

(No Model.)

H. H. MEYER.
CUT-OFF VALVE GEAR.

No. 285,500.

Patented Sept. 25, 1883.

Fig. 1.

Fig. 4.

Fig. 2.

Fig. 3.

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CUT-OFF-VALVE GEAR.

SPECIFICATION forming part of Letters Patent No. 285,500, dated September 25, 1883.

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To all whom it may concern:

Be it known that I, HERMAN H. MEYER, a citizen of the United States, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Automatic Cut-Off-Valve Gears for Steam-Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to that class of steam-engines in which counter-weights arranged in a disk attached to the main shaft of the engine act through centrifugal force upon an eccentric moving on said main shaft and connected to the slide-valve in the steam-chest by a series of rods and crank-arms, and thereby automatically control or govern the movement of said slide-valve; and my said invention consists in certain novel combinations of parts, as will hereinafter more fully appear, and which will form the subject of specific claims.

Referring to the drawings, in which similar letters of reference indicate like parts in the several views, Figure 1 represents a side elevation, partly in section, of my improved arrangement of automatic governor or cut-off for steam-engines, and Fig. 2 a plan of the same. Fig. 3 is a sectional view of a piston-valve to which my proposed arrangement is applicable, the same as to the ordinary slide-valve shown in Fig. 2. Fig. 4 represents the position of the eccentric of the governor should the speed of the engine be increased sufficiently to act upon the centrifugally-acting weights which operate said eccentric.

A is the cylinder, and B the steam-chest, of an ordinary steam-engine. B' is the slide-valve, and b its rod. This slide-valve is operated by the fixed eccentric E on the main shaft of the engine, connecting-rod c, vibrating arms J K, connected by link j, and valve-rod b. D is another eccentric, also on the main shaft, and acting through rod l and rocker-arms L and K to move the slide-valve B'. C is a disk containing the automatically-acting valve-governing devices, keyed to the main shaft of the engine. Within this disk C is arranged the counter-weights F, F', and H, which act upon a lever, D', pivoted to the disk C at d', and having an elliptical opening, d, in its large end, through which passes the main shaft

of the engine. To this lever D' the eccentric D is secured, and moves with the disk C. The counter-weight F is attached by a short rod, f', directly to the lower part of the enlarged end of the eccentric-lever D', while the similarly-formed weight F' is connected to said eccentric-lever D' through a rocker-arm, O, pivoted at o, and a link, P, pivoted to the short end of the rocker-arm O, and to the eccentric lever D' at p. These weights F and F' have side roller-bearings, f, and by reason of their gravity, combined with the springs G G', act to keep the eccentric-lever in the proper eccentric position, as shown in Fig. 1—that is, with the main shaft at one end of the slot d thereof. The counter-weight H is of different construction from the ones F and F', being pivoted at h to the disk C, and engaging by a short arm with a short projecting end of the eccentric-arm D', as shown at h'. The action of this weight is the same as that of the ones F F'—that is, to keep the eccentric-arm D' in such position that the main shaft will be at one end of the slot d thereof, as shown in Fig. 1. G G' are spiral springs, the one G arranged to act against the eccentric-lever D', and the one G' arranged to act against the short arm or end of the pivoted weight H.

The object of the foregoing-described parts is to form a secondary means for acting upon the slide-valve, in connection with the usual eccentric and its connection, which shall be brought into action automatically by the centrifugal force of weights acting upon an eccentric, should the speed of the engine be increased sufficiently to cause these weights to act and close the steam-ports, thus forming an automatic governor to regulate the speed of the engine.

