(No Model.)

T. & F. A. SCHEFFLER.

STEAM ENGINE GOVERNOR.

No. 421,871. Patented Feb. 18, 1890.

Fig. 4.

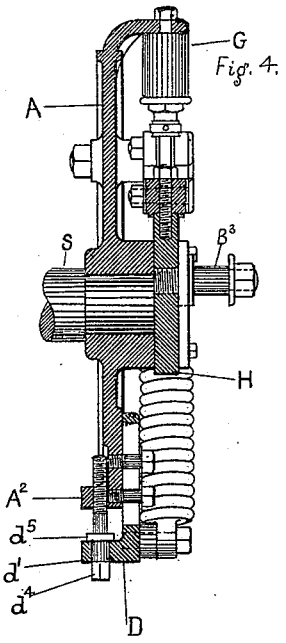


Fig. 3.

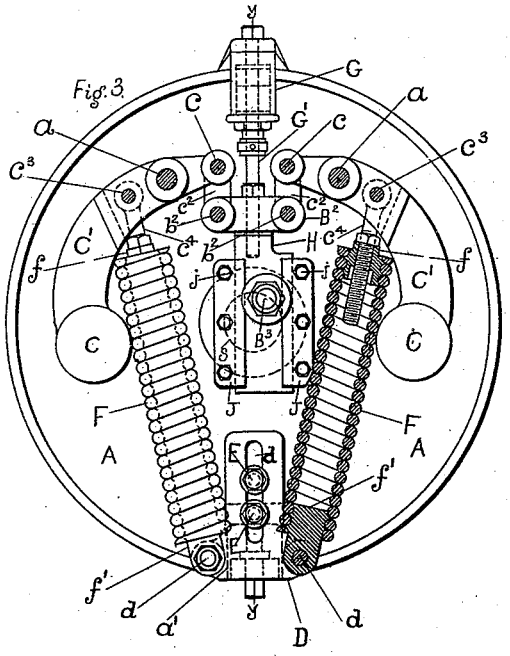


Fig. 2.

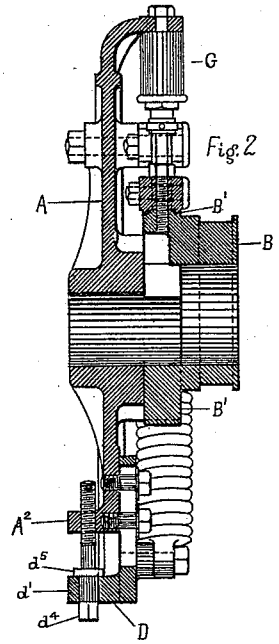
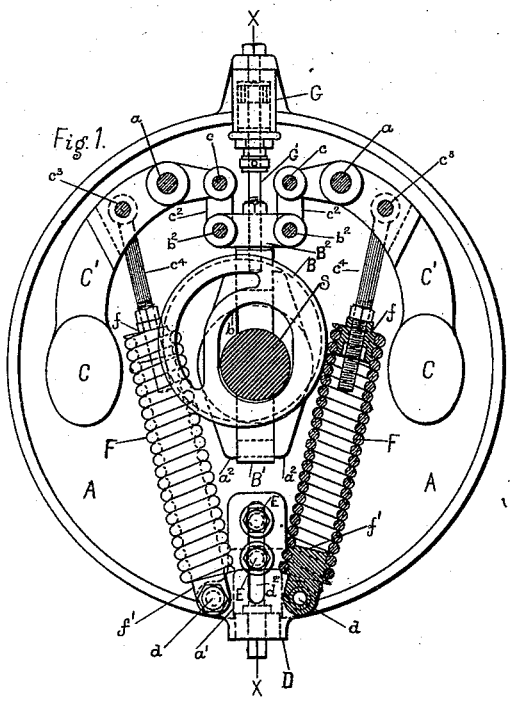


Fig. 1.



Witnesses
W. L. Morrison.
F. E. Quinn.

Inventors
Theodore Scheffler.
Fred'k A. Scheffler.

UNITED STATES PATENT OFFICE.

