Sheet 1.
2 Sheets.

B. W. Hudson.

Steam Slide Valve.

No. 71618 Patented Dec. 3, 1867.

Fig. 1.

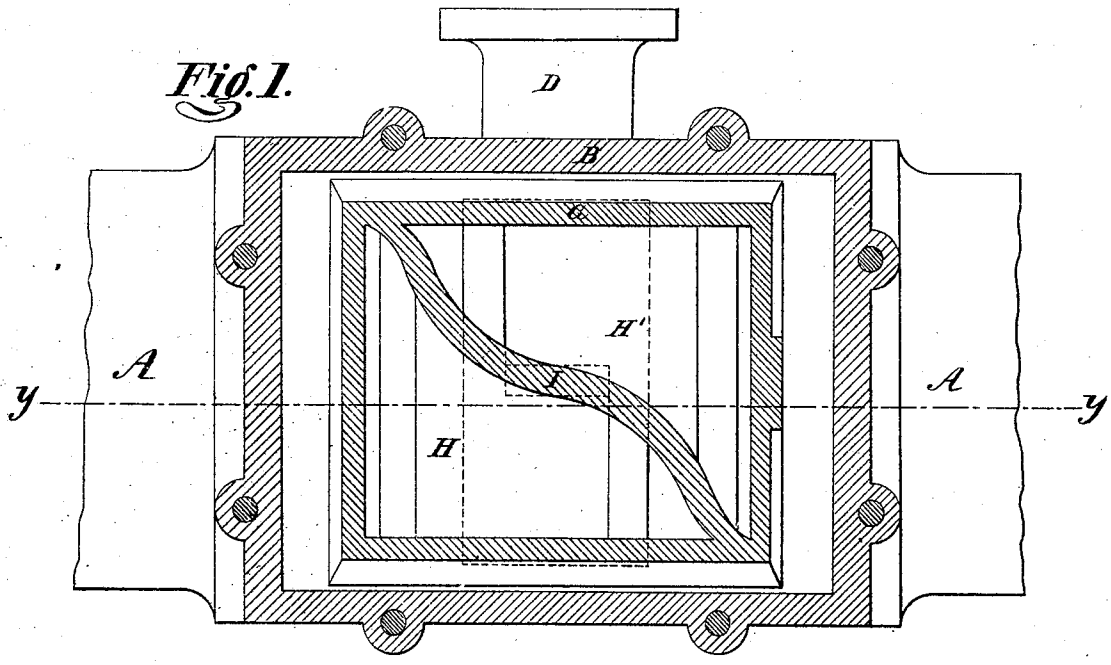
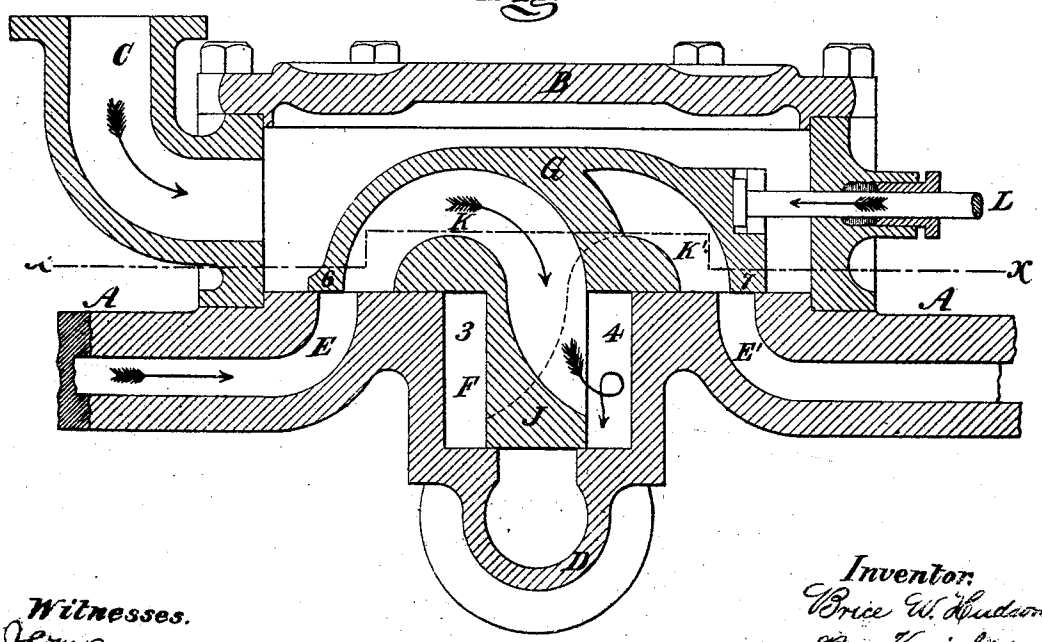


Fig. 2.



