

(No Model.)

N. W. WILLIAMES.
GOVERNOR FOR STEAM ENGINES.

No. 280,984.

Patented July 10, 1883.

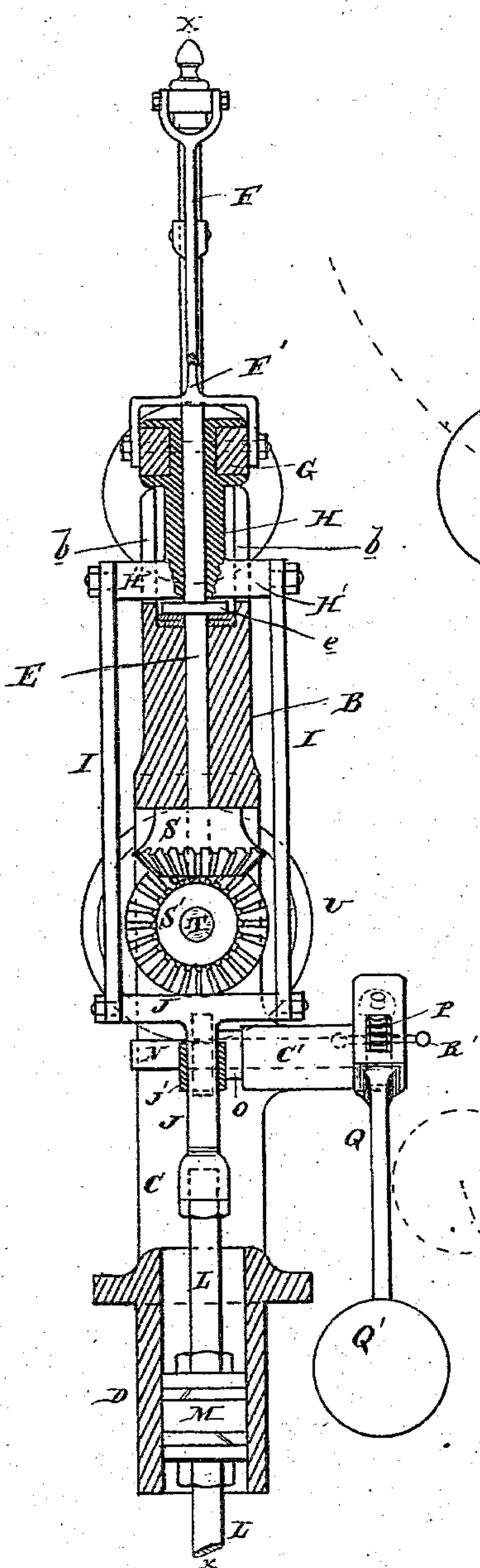


Fig. 2

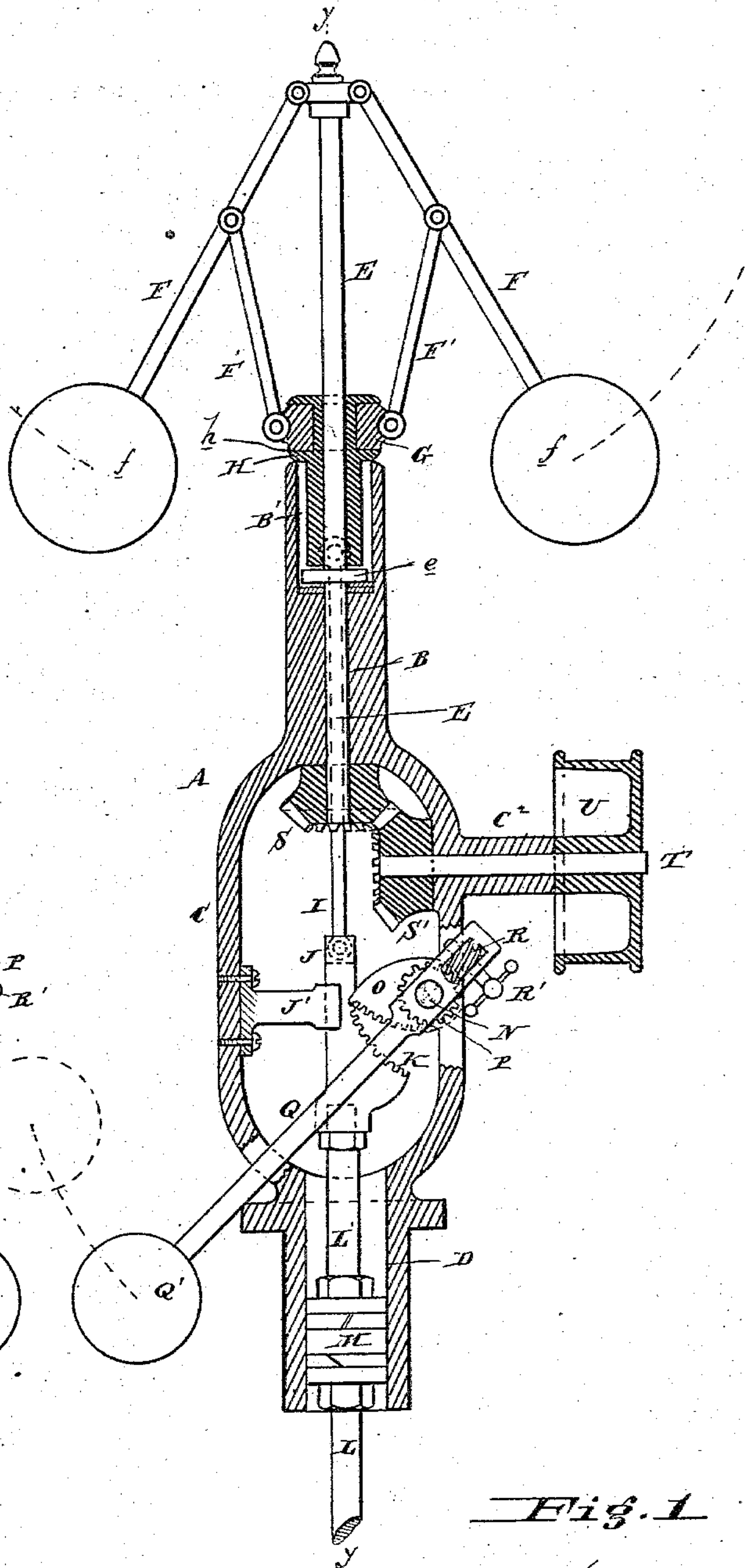


Fig. 1

Attest
W. S. Wade

Inventor
Napoleon W. Williams
By his atty.

[Signature]

UNITED STATES PATENT OFFICE.

NAPOLEON W. WILLIAMES, OF PHILADELPHIA, PENNSYLVANIA.

GOVERNOR FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 280,984, dated July 10, 1883.

Application filed April 27, 1883. (No model.)

To all whom it may concern:

Be it known that I, NAPOLEON W. WILLIAMES, of the city of Philadelphia, county of Philadelphia, and State of Pennsylvania, have
5 invented an Improvement in Governors for Steam-Engines, of which the following is a specification.

My invention has reference to governors for steam-engines; and it consists in combining
10 with the usual ball-governor a pivoted weighted arm or lever adapted to be raised or lowered by the movement of the governor-rod by segmental gear of gradual increasing radius, whereby the leverage exerted by said govern-
15 or-rod to raise said weighted arm shall gradually decrease as the said arm assumes a more horizontal position; further, in combining with the above, mechanism to adjust the relative position or angle of said weighted arm
20 with respect to its gear of varying radius; further, in forming the stuffing or packing box of a small piston working in a cylinder, and in many details of construction, all of which are fully set forth in the following specification, and shown in the accompanying drawings, which form part thereof.

The object of my invention is to provide suitable means to vary the speed of the engine without in any wise altering the governor
30 proper, or to change the power of the engine by the admission of more steam when running at its normal speed; also, to make the governor sensitive to varying pressures in the boiler, and thereby admit more or less steam automatically, as required.

In the drawings, Figure 1 is a sectional elevation of my improved governor on line *x*
35 *x*, and Fig. 2 is a sectional elevation of same on line *y y*.

40 A is the governor-frame, and consists of the bearing B, having sleeve or annular collar *b*, open part C, having bearings C' and C'', and cylinder D.

Supported in the bearing B is the shaft E,
45 provided with a collar, *e*, working on the top of said bearing, and a bevel-gear wheel, S, on its bottom, which latter gears with wheel S' on shaft T, carried in bearing C'', and rotated by pulley U.

