No. 840,499. PATENTED JAN. 8, 1907.

J. KNOWLSON.

SPEED GOVERNOR.

APPLICATION FILED MAY 7, 1906.

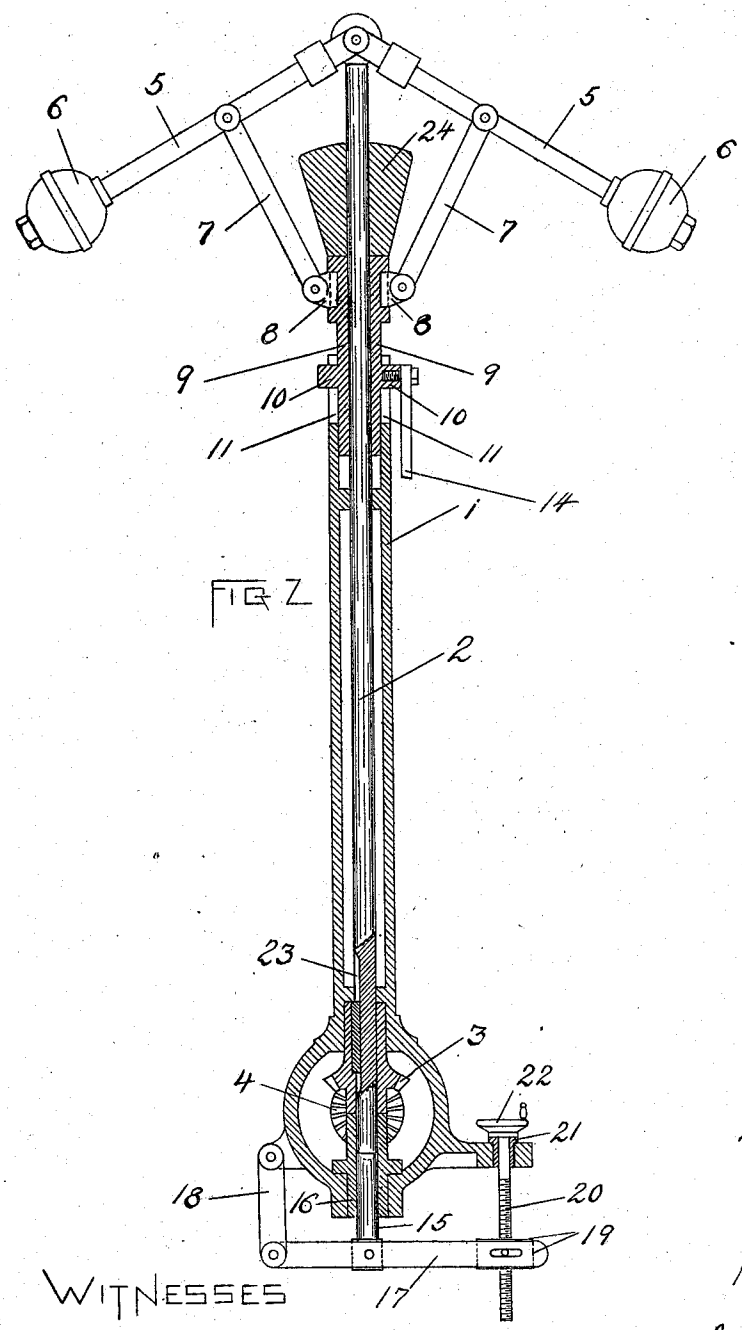

FIG 2

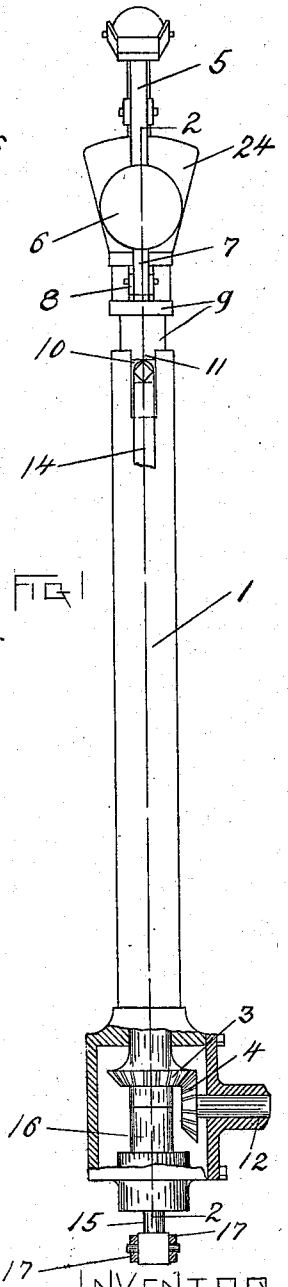

FIG 1

WITNESSES

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SPEED-GOVERNOR.

No. 840,499. Specification of Letters Patent. Patented Jan. 8, 1907.

Application filed May 7, 1906. Serial No. 315,478.

To all whom it may concern:

Be it known that I, JOHN KNOWLSON, a citizen of the United States, residing at Troy, county of Rensselaer, and State of New York, have invented certain new and useful Improvements in Variable-Speed Governors, of which the following is a specification.

The invention relates to such improvements; and it consists of the novel construction and combination of parts hereinafter described and subsequently claimed.

Reference may be had to the accompanying drawings, and the reference characters marked thereon, which form a part of this specification.

Similar characters refer to similar parts in both figures therein.

Figure 1 of the drawings is a view in side elevation of a centrifugal governor embodying my invention. Fig. 2 is a central vertical longitudinal section of the same, taken on the broken line 2 2 in Fig. 1.

