

E. BUSS.
Governors for Engines.

No. 140,467.

Patented July 1, 1873.

Fig. 1.

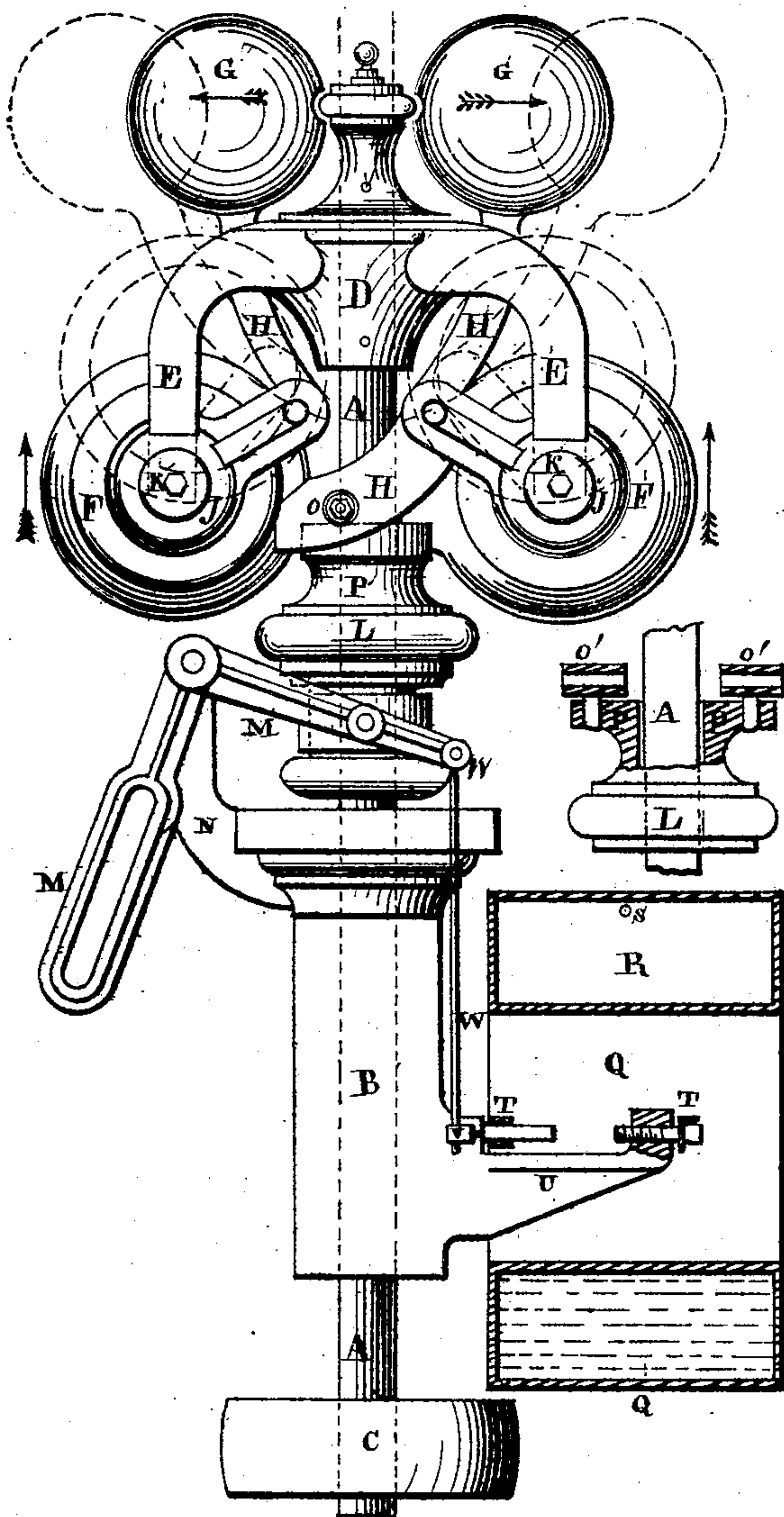
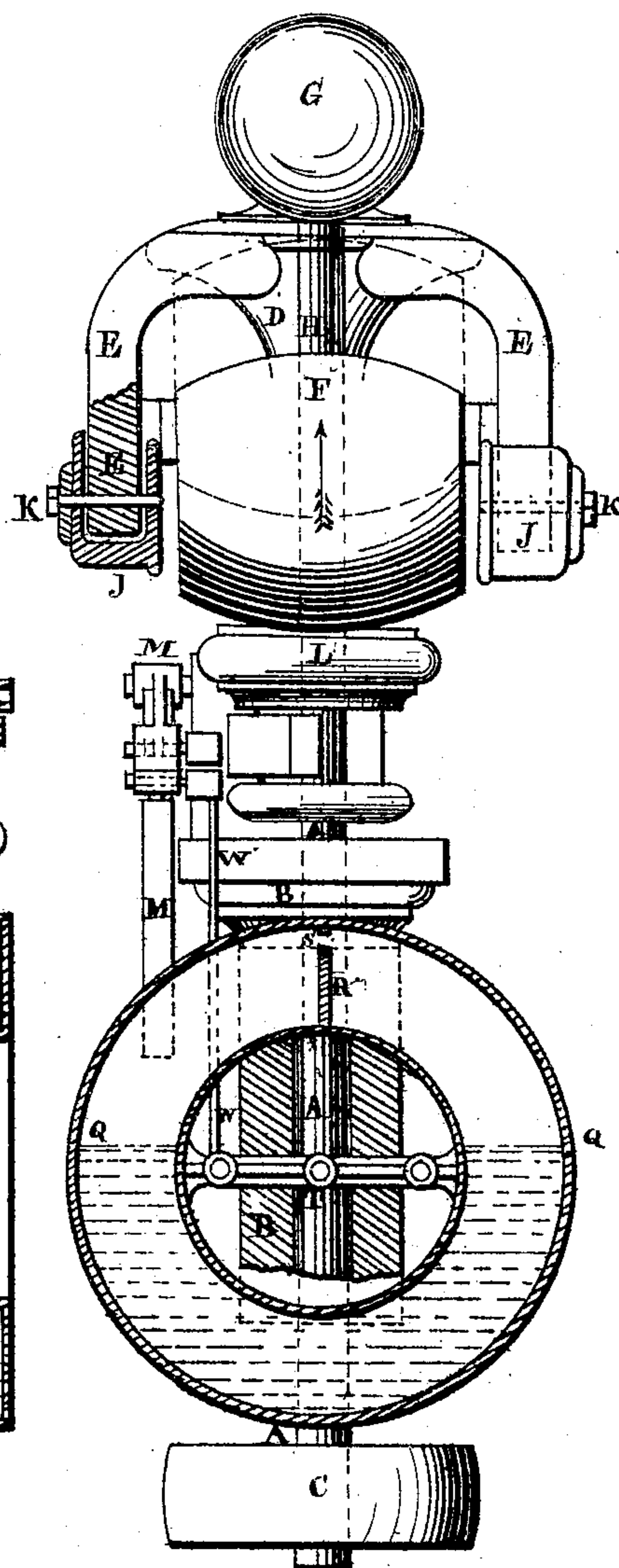


