

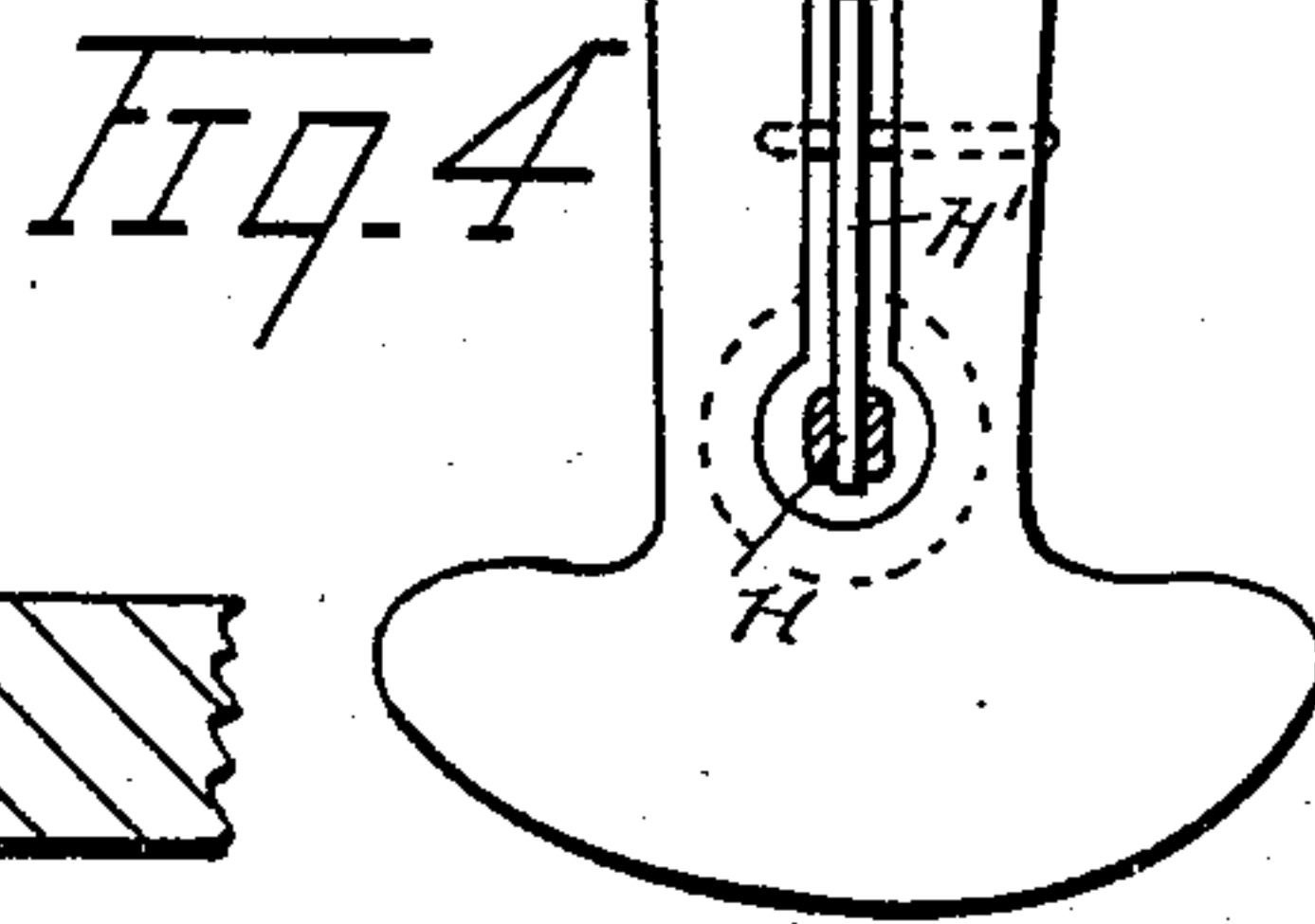
