

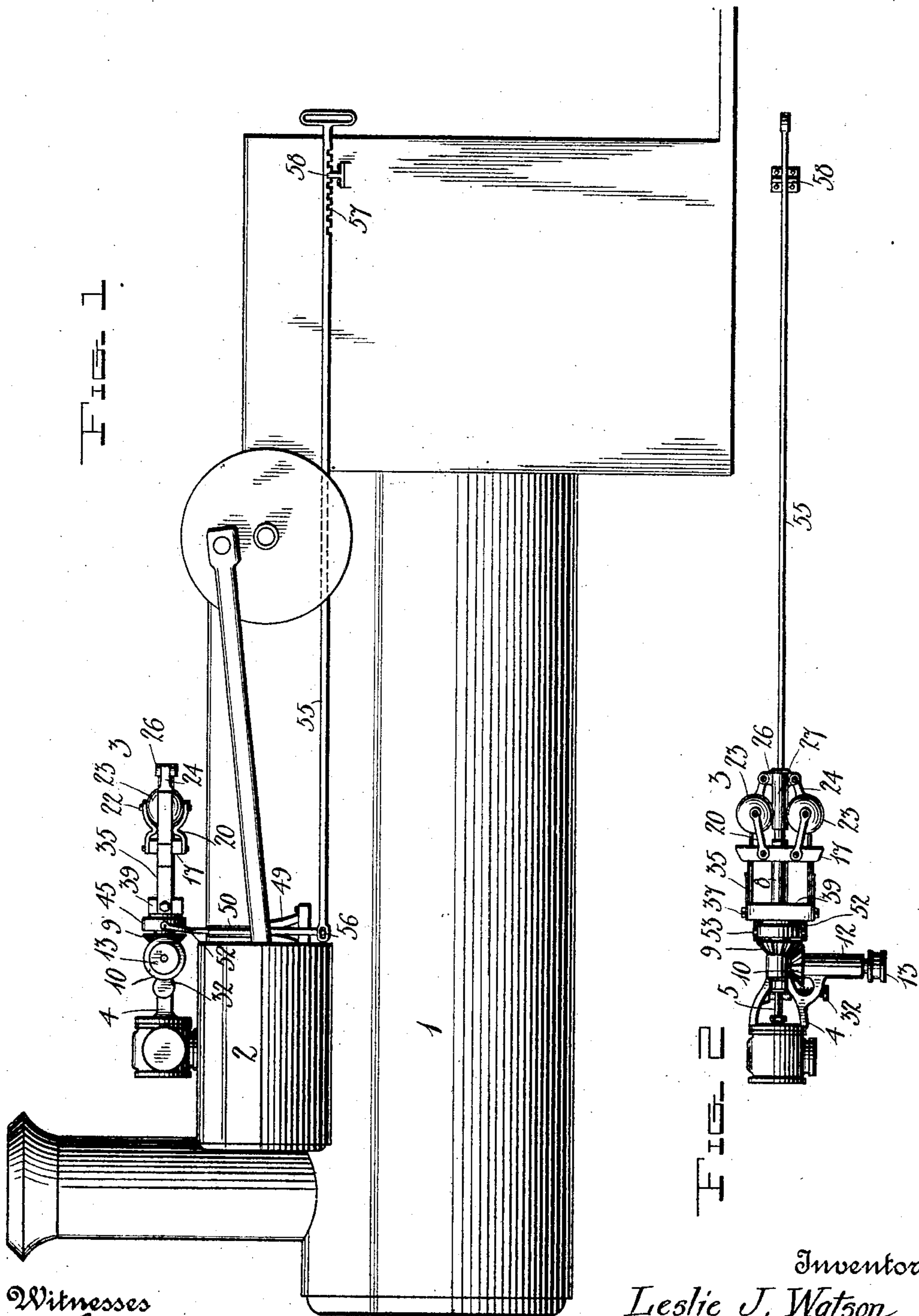
No. 814,579.

PATENTED MAR. 6, 1906.

L. J. WATSON.  
GOVERNOR.

APPLICATION FILED FEB. 27, 1905.

