(No Model.) 3 Sheets—Sheet 1.

J. B. STANWOOD.

AUTOMATIC CUT-OFF GOVERNOR.

No. 307,501. Patented Nov. 4, 1884.

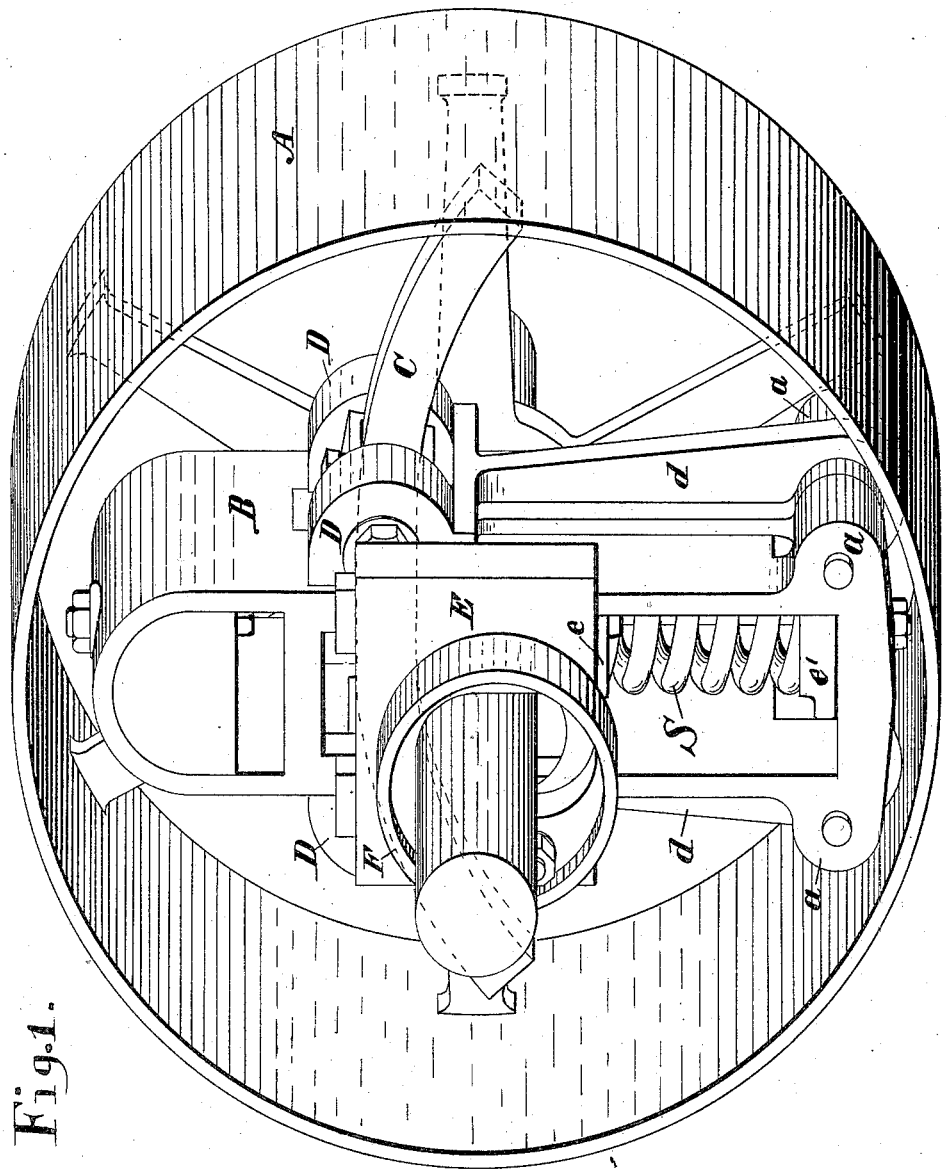

Fig. 1.

Witnesses.
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C. Shappell.

Inventor.
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by Hosea
Atty.

(No Model.)