Fig. 2.



Witnesses.

John J. Royle

George W. Belshaw.

Inventor.

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Fig. 3

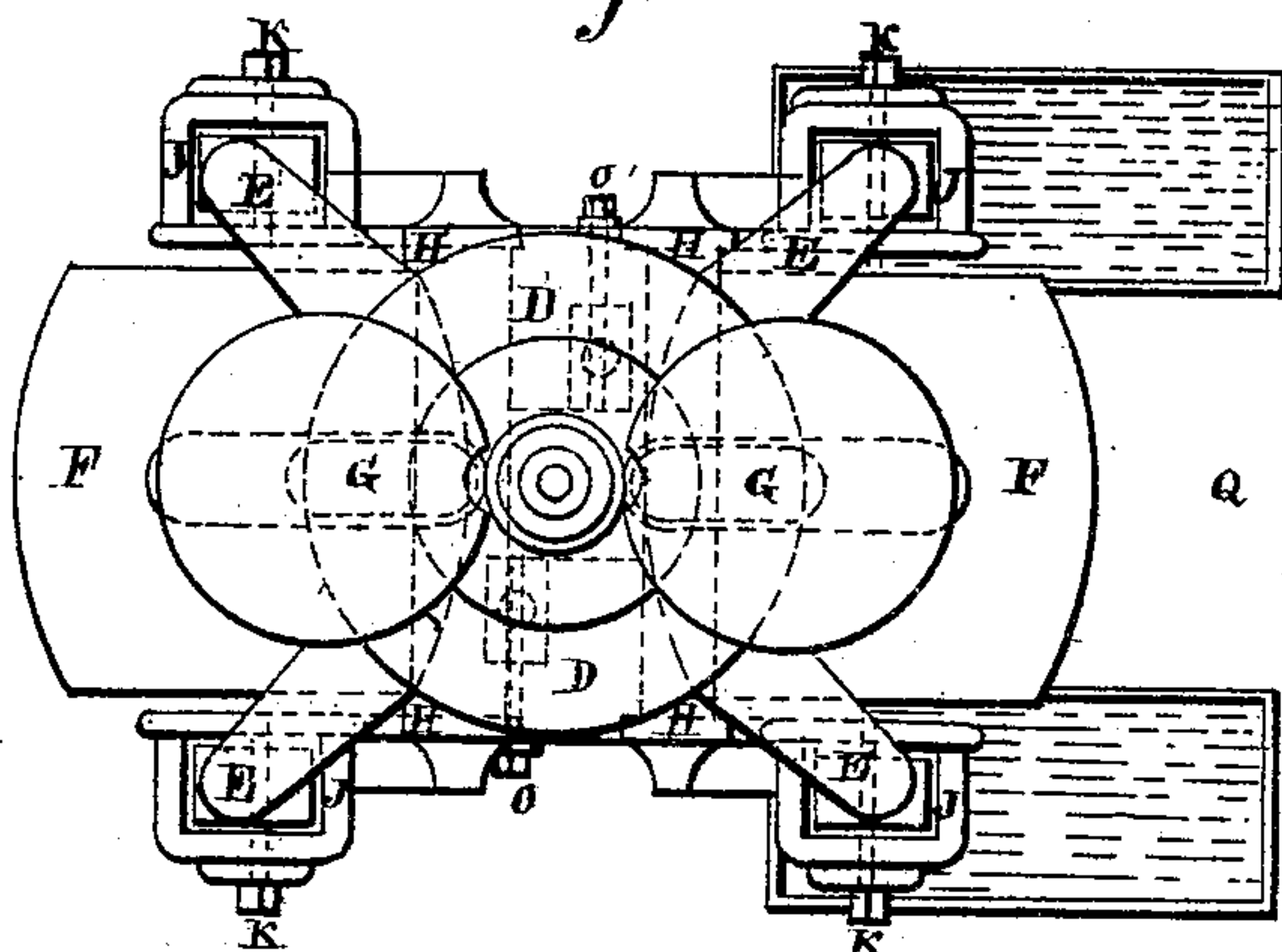


