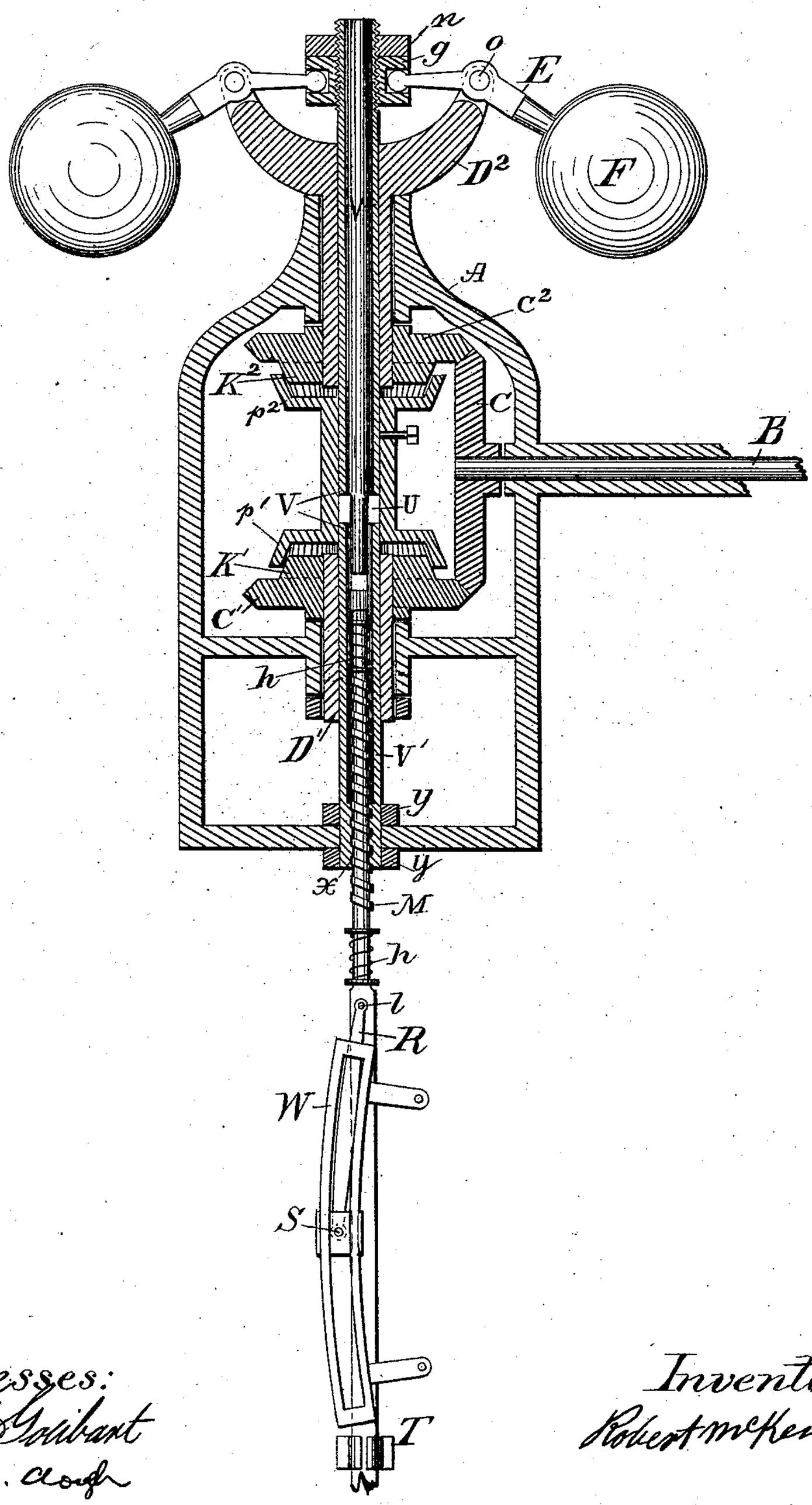
(No Model.)

R. McKENNA.

CENTRIFUGAL SPEED GOVERNOR.

No. 361,251. Patented Apr. 12, 1887.



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CENTRIFUGAL SPEED-GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 361,251, dated April 12, 1887.

Application filed September 30, 1886. Serial No. 215,000. (No model.)

To all whom it may concern:

Be it known that I, ROBERT MCKENNA, a citizen of the United States, residing at White, in the county of Shelby and State of Tennessee, have invented certain new and useful Improvements in Centrifugal Speed-Governors, of which the following is a specification.

This invention relates to improvements in centrifugal speed-governors; and it consists in the construction and combination of parts, substantially as hereinafter set forth, the object being to produce a speed-governor which shall be simple and cheap of construction, efficient of service, and not liable to get out of order. I attain these objects by the mechanism illustrated in the accompanying drawing, which is a vertical sectional elevation of this my improved centrifugal speed-governor.

In the drawing, A represents the frame; B, the driving-shaft, journaled horizontally in the frame A.

V represents a hollow shaft journaled in the frame A, which extends vertically through the center of the device. It is made in sections V′ and V². Said sections are joined together by a lap-joint, U, to allow section V² to move up and down and to enable it to communicate rotary motion to section V′. Section V′ has an interior screw-thread, X, and is prevented from moving up or down by collars *y y*. Section V² has a friction-cup, *p*′, and a friction-cup, *p*², secured on it near its lower end, and a flanged nut, *g*, which hangs on the inner ends of arms E E, screws onto its upper end, and is vertically adjustable thereon with reference to friction-cups *p*′ and *p*², and can be retained after adjustment by a jam-nut, *n*.

D′ represents a sleeve sleeved on section V′ of the shaft V. Sleeve D′ is journaled in the frame, and has secured on its upper end a miter-gear, C′, provided with a friction-block, K′.

