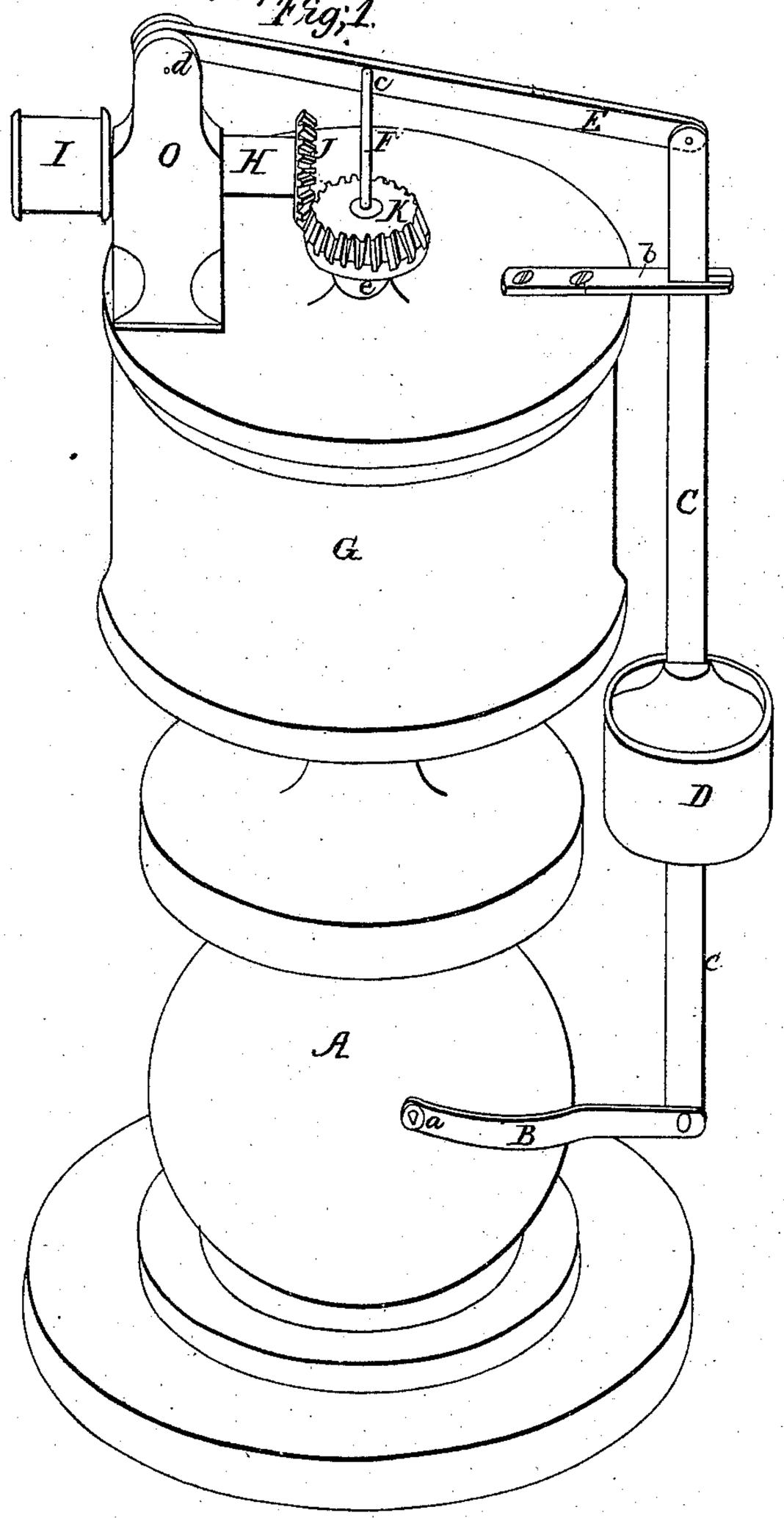
J. A. Marden.