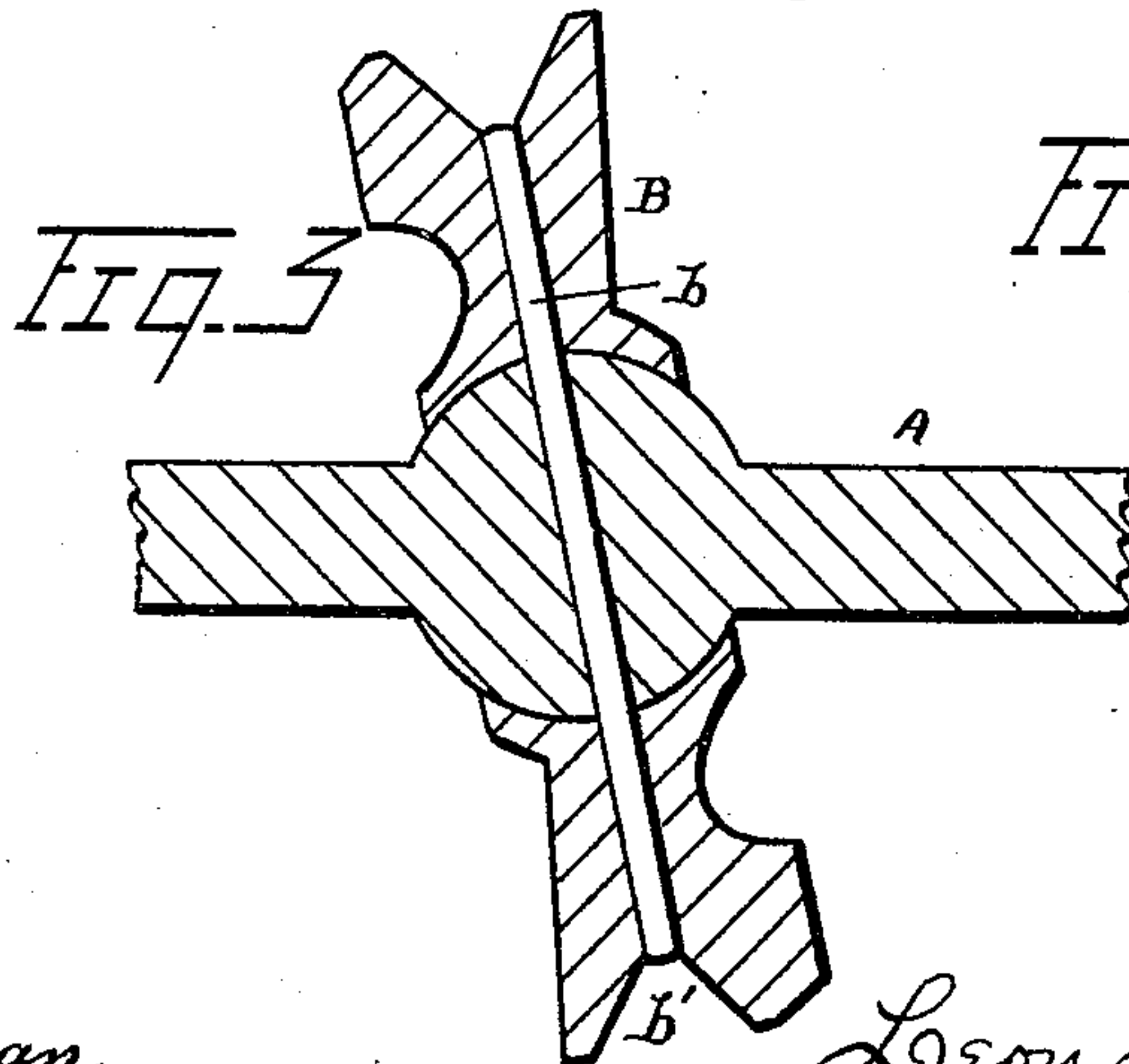
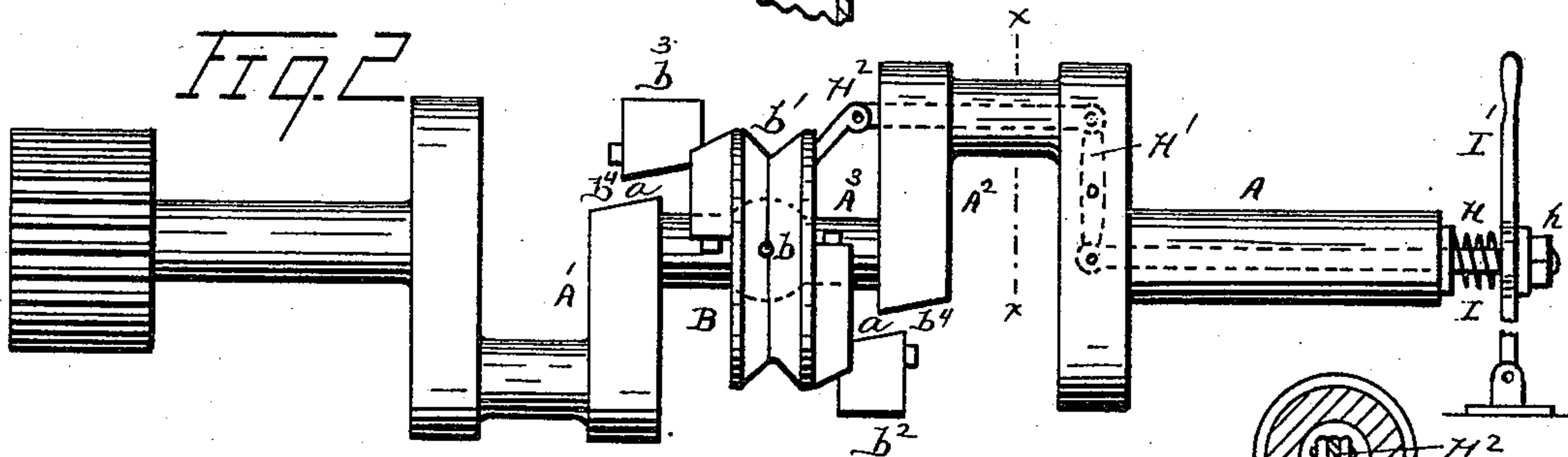
