

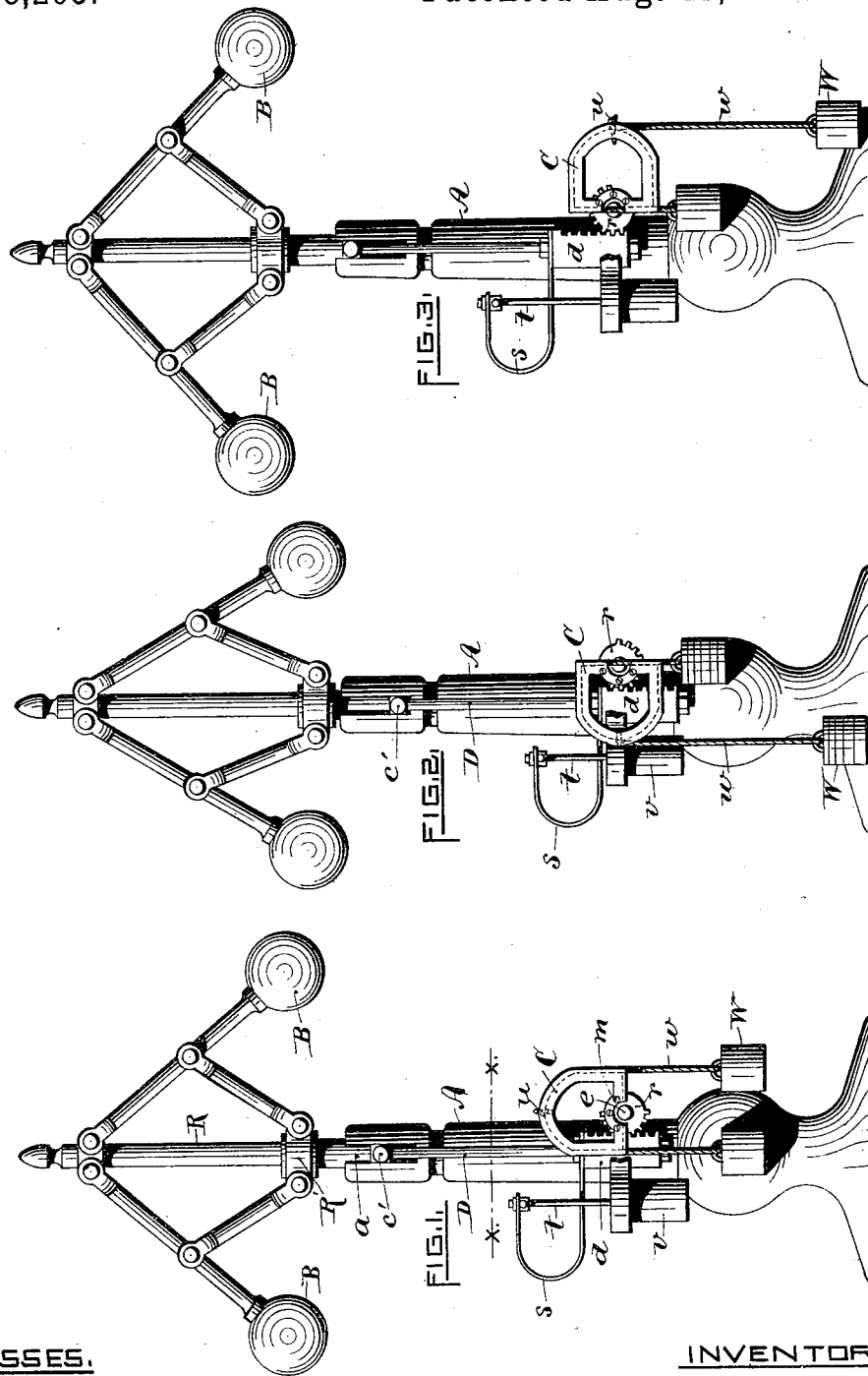
(No Model.)

2 Sheets—Sheet 1.

W. L. COLLAMORE.
STEAM ENGINE GOVERNOR.

No. 348,265.