The operation is as follows: The first eccentric, E, is set opposite in position to the piston crank-arm I, and is connected with the valve-rod b by a rod, c, pivoted to a rocker-arm, J, having a central pivot at 1 on the frame of the engine, and a similar arm, K, to which the valve-rod is attached, having a pivot bearing at 3 on the rocker-arm L, and connected to the arm J by a link, j. The travel of this eccentric E is only slightly in excess of the lap of the valve—that is, the movement is just sufficient to open the port for the admission of

steam at the beginning of the stroke, as shown in Fig. 2. Should there be no other provision, the eccentric E would simply open the ports, as shown, just sufficient to admit steam, and then at once commence to close the ports again; but at the moment the eccentric E finishes its forward stroke, bringing the valve in the position shown in Fig. 2, the eccentric D, revolved by the disk C, commences to act, and through its rod *l*, pivoted to an arm, L, rocking on a bearing on the engine-frame at 2, and pivoted at 3 to the rocker-arm K of the valve-rod *b*, continues the forward movement of the valve-rod and carries the valve over the steam-ports its full stroke. The same movement takes place on the reverse stroke, so that the proper movement for the valve is obtained. Should the speed of the engine increase sufficiently to cause the weights F, F', and H to move by centrifugal force from the center, they, through their connections, cause the eccentric-lever D' to move from its normal position (represented in Fig. 1) and assume the position represented in Fig. 4, with the main shaft in a central position, which being a non-eccentric one, or one of no eccentricity, the eccentric D ceases to vibrate, the rocker-arm L assuming a vertical position, as shown in Fig. 1, and the steam is cut off from a point just sufficient to move the engine by the fixed eccentric. In other words, the eccentric D ceases to act, and the fixed one E being adjusted through the rocker-arm J, pivoted at 1, and rocker-arm K, pivoted to the arm L at 3, so as to move the valve only so as to just lap the ports, the volume of steam admitted is decreased, and consequently the rapid movement of the engine at once ceases. Upon the slackening of the revolution of the disk C consequent upon the diminished amount of steam admitted by the ports, the weights lose their centrifugal momentum, and the springs G G', which had been compressed by the action of the weights, are permitted to react upon the eccentric-lever D' and bring the eccentric D back to its normal or eccentric position, as shown in Fig. 1, when the eccentric D is again brought into play and the arm L vibrates and the full stroke given thereby to the valve. This movement, imparted by the weights to

the eccentric-arm, and through its eccentric D and rod *l*, causes the arm L to vibrate a greater or less degree, according to the speed of the engine, and to correspondingly act through the rod *b* upon the valve in the steam-chest, and thereby give more or less travel to the valve, and opening or closing the steam-ports accordingly.

The engine may be run entirely by the eccentric E, in case of damage to the cut-off mechanism, by shifting the eccentric to an opposite position, disengaging the rod *e* from its present position at the top of the rocker-arm J, and securing it to the bottom of said arm, throwing off the connecting-link *j*, and substituting a longer valve-rod for the one *b* that will reach from the top end of the arm J to the slide-valves.

What I claim is—

1. In an engine-valve gear, the rocker-arms J K and arm L, the link *j*, connecting said arms J K, the rods *e* *l*, and valve-rod *b*, in combination with the eccentrics D E, one being free to move across the shaft, and the disk-governor C on the main shaft of the engine, substantially as and for the purpose set forth.

2. In an engine-valve gear, the combination, in a disk-governor, of the disk C, weights F F', and pivoted weight H *h*, lever O, and its link P, the eccentric arm or lever D', pivoted to the side of the disk, and the springs G G', arranged to act upon the eccentric-arm D', and pivoted weight H, respectively, all arranged to operate as and for the purpose set forth.

3. In an engine-valve gear, the combination, with the rocker-arms J, K, and L, and the link *j*, connecting said arms J K, of the eccentrics D and E, rods *e* and *l*, valve-rod *b*, disk C, weights F F', pivoted weight H, lever O, and its link P, arm D', and springs G G', all combined and arranged to operate as and for the purpose set forth.

In testimony whereof I have affixed my signature in the presence of two witnesses.

HERMAN H. MEYER.

Witnesses:

GEORGE E. ROSS-LEWIS,
STEPHEN H. CAMPBELL.