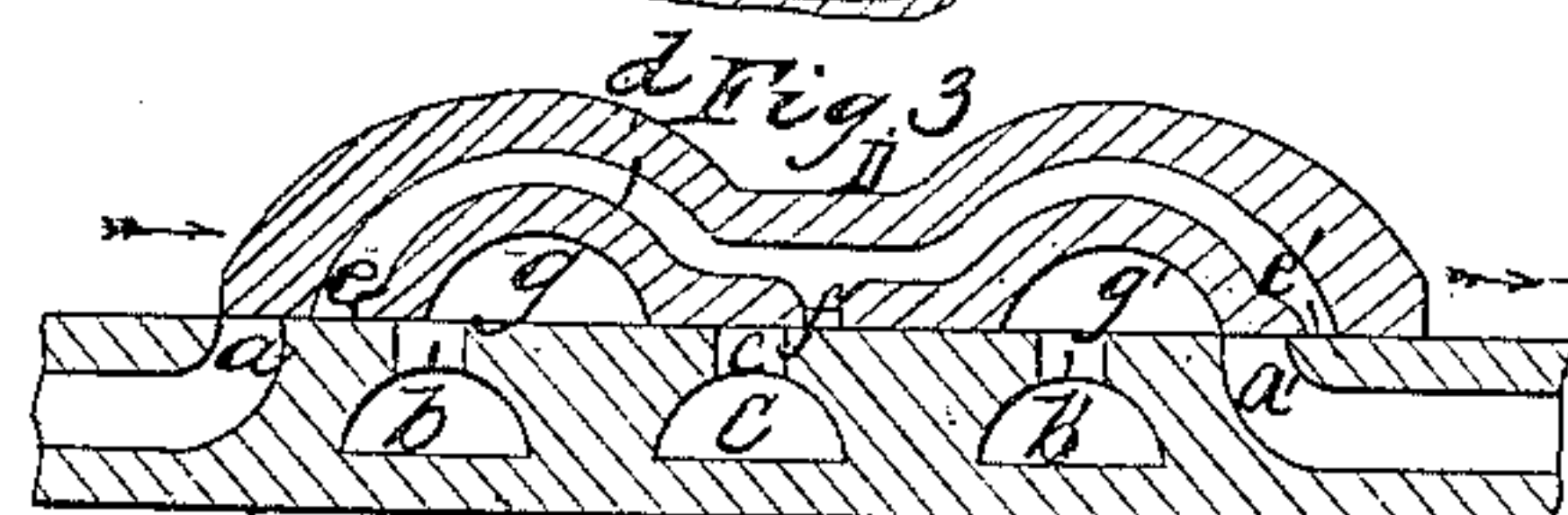
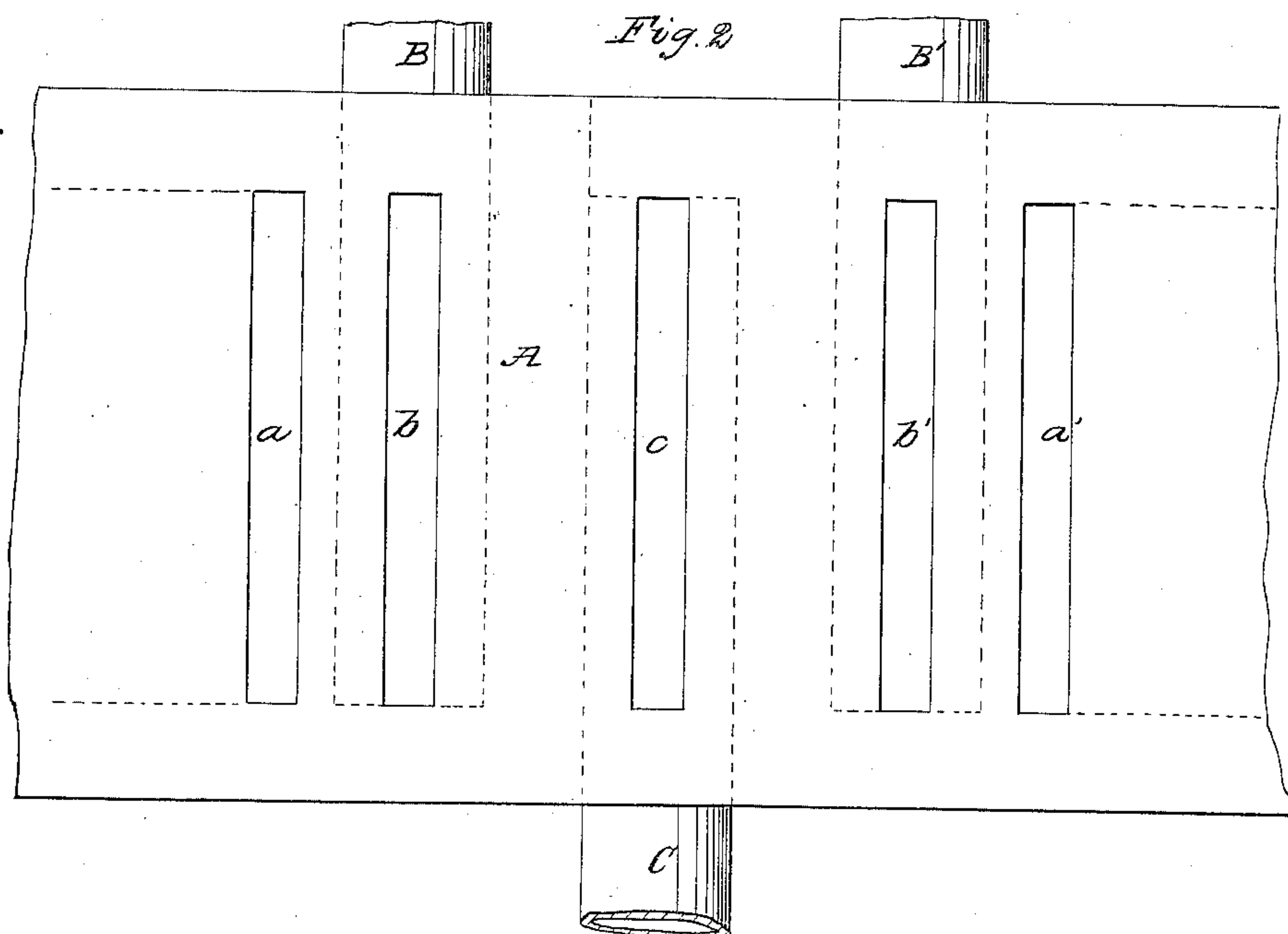