2 SHEETS—SHEET 1.



Witnesses  
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*C. H. Giesbauer*

Inventor  
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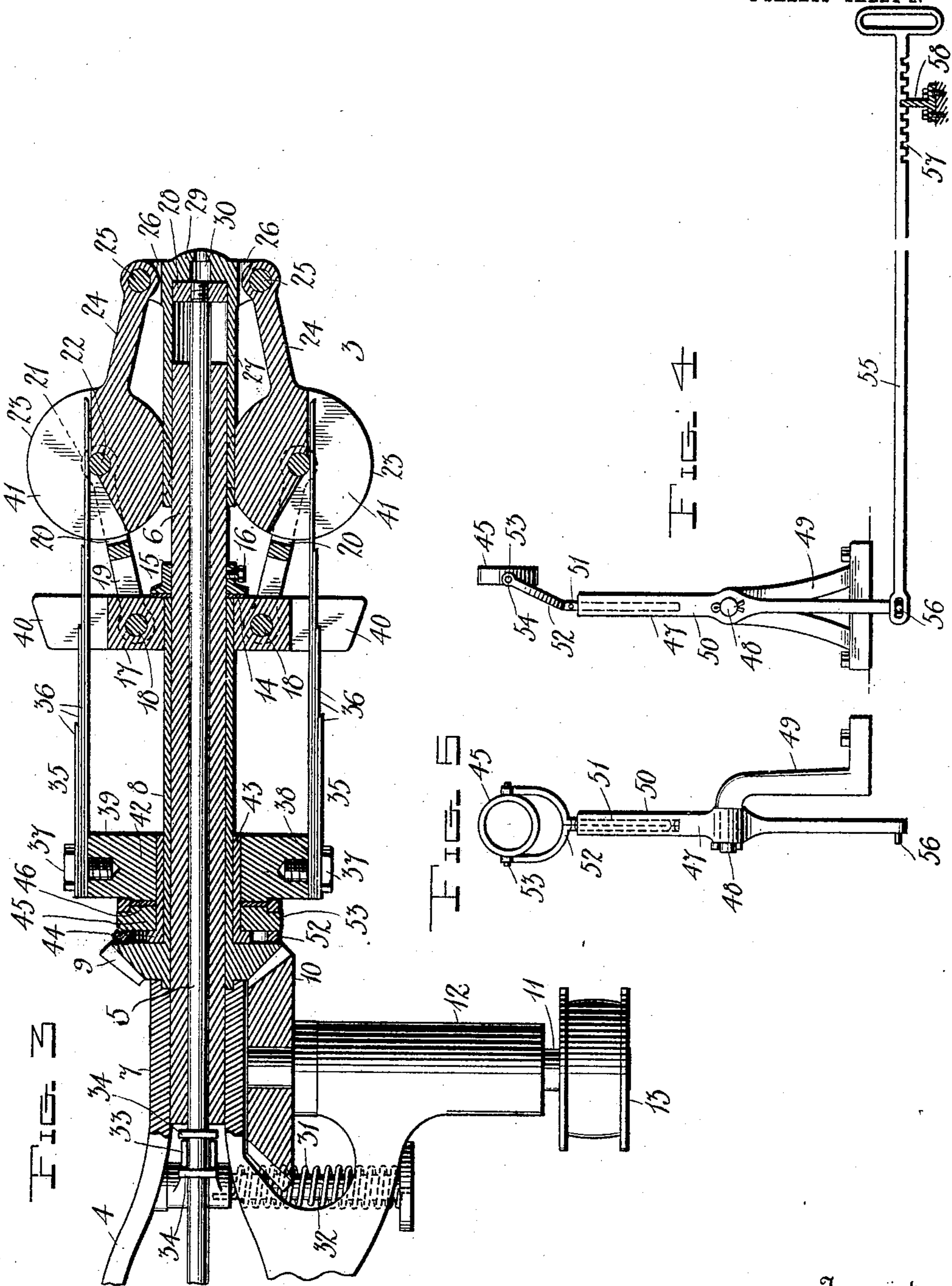
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# UNITED STATES PATENT OFFICE.

LESLIE J. WATSON, OF PORT HURON, MICHIGAN, ASSIGNOR OF ONE-HALF  
TO ARTHUR S. WHITE, OF PORT HURON, MICHIGAN.

