(No Model.)

# H. COOK.

## CUT-OFF GOVERNOR.

No. 299,963. Patented June 10, 1884.

Fig 4

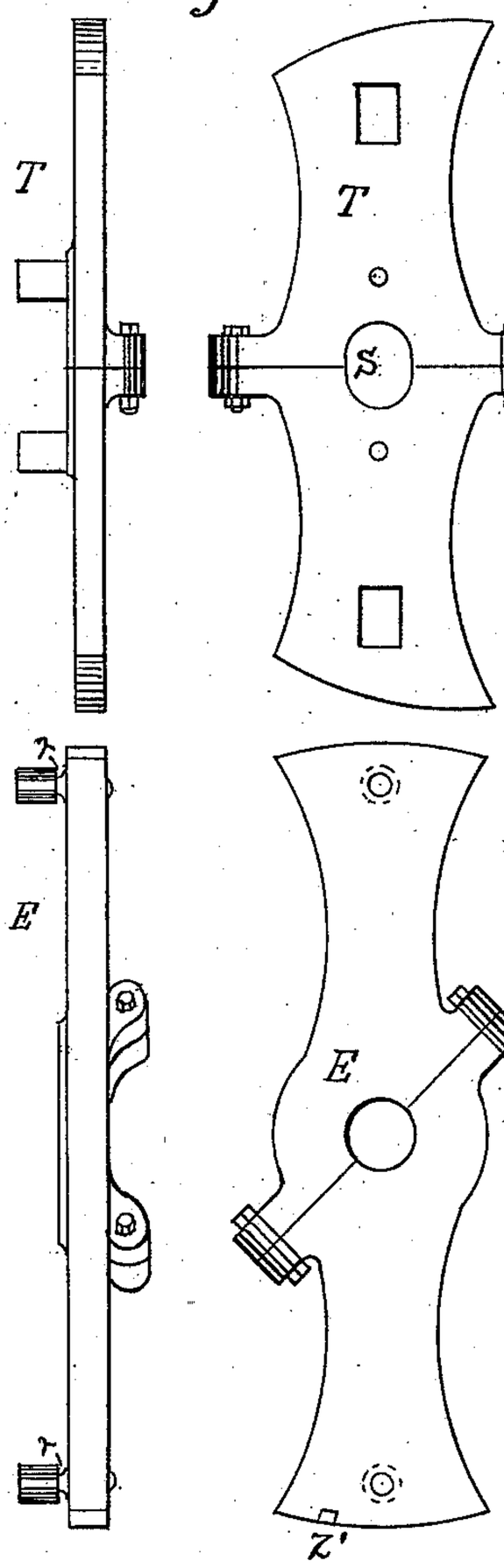


Fig 5



Fig 6



Fig 7

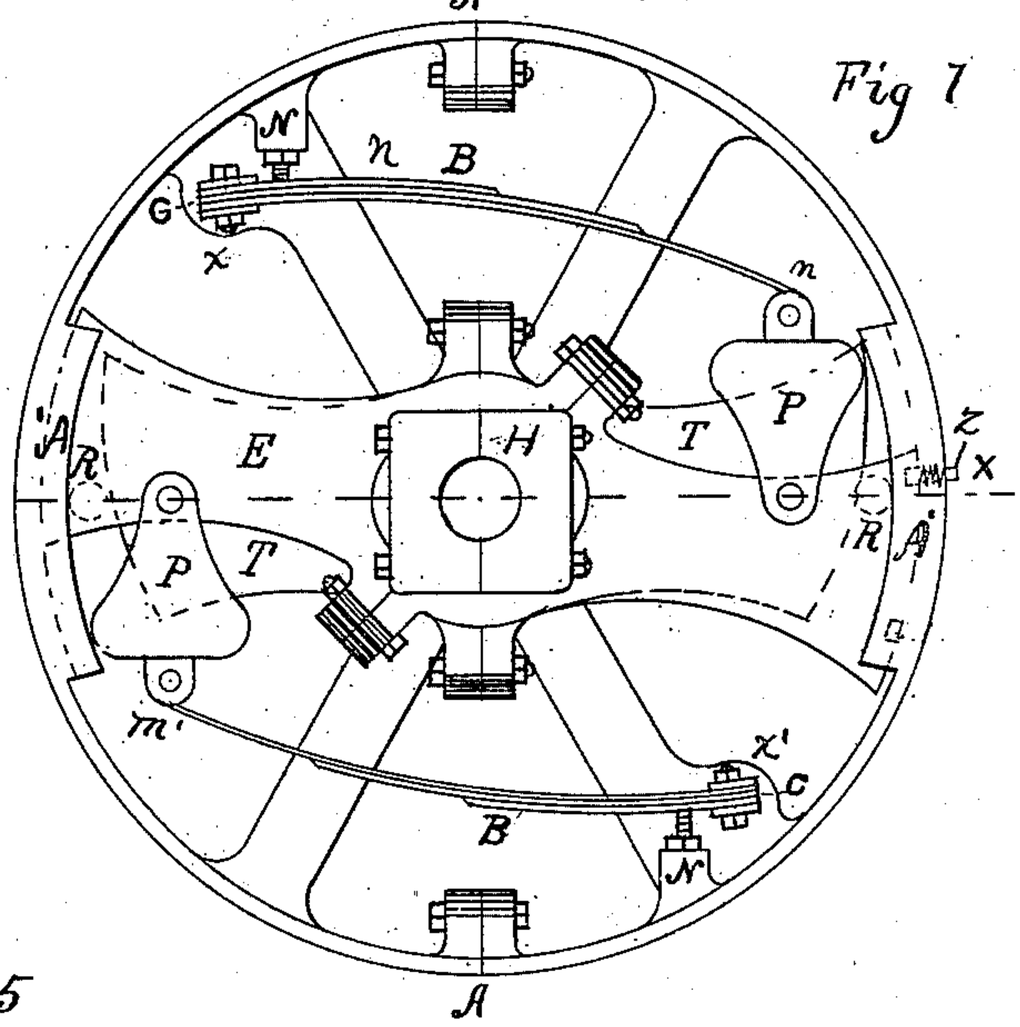