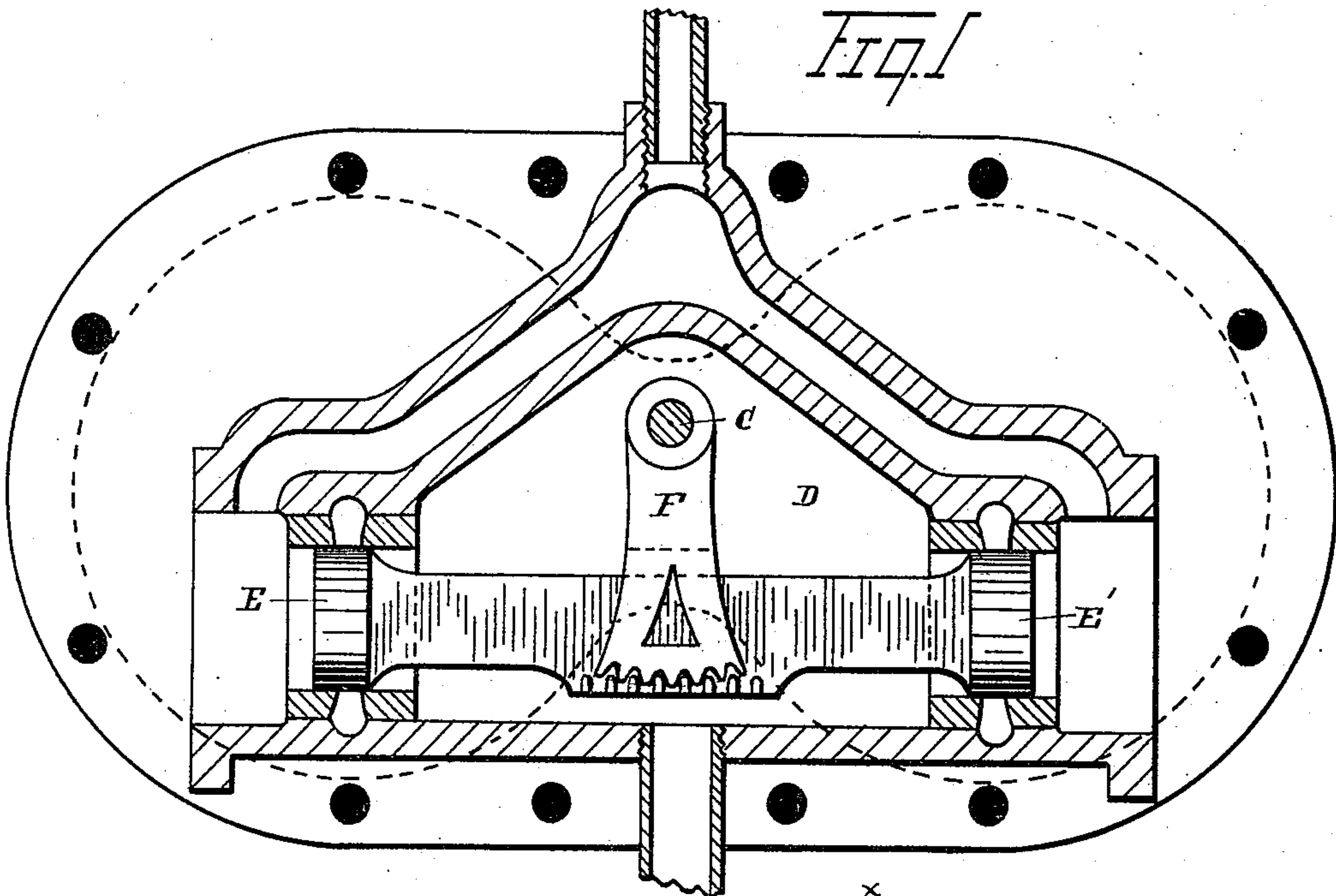
(No Model.)

