(No Model.)

R. McKENNA.

SPEED GOVERNOR.

No. 342,623. Patented May 25, 1886.

Fig. 1.

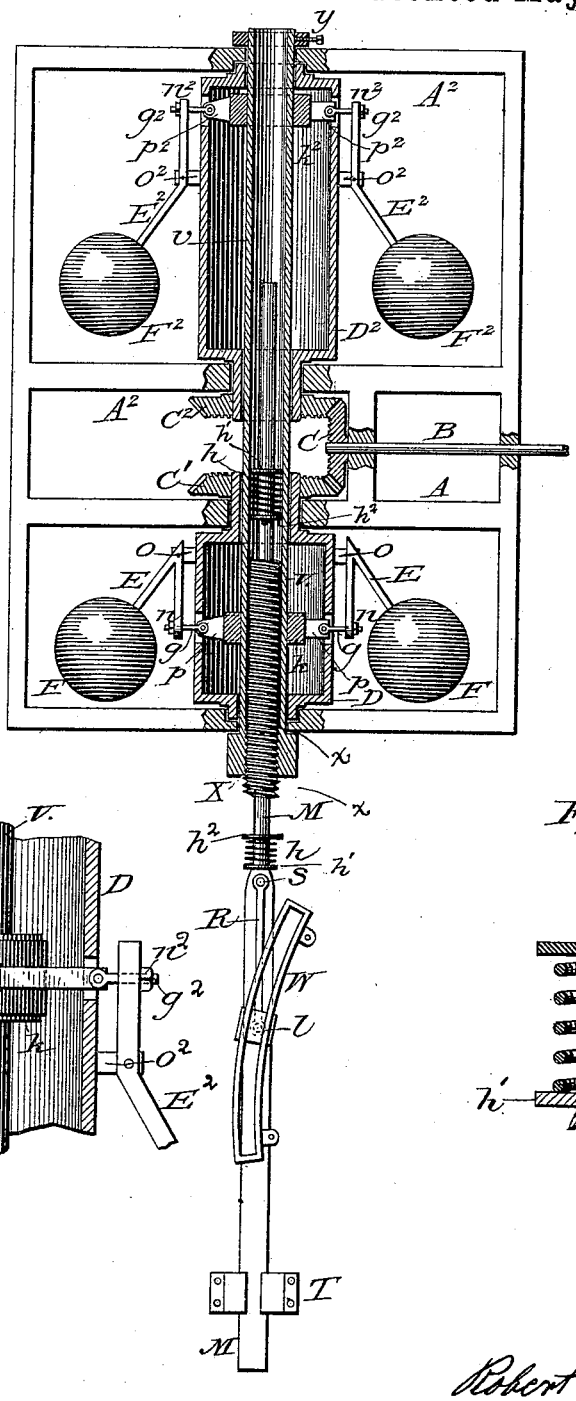


Fig. 2.

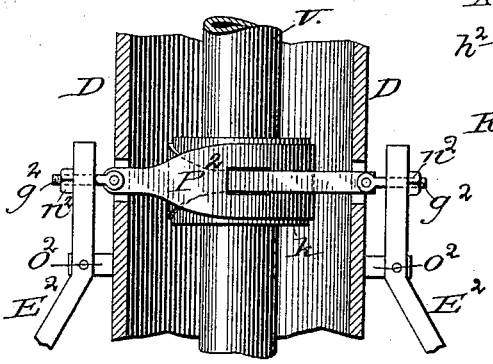
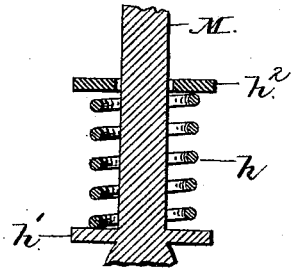


Fig. 3.



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ROBERT McKENNA, OF WHITE, TENNESSEE.

SPEED-GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 342,623, dated May 25, 1886.

Application filed November 20, 1885. Serial No. 183,436. (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 new and useful Improvements in Duplex Ball Speed-Governors, of which the following is a specification.

My invention relates to an improvement in speed-governors for steam-engines; and it consists in the peculiar construction and combination of devices that will be more fully set forth hereinafter, and particularly pointed out in the claims.

In the drawings, Figure 1 is a vertical sectional view of a speed-governor embodying my improvements. Fig. 2 is an enlarged detail view. Fig. 3 is a detailed sectional view.

A represents a suitable frame, and B represents a driving-shaft, which is journaled horizontally in the said frame.

V represents a vertical hollow shaft, which is journaled in the frame A, and provided at its lower end with an enlarged head and at its upper end with a collar, *y*, and thereby prevented from moving vertically in the frame.