Fig 2

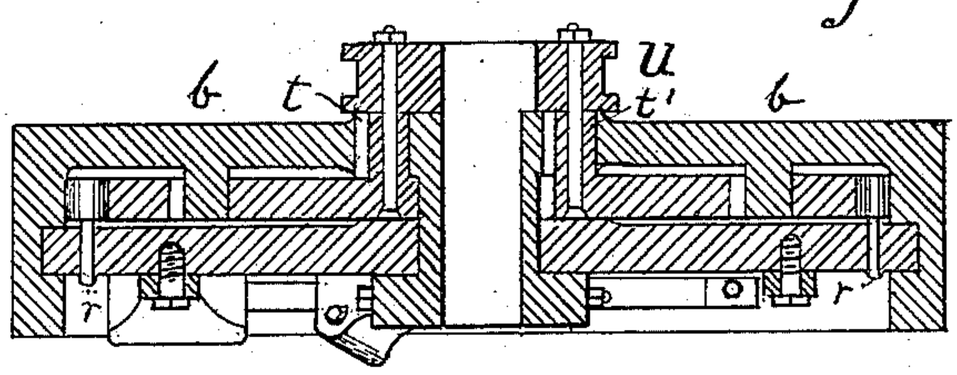
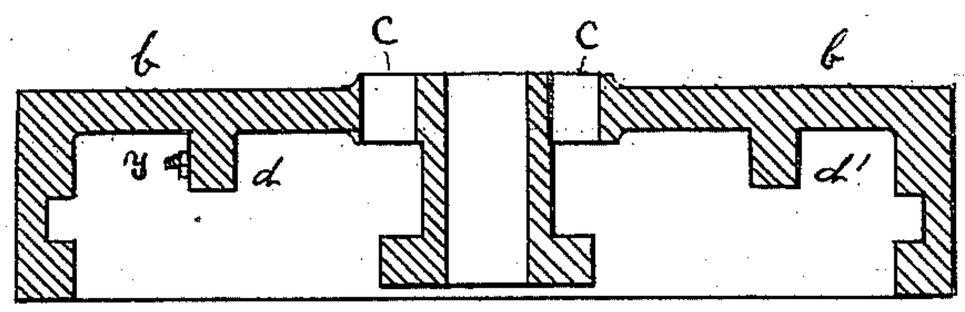


Fig 3



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# UNITED STATES PATENT OFFICE.