2 Sheets—Sheet 1.

L. ANDERSON.
GOVERNOR FOR STEAM ENGINES.

No. 441,630.

Patented Dec. 2, 1890.



Witnesses
John Schuman.
Charles F. Salow.

Inventor
Leonard Anderson
By his Attorney
Newell & Wright.

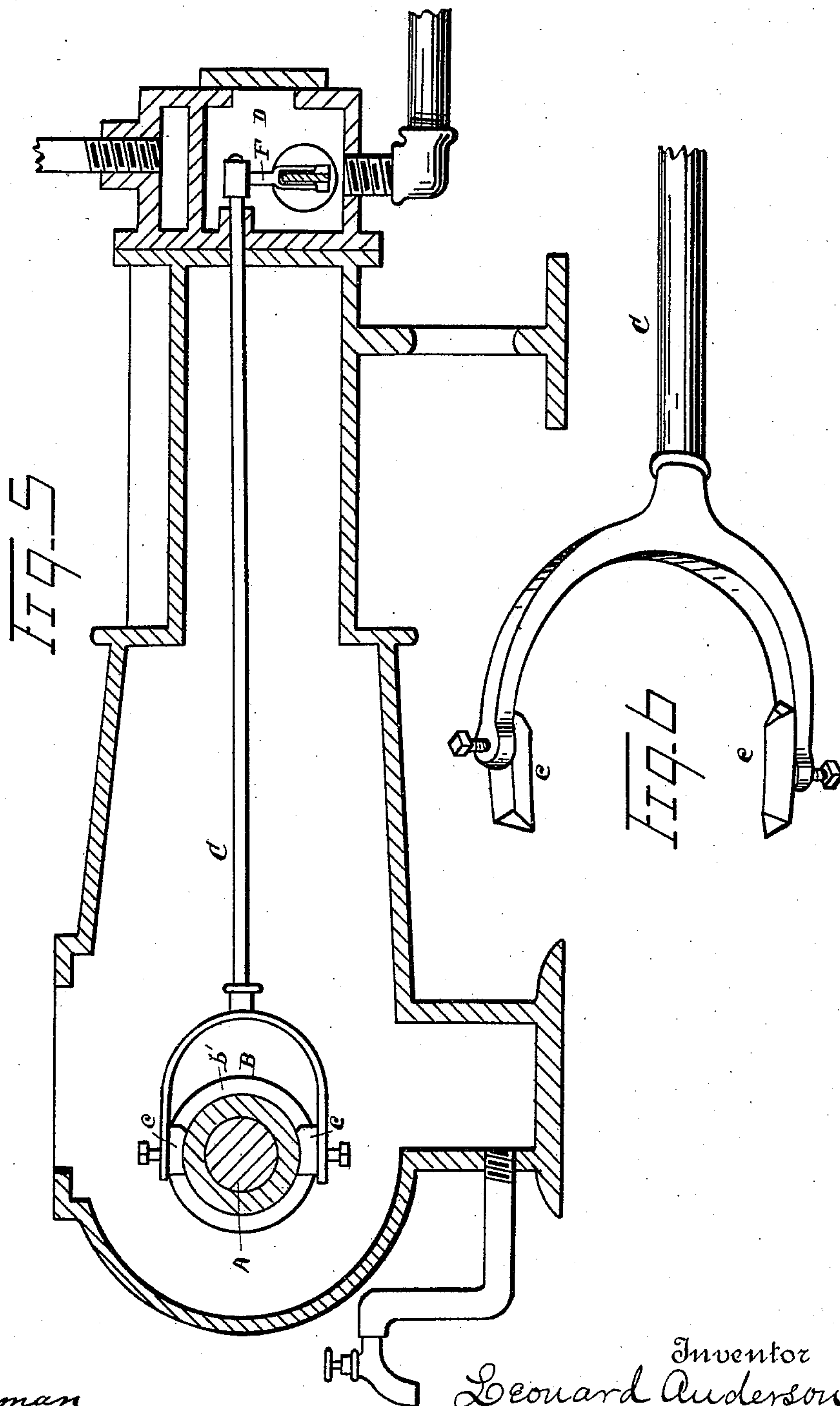
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UNITED STATES PATENT OFFICE.

