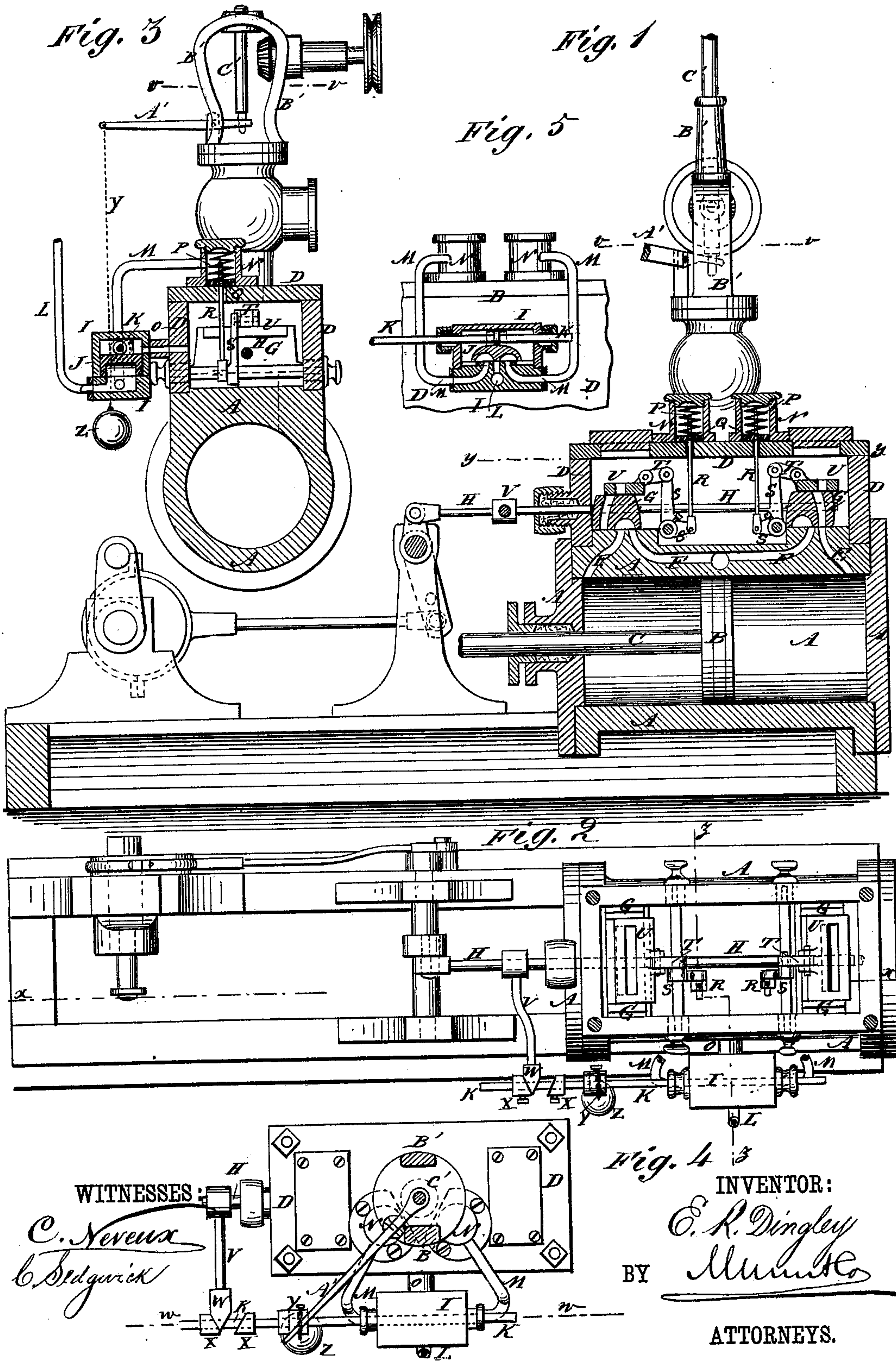


E. R. DINGLEY.  
Automatic Cut-Off for Plane-Valve Engines.  
No. 203,009.      Patented April 30, 1878.





# UNITED STATES PATENT OFFICE.

EPHRAIM R. DINGLEY, OF NEW YORK, N. Y.

## IMPROVEMENT IN AUTOMATIC CUT-OFFS FOR PLANE-VALVE ENGINES.

Specification forming part of Letters Patent No. 203,009, dated April 30, 1878; application filed April 10, 1878.

*To all whom it may concern:*

Be it known that I, EPHRAIM R. DINGLEY, of New York city, in the county and State of New York, have invented a new and useful Improvement in Automatic Cut-Offs for Plane-Valve Engines, of which the following is a specification:

Figure 1 is a vertical longitudinal section of my improved engine, taken through the line *x x*, Fig. 2. Fig. 2 is a top view of the same, the valve-chest being removed. Fig. 3 is a vertical cross-section of the same, taken through the line *y y*, Fig. 2. Fig. 4 is a top view of the two valve-checks, partly in section, through the line *v v*, Fig. 3. Fig. 5 is a detail section taken through the line *w w*, Fig. 4.

