

(No Model.)

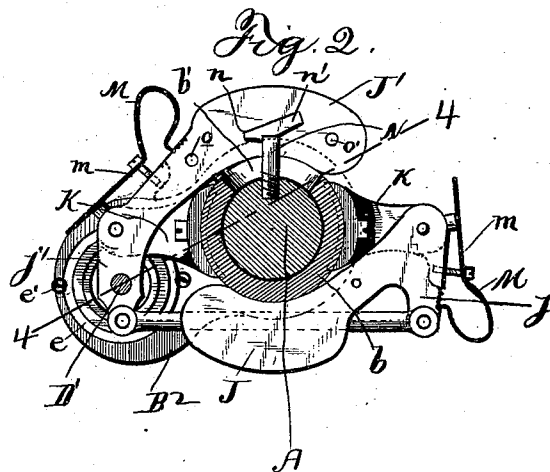
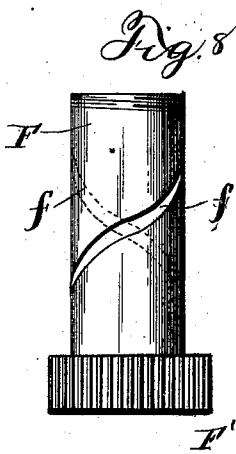
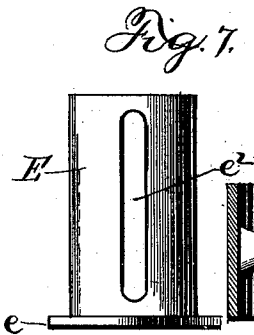
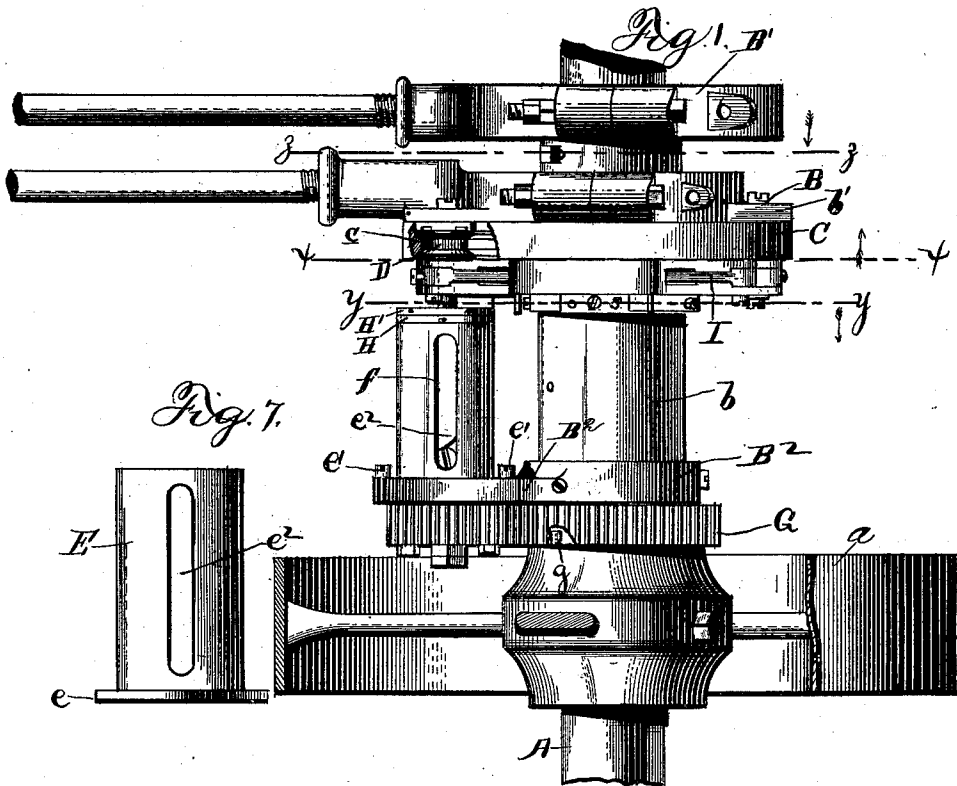
2 Sheets—Sheet 1.

D. H. DUGAR.

STEAM ENGINE GOVERNOR.

No. 357,585.

Patented Feb. 15, 1887.