50 Pivoted to the top of the vertical shaft E are

the ball levers or arms F, which carry the balls *f* on their lower or free ends.

F' are the links hinged to said arms F at their tops, and pivoted to the block G, carried by the slide H, having extensions H',
55 which work vertically in the guideways or slots *b*. Secured to these extensions H' are links I, which connect with the T-block J, which is guided by bracket J', and provided with the segmental rack K. Secured to this
60 block J is the valve or governor shaft L, which is provided with a piston, M, which works in the cylinder D, performing the function of a packing-box.

The bearing C' carries a shaft, N, secured to
65 which is the segmental cam-gear O, whose radii vary at every tooth. This cam-gear meshes with the rack K on block J, and is moved thereby. Secured to the outer end of the shaft
70 N is a worm-wheel, P, and loosely pivoted to said shaft is an arm or lever, Q, carrying a weight or ball, Q', on its free end, and also a worm, R, which is adapted to work with said worm-wheel P, and may be rotated by a handle, R, to adjust the relative position of said
75 arm Q with respect to said segmental cam-gear O.

It is evident that any other suitable mechanism may be used to change the relative position of said arm with respect to the seg-
80 mental cam-gear, and the various parts of the governor may be modified in various ways without departing from my invention.

The boiler-pressure being constant, the speed of the engine is controlled by the governor in
85 the usual way. The cam or segmental gear is to assist the governor-balls to act as sensitively in a high rotary plane as they would in a lower, for the radius of the cam-gear O shortens when the said balls are in a high
90 plane where gravitation increases, and the lever Q and its weight Q' exert a greater force to counteract the increase of power in the governor. By simply turning the handle R' and its worm R the ball Q' and lever Q may be
95 thrown from a vertical to a horizontal position, thus multiplying the weight on the said lever and varying its power to rotate shaft N and cam-gear O, which latter transmits its motion to gear K on block J, and finally to the gov- 100

ernor proper. The said lever Q, with its ball Q', is utilized to its full limit when the lever stands in a horizontal line, and it then takes the same proportion of weight out of the governor-balls and allows the engine to run faster; hence by simply changing the position of the said lever the engine may be made to run either faster or slower with the same load and same boiler-pressure. If the boiler-pressure should vary, it acts upon the under side of piston M and raises or lowers the valve-shaft L, varying the admission of steam to the engine, and thus keeping it in regulation for varying boiler-pressure. In addition thereto, this piston acts as the stuffing or packing box.

No valve is shown in the drawings, as any of the valves at present used may be employed, or the rod or shaft L may be made to control a cut-off valve, as set out in another pending application of mine bearing even date with this.

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

25 1. A centrifugal governor for steam-engines, provided with a weighted arm, means to vary the position of said arm from a vertical to a horizontal line, and connecting mechanism, substantially as described, by which the effects
30 of said weighted arm are transmitted to the governor shaft or rod with a force increasing in proportion to the elevation or angle said arm makes with a vertical line for operating the valves, substantially as and for the purpose specified.

35 2. A centrifugal governor for steam-engines,

provided with a weighted arm, means to vary the position of said arm from a vertical to a horizontal line, and cam-gear connecting said arm or its shaft with the governor shaft or rod for operating the valves, by which the leverage exerted by said weighted arm may be automatically increased or decreased, substantially as and for the purpose specified.

3. A governor provided with a cylinder, D, 45 formed in the governor-frame, and a piston, M, secured to the valve-rod L, and adapted to work in said cylinder, substantially as and for the purpose specified.

4. A governor for steam-engines, having its valve-rod provided with a segmental cam-gear, K, in combination with shaft N, cam-gear O, lever Q, and weight Q', substantially as and for the purpose specified.

5. A governor for steam-engines, having its valve-rod provided with a segmental cam-gear, K, in combination with shaft N, cam-gear O, worm-wheel, worm, lever Q, and weight Q', substantially as and for the purpose specified.

6. A governor for steam-engines, having a cylinder, D, and its valve-rod provided with a segmental cam-gear, K, and piston M, in combination with shaft N, cam-gear O, lever Q, and weight Q', substantially as and for the purpose specified. 65

In testimony of which invention I hereunto set my hand.

NAPOLEON W. WILLIAMES.

Witnesses:

R. M. HUNTER,
R. S. CHILD, Jr.