

No. 631,778.

Patented Aug. 29, 1899.

W. E. DEAN.
AUXILIARY GOVERNOR.
(Application filed Apr. 26, 1899.)

(No Model.)

3 Sheets—Sheet 3.

FIG. 3

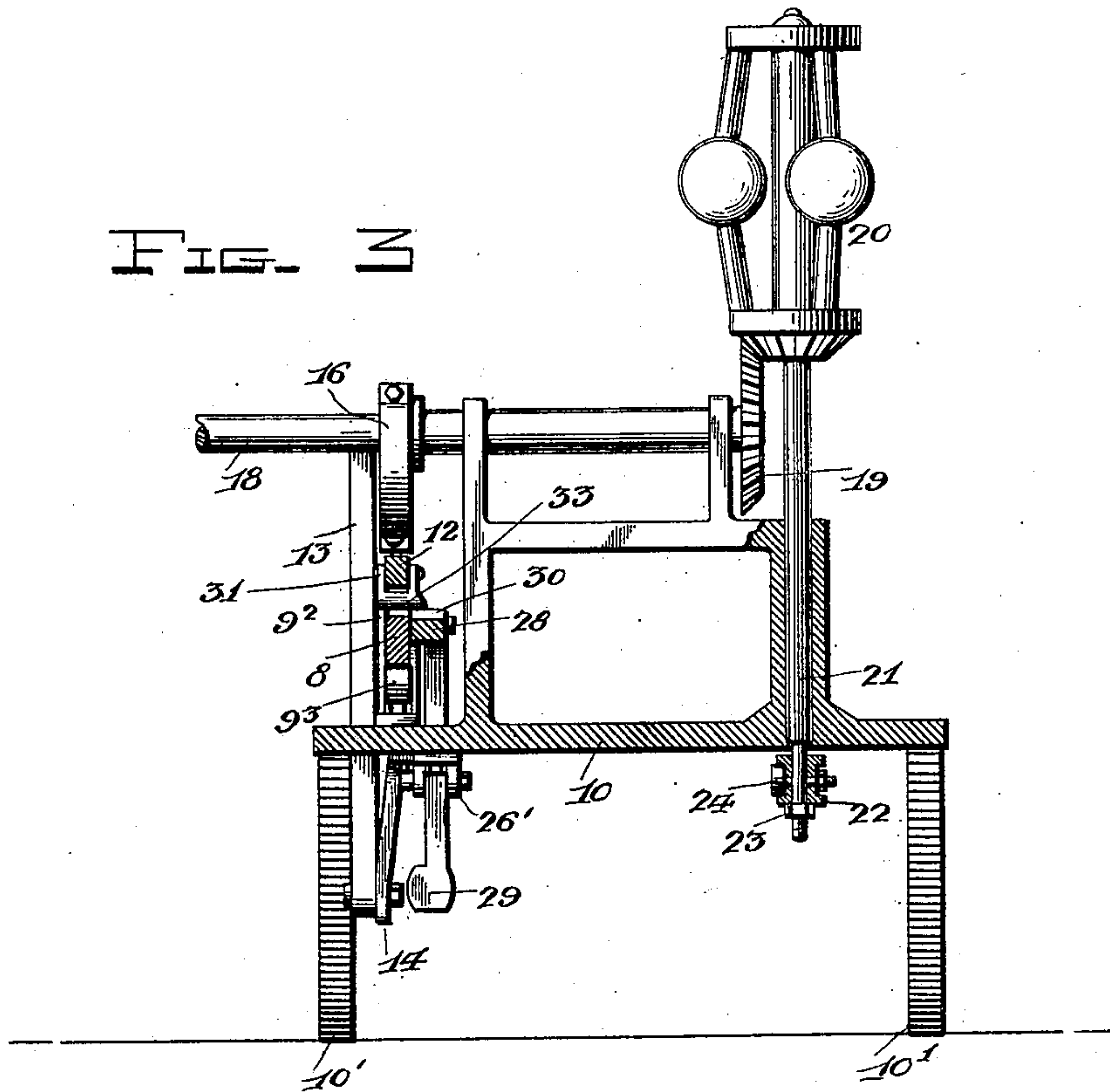
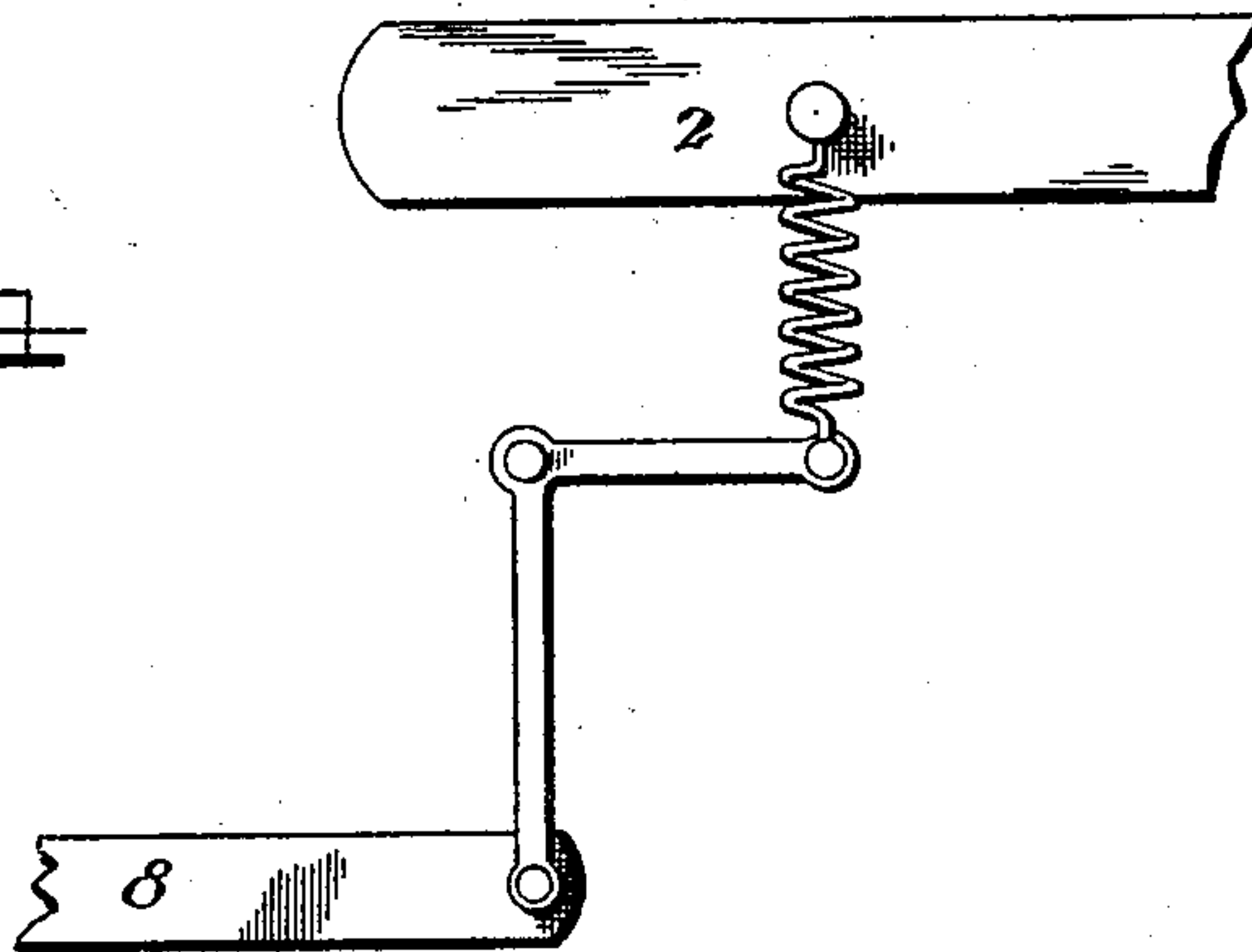


FIG. 4



Witnesses
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UNITED STATES PATENT OFFICE.

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AUXILIARY GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 631,778, dated August 29, 1899.