3 Sheets—Sheet 2.

J. B. STANWOOD.

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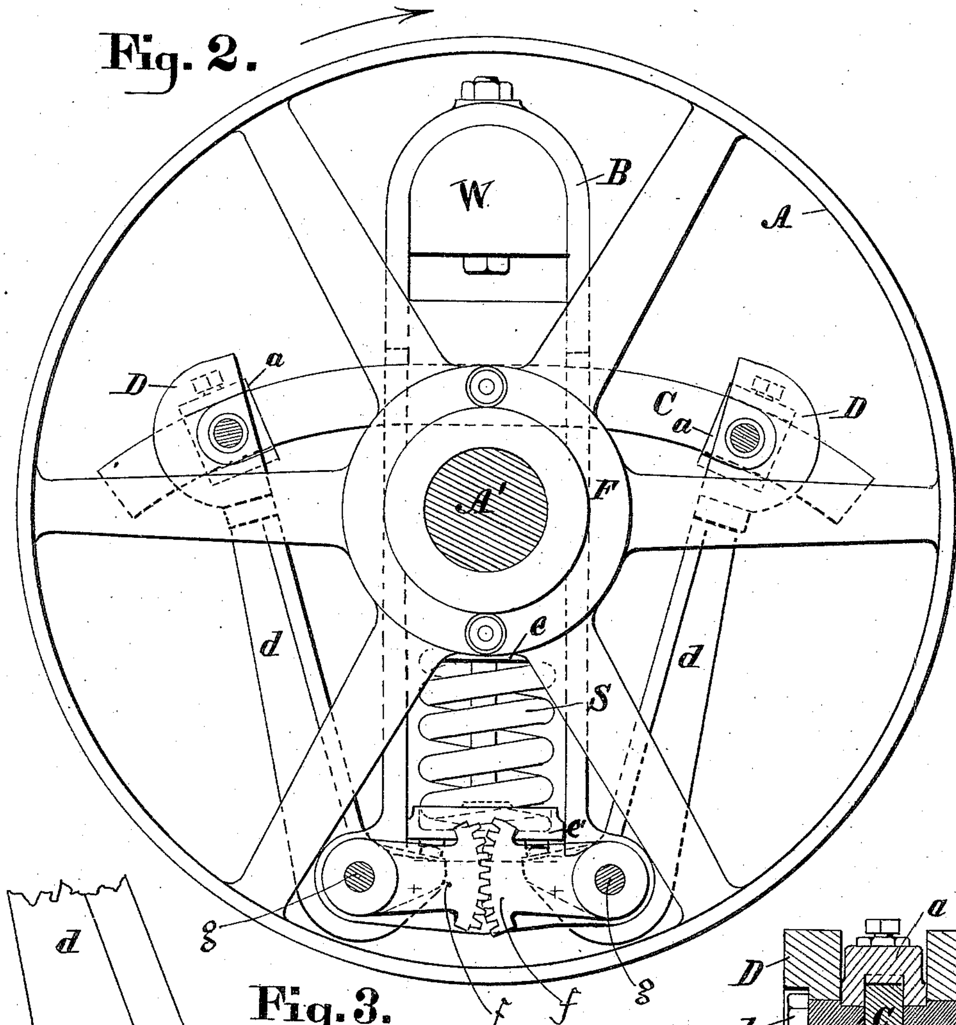
No. 307,501. Patented Nov. 4, 1884.

Fig. 2.



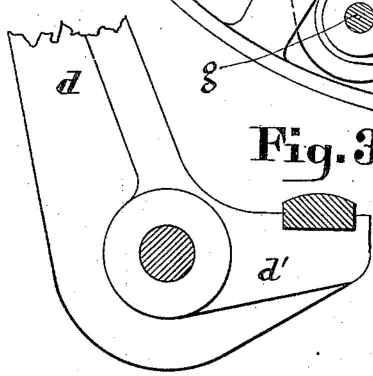


Fig. 3.

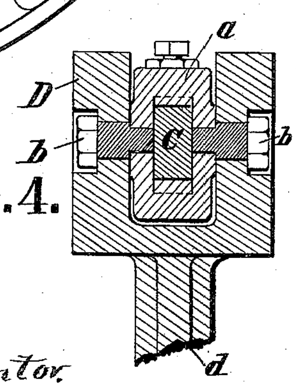


Fig. 4.

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(No Model.) 3 Sheets—Sheet 3.

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AUTOMATIC CUT-OFF GOVERNOR.

No. 307,501. Patented Nov. 4, 1884.

Fig. 5.

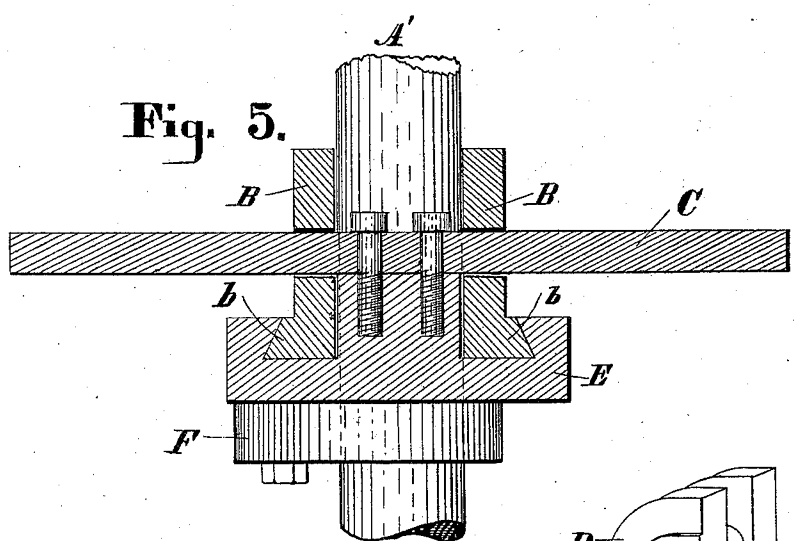


Fig. 6.