D² represents a similar sleeve sleeved on section V² of the shaft V. Said sleeve D² is journaled in the frame and has secured on its lower end a miter-gear, C², provided with friction-block K². The upper portion of sleeve D² is enlarged, to adapt it to carry, fulcrumed on pins *o o*, arms E E, which carry the usual governor-balls, F F. To the inner end of shaft B is secured a miter-gear, C, which meshes with miter-gear C′ and with miter-gear C². By this construction it will readily be seen that the sleeves D′ and D² are rotated in opposite directions on the hollow shaft V when the shaft B is turned.

M represents a vertically-movable bar, the upper portion of which is adapted to fit in the hollow shaft V, and is provided with a screw-thread that fits in the thread *x* in the shaft V. The lower portion of the bar M is angular, and works in a guide, T, and is connected to a valve-moving link, W, by a connecting-link, R, as at *l* and S. Link W is connected by pins, rods, straps, and eccentrics to the main shaft, and in the opposite direction by wrist-box, wrist-pin, and rod to the main valve of the engine, in the usual manner of connecting such parts in link-motion valve-gear on steam-engines.

The operation is as follows: When the engine is in motion at the desired speed, the balls swing at an elevation that holds friction-cups *p*′ and *p*² midway between friction-blocks K′ and K², thereby permitting the friction-cups *p*′ and *p*², and therefore the hollow shaft V, to remain stationary. When the speed increases, the balls press outwardly, causing the inner ends of the arms E to press down the flanged nut *g*, and with it section V² of shaft V, and also the friction-cups *p*′ and *p*², and by so doing jam friction-cup *p*′ onto friction-block K′, thereby locking the shaft V to the sleeve D′, causing shaft V to rotate with that sleeve, and the screw-thread *x* to work on the threaded portion of the bar M, causing said bar, and with it valve-moving link W, to descend until valve-moving link W becomes so adjusted that it will move the main valve of the engine so as to cut off the steam at a point of the stroke that will keep the speed regular and uniform while the engine is performing greatly varied and intermittent labor. When the bar M reaches the limit of its movement in either direction, its threaded portion passes beyond the thread *x* in the shaft V, and thereby becomes disengaged therefrom. If the threaded portion of the bar M were permitted to remain permanently disengaged from the thread *x*, the governor would cease to operate. To prevent this the bar M is provided with the springs *h h*, which are adapted to bear against the upper and lower ends of the thread *x*, thereby exerting a press-

ure on bar M, so as to hold it in a position that causes its threaded portion to re-engage with the thread *x*, when the shaft V turns in the contrary direction, which it does when the engine runs slower than the speed desired, in which case the balls press inwardly, causing the inner ends of arms E to raise the flanged nut *g*, and with it section V^2 of the shaft V and the friction-cups, thereby jamming friction-cup p^2 onto friction-block K^2, whereby rotary motion is communicated from sleeve D^2 to hollow shaft V. The thread *x* in shaft V working on the threaded portion of the bar M raises said bar, and with it the valve-moving link W, until said link W becomes so adjusted that it will move the main valve of the engine so as to cut off the steam at a point of the stroke that will keep the speed regular and uniform.

Any desired speed within the capacity of the steam and the engine can be attained by the adjustment of the flanged nut *g*, which adjustment can be made while the governor is in active operation.

I claim—

1. In a centrifugal speed-governor, the combination of the sleeve V, having the friction-cups p' and p^2 fast thereto, the sleeves D′ and D^2 on the sleeve V, and free to rotate thereon, the said sleeves having the wheels C′ and C^2, respectively, provided with the respective friction-cones K′ and K^2, the weighted lever-arms E, fulcrumed to the sleeve D^2 and having their inner ends connected to the sleeve V, for the purpose set forth, and the rotating shaft B, having the wheel C, meshing with the wheels C′ and C^2, substantially as described.

2. In a centrifugal speed-governor, the combination of the sleeve V, having the friction-cups p' and p^2 fast thereto, the upper end of the said sleeve being screw-threaded, the sleeves D′ and D^2 on the sleeve V, and free to rotate thereon, the said sleeves having the wheels C′ and C^2, respectively, provided with the respective friction-cones K′ and K^2, the weighted lever-arms E, fulcrumed to the sleeve D^2, and the vertically-adjustable grooved nut *g* on the threaded end of the sleeve V, and to which the inner ends of the levers E are connected, substantially as described.

3. In a centrifugal speed-governor, the combination, with the miter-gears C′ and C^2, the miter-gear C, secured to the driving-shaft and meshing with the said gears C′ and C^2, and the balls F, supported by a sleeve connected to said gear C^2, of a hollow shaft, V, passing loosely through said gears C′ and C^2, and provided with an internal screw-thread, *x*, at its lower end, the balls F being connected to the upper end thereof, a clutch mechanism, substantially as described, located between said gears C′ and C^2, substantially as described.

4. In a centrifugal speed-governor, the combination of a hollow shaft, V, made in sections V′ and V^2, said sections being joined together by a lap-joint, U, with frame A, shaft B, miter-gears C C′ C^2, rotating sleeves D′ and D^2, arm-pins *o o*, arms E E, and balls F F, substantially as set forth.

5. In a centrifugal speed-governor, the combination of a valve-moving link, W, a vertically-movable bar, M, having a screw-thread on a portion of its length, the other portion being angular and adapted to work in a guide, T, with a hollow shaft, V, provided with friction-cups p' and p^2, a rotating sleeve, D′, carrying a miter-gear, C′, provided with a friction-block, K′, a rotating sleeve, D^2, carrying a miter-gear, C^2, provided with a friction-block, K^2, shaft B, carrying a miter gear, C, arm-pins *o o*, arms E E, and balls F F, substantially as set forth.

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