

No. 887,778.

PATENTED MAY 19, 1908.

A. DICKERSON.
GOVERNOR.

APPLICATION FILED APR. 1, 1907.

Fig. 1

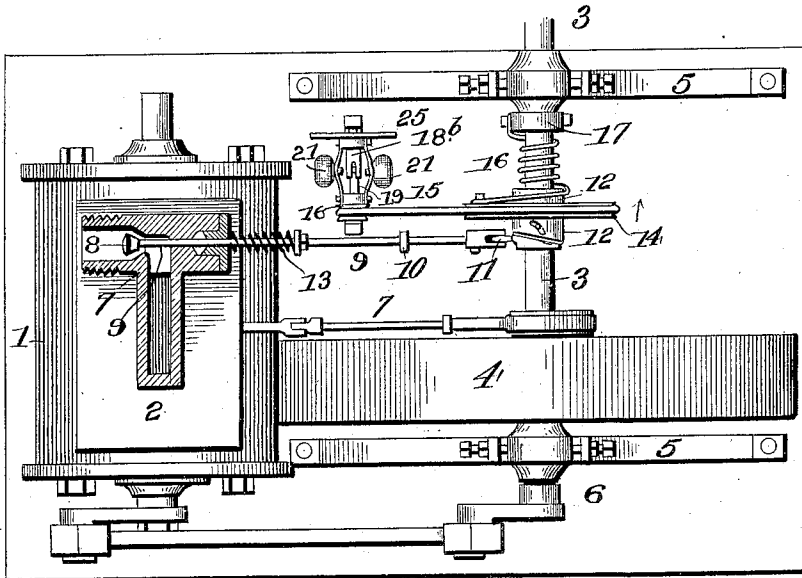
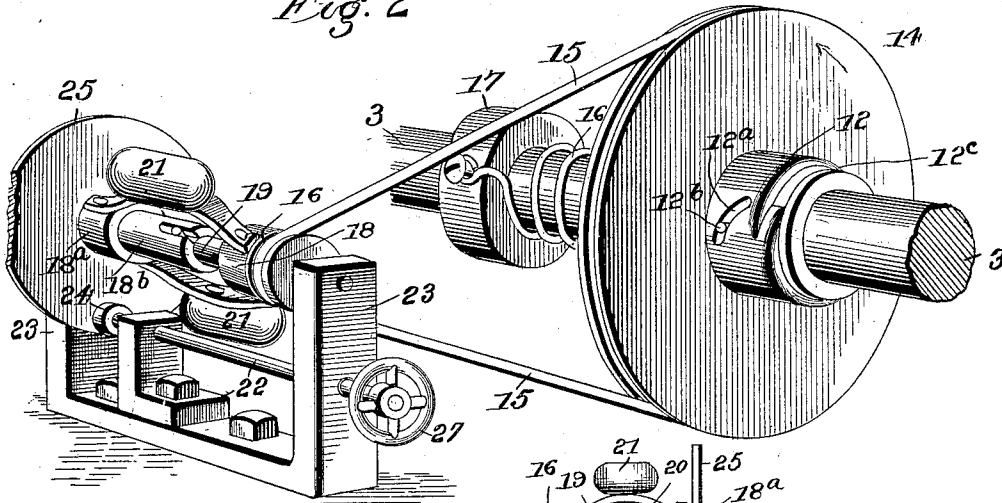
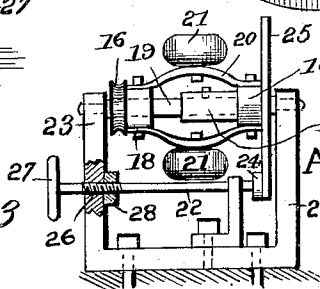


Fig. 2



WITNESSES
C. Chaffey
Anna W. Hart

Fig. 3



INVENTOR
ARTHUR DICKERSON

BY *Munn & Co.*

ATTORNEYS

UNITED STATES PATENT OFFICE.