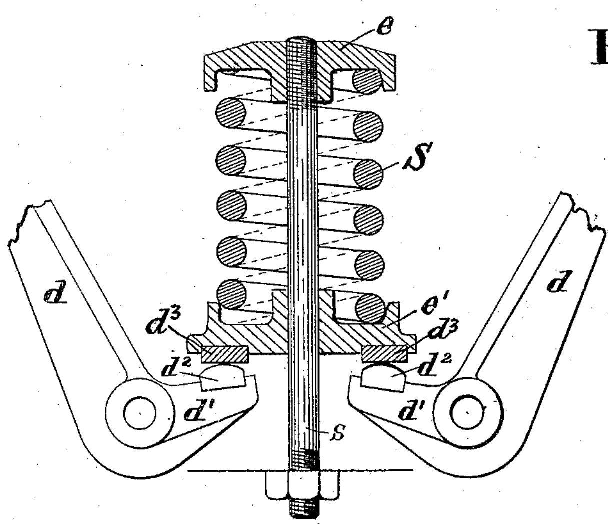
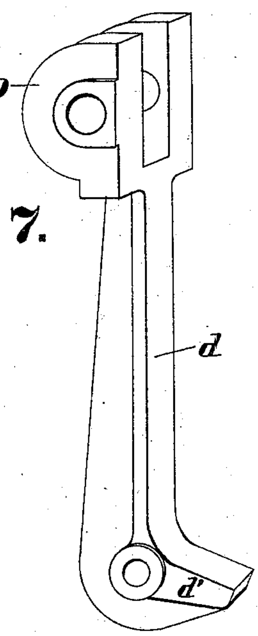


Fig. 7.



Witnesses.

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N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

JAMES B. STANWOOD, OF CINCINNATI, OHIO.

AUTOMATIC CUT-OFF GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 307,501, dated November 4, 1884.

Application filed May 28, 1884. (No model.)

To all whom it may concern:

Be it known that I, JAMES B. STANWOOD, a citizen of the United States, residing at Cincinnati, Ohio, have invented new and useful Improvements in Automatic Cut-Off Governors, of which the following is a specification.

My invention relates to that class of governors for steam-engines ordinarily denominated "automatic cut-off governors," which, by means of the rotation of the main shaft, control the eccentricity of the valve-mover, and thus regulate the travel of the slide-valve and the admission of steam to the piston; and it consists in the construction and arrangement of apparatus, as hereinafter fully described and illustrated.

In the drawings herewith, Figure 1 is a perspective elevation of my improved governor complete; Fig. 2, a front elevation of the same from the pulley side; Fig. 3, a detail view of one of the bell-crank levers, showing the short arm and bearing block; Fig. 4, a detail cross-section of the jaw end of one of the bell-crank levers, showing the construction and relation of the arc-bar and sliding yoke. Fig. 5 is a detail cross-section taken longitudinally through the arc-bar and across the cross-head and its guides; Fig. 6, a detail cross-section through the spring, showing its construction and relation to the bell-crank levers; and Fig. 7, a detached perspective view of one of the bell-crank levers.

In the drawings, A designates a pulley attached to the main shaft of the engine, and may be used as a band-pulley for the transmission of power. To the pulley is attached my improved governor, consisting, essentially, of a supporting-frame secured to and rotating with the shaft, weighted lever fulcrumed in the frame and acting centrifugally, and by such action controlling the relative eccentricity of the valve-mover through intervening mechanism.

The frame B, with which the operative parts of the governor are connected, is a U-shaped open frame, having parallel sides, and lugs *a* projecting laterally from its sides below. Between the lugs at each side of the frame are pivoted bell-crank levers, whose long arms *d* rise outside of and parallel with the frame, terminating in heads D, constituting the weights, which, by the rotation of the pulley, swing outward upon their pivots through the influence of centrifugal force, as indicated by their position in Fig. 2. The shorter arms *d* of the bell-cranks extend through suitable openings within the frame, and rest beneath a spiral spring, S, held by a bolt secured in the bottom of the frame and passing centrally between the ends of the lever-arms *d* and through the spring S. The spring is secured between a fixed cup-shaped head, *e*, upon the upper end of the bolt *s*, and a similar-shaped sliding head, *e'*, centered upon the bolt, the spring acting by compression against the former as an abutment. The arms *d'* of the levers extend inward beneath the sliding head *e'*, as indicated in Fig. 6, the bearing-contacts being provided with steel or gun-metal facing-blocks d^2 d^3, the arrangement being such that the centrifugal action of the weights D, carrying the arms *d* outward, is resisted by the expansive action of the spring upon the short arms *d'*, which normally holds the weighted arms closed inward, as shown in Fig. 1. The weighted heads D of the arms *d* are slotted to form jaws, between which an eccentric arc-bar, C, passing through the frame B through openings in the sides, permitting a vertical reciprocation of the arc-bar, is arranged, held in sliding yoke-boxes *a*, pivoted in the jaws of the head D. The curvature of the arc-bar C is in such eccentric relation to the center of the arms *d* that in their outward oscillation by centrifugal force the arc-bar is carried upward by a cam movement and drawn downward by the inward closing of the arms under the influence of the spring S.