On the lower portion of the shaft V is an enlarged sleeve, D, and on the upper portion of said shaft is a similar sleeve, D^2, the said sleeves being journaled at their upper and lower ends in the frame and free to rotate independently of the shaft V. The latter has a drum, *k*, on its lower portion in the sleeve D, and a similar drum, k^2, on its upper portion in the sleeve D^2, and has its lower end provided with an interior screw-thread, X.

To the inner end of the shaft B is secured a miter-pinion, C, which meshes with a similar wheel, C′, fixed on the upper end of the sleeve D, and with a similar pinion, C^2, fixed on the lower end of sleeve D^2. By this construction it will be readily seen that the sleeves are rotated in opposite directions on the shaft V when the shaft B is turned.

The sleeves are provided with studs O and O^2, which project from their outer sides, and also with openings in their sides, which align vertically with the studs.

To the studs O are fulcrumed lever-arms E, which carry the usual governor balls or weights, F, and similar arms, E, carrying balls F^2, are fulcrumed to the studs O^2.

P and P^2 represent flexible straps, which encircle the drums *k* and k^2, respectively, and have their outer ends passed through the openings in the sleeves, and connected to the free ends of the lever-arms E and E^2 by means of the bolts *g* and g^2, which are provided on their outer threaded ends with jam-nuts *n* and n^2, by means of which the friction of the flexible straps on the drums may be regulated.

M represents a vertically-movable valve-governor stem, the upper portion of which is adapted to fit in the hollow shaft V, and is provided with a screw-thread that fits the thread X in the interior of the said hollow shaft. The lower portion of this said valve-governor stem is angular and works in a guide, T, and is connected to a valve-link, W, by a pitman, R, as at *s* and *r*. The link W is connected to the throttle-valve of the steam-engine by means of any suitable and well-known devices, which are not shown, nor more particularly described herein, as they form no part of my invention.

On the stem M are placed bearing-springs *h*, which bear between washers *h′* that are immovable on the stem and washers h^2 that are free to slide upon the stem, against the pressure of the springs, as shown in Fig. 3.

The operation of my invention is as follows: When the engine is in motion at the desired speed, the balls F and F^2 swing at such an elevation as will cause the flexible straps to loosely encircle the friction-drums, thereby permitting the latter, and therefore the hollow shaft, to remain stationary. When the speed of the engine increases, the balls F rise, and cause the strap P to tightly embrace the drum *k*, thereby locking the shaft V to the sleeve D and causing said shaft to rotate. Its screw-thread working on the threaded portion of the stem M, causes the latter to descend, and thereby partly close the throttle-valve, and thus diminish the quantity of steam supplied to the engine. When the stem M reaches the limit of its movement in either direction, its thread passes the thread X in the hollow shaft, and thereby becomes disengaged therefrom. If the threaded portion of the stem were permitted to remain permanently disengaged from the thread in the hollow shaft, the governor would cease to operate. To prevent this, the springs *h* on the stem M have been devised. When the threaded por-

tion of the stem becomes disengaged from the threaded opening in the hollow shaft, one of the loose plates or washers, h^2, is caused to bear against one of the shoulders x formed by the ends of the threaded portion of the hollow shaft, and one of the springs h is thus caused to exert a pressure on the stem, and thus prevent it from ascending or descending any farther, as the case may be, and holding the threaded portion of the stem in readiness to re-engage the threaded portion of the hollow shaft when the motion of the latter is reversed, as will be very readily understood. When the engine runs too slowly, the balls F^2 descend and cause the strap P^2 to tightly embrace the drum k^2, and thereby rotate the shaft V in the contrary direction, raise the stem M, and open the throttle wider to admit more steam to the engine, as will be readily understood.

I claim—

1. The combination of the shaft V, the valve-stem M, means connecting the latter with the shaft V, whereby it will be moved when the said shaft rotates, the sleeves rotating on the shaft in opposite directions and carrying the fulcrumed weighted governor-arms, and the flexible straps encircling the shaft V, and having their ends connected to the governor-arms, for the purpose set forth, substantially as described.

2. The combination, in a duplex ball speed-governor, of a hollow shaft, V, having a thread, x, on its inside surface, and friction-drums k and k^2, secured on its outside, with arms E and E^2, having flexible bands P and P^2 attached to their inner ends, said flexible bands being adapted to encircle, embrace, and turn friction-drums k and k^2, substantially as and for the purpose set forth.

3. The combination, in a duplex ball speed-governor, of a valve-moving link, W, and a connecting-link, R, with a threaded valve-stem, M, having a part of its length made so as to adapt it to slide up and down in a guide, T, a hollow shaft, V, having a thread, X, on its inside surface, and friction-drums k and k^2, secured on its outside, and arms E and E^2, having flexible bands P and P^2 attached to their inner ends, all substantially as set forth.

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