

(No Model.)

H. WHITING.
PISTON VALVE.

No. 292,778.

Patented Jan. 29, 1884.

Fig. 1.

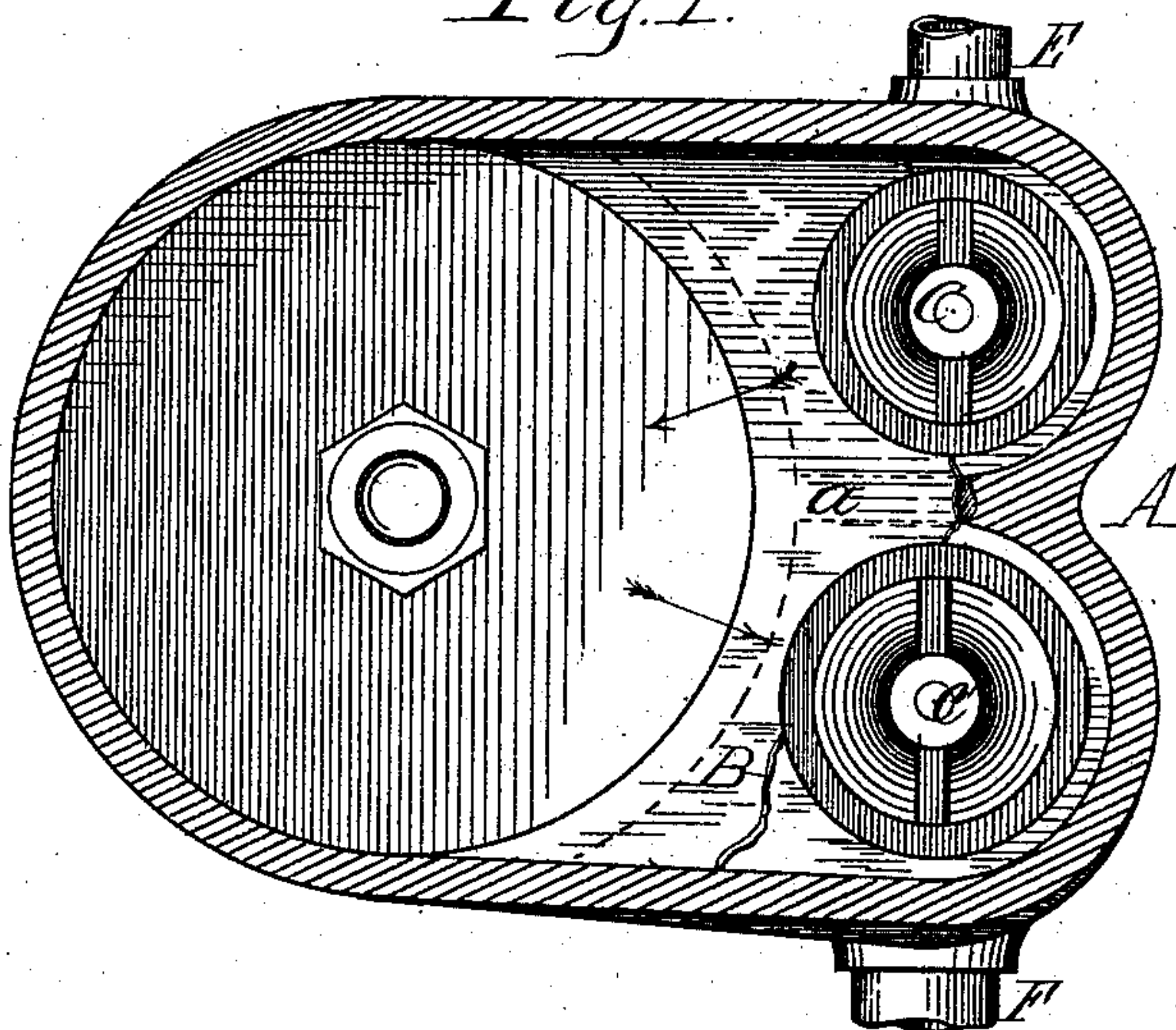
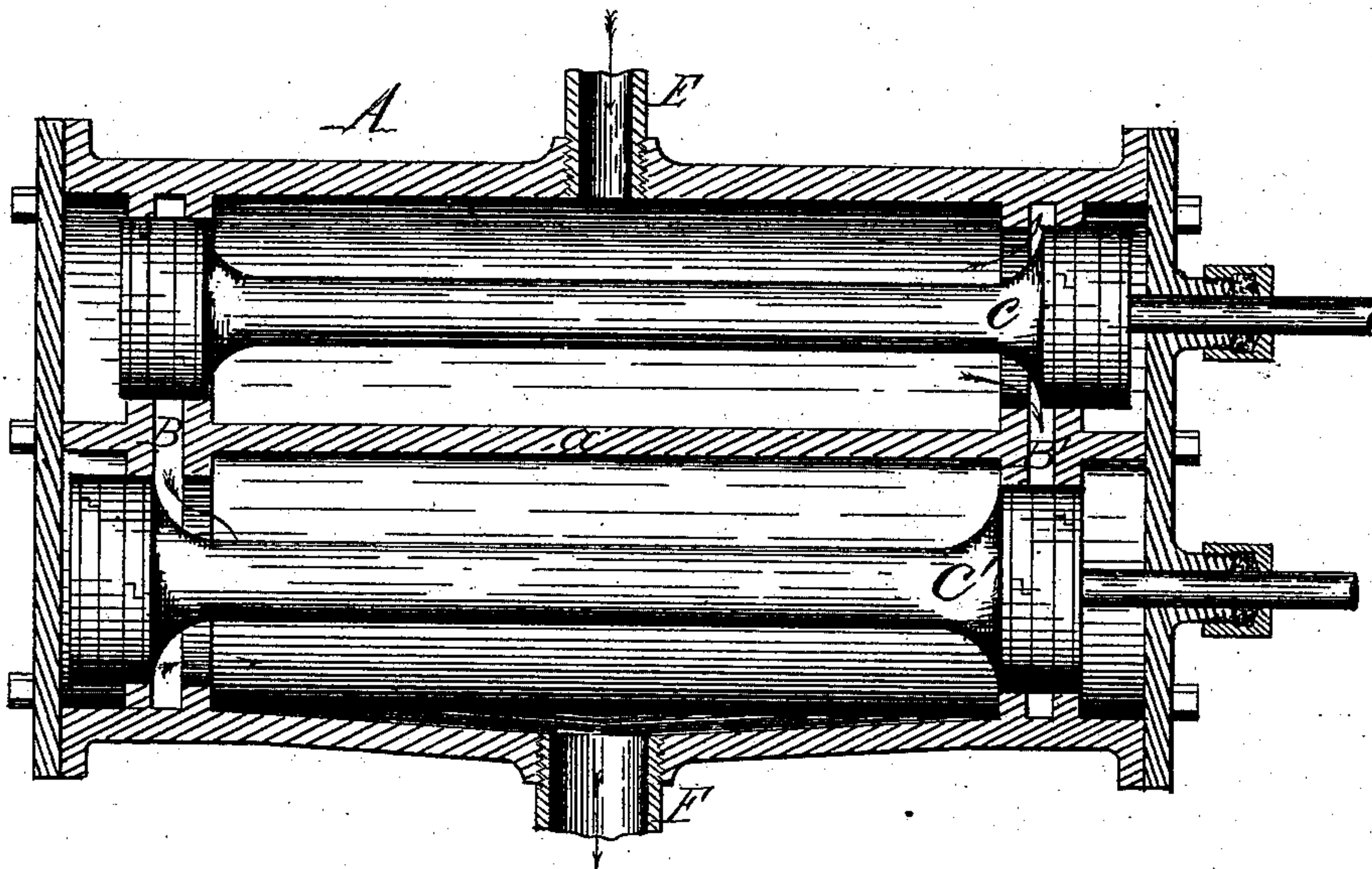


