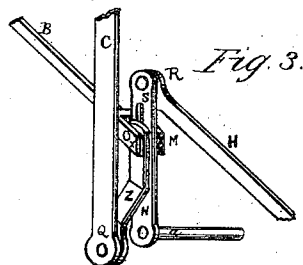
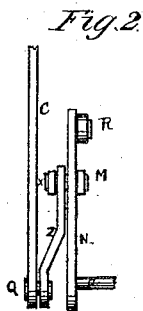
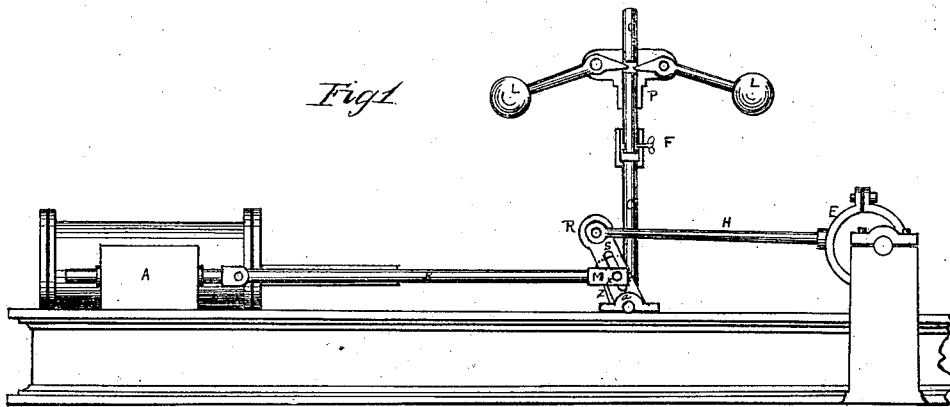


G. E. Long,

Cut Off Valve.

No. 103904.

Patented June 7. 1870.



Witnesses:
F. M. Baas
Stephen H. Keaven

Inventor:
G. E. Long

United States Patent Office.

GEORGE E. LONG, OF HARRISBURG, PENNSYLVANIA.

Letters Patent No. 103,904, dated June 7, 1870.

VARIABLE CUT-OFF VALVE-GEAR.

The Schedule referred to in these Letters Patent and making part of the same.

I, GEORGE E. LONG, of Harrisburg, in the county of Dauphin and State of Pennsylvania, have invented an Improved Governor-Valve Gear, of which the following is a specification.

The nature and objects of my invention consist in,

First, the employment of a simple hinged rocking frame, whereby the limb of the governor is connected with the valve-stem in such manner that the rocking motion effected by the eccentric-rod in throwing the valve is counteracted or balanced, in order to maintain the governor-limb as little disturbed as possible in its vertical direction.

Second, regulating or modifying the throw of the valve, so as to render the cut-off variable and automatic by a simple combination of parts whereby a pin, encased in a friction-roller, connects the valve-stem with a slotted arm on the rock-shaft, and also connects with one end of a swinging bar, which, at its other end, connects with the limb of the governor.

In the accompanying drawing—

Figure 1 is a side elevation embodying my invention.

Figure 2 is an edge view of the gear.

Figure 3 is a perspective view of the same.

Similar letters denote similar parts in the specification.

A is the steam-chest.

B is the valve-stem.

E is the eccentric.

H is its connecting-rod.

C is the governor-limb.

The gear proper, figs. 2 and 3, consists of governor-limb C, a bent bar or rod Z, a slotted arm N on the rock-shaft, a clevis M, which is the outer end of valve-stem B.

The rod Z and governor-limb C are pivoted together at their lower ends, thus forming a hinge-joint.

Rod Z is bent away from limb C toward arm N, in the plane of which its other end lies, thus effecting a clearance for clevis M to pass limb C.

Clevis M is made wide enough to admit rod Z and slotted arm N between its arms loosely. A pin, X, passes through both arms of the clevis, in which it is fastened rigidly.

Pin X serves as a pivot for the rod Z, through which it passes loosely, and it serves as a traversing wrist-pin in the slot of arm N. Pin X thus serves as a center of motion for the upper end of the bent rod Z and for valve-stem B, when the shaft α is rocked by the eccentric-rod H, which is connected with slotted arm N by a hinge-joint, at R. Pin X also serves as a variable crank in slot S, as its place in the slot is dependent upon the position of the governor-limb C, thus making the distance from rock-shaft α to clevis

M, and, therefore, the throw of valve-stem B variable.

The rock-shaft α is supported on the engine-bed by cap and box-bearings, or in any suitable manner, and it is the only fixed part of the gear.

The arm N and its attachments move back and forth, according to the throw of the eccentric, while the hinge-joints, at the extremities of the bent rod Z, serve to counteract or balance the rocking motion in relation to the governor-limb C, so as to maintain its motion as nearly as possible in a vertical direction.

The throw of valve-stem B is regulated or modified by the position of its end M.

The throw of arm N being uniform, raising end M increases the throw of stem B, and lowering end M diminishes the throw of the same.

Now, as the operations of raising and lowering the end of valve-stem are effected by the lowering and raising of the limb C of the governor, the cut-off is not only variable, but also automatic.

The limb C will be lowered by increase of speed, and the throw of valve-stem B will be diminished, and the limb will be raised by the decrease of speed, and the throw of the valve will be increased.

This cut-off is designed to act promptly, and to be sensitive enough to cause the engine to run with a nearly uniform speed. The position of the clevis M will, therefore, not vary much from any assumed rate of speed, but considerably for different rates in succession.

This gear is designed not only for slide-valves, but, also, for all valves in which reciprocating rectilinear motion can be employed for opening and closing the ports, or where the induction-port becomes the exhaust-port at the return stroke.

Another advantageous feature of this gear is its simplicity. Cams, ratchets, levers, springs, friction-plates, &c., are all dispensed with. No hand manipulation is needed, of bars or weights. It needs only a governor of light proportions, and can be attached to any governor in common use.

I claim—

The combination of the governor-limb C, and valve-stem B, by means of the intermediate bent rod Z, which is hinged to the former at its lower end, and connected to the latter at its upper end, by a pin enclosed in a friction-roller which traverses the slot in arm N, when the cut-off is rendered variable and automatic by the raising or lowering of the valve-stem end M, in the manner as herein set forth.

G. E. LONG.

Witnesses:

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