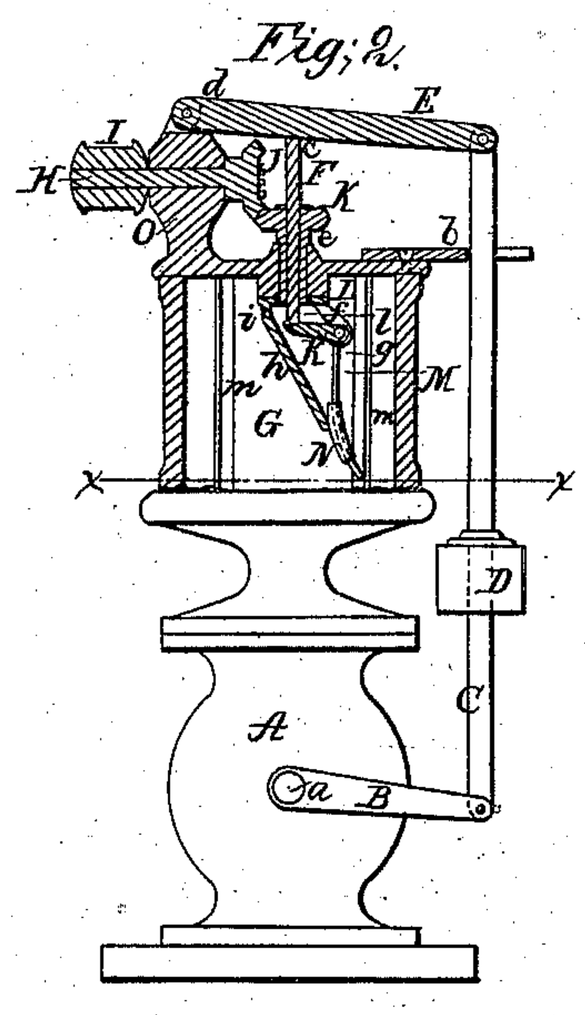
Steam Engine Governor.

No. 88,497. Patented Mar. 30, 1869.

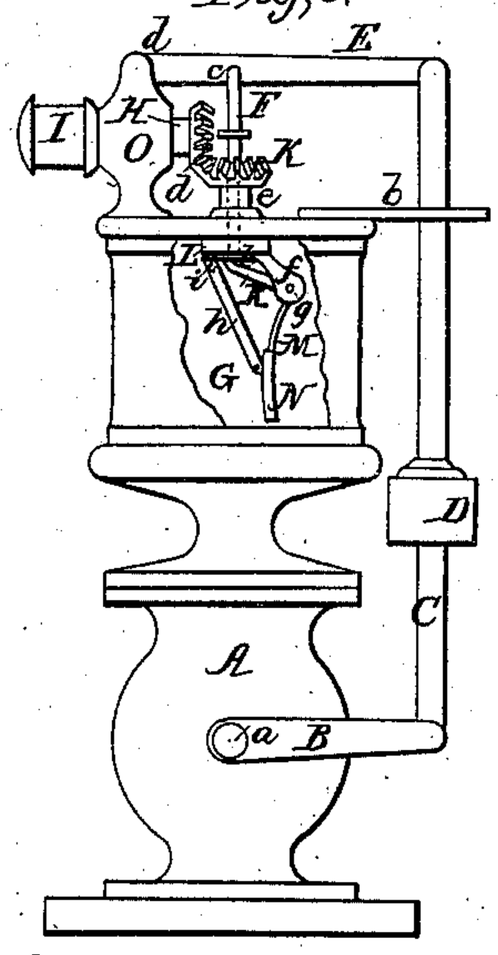
Fig; 1.