Witnesses
W. L. Lammie
Carupta Specht

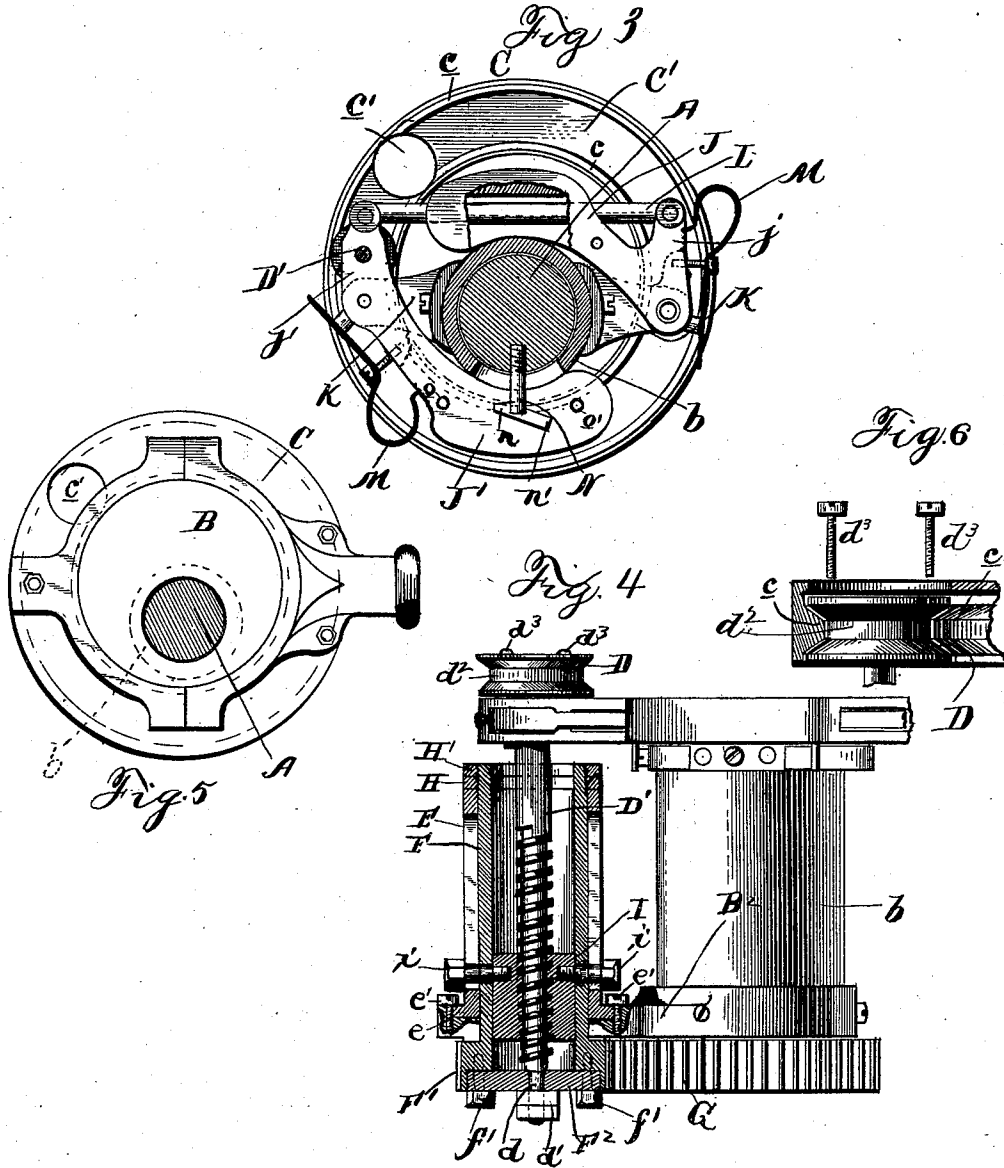
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UNITED STATES PATENT OFFICE.

DELANO H. DUGAR, OF CEDARTOWN, GEORGIA.

STEAM-ENGINE GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 357,585, dated February 15, 1887.

Application filed October 11, 1886. Serial No. 215,913. (No model.)

To all whom it may concern:

Be it known that I, DELANO H. DUGAR, a citizen of the United States, residing at Cedartown, in the county of Polk and State of Georgia, have invented certain new and useful Improvements in Steam-Engine 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to an improved governor for steam-engines, for regulating the throw of the cut-off valve, whereby the cut-off may be effected at any desired position of the piston and the engine prevented from running away with no load.

