(No Model.)

J. P. SIMMONS.

ENGINE GOVERNOR.

No. 306,541. Patented Oct. 14, 1884.

FIG. 2.

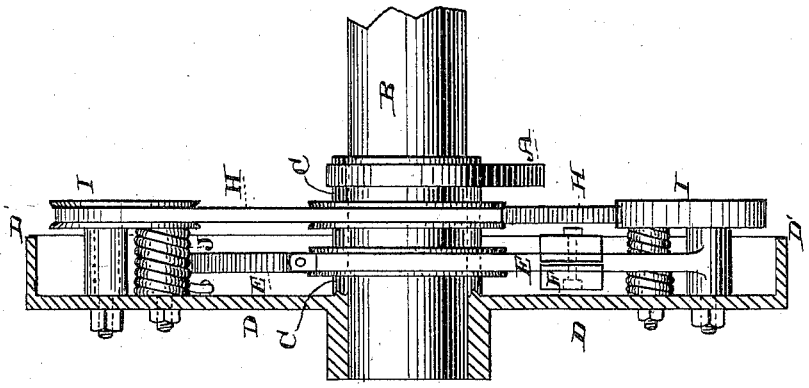
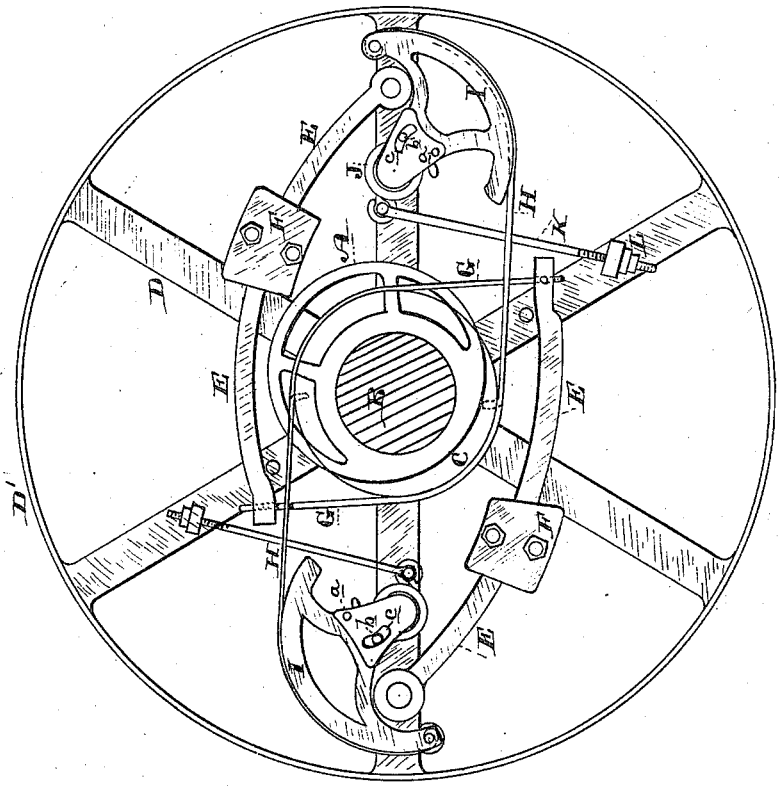


FIG. 1.



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UNITED STATES PATENT OFFICE.

JOHN P. SIMMONS, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR OF ONE-HALF TO W. H. OHMEN, OF SAME PLACE.

ENGINE-GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 306,541, dated October 14, 1884.

Application filed May 23, 1884. (No model.)

To all whom it may concern:

Be it known that I, JOHN P. SIMMONS, of the city of San Francisco, in the county of San Francisco and State of California, have invented an Improvement in Engine-Governors; and I hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to a governor for steam and other engines; and it consists of a hub loosely revolving upon the engine-shaft, and having formed with it or attached to it an eccentric, by which the valve is moved. A circular disk or casing is fixed to the engine-shaft by the side of this hub, and has two arms pivoted near its circumference at opposite sides, the inner ends of these arms approaching the hub and connecting with it by straps. Weights are adjusted upon these arms, and when the engine-shaft revolves the centrifugal force carries the weights and the unattached ends of the arms outward, thus rotating the hub and the eccentric upon the shaft, and changing the relative motion of the valve-gear to that of the crank. Other straps passing around the hub extend to adjustable eccentric or cam-shaped arcs, which are pivoted within the disk, and have springs acting upon their axes, so that when the speed of the engine becomes slower these curved arcs with the springs act to draw the eccentric back to its original position.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a side elevation showing my mechanism. Fig. 2 is a transverse section through the disk, showing the arms, weights, the hub with its connecting-straps, and the eccentric upon the engine-shaft.