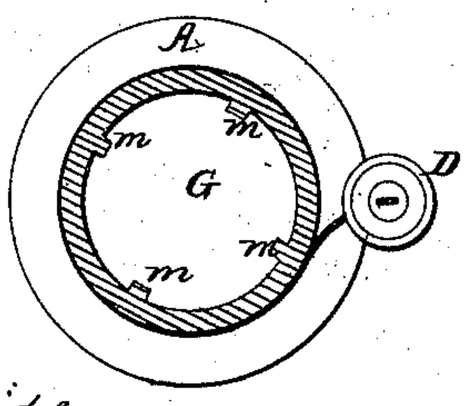
Fig; 2.



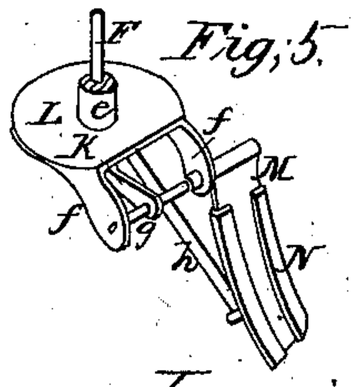
Fig; 3.



Fig; 4.



Fig; 5.



Witnesses;
W. J. Cambridge
L. E. Batchelder

Inventor;
Jeremiah A. Marden
Per his Attorneys
Teschemacher & Stearns.

United States Patent Office.

JEREMIAH A. MARDEN, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO CHARLES E. AND JOHN H. ABBOTT, OF SAME PLACE.

Letters Patent No. 88,497, *dated March* 30, 1869.

IMPROVEMENT IN STEAM-ENGINE GOVERNORS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JEREMIAH A. MARDEN, of Boston, in the county of Suffolk, and State of Massachusetts, have invented certain Improvements in Governors for Steam-Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a perspective view of the exterior of the casing which encloses the valve, with such portion of my improvements applied thereto as are situated outside.

Figure 2 is a longitudinal section through the centre of the same, some of the mechanism being shown in elevation, the various parts being in the position they occupy when the valve is wide open.

Figure 3 is an elevation, representing the receptacle which contains a portion of my improvements broken away, to show their construction, the parts being in the position they occupy when the valve is nearly closed.

Figure 4 is a section on the line *x x* of fig. 2.

Figure 5 is a perspective view of the extension paddle-blade, with some of the mechanism immediately connected therewith.

My invention consists in one or more extension paddle-blades, revolving in a receptacle containing oil, or other suitable fluid, the increased resistance on the extension-blade or blades, occasioned by its or their increased rate of speed through the fluid, causing the blade or blades to be deflected, in such manner as to operate certain devices connected therewith, and partially close the valve to the steam-chest, thus reducing the pressure of the steam, and consequently checking the speed as required; and, in combination with such extension paddle-blade or blades,

My invention also consists in a rocker-shaft, which raises or allows to descend a sliding rod, which serves as a movable fulcrum for the upper of one of a series of levers connected with the valve-stem, weights of different denominations being employed, according to the mean degree of speed which it is required for the engine to maintain.

To enable others skilled in the art to understand and use my invention, I will proceed to describe the manner in which I have carried it out.

In the said drawing, the base of the casing A, which encloses the valve-chamber, is secured to the steam-chest of the cylinder, the induction-passage communicating with the valve-chamber.

The stem of the valve passes through the outside of the casing, at *a*, and has secured thereto a short bent lever, B, to the outer end of which is pivoted the lower end of an upright lever, C, which carries weights, D, of the denomination necessary for maintaining any desired uniform rate of speed predetermined.

The upright lever C passes through a slotted guide, *b*, and has pivoted to its upper end the outer end of an arm, or lever, E, which rests in a bifurcated fulcrum, *c*, at the upper end of a vertical rod, F, which passes through the top of a receptacle, G, containing oil, the lower end of this vertical rod extending down into the receptacle, and being free to slide up and down, when acted on by mechanism hereafter to be described.

The inner end of the lever E is pivoted, at *d*, to a short stud, O, rising from the top of the oil-receptacle, G.