The improvements consist in the novel features presently to be described, claimed, and shown in the annexed drawings, in which—

Figure 1 is a plan view, parts broken away, of a governor of my construction. Fig. 2 is a sectional view on the line yy of Fig. 1, looking in the direction of the arrow. Fig. 3 is a similar view on the line xx of Fig. 1, looking in the direction of the arrow. Fig. 4 is a sectional view, parts broken away, on the line 4 4 of Fig. 2. Fig. 5 is a sectional view on the line zz of Fig. 1. Fig. 6 is a sectional detail of the grooved disk, showing the manner of securing the divided pulley in place. Fig. 7 is an enlarged detail view of the outer longitudinally-slotted sleeve, and Fig. 8 is a similar view of the inner spirally-slotted sleeve.

The shaft A, which is the usual crank-shaft driven from the engine, is provided with the eccentrics B and B', of usual construction, and the fly or band wheel a . The eccentric B has a sleeve, b , on the outer end of which the bracket B² is fixedly secured by suitable means. The eccentric and sleeve is loosely mounted upon the shaft, so that it can turn freely thereon.

The eccentric-strap is made in two parts, as usual, and each part is provided with lugs b' . The disk C is bolted to the eccentric-strap by screws or bolts passing through the lugs b' . The disk is provided with an annular groove,

C', on its inner face, having V-shaped ribs c , extending inward from the walls, between which walls is located the roller D, having a groove around its periphery corresponding with the outline of the ribs c in cross-section. This roller is keyed to the outer end of the screw-shaft D', passing through sleeves E and F, supported by the outer end of the bracket B². The sleeve E has a flange, e , on its end, which flange is fitted into a seat in the side of the bracket and held therein by the screws e' , which are secured into the bracket and have their heads overlapping the flange. The sleeve F is located within the sleeve E, and is free to turn therein. It extends through the bracket and has a pinion-head, F', formed on the projecting end to mesh with the gear-wheel G, mounted on the shaft A and keyed thereto in any suitable manner, preferably by the pin g , extending from the fly-wheel, entering an opening in its side, as shown in Fig. 1. The inner end projects beyond the sleeve E and is threaded. The rings H and H', screwed upon this threaded end, holds the sleeve F in place. The screw-shaft D' passes through the inner sleeve, F, and through the nut I, located therein. The end opposite the roller D is reduced and extends through the plate F², set in a recess in the head of the sleeve F and secured therein by screws f' . The outer portion of the reduced end d of said screw-shaft is threaded, and nuts d' screwed thereon holds it the (screw-shaft) from longitudinal movement.

The inner sleeve, F, has two slots, f , formed through its sides. Said slots are diametrically arranged relative to each other, and are spirally formed. The outer sleeve, E, has two diametrically-arranged slots, e^2 , extending longitudinally thereof, through which and the spiral slots f screws i loosely pass and are screwed into the nut I from opposite sides.

The governor-weights J and J' are pivotally supported upon the brackets K, secured to the sleeve b upon diametrically opposite sides. The weight J' is extended beyond its pivot and forms a bearing for the screw-shaft D', which passes therethrough; and the weight J has an extension, j . The rod I, interposed between the two weights, is connected at one end with the extension j of the weight J and at the opposite end with the projected end j'

of the weight J'. The weight J is cored, and the rod L passes through said core.

The springs M are held to the brackets K by the screws *m*. The outer ends of the springs bear upon the weights, and are adapted to fit into one of a series of notches formed in their edges, and the inner ends rest upon the ends of the brackets K. The tension of the springs can be adjusted by moving their ends nearer to or farther from the pivot of the weight, or by moving the screws in or out. Either or both of these adjustments will effect the desired result. The tension of said springs is so regulated that the roller D will be normal between the two walls of the groove.

The governor is so arranged that the cut-off will take place as early as is desirable, nearly close enough to prevent the engine running away when not loaded, and will adjust itself to make a cut-off as late as seven-eighths; and to prevent the eccentric from revolving on the shaft beyond these points, the sleeve *b* has a slot, *b'*, formed at right angles to its length, through which the stop N passes and screws into the shaft A. The head of this stop extends in opposite directions, forming arms *n* and *n'*, which are adapted to engage with pins *o* and *o'*, projecting from the side of the weight J. These arms *n* and *n'* and the pins *o* and *o'* are so disposed that when the eccentric revolves in one direction, carrying the weights, the arm *n* will engage with the pin *o* and lift it, thus disengaging the rollers D from one wall of the groove C', and when revolving in an opposite direction the arm *n'* will catch over the pin *o'* and pull it in and disengage the roller D from the opposite wall of the groove.