Application filed April 26, 1899. Serial No. 714,564. (No model.)

To all whom it may concern:

Be it known that I, WALLACE E. DEAN, a citizen of the United States, residing at Huntsville, in the county of Madison and State of Alabama, have invented certain new and useful Improvements in Auxiliary Governors; and I do 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.

My invention relates to auxiliary governors for steam-engines; and the object is to provide a simple and effective device for automatically controlling the engine conformably to its working load through the medium of the main governor.

To this end the invention consists in the construction, combination, and arrangement of the several parts of the device, as will be hereinafter more fully described, and particularly pointed out in the claims.

In the accompanying drawings the same reference characters indicate the same parts of the invention.

Figure 1 is a side elevation of my improved auxiliary governor. Fig. 2 is a top plan view of the same. Fig. 3 is a transverse section on the line 3 3 of Fig. 1. Fig. 4 is a modified form showing a spring in place of the counterbalance-weight.

Heretofore in operating ball-governors as commonly made the centrifugal force was relied upon wholly to control the time of cut-off or the amount of steam admitted, and this was more or less unreliable when there were great varieties in the duty or the load on the engine. The governor-balls are sensitive to slight intermittent differences; but if half of the load (more or less) should be taken off the speed will be accelerated two per cent., (more or less,) which would be too fast for the remaining load, and the governors will not adjust themselves to the former speed from the fact that it requires less steam. To accomplish this change, it requires an accelerated speed for the governor to adjust itself, and the same is true if the steam-pressure should be increased, and vice versa, from which defects it follows that the engine will not remain at a uniform speed if the load or steam-pressure is materially varied. This objection is overcome by the use of a lever-

and-weight (or spring) mechanism for acting directly or indirectly on the balls or their equivalent mechanism for actuating the governor or throttle valve, whereby they are practically increased or decreased in weight, and this, too, while the balls are in motion, so as to render them extremely sensitive and quickly responsive to the variations in the load upon the engine. In the ordinary construction of this form of governor the lever is pivoted on one side of its fulcrum-point to the governor-rod and the other is a sliding weight or spring, which normally counterbalances the main governor-operating mechanism. So far as I am aware this counterbalancing weight or spring has heretofore been adjusted by hand. To overcome this objection, I have provided an auxiliary governor whereby this weight is automatically adjusted more quickly and accurately by the mechanism which I will now proceed to describe.

1 denotes the main or engine governor stand; 2, the lever coacting therewith, as above stated; 3, the cut-off lever, and 4 the counterbalancing-weight, which has a sliding engagement with the lever 2. The levers 2 and 3 are fixed on a counter-shaft 2', which also carries a yoke-lever 2'', engaging the sleeve 3', which has a sliding engagement with the governor-stand 1, as shown in Fig. 2.

5 denotes a lateral stud on the weight, on which is pivoted the swiveled threaded socket 6 to receive the threaded end of the rod 7, adjustably secured therein by the usual jam-nut. The opposite end of the rod carries a similar socket 6', which is pivoted to a rack-bar 8, having a reciprocating engagement with the aligned standards 9 9' 9'', fixed on the bed-plate 10, supported on the fixed brackets 10' 10''. The standards are provided with roller-bearings 9³, upon which the rack-bar 8 travels, and 12 denotes a reciprocating bar mounted vertically above and parallel with the rack-bar, its free end having a sliding engagement with the standard 9', and its opposite end is pivoted to the vertical lever 13, fulcrumed in the bracket 14, fixed to the bed-plate 10, and its upper end is pivoted to the adjustable eccentric-rod 15, secured to the eccentric-strap 16, encompassing the eccentric 17, fixed on the counter-shaft 18, provided with a band-pulley 19, by means of

which motion is communicated to the auxiliary governor 20, the vertical shaft 21 of which extends through the bed-plate 10 and carries a slotted collar 22, adjustably secured thereon by the join-nut 23 and which receives the free end of a lever 24, fixed on a rock-shaft 25, journaled in bearing-boxes 26, fixed to the bed-plate.