Fig 4

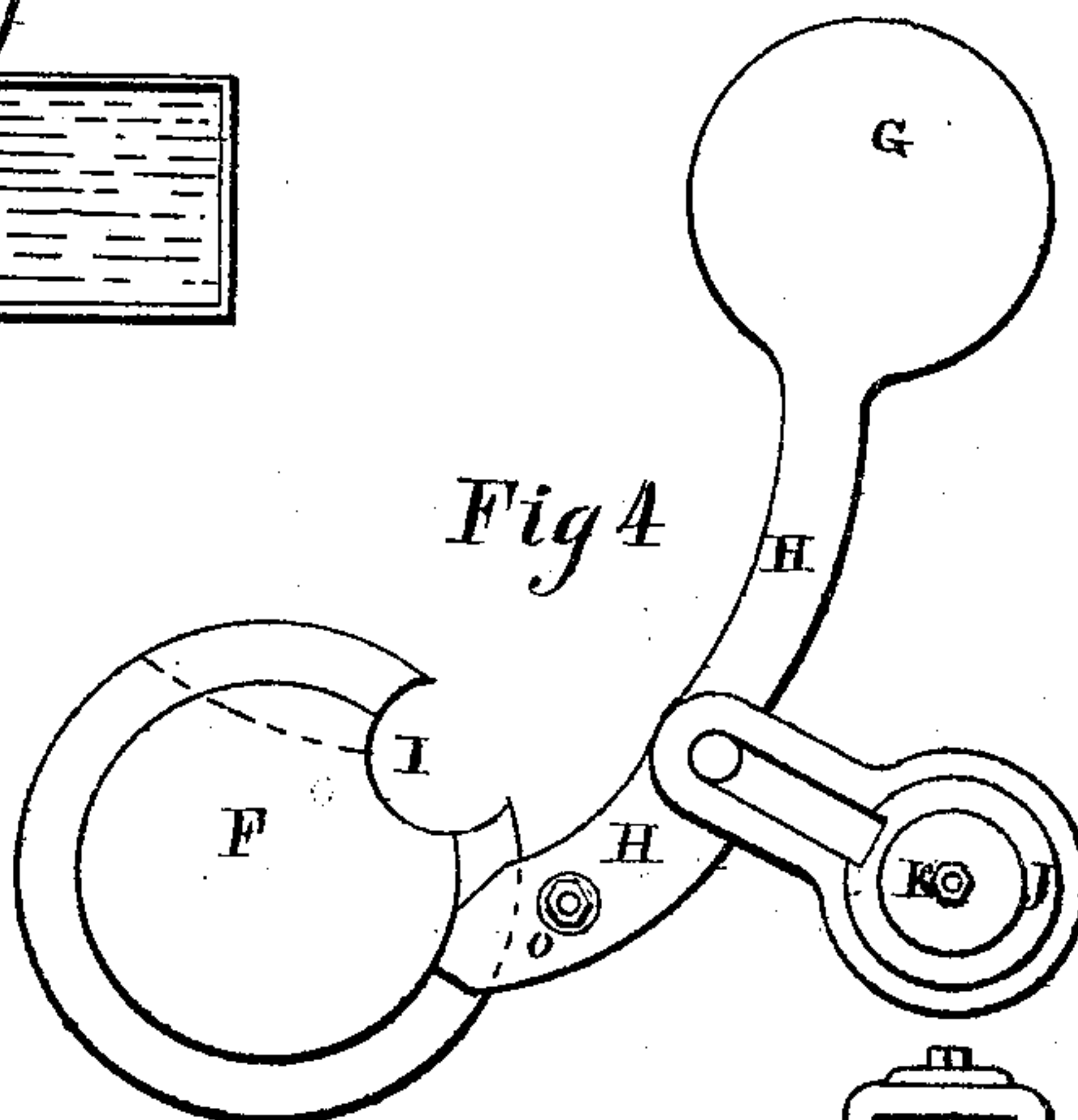
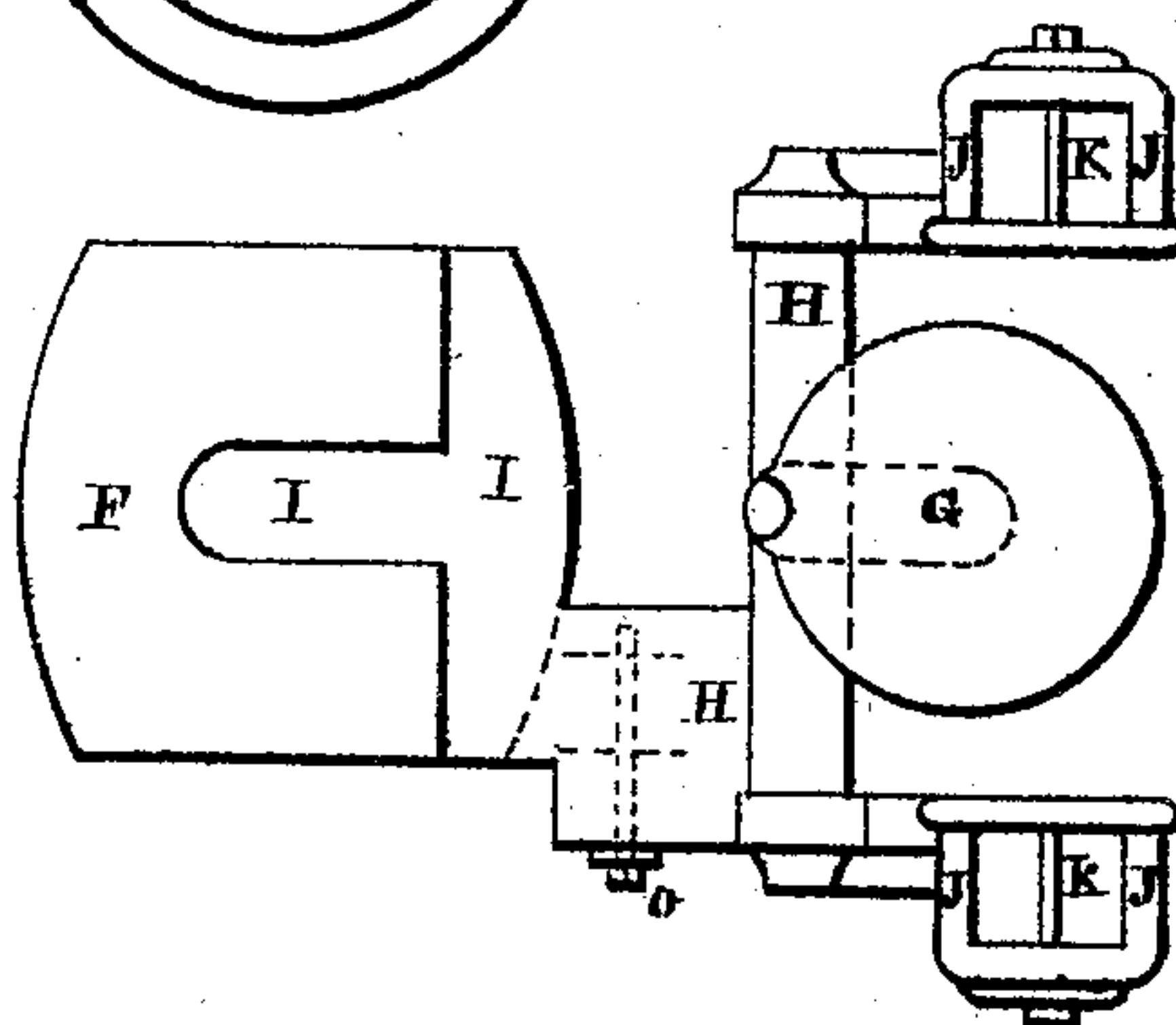