ARTHUR DICKERSON, OF AMERICAN FORK, UTAH, ASSIGNOR OF TWO-FIFTHS TO HENRY D. BOLEY AND ONE-FIFTH TO NICHOLAS M. AMBROSE, OF AMERICAN FORK, UTAH.

GOVERNOR.

No. 887,778.

Specification of Letters Patent.

Patented May 19, 1908.

Application filed April 1, 1907. Serial No. 365,754.

To all whom it may concern:

Be it known that I, ARTHUR DICKERSON, a citizen of the United States, and a resident of American Fork, in the county of Utah and State of Utah, have invented an Improved Governor for Steam-Engines, of which the following is a specification.

It is the object of my invention to provide an improved means for governing and equalizing the admission of steam or other motive fluid to the chest and cylinder of an engine so as to render the action of the engine practically equal or isochronous under variations in the loads imposed on the engine or the variations in the pressure in the motive fluid.

The details of construction, arrangement, and combination of parts are as hereinafter described and illustrated in the accompanying drawings, in which

Figure 1 is a plan view of an engine embodying my invention, a portion being shown in section for sake of better illustration. Fig. 2 is a perspective view of the governor as a whole. Fig. 3 is a side view of the centrifugal governor proper.

In Fig. 1, the numeral 1 indicates a cylinder; 2, the steam-chest; 3, the shaft; and 4, the balance wheel of an engine of the oscillating type, for which I have filed the allowed application, #301,003, on Feb. 14, 1906. It is to be understood, however, that my invention about to be described, is suitable for various other type of engines. The aforesaid shaft 3 is mounted in suitable bearings 5, secured to a base 6.

7 indicates the rod which operates a slide valve (not shown) in the steam-chest. Upon the top of the steam-chest 2, is a chamber that communicates with the interior of the steam-chest. In such chamber I arrange a cut-off valve 8 whose rod 9 is supported slidably in a vertical bar 10, and is provided at the other end with an anti-friction roller 11, that works in contact with a device applied loosely to the shaft 3 and consisting of the following parts. The body of the device is in the nature of a hub or sleeve 12 having a diagonal slot 12^a—see Fig. 2—in which works a stud or pin 12^b that is fixed in the shaft. The adjacent end of this hub or sleeve is constructed with a cam, or tapered portion; and normally the anti-friction roller 11 runs on the cylindrical portion of the sleeve so that the valve 8 is held normally open, as shown, thereby permitting free pas-

sage of steam or other motive fluid into the steam-chest and cylinder. It is obvious, however, that if the sleeve 12 be shifted in the direction of the collar 17, the wheel 11 will run on the cam or tapered portion of the sleeve, which, being of less duration than the cylindrical portion, will allow the valve 8 to close sooner or later under the tension of the spring 13. On the hub 12—see Fig. 2—is mounted a large grooved pulley 14, and a round belt 15 runs thereon, and also on a small pulley 16 forming an attachment of the centrifugal governor, which will be further described. The spring 16 is coiled about the shaft 3 adjacent to the hub or sleeve 12 and one end of the same is attached to the pulley 14, the other being secured to a collar 17 secured on the shaft. It is obvious that this spring tends to hold the pulley in a certain normal position so that it is carried around with the shaft, but it permits the pulley to shift rotatably to the extent permitted by the slot 12^a and pin 12^b, before referred to.

In the centrifugal governor proper, the pulley 16 before referred to is secured to a collar 18 that is mounted on the shaft 19. Curved plate springs 20 connect the said collar with another one 18^a which is adapted to slide on the shaft 19, and is provided with an elongated sleeve 18^b the same having a lengthwise slot—see Figs. 1 and 2—. A pin is fixed in the governor shaft 19 and is arranged in the aforesaid slot. Balls or weights 21 are attached to the central portions of the plate springs 20.