27 denotes a vertical lever fixed on the rock-shaft 25, and its upper end is pivoted to a horizontal bar 28, its opposite end being pivoted to a corresponding parallel lever 27', fulcrumed in the bracket 26', fixed to the bed-plate. The lower ends of these levers 27 27' are each provided with a counterbalancing-weight 29 to equalize their movement, and the horizontal bar 28, which extends parallel with and contiguous to the rack-bar 8, is formed with a recess 30 in its upper edge.

31 and 32 denote gravity-pawls fulcrumed on the horizontal bar 12, and the free end of each pawl terminates in a tooth 33, which extends across the path of the rack-bar 8 and horizontal bar 28, the teeth normally resting on the plane edge of the horizontal bar 28 and on each side of the recess 30, and consequently out of contact with the teeth on the rack-bar 8.

The operation of the device is as follows:

When the main and auxiliary governors are rotating at their normal speed, the weight 4 is adjusted on the lever 2 to conform to the normal load on the engine, and the horizontal bar 28 is so adjusted that the pawls 31 and 32 will travel on the plane edge of the bar 28 on their respective sides of the recess 30 without dropping into it or coming in contact with the teeth on the rack-bar 8, which is connected to the weight 4. If now the load on the engine is increased, the auxiliary-governor shaft 21 raises and, through the medium of the arm 24 and lever 27, moves the horizontal bar 28 to the right, which permits the pawl 32 to drop in the recess 30 and engage one of the teeth on the rack-bar and move it to the left. As the pawl 32 and bar 28 move forward this slides the weight 4 outwardly on the lever 2, thus enabling the engine-governor to increase the length of travel of the cut-off valve, and vice versa. If the load on the engine should be decreased, the auxiliary-governor shaft will move downward and move the bar 28 to the left, so that the recess 30 permits the pawl 31 to drop into the rack-bar and move the weight 4 nearer to the fulcrum-point of the lever 2, and thereby allowing the engine-governor to shorten the cut-off on the engine. The same principle is equally applicable to a throttling-governor, enabling it to admit more or less steam to the cylinder as the load on the engine varies. Instead of the weight 4 a spring may be substituted and the rack-

bar 8 connected thereto, so as to increase or diminish the tension of the spring exerted on the lever 2 to correspond to any variations in the load on the engine.

The advantages of an automatic device of this character will be more fully appreciated when it is stated that the counterbalance-weight 4 has heretofore been manipulated entirely by hand.

In Fig. 4 I have shown the weight 4 supported by a coiled spring, one end of which is fixed to the lever 2 and the other to a bell-crank lever, which in turn is connected to the rack-bar 8, so that a movement of the latter to the right will lessen the tension of the spring, and consequently the weight on the lever 2, and vice versa a reverse effect will be produced when the rack-bar is moved to the left.

The accompanying drawings show my invention in the best form now known to me; but many changes might be made within the skill of a good mechanic without departing from the spirit of my invention as set forth in the claims at the end of this specification.

Having thus fully described my invention, what I claim as new and useful, and desire to secure by Letters Patent of the United States, is—

1. In combination, a main governor provided with an adjustable weight adapted to counterbalance the centrifugal effect of said governor, an auxiliary or independent governor and intermediate means whereby the centrifugal force of the said auxiliary or independent governor will be communicated to the weight on said main governor, substantially as and for the purpose set forth.

2. A steam-engine governor, and its counterbalance, in combination with an auxiliary governor, operatively connected to said counterbalance, substantially as and for the purpose set forth.

3. An engine-governor provided with a counterbalance-weight 4, in combination with the auxiliary governor 20, and its shaft 21, the crank-arm 24, and the parallel levers 27 27' connected by the recessed bar 28, the rack-bar 8 connected to said weight 4, the shaft 18 eccentric, strap and their rod, the lever 13, pivoted to said lever 18, the horizontal bar 12, carried by said lever 13, and the gravity-pawls 31 32 fulcrumed on said bar 12, and projecting into the path of the bars 12 and 28, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WALLACE E. DEAN.

Witnesses:

CHAS. S. MCCALLEY,
TANCRED BETTS.