## GOVERNOR.

No. 814,579.

Specification of Letters Patent.

Patented March 6, 1906.

Application filed February 27, 1905. Serial No. 247,534.

*To all whom it may concern:*

Be it known that I, LESLIE J. WATSON, a citizen of the United States, residing at Port Huron, in the county of St. Clair and State of Michigan, have invented certain new and useful Improvements in 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 improvements in centrifugal speed-governors, and more particularly to the means for changing the centripetal force of the governor to compensate for the variation in any centrifugal force due to the change of the speed of the engine.

The object of the invention is to provide a simple and efficient means for varying the centripetal force of the governor by increasing the number of springs actuated for high speeds and decreasing the number of springs acting for low speeds instead of changing the tension of fixedly-mounted springs, as is common in devices of this character.

With the above and other objects in view the invention consists of certain novel features of construction, combination, and arrangement of parts, as will be hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a side elevation of the upper portion of a traction-engine, showing my improved governor mounted thereon. Fig. 2 is a top plan view of the same. Fig. 3 is a longitudinal sectional view through the governor. Fig. 4 is an elevation of the shifting-lever and its bracket, and Fig. 5 is a detail view showing the forked arm which is slidably mounted in the shifting-lever.

Referring to the drawings by numeral, 1 denotes a portion of a horizontal boiler of a traction-engine, having a steam-engine 2 mounted upon one of its sides at its forward end and the usual footboard or platform at its rear end, and 3 denotes my improved governor, which is preferably mounted in a horizontal position upon the top of the engine 2 and which has means whereby it may be operated from the footboard at the rear of the boiler. The governor comprises a casing 4, containing the usual steam-valve, which is operated by a stem or rod 5, which projects through and is slidably mounted in a tubular shaft 6. Said shaft is stationary and has its

inner end secured in a projecting portion 7 of the casing 4. Mounted to rotate upon the shaft 6 adjacent to its inner end is a sleeve or barrel 8, upon one end of which is formed or secured a beveled pinion 9. Said pinion meshes with a gear 10, secured upon one end of a shaft 11, which is journaled in a bearing-bracket 12, provided upon the casing 4 and which has at its outer end a pulley 13. Said pulley is adapted to be driven by a belt or other driving connection from the crank-shaft of the engine. The sleeve or barrel 8 is retained upon the inner portion of the shaft 6 by a washer 14 and a collar 15, which is secured in position by a set-screw 16, as clearly shown in Fig. 3 of the drawings.

Fixed upon the outer end of the sleeve 8 is a spring-guide 17, to which are pivotally connected, as shown at 18, the inner bifurcated ends 19 of links 20. The outer bifurcated ends 21 of said links 20 are pivoted upon the outer ends of pins 22, which extend through openings formed in centrifugal weights or balls 23. Said balls are formed with integral arms 24, which have their ends pivoted, as at 25, between pairs of ears or lugs 26, formed upon the outer end of a sleeve or cap 27, which is adapted to slide and rotate upon the outer end of the shaft 6. It will be seen that when the sleeve 8 is rotated the sleeve or cap 27 will also be rotated, owing to its connection with the balls 23, the links 22, and the spring-guide 17, and said balls or weights will fly outwardly by centrifugal force and cause the sleeve or cap 27 to be slid inwardly upon the shaft 6 for the purpose of closing the valve in the governor-casing 4. The stem 5 of said valve projects through the outer end of the shaft 6 and carries a head or nut 28, which is engaged by the closed end of the sleeve or cap 29. Said end 29 is formed with a vent-opening 30. The head or nut 28 is held normally in the outer end of the cap or sleeve 20 by reason of the tension exerted by a coil-spring 31, located upon a small shaft 32, which is mounted in the casing 4 of the governor. Said spring exerts its energy upon a bifurcated arm 33, which is mounted upon said shaft and which engages the valve-stem 5 between fixed collars 34. It will be seen that this spring-actuated arm 33 forces the valve-stem in one direction and serves to open the valve when the position of the centrifugal balls or weights 23 will so permit.

