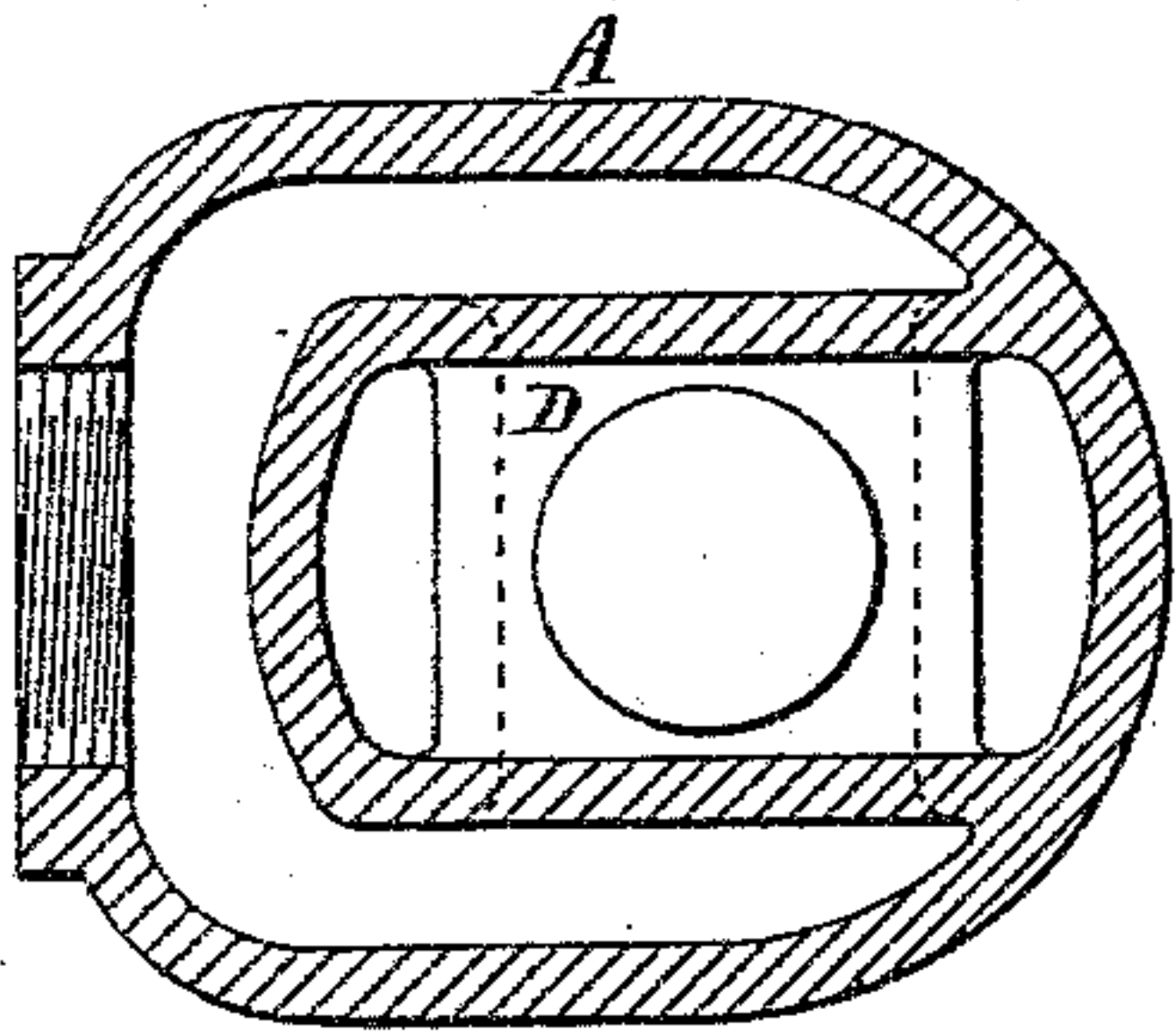