Fig. 5



Witnesses.

John J. Hoyle
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Inventor.

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UNITED STATES PATENT OFFICE.

EDWARD BUSS, OF BUCKAN MAGDEBURG, PRUSSIA, ASSIGNOR TO
ARNOLD BUDENBERG, OF MANCHESTER, ENGLAND.

IMPROVEMENT IN GOVERNORS FOR ENGINES.

Specification forming part of Letters Patent No. **140,467**, dated July 1, 1873; application filed
March 22, 1872.

To all whom it may concern:

Be it known that I, EDWARD BUSS, engineer, of Buckan Magdeburg, in the Kingdom of Prussia, have invented an Improved Governor for Regulating the Speed of Engines, of which the following is a specification:

This invention relates to a peculiar construction of governor for regulating the speed of a steam-engine or other prime mover, with greater precision than has hitherto been practicable, which is accomplished by the use and application of a double-weighted pendulum or pendulums, so mounted and arranged upon a vertical revolving rod, that the utmost possible power is developed for overcoming the friction of the regulating-throttle or other description of admission-valve, while at the same time the extremest sensibility of action is obtained. This governor is capable of being increased or decreased in sensibility by adding more or less weight to its pendulums, and may accordingly be adjusted in power to suit the requirements of the engine, this latter being a qualification hitherto possessed by no other centrifugal governor.

Figure 1 is a front view, Fig. 2 a side view, and Fig. 3 a plan of the governor. Fig. 4 is front view, and Fig. 5 a plan, of one of the double-weighted pendulums used in its construction.

A is a vertical rod mounted in the pedestal B, and having a revolving motion imparted to it by the pulley C, or in any other convenient manner. Upon the top of this revolving rod is fixed a cast-iron pendulum-support, D, consisting of four arms or branches, E, for carrying the peculiar-shaped pendulums hereinafter described. These pendulums, which are two in number, are each constructed (by preference of cast iron) with a barrel-shaped weight, F, and a ball-shaped weight, G, connected together by the peculiarly-twisted arm H, which is so arranged in order that each pendulum shall interlock as close as possible into the other pendulum, on opposite sides of the vertical rod A, for which purpose the barrel-weight F is also partially cut away, as seen at I, Figs. 4 and 5, to allow the arm H of the other pendulum to enter it. These pendulums are each provided with two sockets, J, (see