A is an eccentric, by which the valve is actuated, and it is fitted loosely upon the main engine-shaft B by means of a cylindrical hub or sleeve, C, which forms part of it.

D is a circular disk, which may have a flange, D′, upon its periphery projecting to one side, so as to form a case within which the mechanism may be inclosed. This disk or case is fixed to the shaft by the side of the hub and eccentric. Two curved arms, E, have their outer ends pivoted to opposite sides of the disk near the periphery, while the inner ends extend across the hub C upon opposite sides. These arms have weights F fitted upon them, and these weights may be made to slide upon the arms to or from the point where they are pivoted, so as to give them greater or less centrifugal power as the shaft is revolved. Flexible straps G are secured to the free ends of the arms E, and these straps pass around the hubs C from opposite sides, so that when the inner ends of the arms E are thrown outward by centrifugal force as the shaft revolves rapidly the straps act to turn the hub and the eccentric upon the shaft, so that the latter acts upon the engine-valve and causes it to cut off steam from the cylinder more quickly after the stroke of the piston commences. If the engine runs more slowly, the eccentric is turned in the opposite direction upon the shaft by means of springs and the straps H. The latter pass around the hub C in the opposite direction from the straps G, and thence around the periphery of segments I. The shaft forming the centers of these segments I are journaled upon the side of disk or case D, and have stout coiled or spiral springs J around the shafts, which act to turn segments, and through them and the straps H to turn the eccentric back, so that its action upon the cut-off valve will be to admit steam to the cylinder during a longer period of its stroke.

The tension of the springs J and the position of the eccentric may be regulated and adjusted by means of screws K, one end of which are attached to the springs and the other end pass through the lugs upon the side or arms of the disk, so that they may be acted on by ends L to draw them up or relax them, as may be desired.

It will be seen that the centrifugal power of the weights F will be considerably increased as the arms E move outward toward the circumference of the disk or case, and as the segments I are turned by this action the tension of the springs J will also be increased. Experience proves that the tension of the springs J increase in a greater ratio than the power produced by throwing the weights toward the circumference of the disk, and in order to equalize this the segments or arms I are made eccentric to the journal-pin upon which they turn, that end of the arc upon which the strap draws when the arms E are nearest the

center being nearer to its journal than the opposite end. The result of this will be that as the arms E move outward toward the circumference of the disk the straps H will draw upon the portion of the arc which is constantly increasing its distance from the center, and therefore increasing the centrifugal power to throw the weights out.

The exact eccentricity of the arcs or segments is so determined that the power of the spring and the centrifugal force of the weights will be nearly or quite balanced for either position in which the weights may be.

I have shown the outer portion of the segment attached to that portion which is fixed to the journal-pin by a pin, *a*, at one side and a pin, *b*, projecting through a slot, *c*, which forms an arc about the pin *a*. This allows the end of the arc nearest the center to be moved to or from the center about the pin *a*, and its eccentricity is thus varied to correspond with variations in the position of the weights.

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

1. In a governor, the eccentric fitted loosely to the main engine-shaft, and the curved weighted arms connected with the hub of the eccentric by straps attached to the arms and to segments, so as to rotate it when turned outward by centrifugal action, the said segments having a returning-spring coiled around their pins, as herein set forth.

2. In a governor, the eccentric loosely fitted to the main engine-shaft, the pivoted and curved weighted arms connected with the hub of the eccentric, so as to rotate it when thrown outward by centrifugal action, and the arcs or segments connected with opposite sides of the eccentric, these segments being also made eccentric to their journal-pin, and having springs coiled around said pin, to return them as the centrifugal force decreases, as herein described.

3. In a governor, the eccentric turning loosely upon the main engine-shaft, and having a hub connected with the curved weighted arms, so as to rotate it in one direction when turned outward by centrifugal action, and eccentric segments connected with opposite sides of the hub by straps, with coiled springs J upon their pins to resist the centrifugal action of the weights and return the hub and eccentric to its first position as the centrifugal power decreases, in combination with an adjusting tension-screw connected with the spring and passing through lugs on the arms of the disk and nuts L, as herein described.

4. In a governor, the eccentric loosely fitted to main engine-shaft, the pivoted and curved weighted arms connected with the hub of the eccentric, so as to rotate it when thrown outward by centrifugal force, and the arcs or segments connected with opposite sides of the eccentric, made eccentric to these journal-pins and adjustable with reference thereto, substantially as herein described.

In witness whereof I have hereunto set my hand.

JOHN P. SIMMONS.

Witnesses:
S. H. NOURSE,
H. C. LEE.