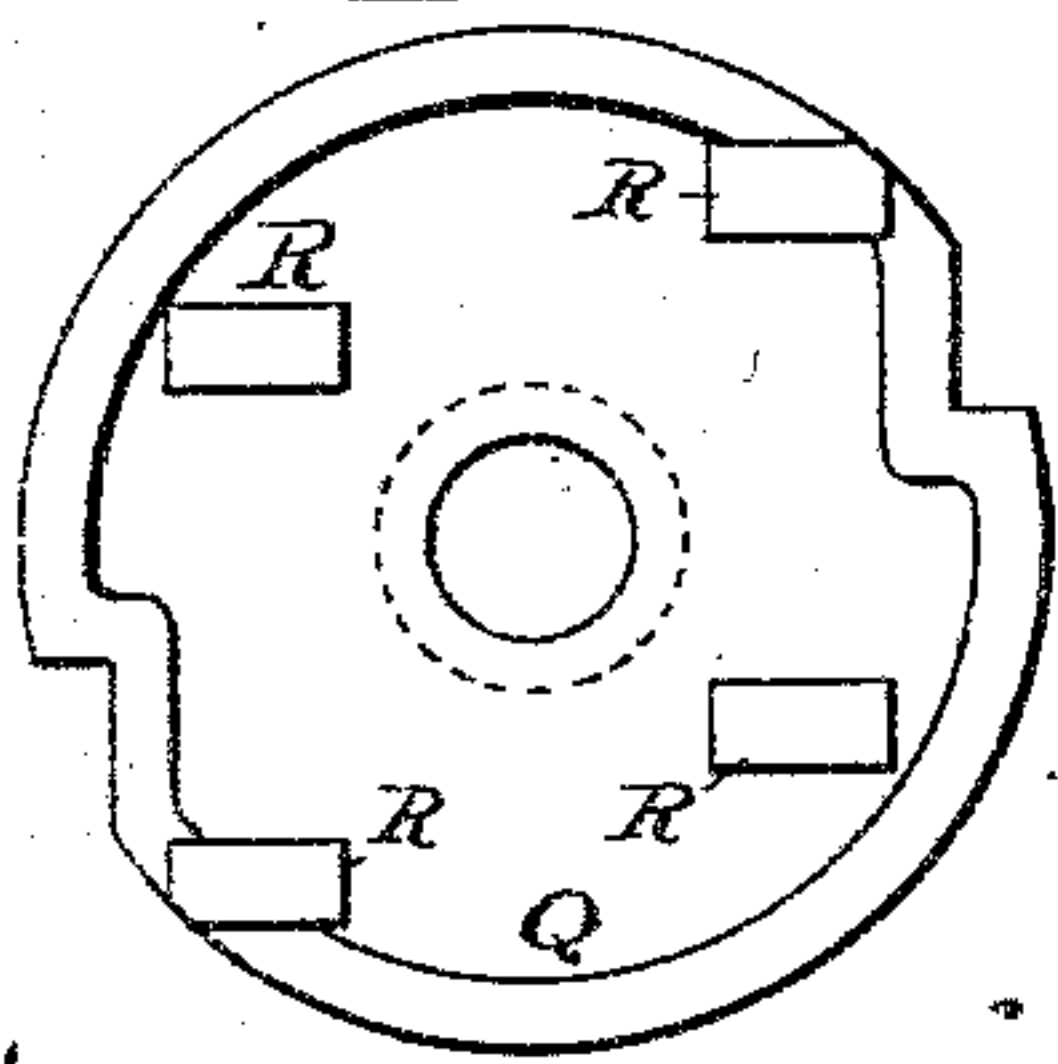