Fig. 2.



Witnesses:
S. M. Endicott
A. W. Vaniman

Inventor:
Henry Whiting
By J. M. S. Jones
Atty.

UNITED STATES PATENT OFFICE.

HENRY WHITING, OF CEDAR RAPIDS, IOWA.

PISTON-VALVE.

SPECIFICATION forming part of Letters Patent No. 292,778, dated January 29, 1884.

Application filed July 30, 1883. (No model.)

To all whom it may concern:

Be it known that I, HENRY WHITING, a citizen of the United States, residing at Cedar Rapids, in the county of Linn and State of Iowa, have invented certain new and useful Improvements in Piston-Valves for Steam-Engines, of which the following is a specification.

The object of this invention is to secure increased power, economy of steam, and uniformity of speed in a steam-engine by providing the same with separate and independent valves in separate compartments of the steam-chest—the one a variable cut-off valve to regulate the flow of steam into the cylinder, and the other a valve to control the exhaust-steam and permit a free escape of the same regardless of the quantity or pressure due to variations in the cut-off.

The invention consists in a steam-chest provided with two chambers separated by an intermediate diaphragm and opening into a common induction and eduction port at each end, communicating with the cylinder of the engine to which such steam-chest is attached, or of which it forms a part, and in two valves operating alternately in said chambers, the upper one being the induction-valve, actuated by an automatic cut-off, and the lower one being the exhaust-valve actuated by regular and positive motion.

In the accompanying drawings, Figure 1 represents an end view of a cylinder and steam-chest with piston and valves in position; Fig. 2, a sectional side elevation of the steam-chest and valves.

The device is of the simplest nature, as will be seen from the drawings and the description following. The cylinder is in the ordinary form, with straight ports at each end. To the side is attached or cast the steam-chest A. This is divided into two compartments by a longitudinal diaphragm, *a*. Both chambers communicate with transverse ports B B, corresponding to the ports in the cylinder. It is desirable to have these ports continuous from top to bottom of the steam-chest and through the diaphragm, for reasons that will be apparent by referring to the drawings. Both the steam-chamber and the exhaust-chamber opening into these ports, each has the advantage of

a port as long as the width of the steam-chest, and ordinarily the diameter of the cylinder. Consequently the steam has a better opportunity to flow freely and quickly from the steam-chamber into the cylinder, and from the cylinder into the exhaust-chamber, than if such chambers communicated with the cylinder by separate ports. In the upper chamber is fitted the feed or induction valve C, adapted to be operated by automatic mechanism connected to the main shaft, and governing the flow of steam to the cylinder by the speed of its revolutions in any suitable and well-known manner. Below it, in the other chamber, is a similar valve, C', to regulate the exhaust-steam, and is actuated alternately with the upper valve by an eccentric or other mechanism attached to the main shaft, and adapted to impart to it a regular and positive stroke. The relative position of the valves is shown in Fig. 2, where the cylinder is taking steam through the right-hand port and exhausting through the left. The valves shown are simple piston-valves, and are best adapted to the invention, because they are the most easily fitted up, as well as the valve-seats, and when constructed as shown make perfectly-balanced valves.

By using a separate valve for the exhaust I am able to afford free exit for the "dead steam," and avoid the "compression" due to a narrow port. When but one valve is used regulated by a variable cut-off, it will be apparent that when the engine is running light the opening of the ports will be correspondingly small, and as a result the exhaust will be retarded and the compression of the escaping steam will be correspondingly great. I desire to make the exhaust perfectly uniform to reduce this compression to the minimum at all speeds of the engine, and I therefore give the lower valve the full stroke by positive mechanism independent of the cut-off.

It will be seen that the bottom of the lower chamber is a little below the lowest point in the cylinder, and that a slight longitudinal incline is given it toward the center, where the exhaust-pipe F is placed. The object of this is to allow the water caused by condensation in the cylinder to flow out through the exhaust-pipe, and thus avoid the necessity of providing the cylinder with cocks for that purpose.

I am aware that the use of two valves in a double-chambered steam-chest is not broadly new, and I do not claim such as my invention; but I am not aware that any such steam-chest
5 has been heretofore provided with a single continuous port into which both chambers communicate, nor that the flow of steam to and from the cylinder has ever been regulated by alternating balanced piston-valves, one actuated
10 by an automatic cut-off and the other by independent and regular motion, as hereinbefore described.

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

1. The combination of a steam-engine cylinder, a steam-chest having two chambers communicating with a common port at each end, and balanced double-headed valves C C', applied in said chambers, and adapted to operate substantially as described.

2. A steam-chest provided with chambers separated by an intermediate diaphragm and opening into a common induction and education port communicating with the cylinder of
25 the engine, in combination with balanced piston-valves operating alternately in said chambers, substantially in the manner and for the purposes described.

3. The steam-engine cylinder provided with
30 a steam-chest having two chambers separated by a diaphragm, and also provided with end passages and balanced piston-valves, in combination with the double-inclined bottom of the lower chambers and the exhaust-pipe E,
35 substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY WHITING.

Witnesses:

J. M. ST. JOHN,
S. M. ENDICOTT.