Patented Aug. 31, 1886.



WITNESSES.

Charles H. Cannigan.
Joseph A. C. Sanford.

INVENTOR.

William L. Collamore
by Remington & Henthorn.
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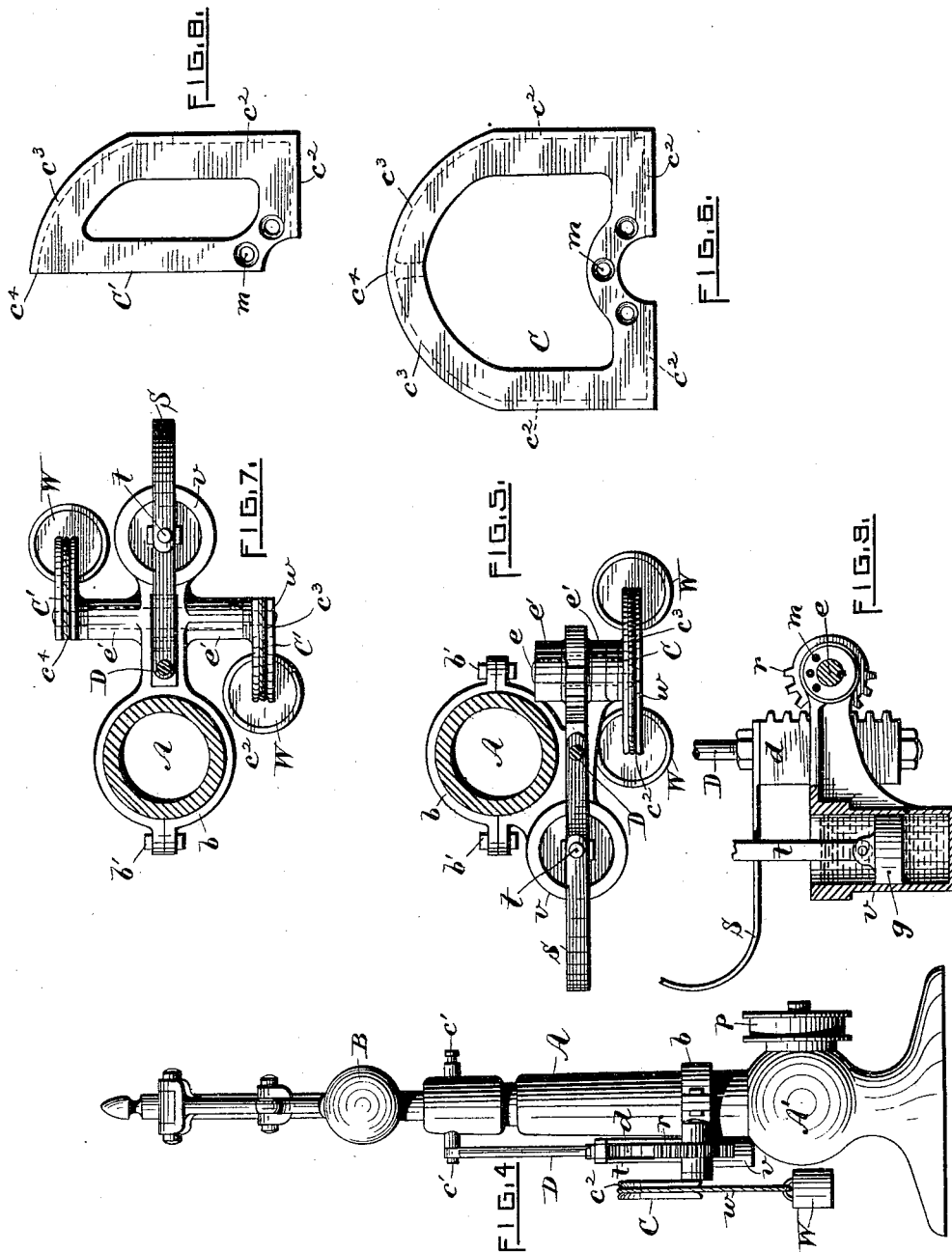
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UNITED STATES PATENT OFFICE.