THEODORE SCHEFFLER, OF PATERSON, NEW JERSEY, AND FREDERICK A. SCHEFFLER, OF ERIE, PENNSYLVANIA, ASSIGNORS TO THE ERIE CITY IRON WORKS, OF ERIE, PENNSYLVANIA.

STEAM-ENGINE GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 421,871, dated February 18, 1890.

Application filed August 14, 1889. Serial No. 320,695. (No model.)

To all whom it may concern:

Be it known that we, THEODORE SCHEFFLER, a citizen of the United States, residing at Paterson, in the county of Passaic and State of New Jersey, and FREDERICK A. SCHEFFLER, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Steam-Engine Governors; and we do hereby 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 use of same.

This invention relates to that class of steam-engine governors which are known as "shifting eccentric" or "shaft" governors; and it consists of certain improvements in the construction of same, as will be hereinafter fully described, and pointed out in the claims.

The invention is illustrated in the accompanying drawings, as follows:

Figure 1 is a side elevation of the governor and the eccentric with the engine-shaft S in cross-section; Fig. 2, a vertical section on line X X in Fig. 1, the shaft S not being shown, and the dash-pot G being left in elevation; Fig. 3, a side elevation of the governor when used on the end of the shaft, with a crank-pin in place of the eccentric; Fig. 4, a vertical section on line Y Y in Fig. 3, the shaft S being shown in elevation.

A is the frame of the governor, which may be a disk on the shaft, or it may be formed on the fly-wheel or pulley of the engine.

In Figs. 1 and 2, B is the eccentric, which has an elongated shaft-opening *b* to permit of its being shifted diametrically across the engine-shaft.

In Figs. 3 and 4, B^3 is a small crank-pin, which is attached rigidly to a sliding guide H, which is held in position by the cap-pieces J J by means of the tap bolts or studs *j*. The guide H permits the crank-pin B^3 to be shifted diametrically across the end of the shaft S.

In Figs. 1 and 2, B′ B′ are extensions on the back of the eccentric which fit in corresponding projections a^2 a^2 on the hub of the frame A, and which thus form a guide for the eccentric B when it is shifted across the shaft. C C are the centrifugal weights, and c' c' are the weight-arms, which are in the form of bell-crank levers, pivoted at their angle or elbow to the frame A, at *a a*. c^2 c^2 are links which connect the short arms of the levers c' c' to the cross-arms B^2, which in Fig. 1 is an extension of the guide B′, and in Fig. 3 of the guide H. The ends of the links are connected to B^2 by means of the pivots b^2 b^2, and to the short arms of the levers c' c' by means of the pivots *c c*.

By observing the parts just described, as seen in Figs. 1 and 3, it will be seen that an outward movement of the weights C C will cause a downward movement of the eccentric B or crank-pin B^3. To resist the outward movement of the weights C C, the coiled springs F F are introduced. One end of each spring is attached to its corresponding weight-lever at c^3 by means of a connection c^4, which screws into a nut *f* at its spring end, and is pivoted at its lever end by the pivot c^3. The other end of each spring is screwed onto the nut *f*′, and the latter is pivoted to the movable plate D by means of the pivot *d*. The plate D is provided with a slot d^2, through which pass binding-screws E E. The plate D has a rearward extension *d*′, which passes through a slot *a*′ in the frame A, and above it is a rearward extension or lug A^2 on the frame A. An adjusting-screw d^4 is tapped into the lug A^2 and passes through the extension *d*′. The screw has a collar d^5, which shoulders against the upper side of the extension *d*′. When the jam-nuts E E are loosened, the plate D may be raised or lowered by turning the adjusting-screw d^4, and as the springs F F are connected to the plate D an adjustment of the latter will reduce or increase the tension on the springs, as may be desired.

In Fig. 1 the parts of the governor are shown in their normal position. It will be noted that the weights C C are extended beyond a vertical line passing through the fulcrums of their levers—*i. e.*, the weights are held beyond their line of gravity. The result of this arrangement is that the weights, when

the governor is in the position shown in Fig. 1, exert a gravity force upon the eccentric sufficient to counteract the gravity of the eccentric. We have found that without provision for thus counterbalancing the eccentric it will drop when in the position shown in Fig. 1, which we call the "normal" position.