A horizontal shaft, H, passes through and has its bearing in the stud O, the outer extremity of the shaft having a drum, or pulley, I, secured thereto, while the inner extremity of the shaft carries a bevel-wheel, J, which meshes into a bevel-wheel, K, on the top of a vertical shaft, or spindle, *e*, passing through the centre of the top of the oil-receptacle G, the shaft of the bevel-wheel being hollow at its centre, to allow the rod F to slide freely up and down therein.

The lower end of the hollow shaft, or spindle *e* terminates in a circular flange, or plate, L, which is bent down at points diametrically opposite, forming two forks, *f f*, into which the ends of a short shaft, *g*, have their bearings.

One extremity of this short shaft projects outside one of the forked bearings, and has secured to it a paddle-blade, M, of a curved form in the direction of its length, *i. e.*, downward, while it is flat in its horizontal cross-section.

A sliding sleeve surrounds, or partially surrounds, the paddle-blade L, and forms an extension-piece, N, thereto.

To the lower end of this extension-piece is pivoted the lower end of a straight rod, *h*, while the upper end of the rod is pivoted, at *i*, to a projection on the under side of the circular flange, or plate L, by which construction the paddle-blade, with its extension, is free to move longitudinally into an inclined position.

The centre of the shaft *g* has formed thereon a short arm, *k*, having a cup-shaped recess, *l*, at its outer end, into which the lower end of the vertical rod F rests.

Over the pulley I, and a pulley on the crank-shaft, (not shown,) is intended to be passed a belt, by which the motion of the engine is communicated, to drive the pulley I, and, through the connections above described, to revolve the extension paddle-blade around within the oil contained in the receptacle G.

The normal position of the paddle-blade and its extension, when at rest, is that shown in fig. 2, the lower end of the extension being slightly above or even with the bottom of the blade; but, as the valve opens, and steam is let on, they commence to revolve through the oil, the resistance of which thereto, as the speed of the engine increases, causes the blade and its extension to be deflected, the latter sliding down upon its blade, and the outer end of the arm *k* is thrown up, thereby raising the vertical rod F into the position shown in fig. 3.

The ascent of the rod F raises the outer end of the

upper lever, E, and with it the upright weighted lever C, which, in its turn, brings up the outer end of the lower lever, B, connected with the valve-stem, and closes the valve sufficiently to shut off a portion of the steam necessary to reduce the speed to the uniform rate determined on, the extension of the paddle-blade sliding up thereon, and the blade itself approaching toward the position seen in fig. 2.

To prevent any objectionable flaring of the oil, when pressed upon by the paddle-blade, I provide the receptacle G with a series of projections, *m*, which serve to keep the surface of the oil comparatively level, and thus insure the paddle-blade being properly immersed therein.

It will be seen, that when the engine is revolving too rapidly, and the paddle-blade is extended, a greater amount of surface is presented to the oil, and the resistance thereto is consequently increased to a degree sufficient to operate the rocker-shaft, and the aforementioned devices connected therewith, and close, or partially close the valve, as required.

If found desirable, more than one extension paddle-blade may be connected to the rocker-shaft H, and other fluid than oil may be used in the receptacle G; but I prefer the use of oil.

Instead of three levers, B C E, one, only, if properly bent, may be employed therefor, and the fulcrum at the top of the vertical sliding rod F, instead of being bifurcated, may be of any other form suitable for performing the office intended, without departing from the spirit of my invention.

Claims.

What I claim as my invention, and desire to secure by Letters Patent, is—

The sliding adjustable paddle N and rod *h*, substantially as set forth.

Also, in combination with the above paddle-blade N, the rocker-shaft *g*, sliding rod F, and weighted lever, for operating the valve, substantially as set forth.

JEREMIAH A. MARDEN.

Witnesses:

N. W. STEARNS,

L. E. BATCHELLER.