Similar letters of reference indicate corresponding parts.

The object of this invention is to furnish an improved device for attachment to steam-engines, which shall be so constructed that should the motion of the engine become too rapid it will cut off the steam automatically at each stroke of the piston until the engine has been slowed down to the proper speed, and which at the same time shall be simple in construction and automatic in operation.

The invention consists in the combination of the secondary valve-chest, provided with the valve and the ports, the secondary steam-cylinders, the springs, the piston, the piston-rods, the elbow-levers, and the adjustable plates, with the main valve and the slide-valves; in the combination of the arm, provided with a wedge-shaped head, the inclined adjustable collars, the chain, the weight, and the lever with the main valve stem, the secondary valve-stem, and the ball-spindle of the governor, as hereinafter fully described.

A represents a steam-cylinder. B is its piston, and C the piston-rod, which passes out through the stuffing-box in one of the cylinder-heads in the usual way. D is the valve-chest, which is provided with ports E, leading to the cylinder A, and with ports F, leading to the exhaust. G are the slide-valves, which are attached to the valve-stem H. The valve-stem H passes out through a stuffing-box in one end of the valve-chest D, and is connected with and receives motion from the piston-rod C in the usual way. At the side of the valve-chest

D is connected a secondary valve-chest, I, in which is the valve J, attached to a valve-stem, K, which passes out through the stuffing-box in the ends of the said valve-chest I. The valve-chest I is provided with an exhaust-port, L, and with ports M, leading to the cylinders N, attached to the top of the main valve-chest D. The secondary valve-chest I is connected with the main valve-chest D by a passage, O, so that the steam-pressure may always be the same in both valve-chests. In the upper part of the cylinders N are placed spiral springs P, the upper ends of which rest against the heads of the said cylinders N, and the lower ends rest upon the pistons Q, placed in the lower part of the said cylinders, which work steam-tight within them. The pistons Q are attached to the upper ends of the piston-rods R, which pass down through holes in the top of the valve-chest D, and their lower ends are pivoted to the short arms of the elbow-levers S. The holes in the top of the valve-chest D, through which the piston-rods pass, are made larger than the said piston-rods, so that the steam may pass through them freely. The elbow-levers S are pivoted at their angles to rods or other supports attached to the lower portion of the sides of the valve-chest D, and to the ends of their upper arms are pivoted the ends of short connecting-rods T, the other ends of which are pivoted to plates U, placed upon the top of the slide-valves G, as shown in Fig. 1. The plates U are provided with ports, through which the steam passes in its passage through the ports of the slide-valves G to the ports E, leading to the cylinder A. When the engine is running at ordinary speed the plates U are in such a position that their ports may be directly over the ports E. To the valve-stem H of the main valve-chest D is attached an arm, V, upon the outer end of which is formed a wedge-shaped head, W, which has a hole formed through it, through which passes the valve-stem K of the secondary valve-chest I. To the valve-stem K, upon the opposite sides of the wedge-shaped head W, are attached adjustable collars X, which are secured in place by set-screws, and the inner sides of which are beveled, as shown in Figs. 2 and 4. To the valve-stem K, or to a collar or drum attached to said valve-stem,



is secured a chain, Y, which makes one or more turns around the said stem, and has a weight, Z, attached to its lower end. The upper end of the chain Y is attached to the outer end of a lever, A', which is pivoted to the frame B' of the governor, and the inner end of which is connected with the lower end of the spindle C', that carries the governor-balls.

With this construction, as the speed of the engine increases the outward movement of the governor-balls depresses the spindle C', which operates the lever A' and turns the valve-stem K, so that the head W of the arm V will strike against the collars X of the said valve-stem, and thus move the valve J upon its seat. As the valve J moves in either direction it connects one of the ports M with the exhaust L, so that steam may escape from the upper part of the cylinder N, with which said port M is connected. This allows the steam-pressure of the valve-chest D to raise the piston Q and move the plate U with a positive movement to shut off the steam. By this arrangement the steam will be shut off at each stroke of the piston B until the engine has been slowed down to its ordinary speed. When this happens the various parts of the device

return to their ordinary position, and remain stationary until again operated by the increased speed of the engine, so that the movement of the engine will always be kept at the required speed.

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

1. The combination of the secondary valve-chest I, provided with the valve J, the ports L M, the secondary steam-cylinders N, the springs P, the pistons Q, the piston-rods R, the elbow-levers S, and the adjustable plates U with the main valve-chest D and the slide-valves G, substantially as herein shown and described.

2. The combination of the arm V, provided with the wedge-shaped head W, the inclined adjustable collars X, the chain Y, the weight Z, and the lever A' with the main valve-stem H, the secondary valve-stem K, and the spindle C' of the governor, substantially as herein shown and described.

EPHRAIM R. DINGLEY.

Witnesses:

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