It is obvious that when the governor is rotated the balls 21 are thrown outward more or less corresponding to the rapidity of rotation, the changes in curvature or contraction of the springs 21 being compensated for by the slidable collar 18^a. It is obvious that the greater the speed rotation the greater is the resistance offered by the balls or weights 21, and consequently a certain drag is applied to the belt 15 which tends to rotate the large pulley 14 in the direction of the arrow—see Fig. 2; and further, such movement of the pulley, which is in a way independent of the rotation of the shaft 3, tends to crowd or shift the pulley towards the collar 17 in consequence of the diagonal arrangement of the slot 12^a, in which the pin 12^b works. In consequence of such lateral movement or shifting of the pulley 14 and its hub 12, the anti-friction wheel 11 carried

by the valve rod 9 is caused to ride on the inclined or reduced portion of the hub and consequently the spring 13 retracts the valve 8 correspondingly. On the other hand, if the engine lags, the reverse action takes place; that is to say, the cut-off rod 9 is forced back and holds the valve longer from its seat and consequently admits a larger volume of steam.

10 The travel of the valve is always the same, the only effect of the cam thereon being to vary the period of closure of the valve on its seat, which is due to the shape of the cam. In brief the valve never opens partially nor
15 closes partially but opens and closes completely and twice in every revolution of the engine shaft. Thus the regulation is effected merely by the operation of closure without being longer or shorter according to the
20 speed and load of the engine. This operation secures greater economy in the consumption of steam. In engines controlled by governors generally in use when running under light loads, owing to the partial closure
25 of the valve actuated by the governor but a small portion of the boiler steam pressure would be available which means that the steam is throttled down and expanded before reaching the cylinder and liberated at the
30 same pressure as it was in the beginning of its stroke. This results unquestionably in a loss of steam which would have been utilized by allowing the same amount of the
35 steam to enter the cylinder at boiler pressure in the beginning of the stroke of the piston.

The upper diagonal portion or level of the cam holds the valve open and the lower diagonal portion or level permits the closure, the time in each case depending upon the
40 different position of the cam sleeve longitudinally on the shaft E³. It is to be noted that the diameter of the sleeve or cam through these portions or levels never changes, but the circumference owing to the
45 diagonal cuts on the cam itself change. In practical result if the valve opens it will open fully and if it closes it closes fully. Thus if the engine takes steam at all it takes it at boiler pressure and at the beginning of the
50 stroke. Steam is never admitted out of place or changed in pressure. The movement of the cam sleeve occurs by reason of

the engine attempting to lag or gain from the speed limited by the governor. The spring 16 is coiled around the shaft 3 and keeps the controller or governor up to its limit speed and the engine must follow. Thus, by my improved governor the action of the engine is rendered practically isochronous, or equalized, regardless of load or pressure.

I employ a device for limiting the speed, the same being practically a stop limiting the outward throw of centrifugal weights 21 of the governor proper. As shown in Figs. 2 and 3, a rod 22 is arranged in the frame 23 that supports the governor proper and its head 24 is arranged for contact with a disk 25 that is connected with a slidable collar 18^a of the governor. The said rod 22 is screw-threaded at 26 where it passes through a threaded hole in the frame 23, and a hand-wheel 27 is applied to the outer end of the same for rotating it. It is obvious that by rotation thereof the head 24 may be advanced or retracted according to the position in which it is to be set. It is obvious that the disk 25 of the governor proper will come in contact with it sooner or later corresponding to the centrifugal action, or outward throw, of the weights 21. A nut 28 is applied to the threaded portion of the rod 22 for locking the latter in any position to which it may be adjusted.

What I claim is:

The combination, with an engine shaft and a centrifugal governor having a pulley, of a cam sleeve which is mounted on, and rotatable, and adjustable longitudinally of the shaft and provided with a large pulley, the said sleeve having an inclined slot, a radial pin fixed in the shaft and working in said slot, a spiral spring encircling the shaft and connecting the sleeve therewith so that it serves to rotate the sleeve with the shaft when under due tension, a valve controlling admission of steam to the engine and having a rod one end of which works in connection with the aforesaid cam sleeve, and a band connecting the governor pulley with the sleeve pulley, as shown and described.

ARTHUR DICKERSON.

Witnesses:

H. C. JOHNSON,
JAMES CHIPMAN, Jr.