LEONARD ANDERSON, OF DETROIT, MICHIGAN.

GOVERNOR FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 441,630, dated December 2, 1890.

Application filed November 16, 1889. Serial No. 330,551. (No model.)

To all whom it may concern:

Be it known that I, LEONARD ANDERSON, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Governors for Steam-Engines; and I 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, which form a part of this specification.

My invention relates to certain new and useful improvements in governors for steam-engines, and has for its object superior simplicity, economy, and utility.

My invention consists of the devices and appliances, their combinations and arrangements, as more fully hereinafter specified and claimed, and more particularly illustrated in the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section through the steam-chest. Fig. 2 is a separate view of the driving-crank shaft. Fig. 3 is a detail view showing the union of the rocking collar upon the shaft. Fig. 4 is a sectional view on the line $x x$, Fig. 2. Fig. 5 is a longitudinal section through the inclosing-case, showing the driving-shaft and steam-chest in cross-section. Fig. 6 is a separate view of the bifurcated end of the valve-rod.

I carry out my invention as follows:

A represents a driving-crank shaft driven by the pistons in any ordinary manner. The crank-arms A^1 and A^2 of said shaft, as shown in Fig. 2, are connected by an intermediate portion A^3 of the shaft, said intermediate portion of the shaft being preferably substantially in line with the extremities of the shaft, although I do not confine myself to any particular construction of the crank-shaft.

Upon the crank-shaft—as, for instance, upon the intermediate portion A^3 thereof—I engage a vibratory or rocking collar B. I prefer that the said collar should have a jointed engagement upon the shaft, as by a ball-and-socket joint, illustrated more particularly in Fig. 3. The collar may be made in halves united together to facilitate its engagement upon the shaft.

A special feature of my invention consists

in the engagement of the rocking collar upon the shaft in an inclined position, as shown in Fig. 3, the collar extending in a diagonal direction relative to a plane at right angles to the shaft. This may be accomplished by means of a pin b extending in an angular direction through the collar and the ball of the shaft. Such an engagement of the collar upon the shaft, it is evident, will give a vibratory or wabbling motion to the collar upon the rotation of the driving-shaft. The collar is grooved upon its periphery, as shown at b' .

C is a valve-rod or spindle bifurcated at its extremity adjacent to the driving-shaft, the two forks of which are each provided with a shoe c , shaped to ride in the groove on the periphery of the vibratory collar. This arrangement, it will be perceived, will cause a partial rotation to and fro of the valve-rod as the collar wabbles back and forth on each rotation, the shoes being carried with the collar back and forth in its vibratory movement.