The principal object of my invention is to utilize the centrifugal governor of a steam-engine, both for establishing different standards of speed for the engine and for automatically regulating the speed of the engine to a desired and established standard.

Other objects of the invention will appear in connection with the following description.

The invention relates more particularly to the type of steam-engine governor wherein the valve regulating the supply of steam to the engine is controlled by the centrifugal action of weighted arms, which are caused to revolve in accordance with the speed of the engine.

Referring to the drawings, wherein the invention is shown in its preferred form, 1 is a stationary hollow post, within which rotates a vertical spindle 2, driven by a bevel-gear 3, meshing with a bevel-gear 4, fixed upon a shaft 12, which is adapted to be connected with the engine or engine-driven machinery in the usual manner.

To the upper end or head of the spindle 2 are pivoted the inner ends of the weight-arms 5, each carrying a weight 6. The weight-arms 5 are connected by the respective links 7 with a collar 8, loosely seated in a peripheral groove in the sleeve 9 and free to rotate with the spindle 2 and weight-arms relatively to said sleeve. The sleeve 9 is movable vertically within the post 1 and longitudinally of the spindle 2 and is provided with oppositely-located offsets 10, which fit and are movable vertically in slideways 11 on the post. To one of the offsets 10 is attached one end of a link 14, which is adapted to be connected in the usual manner with the steam-valve mechanism. (Not shown.)

The spindle 2 being maintained stationary as regards vertical position, differences in its rotary speed will cause the weights 6 to assume by centrifugal force different positions, thereby raising or lowering the sliding sleeve 9 and operating the steam-valve through the link 14 to regulate the supply of steam to the engine in the usual manner. For the purpose of the present invention the spindle 2 is adapted to be raised or lowered to raise or lower the inner ends of the weight-arms 5, whereby the position of the weights can be varied independently of the position of the collar 8 and sliding sleeve 9.

As the lifting force of the weights, due to centrifugal action when revolved at a given speed, is effected by their distance from the axis of revolution, it is possible by thus raising or lowering the spindle 2 to vary the lifting force of the weights for a given speed of revolution.

As the automatic action of the governor tends to maintain the sliding sleeve 9 at a definite height when the lifting force of the weights has been thus affected by a vertical movement of the spindle 2 the automatic action of the governor in its usual manner will cause the speed of the engine to be increased or diminished, as the case may be, until the original lifting force of the weights and definite height of the sleeve 9 are restored, due to the resulting variation in the revolutionary speed of the weights, after which the governor will automatically act in its usual manner to maintain the engine at the new standard of speed thus established.

It is possible by simply raising or lowering the spindle 2 to establish for the engine any desired standard of speed, which established standard will be maintained by the automatic action of the governor in its usual manner.

As a preferred means for raising or lowering the spindle 2 I have shown the spindle at its lower end with a step-bearing formed upon the upper end of a post 15, reciprocatory in a fixed bearing 16 and having at its lower end a swivel connection with a lever 17, fulcrumed at one end upon a pendulous link 18, which is mounted upon the lower end of the post 1, the other end of said lever having a

nut 19 swiveled thereupon, adapted to receive a screw 20, rotatively mounted in a bearing 21 upon the post 1 and adapted to be rotated by means of a hand-wheel 22. By operating the hand-wheel 22 the post 15 can be raised or lowered to impart to the spindle 2 the desired vertical movement.

The vertical movement of the spindle 2 relative to the gear 3 is provided for by means of a feather connection between said gear and spindle, the spindle being provided with a longitudinal groove 23 to receive the feather, said groove being of a length to permit the necessary longitudinal movement of the spindle.

For certain purposes of the invention any known means may be employed for raising and lowering the spindle 2.

The weight 24 serves to counteract or resist to the required degree the lifting action of the centrifugal weights.

My improved governor may be employed in connection with any desired form of engine and supply-valve therefor, being particularly adapted for use in connection with a cylindrical slide-valve in the Corliss type of steam-engine.

What I claim as new, and desire to secure by Letters Patent, is—

1. In an engine-governor and in combination, a rotatory spindle; engine-driven means for rotating said spindle; a sleeve inclosing said spindle, and capable of movement longitudinally thereof; means adapted to connect said sleeve with the valve mechanism controlling said engine; weighted arms pivotally mounted at their inner ends upon the end of said spindle; connections between said weighted arms and said sleeve; and means whereby said spindle can be adjustably moved longitudinally and supported in adjusted position.

2. In an engine-governor and in combination, a vertically-arranged rotatory spindle; engine-driven means for rotating said spindle; a sleeve inclosing said spindle, and capable of movement vertically thereupon; means adapted to connect said sleeve with the valve mechanism controlling said engine; weighted arms pivotally mounted at their inner ends upon the upper end of said spindle; connections between said weighted arms and said sleeve; a step-bearing for the lower end of said spindle; a lever supporting said step-bearing; and a screw for operating said lever to raise or lower said step-bearing.

3. In an engine-governor and in combination, a rotatory spindle; a sleeve inclosing said spindle, and capable of movement longitudinally thereof; means adapted to connect said sleeve with the valve mechanism controlling said engine; weighted arms pivotally mounted at their inner ends upon the end of said spindle; connections between said weighted arms and said sleeve; means whereby said spindle can be adjustably moved longitudinally, and supported in adjusted position; a bevel-gear mounted upon said spindle to rotate therewith and permit sliding movement of the spindle therethrough, and a second bevel-gear meshing with said first-mentioned bevel-gear and adapted to be driven by said engine.

In testimony whereof I have hereunto set my hand this 3d day of May, 1906.

JOHN KNOWLSON.

Witnesses:
FRANK C. CURTIS,
E. M. O'REILLY.