Centrally to the side of the arc-bar is bolted a cross-head, E, arranged to embrace and slide vertically upon the outer edges, *b*, of the frame B, these edges being planed true and formed as parallel guides for the cross-head, the latter being provided with an elongated central slot, permitting its vertical movement unimpeded by shaft A, which passes through it. To the outside of the cross-head is bolted a ring or annular flange, forming the valve-mover, peripherally grooved or ribbed to receive the ordinary yoke connections for operating the side

valve. The ring F also surrounds the shaft A, and is arranged upon the cross-head in such relation as to be moved with it by the centrifugal action of the arms *d* from its position of greatest eccentricity with the shaft to a position of minimum eccentricity therewith, so that in excessive speed of rotation of the shaft the valve-mover is carried toward a concentric position and the travel of the valve correspondingly reduced.

In order to secure a perfectly uniform joint action of the arms *d'*, I provide an intermeshing segment-gear, *f f*, the corresponding elements of which are secured upon the pivotal axes *g* of the bell-cranks, respectively, meshing together and thus compelling a joint and uniform action. A weight, W, is secured in the upper end of the frame B as a counterbalance to the other parts of the governor, so that its own center of gravity shall coincide approximately with the shaft-axis.

The operation is as follows: The weights D, being carried apart by the action of centrifugal force in the rotation of the shaft, act as cams to force the arc-bar C upward, carrying the cross-head E and its attached valve-moving ring, the latter by such movement being brought into a position more nearly concentric with the shaft. The eccentricity of the ring being thus lessened, the travel of the valve is correspondingly reduced. When the speed of the engine is reduced below the determined point, the spring S, acting against the lessened centrifugal force of the weights D, closes them together, thereby forcing the arc-bar downward, carrying the cross-head, and increasing the eccentricity of the valve-mover and the travel of the valve. By this means the movement of the engine is regulated in both conditions produced by an increase or diminution of the load, and the quantity of steam admitted to the piston through the ordinary valve-ports is governed.

For the spring S, arranged as shown, two springs may be employed attached directly to the long arms *d*, and the short arms may be dispensed with; but the construction shown is preferred. A straight bar may be employed instead of the curved arc-bar, also; but, the curved form is preferred, the arcs being at each side eccentric to the centers of pivotal oscillation of the arms in such slight degree as to render the action of the arms upon the arc-bar exceedingly powerful, but rendering a reverse action due to any resistance of the parts impossible.

I claim as my invention and desire to secure by Letters Patent—

1. In a steam-engine governor of the kind described, the combination of two weighted arms pivoted upon a suitable frame at the same side of the shaft, and swinging centrifugally outward therefrom to opposite directions, with a movable cam-bar secured to a cross-head carrying the valve-mover, and operated by such centrifugal movement of the arms to vary the eccentricity of the valve-mover, substantially as set forth.

2. In an automatic cut-off governor, the combination, with the supporting frame and the movable cam-bar carrying the valve-mover, of the bell-crank arms pivoted in the frame, as shown, to swing outward from the shaft and act as a cam upon the movable bar, and the spring arranged, as shown, to act upon the bell-cranks in opposition to centrifugal force, substantially as set forth.

3. In an automatic cut-off governor, in combination with movable cam-bar carrying the valve-mover, the bell-crank arms provided with intermeshing gear compelling their simultaneous action, substantially as set forth.

4. In an automatic cut-off governor, the cam-bar C, in combination with arms *d*, provided with the heads D, and the pivoted yoke-boxes *a*, substantially as and for the purpose specified.

5. In an automatic cut-off governor, the cam-bar C, in combination with the arms *d*, provided with the heads D, and the pivoted yoke-boxes *a*, substantially as and for the purpose specified.

6. In an automatic cut-off governor, the combination of the frame B and the spring S, arranged within the frame above and acting upon the short arms *d'* of the bell-cranks, constructed and arranged substantially as and for the purpose specified.

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

JAMES B. STANWOOD.

Witnesses:
L. M. HOSEA,
F. L. HOSEA.