D is a steam-chest communicating with cylinders outlined in dotted lines, Fig. 1. E and E' denote the valves of the steam-chest.

F is an oscillatory arm engaged with said valves and with the valve-rod C, whereby as the valve-rod is vibrated or rocked by the movement of the collar B the valves are correspondingly reciprocated. The normal lap and lead of the valves are proportionate to the inclination of the vibratory collar, which is secured by the angular projection of the pin b , by which the collar is held out of line of a plane at right angles to the shaft.

The oscillatory arm F may have a toothed or other suitable engagement with the valves, which may preferably consist of piston-valves united by a connecting-rod, as shown.

To make the device govern the engine automatically, the two parts of which the rocking collar is constructed are each weighted, as shown at b^2 and b^3 . These weights may extend from the outer faces of the collar and be constructed with angular seats, as shown at b^4 , to engage upon a similarly-shaped face of the adjacent arm of the crank-shaft, as shown at a , to permit the weights being thrown down as near the center of the shaft as possible. It will be evident that when the speed increases the tendency of the weights on the rotation of the collar will be to diminish the

vibration or wobbling of the collar, the centrifugal force of the weighted collar tending to make it rotate more uniformly in a plane at right angles to the shaft. The result will be to reduce the throw of the valve. The opposite result will be attained when the speed of the engine is unduly diminished, whereby the throw of the valve will be increased. If the engine on which the device is used be a marine engine, the weights on the collar may be dispensed with. A rod H is engaged with the collar by means of intervening rods H' H², jointedly connected the one with the other, the crank-shaft being constructed to receive said rods. (Shown in Fig. 2 in dotted lines extended through the crank-shaft.) At the outer end the rod is provided with a spring I, or at any other suitable point, the tension of which may be regulated in any desired manner, as by an adjusting-nut h, upon the outer end of the rod H. It will be evident that the centrifugal force of the weights upon the rocking collar will work against the tension of the spring I, and vice versa. A lever I' may be engaged upon the outer end of said rod also, whereby the engine may be reversed or stopped, as the position of the valves may be controlled thereby. I do not limit myself to the location of the rocking or vibratory collar upon the driving-shaft, as it might be located upon any rotatable shaft geared with the driving-shaft. What I claim as my invention is—

1. In an engine, the combination, with a rotatable shaft, of a rocking collar grooved on its periphery and a bifurcated valve-rod provided with segmental shoes riding in the peripheral groove of said collar, substantially as described.
2. In an engine, the combination, with a rotatable shaft, of a rocking collar grooved on its periphery and a bifurcated valve-rod provided with segmental shoes riding in the peripheral groove of said collar, and means for adjusting said shoes in said groove, substantially as described.

3. In an engine, the combination, with a rotatable shaft, of a rocking collar having a V-shaped groove on its periphery, a bifurcated valve-rod provided with V-shaped segmental shoes riding in the peripheral groove of said collar, and means for adjusting said shoes upon said collar, substantially as described.

4. In an engine, the combination, with two steam-cylinders, of united reciprocating valves to govern the admission of steam to both said cylinders, a valve-rod provided with a vibratory arm F', connected with said valves, and a vibratory collar connected with said rod, substantially as described.

5. In an engine, the combination, with a rotatable shaft constructed with crank-arms A' A², of a vibratory collar provided with weights upon opposite sides thereof, said weights arranged to seat upon said crank-arms, respectively, when the valve is wide open, substantially as described.

6. In an engine, the combination, with a rotatable shaft, of a vibratory collar located thereupon, a spring connected with said collar, and means for adjusting the tension of the spring to regulate the speed of the engine, substantially as described.

7. In an engine, the combination, with a rotatable shaft, of a vibratory collar located thereupon, a spring located upon one end of the shaft, a bar connecting the spring with the collar, and means for adjusting the tension of the spring, substantially as described.

8. In an engine, the combination, with a rotatable shaft, of a vibratory collar located thereupon, and a spring-bar sleeved through said shaft and connected with said collar, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

LEONARD ANDERSON.

Witnesses:

N. S. WRIGHT,
CHAS. F. SALOW.