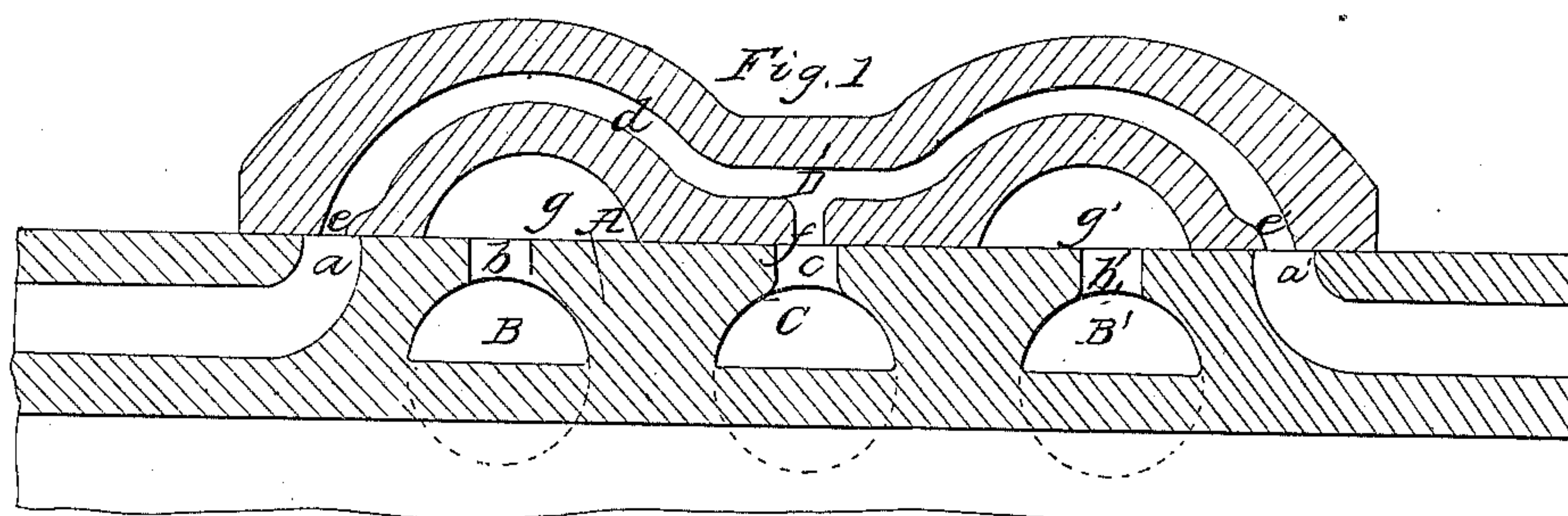