Fig: 9.



Witnesses,
Geo. H. Strong
J. H. Morse

Fig: 10.

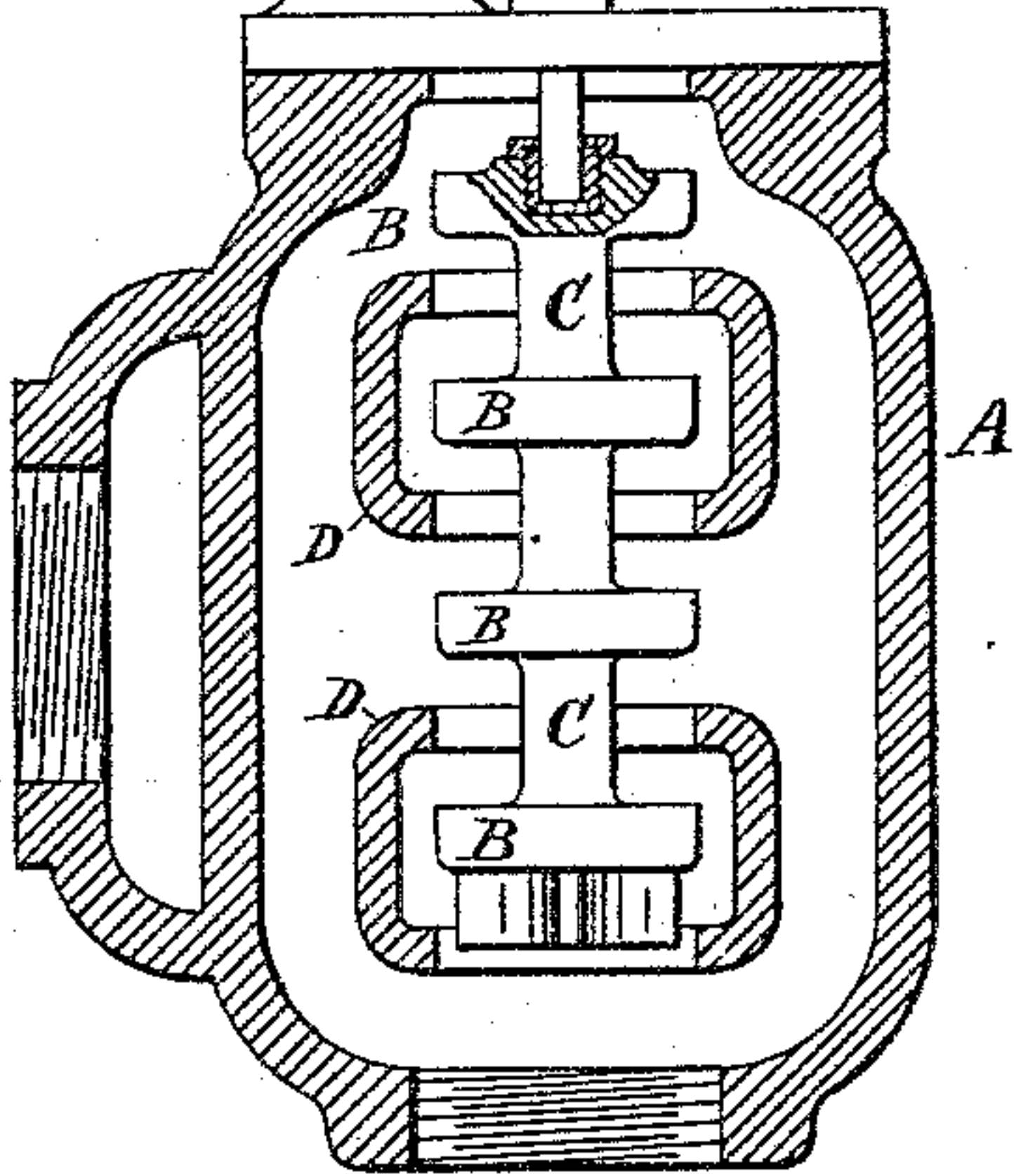


Fig: 12.

