

UNITED STATES PATENT OFFICE.

ANDREW SONANDER, OF SPRINGFIELD, OHIO, ASSIGNOR TO THE FOOS GAS ENGINE COMPANY, OF SPRINGFIELD, OHIO, A CORPORATION OF OHIO.

GOVERNOR FOR GAS-ENGINES.

SPECIFICATION forming part of Letters Patent No. 692,082, dated January 28, 1902.

Application filed February 19, 1901. Serial No. 47,969. (No model.)

To all whom it may concern:

Be it known that I, ANDREW SONANDER, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Governors for Gas-Engines, of which the following is a specification.

My invention relates to gas-engines, and more particularly to improvements in a centrifugal governor and connections to control and regulate the operation of the engine.

The object of my invention is to provide a governor simple in construction, consisting of few parts that can be easily replaced, the combination and adjustment being such as to give perfect regulation. I attain this object by the constructions hereinafter described, and shown in the accompanying drawings, in which—

Figure 1 is a side elevation of the governor on its supporting-frame. Fig. 2 is a detail of a portion of the governor-shaft with movable sleeve, shown in section, and spring. Fig. 3 is a detail of the lever, showing its pivoted connection with the eyebolt or screw. Fig. 4 is a detail, partly in section, showing a portion of the push-rod with the notched finger pivoted to same and the push-blade. Fig. 5 is a side elevation of a portion of the engine, embodying my invention and showing how it is driven from the crank-shaft.

Like parts are represented by similar letters of reference in the several views.

In constructing my device I provide a bifurcated supporting-frame a , attached to the bed b of the engine and carrying in its journals a^1 a governor-shaft a^2 , the driving-gear a^3 and the collar a^4 being rigidly attached to the respective ends of said shaft. Said shaft is reduced at one end thereof, as shown in Fig. 2, and carries a movable sleeve c , having a recess c' formed in one end thereof, journaled on the large end of said shaft, the remaining portion of said sleeve being journaled on the reduced portion of said shaft. In the recess so formed the spring c^3 bears between the shoulder of said recess and the shoulder at the point where said shaft is reduced in size to hold said sleeve in normal position. It will be seen that the spring c^3 , housed in the recess c' , is fully protected and

operates free from dust. The yoke d is rigidly attached to the reduced portion of said shaft and has pivoted thereon the L-shaped arms d' , which carry the balls d^2 at one end and at the other end contact with the enlarged end c^4 of the sleeve c . The balls d^2 are provided with projections d^3 , which contact with the sleeve c , and the arms d' are connected by the spring d^4 to hold said arms and balls in position. The bifurcated bearing a^5 is attached to the supporting-frame a and carries the eyebolt a^6 , to which the lever a^7 is pivoted. On the eyebolt a^6 , within the bifurcated portion of the bearing a^5 , is the collar a^8 , screw-threaded to correspond with the threads on the said eyebolt, having its outer periphery knurled. The upper end of the lever a^7 is provided with a roller a^9 to contact with the enlarged end c^5 of the sleeve c . By operating the knurled collar a^8 the contact of the roller a^9 with the sleeve c is adjusted to regulate the speed of the engine. The lever e is pivoted at its lower end to the engine-bed b , and has pivoted at its upper end the roller e^1 , which contacts with the cam e^3 . Said cam is journaled on the shaft e^4 and attached to the gear e^5 , which is driven by the gear e^6 on the crank-shaft e^7 . The push-rod f , which operates the supply-valve and sparker of the engine, as described and claimed in another application made by myself and Charles E. Patric, Serial No. 47,970, filed February 19, 1901, has pivoted at one end the notched finger f^1 and is provided with a spring f^3 to hold said finger normally in position to contact with the push-blade f^2 , which is rigidly bolted to the lever e . The pivoted lever a^7 contacts with one side of the notched finger f^1 and operates to throw said finger out of position, so that it will not contact with the push-blade f^2 .

It will be seen that the movable sleeve c is normally held by the spring c^3 , so that it will just contact with the roller a^9 , but that when the speed of the engine is above normal the balls d^2 by their centrifugal force through their levers d' will press against the sleeve c , and it in turn will engage the roller a^9 on the lever a^7 , and by reason of said lever being pivoted to the eyebolt a^6 will move the other end, which contacts with the notched finger, so as to throw said finger out of position to

contact with the push-blade f^2 , and when the speed is reduced so as to allow the lever a^7 to resume its normal position the spring f^3 will return the notched finger back into its normal position ready to contact with the push-blade f^2 . It will be further seen that when the speed of the engine is regulated by the knurled collar a^8 it at the same time serves to take up the wear in the operating parts.

10 Having thus described my invention, I claim—

1. In a centrifugal governor, the combination with a shaft, a yoke attached to said shaft, a movable sleeve and a spring housed therein to hold said sleeve in normal position, of balls having arms pivoted to said yoke, independent of but adapted to engage and move said sleeve against the action of said spring, substantially as specified.

20 2. In a centrifugal governor, a bifurcated frame, a shaft journaled in said frame, having a reduced portion, forming a shoulder thereon, a movable sleeve bearing on the reduced portion of said shaft and having a recess therein bearing on the larger portion of said shaft, a spring in said recess bearing against the shoulder of said shaft, a yoke attached to said shaft, balls having arms pivoted to said yoke and adapted to bear against one end of said sleeve and a pivoted lever adapted to contact with and be moved by said sleeve, substantially as specified.

3. In a gas-engine, the combination with a centrifugal governor having a bifurcated frame, a shaft journaled in said frame having a reduced portion forming a shoulder thereon, a movable sleeve bearing on the re-

duced portion of said shaft and having a recess therein bearing on the larger portion of said shaft, a spring in said recess bearing against the shoulder of said shaft to hold said sleeve in its normal position, a yoke attached to said shaft, balls having arms pivoted to said yoke and adapted to bear against one end of said sleeve to move the same in one direction, of a supply-valve, an intermediate movable member of the operating mechanisms for said valve, a spring to hold said movable member in its normal position, and a pivoted lever, one end of which contacts with one end of and is moved by said sleeve when said sleeve is operated by said balls, the other end of said lever contacting with said movable member, whereby said movable member is thrown in and out of engagement with said operating mechanisms, substantially as specified.

4. In a gas-engine, the combination with the movable member of a centrifugal governor a supply-valve and an intermediate movable member of the operating mechanism for the supply-valve, of a pivoted lever, the respective ends of which contact said movable members and an adjustable pivot for said lever to regulate the speed of said engine and take up the wear in the operating parts, substantially as specified.

In testimony whereof I have hereunto set my hand this 26th day of January, A. D. 1901.

ANDREW SONANDER.

Witnesses:

PERCY NORTON,
CHAS. I. WELCH.