W. Huston,
Steam Slide Valve.
N^o 44,632. Patented Oct. 11, 1864.



Witnesses:

Wm. P. Mc Namara

James P. Hall,

Inventor:

William Huston

UNITED STATES PATENT OFFICE.

WILLIAM HUSTON, OF WILMINGTON, DELAWARE.

IMPROVEMENT IN SLIDE-VALVES FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. 44,632, dated October 11, 1864.

To all whom it may concern:

Be it known that I, WILLIAM HUSTON, of Wilmington, in the county of New Castle and State of Delaware, have invented a new and Improved Steam-Valve; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a longitudinal vertical section of this invention. Fig. 2 is a plan of the valve-seat. Fig. 3 is a similar section to that represented by Fig. 1 in a smaller scale than the previous figures, and showing the valve in a different position.

Similar letters of reference indicate corresponding parts.

This invention consists in a valve with a double exhaust, one into the chimney or open atmosphere and the other into a condenser, in such a manner that through the first or ordinary exhaust the pressure of the steam in the exhaust end of the cylinder is reduced to that of the ordinary atmosphere, or nearly so, and the condensation of the remaining steam can be effected in the same manner and by the same means as in a common low-pressure condensing-engine. By the use of this valve the advantages of a high-pressure non-condensing engine are combined with those of a low-pressure condensing-engine. The power of the engine is considerably increased, and a proportionate saving in fuel is effected.

A represents the valve-seat at the bottom of the steam-chest of an ordinary steam-engine. This seat is provided with five apertures, *a a' b b' c*, as clearly shown in Fig. 2 of the drawings. The apertures *a a'* communicate, by means of appropriate channels, with the ends of the steam-cylinder, and they are opened at suitable intervals to admit steam alternately to one and then to the opposite side of the piston. The aperture *c* communicates with the exhaust-pipe C, which leads either to the chimney or to the open atmosphere, and the apertures *b b'* communicate with the pipes or channels B B', leading to a condenser of any desired construction.

D is the valve, which is made in the form of a double D-valve, as clearly shown in

Figs. 1 and 3 of the drawings. The body of this valve, instead of being solid like that of an ordinary D-valve, is provided with a channel, *d*, which extends over the ordinary cavities *g g'*, and communicates with three apertures, *e e' f*. When the valve moves on the seat and arrives in the position shown in Fig. 1 of the drawings, both sides of the cylinder communicate freely through the channel *d* and aperture *f* with the ordinary or chimney exhaust, and the pressure of the steam behind the piston is rapidly reduced to that of the atmosphere, or nearly so. When the valve moves a little farther on, and arrives in the position shown in Fig. 3, the cylinder begins to take steam through the port *a*, and simultaneously therewith the communication between the port *a'* and condenser exhaust-port *b'* is opened, and a vacuum is formed behind the piston whereby the power of the engine is materially increased. This condenser-exhaust remains open until the valve returns on its back stroke to the position shown in Fig. 1, when both ends of the cylinder are brought in communication with the chimney-exhaust, and finally steam is admitted to the cylinder through the port *a'*, and the opposite end of the same is brought in communication with the condenser-exhaust. By the use of this valve only a fractional part of the steam used in a high-pressure engine is to be condensed, and this condensation can be accomplished without any additional friction or increase in the size of the parts of the machinery required for that purpose. The surplus pressure of the steam above the atmosphere is exhausted through the chimney, creating an additional draft; or it may be exhausted in the open atmosphere or into a heater, if desired, and the remaining steam is condensed in the ordinary manner. The advantages of an ordinary non-condensing high-pressure engine are thus combined with those of a condensing low-pressure engine in a very simple and effective manner.

It remains to remark that instead of the slide-valve represented in the drawings a revolving or oscillating valve with appropriate channels might be used; and I do not wish to confine myself, therefore, to valves of the form shown, but reserve the right to change the same as may be desirable, so long as the principle of my invention is not departed from.

I claim as new and desire to secure by Letters Patent—

1. A valve, D, with channel *d* and apertures *e e' f*, arranged in combination with the seat A and ports *a a' b b' c*, substantially as and for the purpose set forth.

2. The exhaust *c*, applied in combination

with condenser exhausts *b b'* and valve D, or its equivalent, in the manner and for the purpose substantially as described.

WILLIAM HUSTON.

Witnesses:

WM. F. MCNAMARA,

J. P. HALL.