

(No Model.)

F. J. WATERS.
CUT-OFF PISTON VALVE.

No. 482,707.

Patented Sept. 13, 1892.

Fig-1.

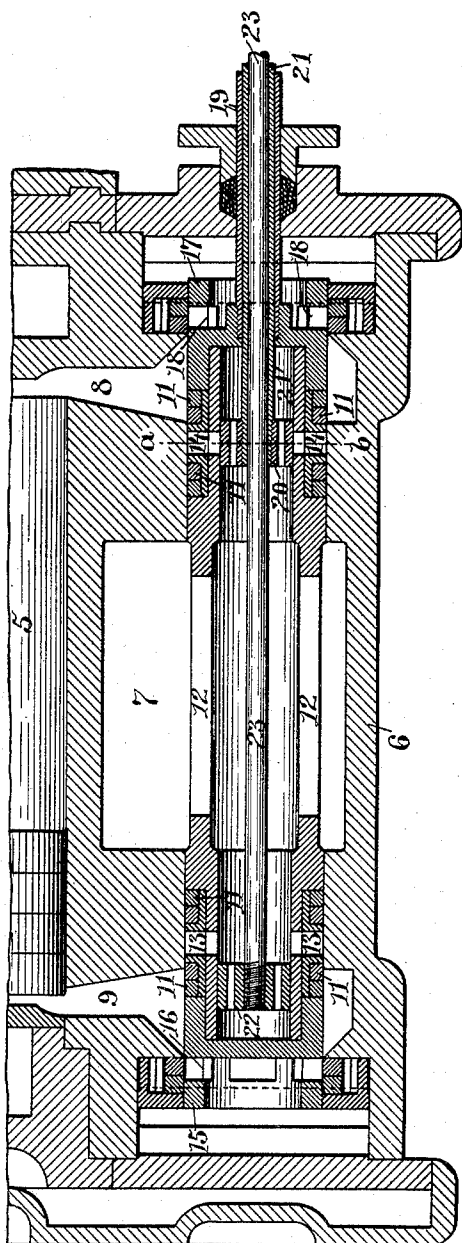
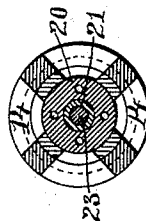


Fig-2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

FRANK J. WATERS, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR OF ONE-HALF TO GEORGE HOWE, OF SAME PLACE.

CUT-OFF PISTON-VALVE.

SPECIFICATION forming part of Letters Patent No. 482,707, dated September 13, 1892.

Application filed April 25, 1892. Serial No. 430,505. (No model.)

To all whom it may concern:

Be it known that I, FRANK J. WATERS, of the city of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Cut-Off Piston-Valves; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention has reference to improvements in cut-off piston-valves for regulating the entrance of steam into the cylinder of the engine.

The object of the invention is to produce a cut-off piston-valve which can be operated to cut off the entrance to the cylinder when the normal speed of the engine is exceeded and to open the same as the speed of the engine is reduced.

The invention consists in the peculiar construction of the slide-valve and the novel combination therewith of peculiar and independently-operating cut-off valves adapted to be operated by the regulating device, as will hereinafter be more fully described, and pointed out in the claims.

Figure 1 represents a horizontal sectional view of a portion of an engine, showing a portion of the cylinder and the valve-casing containing the improved valve, the construction of which is clearly shown. Fig. 2 represents a cross-sectional view of the slide-valve, taken on a line *a b*, Fig. 1.

Similar numbers of reference designate corresponding parts throughout.

In the drawings, 5 indicates the cylinder of a steam-engine, and 6 is the valve-chamber thereof, into the compartment 7 of which steam is supplied through any ordinary supply-pipe, and from the end portions of which the exhaust-steam is conveyed in the usual manner, steam being admitted from said casing to the cylinder 5 through the forward port 8 and the rear port 9. The slide-valve 10 is generally cylindrical in shape and is free to reciprocate in bearings in which the ends of the valve are supported and in circular bearings formed in the walls separating the central compartment or steam-chest 7 from the passages 8 and 9, portions of the circumference of the valve being cut away to allow

of these bearings being packed by the metal rings 11, cut into segments of a circle to allow of outward expansion, and two rings being used at each bearing to break joints. At the central portion the slide-valve 10 has the longitudinal slots 12, through which the steam supplied to the steam-chest 7 passes into the interior of the valve, and intermediate the ends of these slots and the end walls of the slide-valve are the ports 13, through which steam is admitted to the passage 9, and the ports 14, through which steam is admitted to the passage 8. At a short distance to the rear from the ports 13 is the end wall which closes this end of the valve, and beyond this wall is an extension 15, open at the end and having ports 16 to allow the exhaust-steam from the passage 9 to pass through these ports and into the rear end of the valve-casing when the slide-valve moves forward. The forward end wall of the slide-valve is also provided with an extension 17, open at the end and provided with the ports 18, through which exhaust-steam from the passage 8 may pass to the forward end of the valve-case. The forward end wall of the slide-valve has a threaded perforation, into which the end of the tubular valve-stem 19 is secured. This valve-stem passes through a stuffing-box in the forward end of the valve-casing, the outer end being secured to a reciprocating valve drive-rod of any usual construction and operation. The forward cut-off valve 20 is longitudinally perforated and is formed to closely fit the bore of the slide-valve. This valve is furnished with the tubular valve-stem 21, which extends through the tubular valve-stem 19, and, if desired, through a stuffing-box formed on a reciprocating bracket. The rear cut-off valve 22 is also perforated and closely fits the bore of the slide-valve, being provided with a valve-stem 23, which may be solid and extends through the valve-stem 21, being secured to a reciprocating arm. (Not shown.) The reciprocation of the cut-off valves 20 and 22 is governed by any form of governor to wholly or partially close the ports 13 and 14 of the slide-valve when the speed of the engine rises above the normal and to open the same when the speed of the engine is reduced. By the use of the perforations in these cut-off valves they are perfectly balanced.

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

1. In a piston slide-valve, the combination,
5 with a cylindrical slide-valve having solid ends and provided with central longitudinal inlet-slots and outlet-ports intermediate said slots and the end walls and a tubular valve-stem secured through a perforation in one
10 end wall, of an independently-movable cut-off valve carried in the forward end of said valve-chamber and provided with a tubular valve-stem extending through the stem of the slide-valve, and an independently-movable
15 cut-off valve carried in the rear portion of the slide-valve and provided with a valve-stem extending through the stem of the forward cut-off valve, as described.

2. The combination, with the slide-valve 10,
20 longitudinally movable in a suitable valve-casing and provided with inlet and outlet ports, and the extensions 15 and 17, provided with outlet-ports 16 and 18, of the bearing-rings 11 11, contained within circumferential

depressions in the walls of the slide-valve, as 25 described.

3. The combination, with the slide-valve 10, having solid ends and provided with the inlet-slots 12 and the outlet-ports 13 and 14, the extensions 15 and 17, provided with the ports 30 16 and 18, and the tubular valve-stem 19, secured in a perforation in the forward end of the slide-valve, of an independently-movable cut-off valve 20, contained within the forward portion of the slide-valve and pro- 35 vided with a tubular valve-stem 21, extending through the stem of the slide-valve, and an independently-movable cut-off valve 22, contained within the rear portion of the slide-valve and provided with a valve-stem 23, ex- 40 tending through the stem of the forward cut-off valve, as described.

In witness whereof I have hereunto set my hand.

FRANK J. WATERS.

Witnesses:

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