HUGO COOK, OF LIMA, OHIO.

## CUT-OFF GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 299,963, dated June 10, 1884.

Application filed May 23, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, HUGO COOK, a citizen of the United States, residing at Lima, in the county of Allen and State of Ohio, have invented a new and useful Automatic Cut-Off Governor, of which the following is a specification.

The invention consists in certain details of construction and combination of parts, as hereinafter pointed out and claimed.

My invention is embodied in mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a general face view of the governor entire; Fig. 2, a cross-section in the axial plane of the shaft and eccentric and longitudinally through the carrier-arm; Fig. 3, a separate cross-section of the fixed pulley in the plane of its axis; Fig. 4, face and edge views of the carrier-arm detached, showing its inclined ends and the guide slots and lugs; Fig. 5, similar face and edge views of the oscillating cam-arm, showing the studs and rollers for actuating the carrier; and Fig. 6, similar face and edge views of the centrifugal weights.

The parts hereinafter described are designated on the drawings by letters of reference.

The wheel A, constituting the supporting-frame of my improved governor, and which may be utilized also as a band-pulley for transmitting power, is preferably made in separate portions, so as to be placed upon the main shaft of the engine without removing the latter from its bearings, and is rigidly secured by keys or bolts in the usual manner, so as to rotate with the shaft. Two opposite spokes, *b b*, of the wheel (shown in section, Fig. 2) are made of enlarged size and strength, and provided with radial slots *c c* at opposite sides of and equidistant from the center. At one side of the wheel A its cylindrical hub H is somewhat extended, while at the other side the hub is flush with the face of the wheel. At the side of the wheel in the recess adjacent to its extended hub is arranged a flat plate or arm, T, which may be termed the "carrier." The arm or carrier has a central opening or slot, L, elongated in the direction of the general length of the arm, through which the hub H passes, permitting a longitudinal movement of the arm in relation to the wheel A. The outer extremities of the arm T are dressed to corresponding curved surfaces *a a*, eccentric to the shaft-axis, and at one side of the arm in the prolonged line of the slot, and at equal distances from the center, project two lugs, *t t'*, which, when the parts are in position, pass through the slots *c c*, and may form guides operating in the slots for the reciprocating movements of the arm or carrier T, and also abutments to compel the revolution of the arm T in unison with the wheel A upon their common axial center.

To the ends of the lugs *t t'*, projecting through the wheel A, is bolted an annular ring, U, surrounding the shaft, but having an opening of sufficient diameter to permit an adjustment across the shaft in a plane perpendicular to the axis of the latter. The ring U stands normally eccentric to the shaft, and constitutes the valve-mover, to which end its outer periphery is turned off with suitable grooves or ribs to receive the ordinary yoke and valve connections, its adjustment being effected in the line of its eccentricity by the reciprocating movement of its carrier-arm T. The latter movement is effected by an oscillating cam or plate, E, centered upon the hub H, outside of and adjacent to the carrier-arm, and carrying upon studs *r r'*, projecting at one side near the opposite ends, friction-rollers R R', which, when the parts are in position, bear against the eccentric surfaces, constituting the opposite ends of the arm T, and by the oscillation of the cam E produce a longitudinal reciprocation of the arm T. The oscillation of the cam E from it normal position of rest is produced by the centrifugal action of weights P, which are somewhat pear-shaped and pivoted at their smaller ends to the cam-arm T at points equidistant from the center. The weights are arranged to stand normally with their axis perpendicular to the center line of the arm T, projecting at opposite sides thereof in the general plane of its rotation, and are held at their outer ends by leaf-springs B B', respectively, arranged in the same plane across the wheel in opposite directions approximately parallel to the arm T. The springs are secured at their butt-ends by bolts or lugs to

abutments *x x'*, cast upon adjacent spokes, and arranged in such manner that strengthening-leaves may be added or withdrawn, as desired. At their outer ends the springs are coiled over in figure 6 form and pivoted to the outer ends of the weights P P, as shown at *m m'*, the whole being arranged as shown in Fig. 1. Adjacent to each of the lugs *x*, and above the spring, an abutment, N, is cast upon the inner periphery of the pulley A, and forms the seat for an adjusting-screw, *n*, which bears against the spring and serves as a means for regulating its tension.