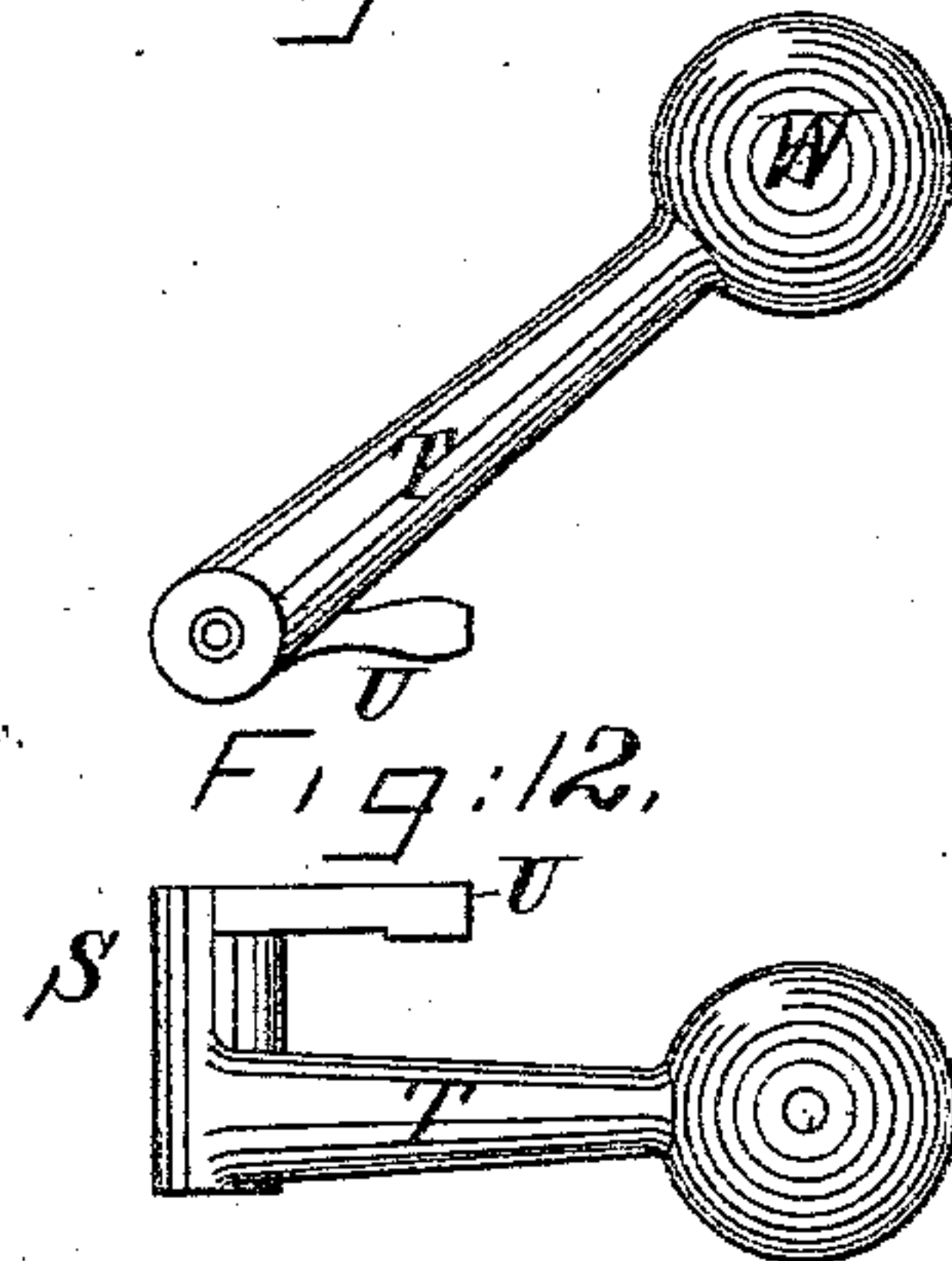


Fig: 7.