Coacting with the centrifugal balls or weights 23 are centripetal springs 35, each of which is composed of a series of flat or leaf springs 36 of unequal lengths placed upon each other so that the end of one will overlap or project beyond the end of the next adjacent, as clearly shown in Fig. 3 of the drawings. Said springs 35 have their inner ends secured by screws or other suitable fastening means 37 in recessed portions 38 of a holder 39, which is slidably mounted upon the inner portion of the sleeve or barrel 8. The outer portions of the springs 35 project through slots or openings 40 formed in the guide 17 and into slots or openings 41 formed in the balls or weights 23, so that said outer ends of the spring bear against the pins or rods 22. The spring-holder 39 consists of a head 42, which is fixed upon the outer end of a sleeve 43, which is adapted to slide freely upon the shaft 8 and which has at its inner end a flange 44. Loosely mounted upon the sleeve 43 between its flange 44 and the head 42 is a ring 45 and a washer 46. The collar 45 is provided for the connection of an operating-lever by means of which the springs may be adjusted to vary the centripetal force of the governor in order to compensate for the variation in centrifugal force due to the change of speed of the engine. When the springs are in the position shown in Fig. 3 of the drawings, in which position the governor is set for running the engine at a low speed only the outer ends of the longest leaves 36 of the springs 35 coact with or exert a resistance to the outward movement of the balls or weights 23; but as the springs are moved longitudinally the different leaves of the springs are successively brought into operative relation with respect to said weights, so as to increase the resistance offered to the outward movement of the weights. By slidably adjusting the springs 35 in this manner one or more of the leaves of each of them may be caused to act against the spread of the balls, according to the speed at which the engine is run.

In order to adjust the spring-holder 39 and the springs 35 and to hold them in such adjusted position, I preferably provide a lever 47, which is pivoted intermediate its ends upon a stud 48, formed upon a bracket 49, which may be secured upon the engine or boiler at a suitable point. The upper end of the lever 47 is formed with a tubular socket 50, in which is slidably mounted the lower end of a forked arm 51. This arm 51 is preferably formed of two parts which are riveted together, as shown in Fig. 5 of the drawings. The loose collar 45 is pivotally mounted in the forked or bifurcated end 52 of the arm by having integral studs or trunnions 53, which are formed at diametrically opposite points on the collar 45, engage bearing-openings 54, formed in the ends of the fork 52. It will be seen that when the lever 47 is oscillated the

collar 45, and hence the spring-holder 39, will be moved longitudinally to adjust the springs, free movement of said parts being permitted by reason of the sliding connection of the arm 51 with the lever 47. The said lever may be operated and secured in an adjusted position by means of an operating-rod 55, which has one of its ends pivoted, as at 56, to the lower end of the lever 47 and its opposite end, which extends rearwardly to the footboard of the traction-engine, adjustably mounted in any desired manner. This mounting of the rear end of the rod 55 is preferably effected by forming the latter with a series of notches 57, which are adapted to engage a tooth or stud 58, secured at a suitable point upon the traction-engine. By means of the rod 55 the lever may be swung to any position to adjust the springs 35 and may then be secured in such adjusted position.

From the foregoing description, taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A governor of the character described, comprising a stationary shaft, a sleeve mounted to rotate thereon, a fixed guide at one end of said sleeve, an adjusting-sleeve mounted to rotate and slide upon said shaft, centrifugal weights or balls mounted between said guide and said adjusting-sleeve, a spring-holder slidably mounted upon the first-mentioned rotary sleeve, springs secured upon said holder and engaged with said guide and said weights, each of said springs consisting of a plurality of overlapping leaves of unequal length, a loose collar upon said holder, an operating-lever, a forked arm pivoted upon said collar and slidably mounted upon said lever, and means for adjusting and securing said lever in an adjusted position, substantially as described.

2. In a governor of the character described, the combination with a slidably-mounted spring-holder, of a collar mounted to rotate loosely thereon, an operating-lever having one of its ends formed with a tubular socket, a forked arm slidably mounted in said socket and pivotally connected to said collar, an operating-rod pivoted at one of its ends to the opposite end of said lever, and formed at its opposite end with a series of notches, and a keeper stud or tooth adapted to be engaged by the notches in said lever.

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

LESLIE J. WATSON.

Witnesses:

F. B. WHIPPLE,  
W. G. McLEAN.