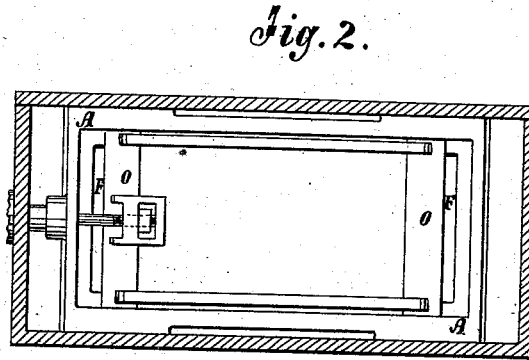
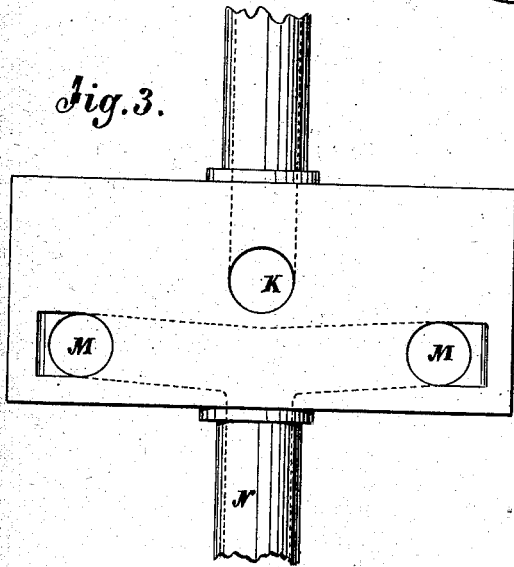
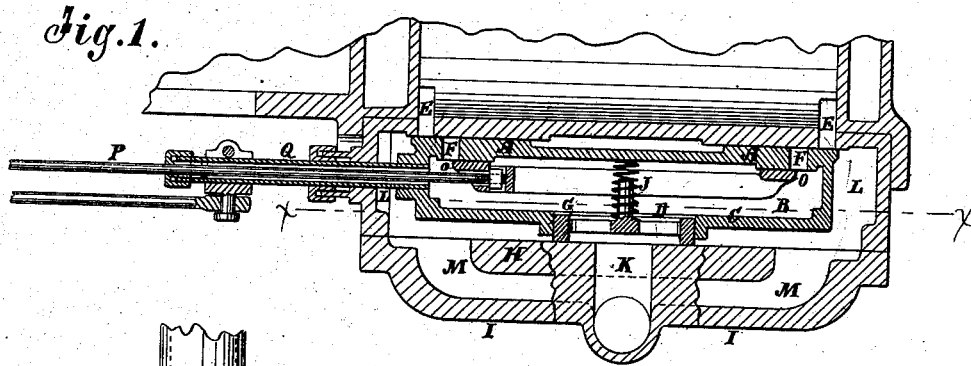


J. W. THOMPSON.  
Balanced and Cut-off Valve.

No. 162,714.

Patented April 27, 1875.



WITNESSES:

*A. Remondet*  
*A. J. Terry*

INVENTOR:

*J. W. Thompson*  
BY *Wm. H. [Signature]*  
ATTORNEYS.

# UNITED STATES PATENT OFFICE.

JOSEPH W. THOMPSON, OF SALEM, OHIO, ASSIGNOR TO HIMSELF AND  
BUCKEYE ENGINE COMPANY, OF SAME PLACE.

## IMPROVEMENT IN BALANCED AND CUT-OFF VALVES.

Specification forming part of Letters Patent No. **162,714**, dated April 27, 1875; application filed  
October 10, 1874.

*To all whom it may concern:*

Be it known that I, JOSEPH W. THOMPSON, of Salem, in the county of Columbiana and State of Ohio, have invented a new and Improved Balanced and Automatic Cut-Off Valve, of which the following is a specification:

The first part of the invention consists of the valve, so contrived that steam is admitted to a chamber in the main valve containing the cut-off, and it exhausts into the ordinary steam-chest at the ends of the valve.

The top of the chamber or back of the valve works in close proximity to the steam-chest cover, and is furnished with one or more openings, to which are fitted suitably-constructed packing-rings, which work, steam-tight, against the cover, and, by embracing or surrounding the openings which communicate with the steam-pipe, admit steam to the chamber of the valve. The area of said opening or openings is made just sufficient to hold the valve to its seat, thus serving to balance it.

The essential advantage of this arrangement is that the space ordinarily required in the shell of the cylinder, between the bore and the valve-face, for the exhaust-passages is avoided, and the main valve-face is brought as near to the bore as is consistent with the necessary strength of material in the valve; also, the exhaust having a more direct passage to the pipe after leaving the cylinder, there is less back pressure than with the ordinary arrangement.

Another advantage of this arrangement is that the lap on the live-steam side is on the inside of the port—that is, toward the center—where there is plenty of room for making it as long as may be desired under any circumstances, without having to increase the length of the valve and the chest, as in the case where the lap is on the outside of the valve, where I have the lap for the exhaust, which only needs to be short under any circumstances.

Figure 1 is a horizontal section of the valve and valve-chest arranged upon the side of the engine to work on a vertical valve-face. Fig. 2 is a longitudinal sectional elevation taken on the line *xx* of Fig. 1. Fig. 3 is an inside elevation of the top of the steam-chest.

Similar letters of reference indicate corresponding parts.

A is the main valve, in which is a chamber, B, inclosed by the cover C, which has an opening, D, to admit the steam to the chamber for entering the ports E of the engine through the passages F in the valve. The opening D is also for balancing the valve by means of a packing-ring or piston, G, together with suitable steam-packing arranged in said opening to work against the face-plate H of the cover I of the steam-chest. J is a spring, used to keep the piston on the face-plate when the steam is shut off. There may be two or more of these openings D in the cover of the steam-chamber B, if necessary. The steam enters the chamber through the pipe K, and it exhausts at the ends of the valve, through the steam-chest L, into passages M in the steam-chest cover leading to the exhaust-pipe N. O is the cut-off valve, which is arranged in chamber C on the back of valve A. The stem P of this valve extends out of the steam-chest through the hollow tube Q, forming part of the main valve-stem, and it connects with its rock-arm R in the line of the connection of the main valve-stem with its rock-arm S, and this rock-arm is pivoted on the rock-arm S at its middle or thereabout.

The eccentric-rod T of the cut-off valve is connected to the rock-arm R in the line of the pivot of the rock-arm of the main valve, and the eccentric for working it is fitted on the crank-shaft, so that it can be shifted around it for cutting off sooner or later, according to the speed of the engine.

I reserve the right to make future application for Letters Patent on the rack-arm or valve-gear S.

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

1. The combination of the sliding hollow steam-valve A, and inclosed sliding cut-off valve with the steam-chest L, having steam-induction pipe K, exhaust-passages M M, and pipe N, all constructed and relatively arranged substantially as herein shown and described.

2. The combination of the tubular valve-rod Q with the rod P, the valves A O, their eccentrics, and connecting-rods, as herein shown and described.

JOSEPH W. THOMPSON.

Witnesses:

C. SEDGWICK,  
T. B. MOSHER.