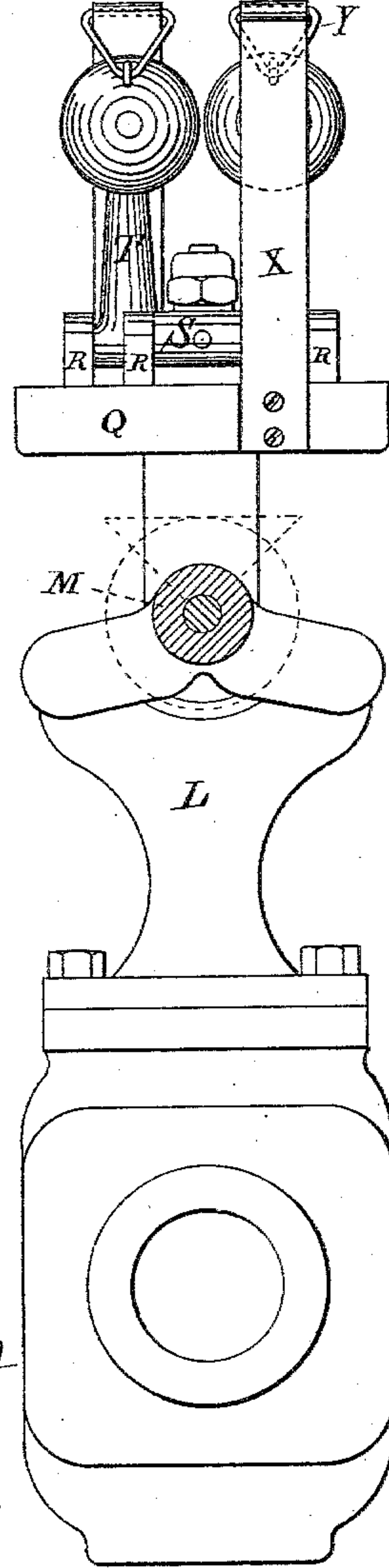
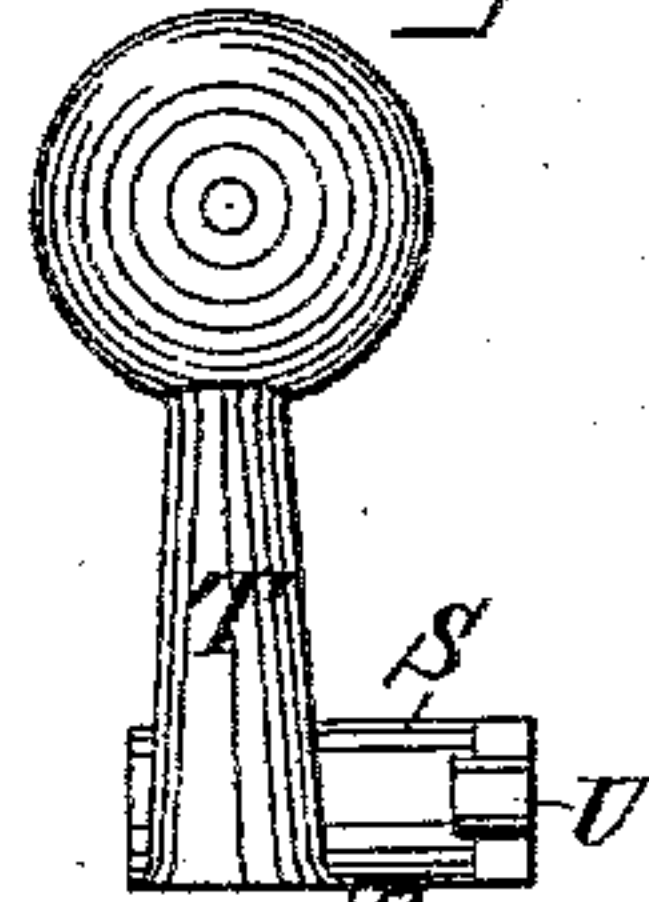


Fig: 11.



Inventor,
J. L. Heald
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UNITED STATES PATENT OFFICE.

JOHN L. HEALD, OF CROCKET, CALIFORNIA.

ENGINE-GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 305,816, dated September 30, 1884.

Application filed March 1, 1884. (No model.)

To all whom it may concern:

Be it known that I, JOHN L. HEALD, of Crocket, county of Contra Costa, and State of California, have invented an Improvement in Engine-Governors; and I hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to certain improvements in governors which act by centrifugal force; and it consists of a pair of weighted arms crossing each other diagonally to a central vertical line, and having thin lower ends hinged to a horizontally-rotating disk or table. To the sides of this table steel springs are secured behind each arm, so as to curve above them, the upper ends of the springs being connected by links with the upper weighted ends of the arms, so that their tendency is to counteract the centrifugal action of the arms when in motion. The arms act upon a vertical adjustable central stem which connects with a double-balanced valve, all of which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a perspective view of my governor. Fig. 2 is a vertical section of the disk Q and connected parts. Fig. 3 is a view of guide-sleeve G. Figs. 4 and 5 are views of spring and shackle. Fig. 6 is a side elevation of governor and section of valves. Fig. 7 is an end elevation of governor. Fig. 8 is a horizontal section of valve-chamber. Figs. 9, 10, 11, and 12 are detached views of arms and disk.