The roller D is made in two parts, separated by the washer *d'*, which are bolted together by the screws *d*. The part adjacent to the bottom of the groove is slipped into position through the opening *e'* formed in said disk C.

In practice the governor is adjusted upon the shaft preferably midway the points designating the limit of movement of the eccentric on said shaft. When the engine revolves at a normal rate of speed, the roller D will occupy a position midway between the two walls of the groove; but when the speed is accelerated or slackens, the weights J' and J will fly outward or inward, as the case may be, and carry the roller D to one side or the other of the groove in the disk, by which it will be revolved and cause the screw-shaft to revolve likewise. The revolution of said screw-shaft will effect a longitudinal movement of the nut I, which is guided by the screws and the slot *e'* of the sleeve E, fixed to the bracket B'. This movement of the nut will effect a partial revolution of the inner sleeve, F, and the head F' of which, meshing with the gear-wheel G, keyed to the shaft A, will cause the whole eccentric (which is loosely mounted on said shaft A) to turn, as will be readily comprehended. The direction in which the eccentric is shifted depends upon the position of

the roller. If it is in contact with the outer wall of the groove, it (the eccentric) will be moved in one direction, and when in engagement with the inner wall the eccentric will be moved in an opposite direction.

To fully comprehend the foregoing description of the operation of the device, it will be remembered that the sleeve *b* and eccentric B are loosely mounted upon the shaft A, and that the sleeves E and F are normally held together and are mounted upon a bracket secured to the sleeve *b*, and also that the sleeve F has a pinion which meshes with the gear-wheel G, keyed upon the shaft A. By this means, under normal conditions, the shaft A and eccentric B revolve together, and the roller D travels around in the groove C' of the disk C, which disk is fixed relative to the eccentric; or, properly speaking, the eccentric revolves within the disk or eccentric-strap, or both, and moves the disk so as to compensate for its eccentricity to the shaft, whereby the roller D can travel in the groove C' under normal conditions without coming in contact with either wall thereof, inasmuch as the roller, the eccentric, and the shaft travel together and in the same direction. Under abnormal conditions the roller D is shifted to and from the shaft A, and is forced against the inner or outer wall of the groove C' in the disk C, and as said roller is carried bodily around it is revolved in one direction or the other, according to the wall with which it is in contact, and, revolving thus, effects, through the means above described, a rotation of the sleeve F, the pinion F' of which, meshing with the gear-wheel G, keyed to the shaft A, compels the sleeve *b* and the eccentric B to move about the shaft A, which movement changes the position of the eccentric B relative to the shaft, as will be readily appreciated.

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

1. The combination, with the shaft and the eccentric loosely mounted thereon and having a sleeve projecting laterally therefrom, of the annular grooved disk secured to the eccentric-strap, the roller fitting in the groove of said disk, the pinion connected with the sleeve projecting from the eccentric, the gear-wheel keyed to said shaft and meshing with the pinion, and the governor-weights for shifting the roller for bringing it in contact with either wall of the groove, substantially as and for the purpose described.

2. The combination, with the shaft, the eccentric having a sleeve, the annular grooves, disk secured to the eccentric-strap, and the bracket fastened to the outer end of said sleeve, of the sleeve E, secured to the bracket and having longitudinal slots, the sleeve F, having spiral slots located within the sleeve E, the nut, the screw-shaft D', having the roller on its outer end adapted to work in the groove of said disk, the pinion formed on the end of the sleeve F, the gear-wheel keyed to said shaft

and meshing with the pinion, and the governor-weights connected with the screw-shaft for moving it to and from the center about which the governor revolves, substantially as and for the purpose described.

5 3. In a governor for steam-engines, the combination, with the disk C, secured to the strap of the eccentric, provided with an annular groove having V-shaped inner and outer walls, 10 of the screw-shaft having the roller D, composed of two parts keyed upon its outer end, and the washer interposed between the two parts, substantially as and for the purpose described.

15 4. In a steam-engine governor, the combination, with the annular grooved disk secured to the eccentric-strap and the screw-shaft hav-

ing the roller keyed to its outer end and adapted to work in the groove of said disk, of the governor-weight having a bearing for said screw-shaft, substantially as and for the purpose described.

5. The combination, with the shaft A, of the eccentric B, the sleeve *b*, having the slot *b'*, the governor-weights, the stop N, and the pins *o* 25 and *o'*, substantially as and for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

DELANO H. DUGAR.

Witnesses:

VAN BUREN HILLYARD,
G. P. KRAMER.