The operation of these parts is as follows: The springs B B', bearing against the weights P P, and through them (as links) against the arm E, hold the latter in its ultimate normal position, the tension being regulated by the adjusting-screws *n* and the inherent strength of the springs, according to the requirements of the load carried by the engine. By the revolution of the wheel and the arm E the weights are actuated centrifugally, the resultant force (the centrifugal action being modified by the holding attachments of the weights) tending to oscillate the arm E on its axis against the force of the springs. This oscillation actuates the sliding arm or carrier T by means of the studs *r* and friction-rollers R, and carries the valve-moving ring or eccentric U, and the parts being properly so arranged and adjusted, the result is to lessen the eccentricity of the ring U in relation to the shaft, and thus reduce the travel of the slide-valve.

I have described the lugs *t t'* upon the arm T, acting in relation to the slots *c c'* in the wheel A, as holding devices to guide the arm in its reciprocal movement and to compel the consonant rotation of the arm with the wheel; but in practice it is desirable to perform these functions by parts situated at greater radial distance from the center to avoid the friction due to excessive leverage. To this end are provided two lugs, *d d'*, projecting at equal distances from the center from the inner face of the wheel A, passing into or through two radially-elongated slots, *e e'*, in the arm T. These may be arranged as near the extremities of the arm T as convenient, and to limit the reciprocal movement of the arm in the direction giving greatest eccentricity to the the valve-mover, I seat in one of the lugs, *d*, an adjustable abutment-screw, *f*, which forms an adjustable enlargement or re-enforce of the lug against the end wall of its corresponding slot. By the proper manipulation of this screw, as will be readily understood, the normal limit of the valve-travel can be regulated and determined.

I also provide a means of locking the valve in its ultimate position of non-action, should such position be reached through the excessive speed of the engine from any accidental cause. This consists in a spring push-pin, *z*, inserted through the rim of the wheel A to bear against the curved extremity of the arm E, and drop into a slot or recess, *z'*, formed in such curved surface at the point in contact with the pin at the extreme oscillation of the arm. The action of the pin under such circumstances will lock the arm in such extreme position and hold the valve-mover in its concentric position and stop the engine until the pin is released by hand and the parts permitted to resume their normal functions.

I have omitted to mention that the arm E is retained in its plane of oscillation by guide-wings A', cast upon the inner periphery of the wheel A.

I claim—

1. In a cut-off governor, the combination of the following elements, to wit: a fixed pulley or carrying frame on the main shaft, a reciprocating arm carrying the valve-mover, and an oscillating cam controlled by springs and centrifugal weights and actuating the reciprocating arm, substantially as and for the purpose set forth.

2. In a revolving cut-off governor, the leaf-springs B B, each secured at one end to the wheel and at the other end pivoted to the weight, the oscillating plate or arm E, and the weights pivoted thereto, all combined and operating substantially as stated.

3. In a revolving cut-off governor, the combination of the oscillating arm or plate E with the weights P, pivoted thereto, the leaf-springs, each secured at one end to the wheel and at the other pivoted to the weights, and the set-screws *n*, placed, as described, so as to bear on the leaf-springs, as set forth.

4. The oscillating cam E, provided with studs *r* and friction-rollers R, in combination with the reciprocating carrier T, having inclined surfaces *a a*, arranged and operating substantially as and for the purpose described, in a revolving cut-off governor.

5. In a revolving cut-off governor, an oscillating cam-plate controlling the eccentricity of the valve-mover, provided with means, substantially as described, for arresting and locking the valve-mover in its concentric position upon the shaft, substantially as set forth.

6. In a revolving cut-off governor, a locking-pin, *z*, arranged in the periphery of the carrying-pulley, in combination with the oscillating cam E, provided with a recess, *z'*, substantially as set forth.

7. In a revolving cut-off governor, a reciprocating carrier controlling the eccentricity of the valve-mover, in combination with means, substantially as described, for adjusting and limiting the normal limit of its reciprocation, substantially as set forth.

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Witnesses:
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