WILLIAM L. COLLAMORE, OF WARREN, RHODE ISLAND.

STEAM-ENGINE GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 348,265, dated August 31, 1886.

Application filed May 3, 1886. Serial No. 200,925. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. COLLAMORE, a citizen of the United States, residing at Warren, in the county of Bristol and State of Rhode Island, have invented certain new and useful Improvements in Attachments for Steam-Engine Governors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My present invention relates to certain improvements in steam-engine governors; and it consists, essentially, of an attachment combining a dash-pot, a spring-connected piston working therein, a rod operated by the governor, a rack, a pinion engaging the rack, a suitably-mounted shaft, to which the pinion is secured, a double cam actuated by said pinion-shaft, and weights suspended from the cam, the latter being so constructed and arranged that any angular movement thereof from its normal position (caused by the rise or fall of the governor) produces a change in the position of the weights proportionate to the said movement of the governor-balls, thereby adapting the latter to run at a regular or uniform speed in any position within its limits of extreme movement.

The object of my invention is to provide an engine with means whereby the governor thereof is rendered isochronal in its action, thereby preventing the governor from "racing" when a sudden change in the load or work upon the engine takes place.

In order to fully set forth this invention, I have prepared the two accompanying sheets of drawings, in which—

Figure 1, Sheet 1, represents in elevation the attachment combined with a ball-governor, the parts being in the normal or mid position. Fig. 2 is a similar view showing the position of the cam and weights corresponding to the lowest position of the balls. Fig. 3 is a view showing the balls in the highest position. Fig. 4, Sheet 2, is a side elevation viewed from the right of Fig. 1. Fig. 5 is a horizontal sectional view, enlarged, taken through line *x x* of Fig. 1. Fig. 6 is a detached view, also enlarged,

of the cam which sustains the counter-weights. Fig. 7 is a horizontal sectional view of the detachment, showing the cam made in two parts, each provided with a counter-weight and secured to the ends of the pinion-shaft. Fig. 8 is a detached view of one of the said latter cams; and Fig. 9 represents a vertical sectional view through the dash-pot, &c.

The following is a more detailed description of the invention hereinafter claimed.

A, again referring to the drawings, designates the standard or column of the governor, constructed substantially as usual, *p*, Fig. 4, being a pulley adapted to be driven by a belt. Said pulley is secured upon a shaft which, by means of gearing, &c., (not shown,) mounted within the base portion *A'* of the standard, transmits motion to the spindle *R* to revolve the balls *B*, all as commonly constructed. By means of links, &c., the balls are connected with the sleeve *R'*, which is adapted to slide freely up and down upon said spindle. Extending from the sleeve are one or more projections, *c'*, loosely fitted in openings *a*, formed in the upper portion of the standard *A*, as clearly shown in Figs. 1, 4, &c. To the outer end of the said projection *c'* is attached the depending rod *D*, the latter having a rack, *d*, secured to or formed on its lower portion.

b indicates a frame adapted to be clamped to the column *A*, said frame being provided with bearings *e' e'*, in which a shaft, *e*, is mounted.

r designates a pinion secured to the shaft *e* and intergearing with the rack *d*.

v is a dash-pot or vessel connected with the frame *b*, in which a piston, *g*, is adapted to work freely by means of links *t* and the spring-connection *S*, the latter secured to and moving in unison with the rod *D*.

The foregoing description refers to elements in the device to which I make no claim herewith.