A is the casing within which the valve is contained. This valve is similar to a piston-valve, and consists of four disks or flanges, B, upon a central stem, C, which passes through the two inner seats or casings, D D. These casings are bored through the top and bottom, the openings being of such size that the disks B will just fit within and close them when the valve is closed. The interior of the casings connect with the boiler through a passage and pipe, *b*, so that steam is received into their interior, and when the valve is closed the disks occupying the openings at top and bottom will receive an equal pressure and be balanced. When they are opened, the steam will escape equally upward and downward into the larger space within the outer casing, A, which surrounds the valve-seats D, and the valves will

still remain balanced. The steam passes from the casing A to the cylinder through the passage *d*. A stem, E, screws into the upper part of the valve or its stem, and extends up through a stuffing-box, F, and into a sleeve, G, into which it is screwed, as shown. Arms H project from a collar, I, which is secured to the stem E below the sleeve G, and serve as levers by which to turn the stem and screw it into or out of the sleeve, and thus adjust the valve up or down, to suit the speed at which the engine is to run.

I' is a lock-nut with similar arms, this nut locking against the lower part of the sleeve G, to hold the stem E at the desired point. The sleeve G has an arm, G', extending to one side from it, and the end of this arm slides upon a pin, *a*, by which the sleeve and the stem are prevented from being rotated by the rotation of the governor-arms. A stem, J, extends upward from the sleeve G through the part K, which is supported by an arm, L, from the top of the valve-casing, as shown. A horizontal sleeve, M, is also supported from K by arms N, and the driving-shaft passes through this sleeve, having a pulley upon its outer end and a bevel-gear, O, upon its inner end, to mesh with and drive the gear P, which is secured to the horizontal disk or table Q. Upon this table are lugs R, between which the hubs S of the arms T are pivoted or hinged. From these hubs short arms U extend inward and press upon the top of the stem J, which connects with and actuates the valve. This stem extends up into a head, V, which is free to turn loosely about it, and has spaces or slots at each side, into which the rounded ends of the arms U enter, and when the governor acts these arms raise or lower the head V, valve-stem, and valve. The arms T extend upward and diagonally across each other and a central vertical line about which the disk rotates, and their upper ends have weights W upon them.

To the edge of the disk Q springs X are fixed in a line behind each of the arms T, and these springs are curved over above the arms T and weights W. Links Y connect the upper ends of the springs with the outer ends of the weighted arms, so that they may move in unison. The operation will then be as follows: The valve is set so that it will be open when the governor is at rest. When it is set in mo-

tion, the centrifugal force causes the arms T to move downward, pulling the springs with them, and the short arms U act to press the valve-stem down and close the valve. If the engine slows up, the springs act to draw the arms T up again and open the valve. The valve is well balanced, the adjustment may be easily made without stopping, and the peculiar arrangement and relation of the diagonally-crossed and weighted arms and the connected springs make it extremely sensitive. The two arms T move in planes a little on each side of the center, which leaves room for the stem J and its head V, through which connection is made with the arms U.

I am aware that single pairs of valves united by bars have been fitted to seats in the top and bottom of a horizontal steam-pipe, so that when opened the steam could escape above and below, and also that such a valve has been connected by an adjustable stem with a governor, and I do not claim, broadly, such a mechanism.

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

1. In an engine-governor, the centrifugally-acting weighted arms, and vertically-moving adjustable valve-stem and valve, in combina-

tion with the sleeve G, with its guide-arm G' and pin *a*, substantially as herein described. 30

2. In an engine-governor, the weighted arms crossing each other diagonally, and having their lower ends hinged or journaled at opposite sides of a horizontal rotary disk or table, in combination with short arms extending inwardly from the lower ends of the diagonal arms, and connecting with a vertically-moving valve-stem and valve, substantially as herein described. 35

3. In an engine-governor, the weighted arms crossing each other diagonally, and having their lower ends hinged at opposite sides of a horizontal rotary disk, and short arms extending inwardly and connecting with a vertically-moving valve through its stem, in combination with flat springs secured to the edges of the disk, behind the diagonal arms, curving over them, and connected with their upper ends by links, substantially as herein described. 40 45

In witness whereof I have hereunto set my hand.

JOHN L. HEALD.

Witnesses:

S. H. NOURSE,
H. C. LEE.