Fig. 5,) branching from the arm H, into which sockets the extremities of two of the arms E of the pendulum-support D enter, when, by means of a pin, K, passed through them, such pendulums are swung or supported upon the pendulum-support D, with their respective weights F and G on opposite sides of the vertical rod A, each barrel-shaped weight being disposed and working up and down between the two sockets J of the other or opposite pendulum. L is a collar mounted on the vertical rod A, upon which it is free to slide up and down. This collar is connected to the throttle or other valve by means of the ordinary forked lever M working upon the bracket N, which projects from the pedestal B, and is also jointed to each pendulum by means of a pin, O, screwed through the side of each pendulum-arm G into the head of a stud or set-screw, O', secured in the top of the neck P of such sliding collar, (see detached side view of collar,) so that as the pendulums work up and down, or swing upon their axes or pins K, owing to the slightest variation in the speed of the engine, the sliding collar L is at the same time moved up and down, and so opens and closes the throttle-valve. To prevent the too sudden action of this governor, it is advisable to apply some modifying influence, and this is perfectly accomplished by means of the inclosed annular cylindrical vessel Q, which is partially filled with water, and has a space above the water divided by a partition, R, into two compartments, which are filled with air, and communicate together through the small hole S. This vessel Q is mounted upon horizontal pivots T, screwed into the bracket U projecting from the pedestal B, and is connected by means of the crank-pin V and connecting-rod W to one extremity of the forked lever M, so that as the sliding collar L moves up and down this cylindrical vessel Q is caused to partially revolve upon its horizontal axis or pivots T, and any sudden movement of such sliding collar will cause the liquid to rise in one compartment of the cylindrical vessel Q, and to sink in the other, so momentarily compressing the air and offering a resistance until an equilibrium is re-established by the air passing through the small hole S and exercising the same pressure

again in both compartments. The peculiar action of this cylinder is to offer no practical resistance to the action of the governor unless it has a tendency to move too suddenly.

The action of this governor is as follows: The pulley C, (which may be fixed upon the upper extremity of the revolving rod A, when carried through the pendulum-support D, as shown by the dotted lines in Fig. 1,) having a strap passed round it from the engine requiring to be regulated, and the throttle or other description or regulating-valve being connected to the forked lever M, any augmentation of the speed of the prime mover will cause the pendulums of the governor to act; so that the ball-weights G move outward from the revolving rod A, while the two barrel-weights F rise in the direction of the arrows, consequently the sliding collar L is raised along the vertical rod A, and on the contrary, when the angular speed diminishes, exactly the reverse takes place.

This peculiar form of governor differs from all others in its pendulums being in a state of stable equilibrium when the center of gravity is above the point of suspension, whatever may be the angular speed; and it is also characteristic in its highest equilibrium position occurring when the center of gravity stands vertically above such point of suspension; whereas, in all other governors, the highest equilibrium position is when the center of gravity is at the horizontal line of suspension or axis of oscillation, which can only be attained when revolving at a great angular velocity.

It will be apparant that as the weights of the pendulums are distributed on both sides of the revolving rod that it is possible to con-

struct this governor with only one pendulum, whereas the adoption of only one pendulum is practically and theoretically impossible in governors of other principles.

It may also be here stated that it is not imperative to construct the weights of the pendulums of the precise form illustrated on the drawing.

The component parts of this governor lie so close together that its inertia is reduced to the minimum, and the friction and wear and tear of the working parts are considerably less than in any other centrifugal governor, owing to the small angle described by the pendulums.

The point of suspension and the center of gravity in the pendulums being nearly in a horizontal line the pendulums, therefore, act with a great leverage, so producing more power for regulating purposes, for a given weight of pendulum, than any other governor.

Variations of velocity, which are not perceptible to the naked eye, are sufficient in this governor to develop a power capable of overruling the friction of a powerful lid or valve, whereas in the ball-governors hitherto in use considerable irregularities are allowed to take place before they are able to alter the position of the said lid or valve.

I claim—

The combination of the pendulum-support D and arms E, with the double-weighted pendulums F and G, when arranged, mounted, and operating substantially as and for the purpose described.

EDWARD BUSS,
Engineer.

Witnesses:

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