C designates the cam or frame of novel construction, to which the two counter-weights *W* are attached by means of the cord *w*, or any other suitable flexible connection. Said cord is secured at *u* to the center of the top side of the cam, as shown in Figs. 1, &c., the cam itself in turn being secured to the projecting end of the shaft *e* by means of screws *m*. This cam *C*, which forms an essential part of the invention, is constructed substantially as fol-

lows: its shape or outline corresponding to a skeleton frame having four sides, the top side, c^3 , being curved alike on each side thereof downwardly from the center or apex c^4 , as shown in Fig. 6, the width of the cam being substantially the same as its height through the center. The form of the curved side c^3 is such that when the weights W W are suspended from each side of the cam in the normal position, (see Fig. 1, corresponding to the mean position of the balls,) and the cam then deflected to the right or left, the preponderance of weight on one side and the reduced leverage and weight on the other agree almost exactly with the force exerted by the balls B in their maximum and minimum planes of revolution, thereby producing a uniform speed of governor within its extreme limits of up-and-down movement. The cam is provided with the peripheral groove c^2 , in which the cords w are guided and retained. It will be observed that when the cam is in its extreme position right or left, as shown in Figs. 2 and 3, the leverage of the center weight is *nil*, as the cord w then passes vertically through a line drawn across the center of the shaft e , while at the same time the other weight is exerting its force through the medium of the longest arm or lever of the cam.

In Figs. 7 and 8 the cam C' is substantially the same as shown in the other figures, except that it is made in two parts and secured to each end of the shaft e , each half-cam being provided with a counter-weight W , as hereinbefore described with reference to the cam C . By means of this construction the pressure upon the shaft is more evenly distributed. The action of the cam, &c., however, is identical with that shown in the preceding figures.

The weights W may be made hollow or cup-shaped, for the purpose of effecting a greater degree of accuracy by means of the addition of shot or other small weights; or, as indicated in Fig. 2, the weights may be composed of a series of minor plate-like weights.

Oil or other suitable fluid placed in the dash-pot v , in conjunction with the spring s and its attached freely-working piston g , serves to prevent the governor from traveling too far under sudden and wide fluctuations; but at the same time, however, by means of said spring, the governor is adapted to rise and fall rapidly when required by the varying conditions of the load upon the engine.

I am aware that it is not new to provide a steam-engine governor with means for automatically effecting a uniform speed irrespective of the work or load which the engine may be suddenly called upon to overcome. Therefore I do not broadly claim herewith such as my invention. Neither do I specifically claim herewith a dash-pot and spring-connected piston working therein; but

What I do claim, and desire to secure by Letters Patent of the United States, is—

1. In an attachment for steam-engine governors, the combination, with an actuated shaft, and a cam attached thereto, of two counter-weights suspended from said cam by means of flexible connections, substantially as shown, and for the purpose hereinbefore set forth.

2. The combination, with a governor and mechanism for producing an isochronal movement, of a cam having two parallel vertical sides, a top side downwardly curved each way from its center, meeting said vertical sides, and a base side formed at right angles with and joining the vertical sides, said cam being so constructed that its width is equal to its height, substantially as shown and hereinbefore set forth.

3. The combination, with a governor, of counter-weights W , cam C , and means, substantially as shown and described, for actuating the said cam and weights, as and for the purpose hereinbefore set forth.

4. In a steam-engine governor, the combination, with the toothed rod connected to and actuated by the governor, of a frame, a shaft mounted in said frame, a pinion secured to the shaft, a cam adapted to move in unison with said pinion, and weights suspended from the cam, all constructed and arranged whereby the governor in its fluctuations up and down is counteracted by the movement of the said cam and weights, substantially as shown and hereinbefore set forth.

5. In a steam-engine governor, the combination, with the rod D , actuated by the governor, of a cam, weights suspended from said cam by flexible connections, and means both for supporting and actuating the cam, substantially as shown, and for the purpose hereinbefore described.

6. The combination, with a governor and toothed rod D , actuated by the governor, of a frame, b , links t , spring s , dash-pot v , piston g , pinion r , shaft e , cam C , and counter-weights W , suspended from said cam, the whole constructed and arranged substantially as shown, and for the purpose hereinbefore set forth.

7. The attachment for steam-engine governors hereinbefore described, consisting of the toothed rod D , frame b , pinion r , shaft e , dash-pot v , spring-connected piston g , cam C , and counter-weights W , suspended from said cam by means of flexible connections, the whole constructed and arranged substantially as shown and set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

WILLIAM L. COLLAMORE.

Witnesses:

GEO. H. REMINGTON,
CHARLES HANNIGAN.