Besides the effect above referred to, when the weights C C are held beyond their line of gravity there is an additional one of allowing more room for a longer spring F, when necessary, and we prefer to curve the long arms of the levers c' c' for increasing this effect, as it can be plainly seen that were the points a and C connected in a straight line the tendency would be to shorten the length of the spring F.

At the upper end of the frame is placed a dash-pot G, the piston-stem G′ of which is attached to the cross-arm B^2, which is connected to the eccentric. The object of this dash-pot is to hold the eccentric against sudden thrust from the reciprocating parts, and thus prevent a fluctuating or vibratory action of the weights. Dash-pots have been used in governors of this class for the same purpose, and governors of this class have been made with weight-arms in the form of elbow-levers which are connected with the eccentric by links—as, for example, in Patent No. 191,084, dated May 22, 1877, issued to H. Tabor, and in Patent No. 386,036, dated July 10, 1888, issued to ourselves. Therefore the following claims must be interpreted as not claiming these features, broadly.

The advantages of our construction over similar constructions heretofore made are numerous, among which are the following: Where only one spring, of either the compression or extension type, is used it is limited to certain sizes of engines—chiefly small ones—because the necessary length of spring cannot be obtained to make the proper proportion between the spring and the centrifugal force without an extremely long and objectionable spring, whereas in our invention, there being one spring for each weight, and so arranged that comparatively long ones can be used to advantage, it is adapted for any-sized engines. Furthermore, the plate D being common to both springs an equal adjustment of both can be made, when required, at the same time; also, should one spring be found to be somewhat more highly tempered than the other one, an adjustment of either one can be made by means of the nuts f or f', so that the tension on both springs will be practically the same. As an eccentric and its strap causes undue friction, they can be dispensed with by substituting the form of crank-pin and connections shown in Figs. 3 and 4, when a convenient connection can be made to the valve-motion from the end of the shaft. In either form, Fig. 1 or 3, as the center of the throw is moved across the shaft in a straight path, the lead remains practically the same.

What we claim is as follows:

1. In a steam-engine governor of the class herein named, the combination of the eccentric B, having an elongated shaft-opening b and an extension B′ on the rearward side of eccentric B, extending therefrom in a plane passing through the greatest diameter of said opening b, projections a^2 a^2 on the frame A to receive extension B′, forming guides for the eccentric B, a cross-arm B^2 on said extension B′, the bell-crank weight-levers c' c', weights C C on the long arms of said levers, and links c^2 c^2, connecting the short arms of said levers with said cross-arm of eccentric, the coiled springs F F, nuts f f and f' f', the links c^4 c^4, connecting one end of said springs to the long arms of weight-levers c' c', and the adjustable plate D, to which the other end of said springs is attached, all substantially as shown and described.

2. In a steam-engine governor of the class herein named, the combination of the eccentric B, having an elongated shaft-opening b and an extension B′ on the rearward side of eccentric B, extending therefrom in a plane passing through the greatest diameter of said opening b, projections a^2 a^2 on the frame A to receive extension B′, forming guides for the eccentric B, a cross-arm B^2 on said extension B′, a dash-pot piston-stem extending from said cross-arm B^2 in the said diametrical line, a dash-pot attached to the frame A to receive said piston-stem, the bell-crank weight-levers c' c', weights C C on the long arms of said levers, and links c^2 c^2, connecting the short arms of said levers with said cross-arm of eccentric, the coiled springs F F, nuts f f and f' f', the links c^4 c^4, connecting one end of said springs to the long arms of weight-levers c' c', and the adjustable plate D, to which the other end of said springs is attached, all substantially as shown and described.

3. In a steam-engine governor, the combination of a device for governing the valve-motion, two (2) pivoted weight-levers carried by the belt-wheel or governor-frame, two (2) tension-springs, a single adjustable support, also carried by the belt-wheel or governor-frame, to which one end of each spring is attached, the remaining ends of the respective springs being attached to the respective weight-levers and acting thereon in opposition to centrifugal force, and connections from said levers to the valve moving the device, substantially as described.

THEODORE SCHEFFLER.
FREDK. A. SCHEFFLER.

Witnesses:
G. L. McCONNELL,
GEO. T. BLISS.