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Sheet 2.
2 Sheets.

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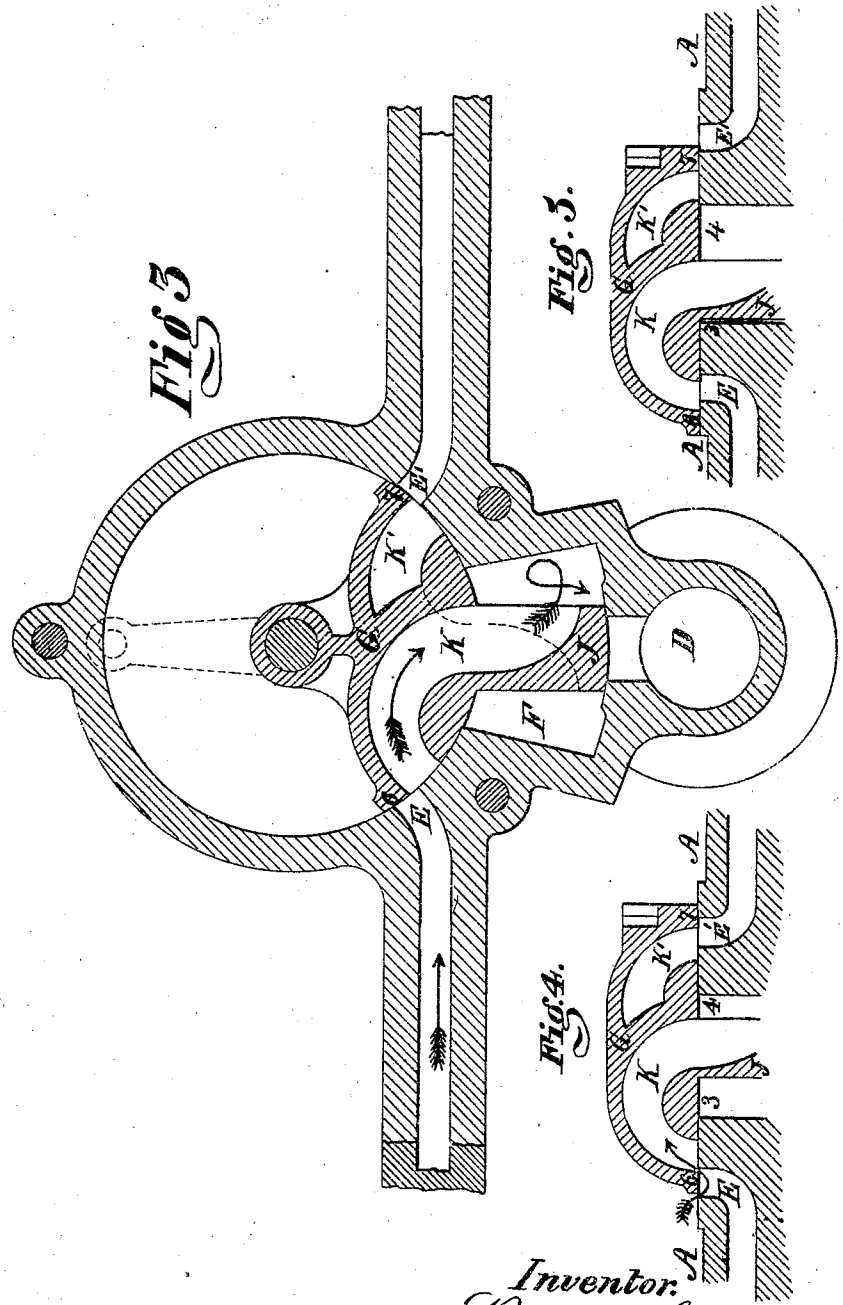

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UNITED STATES PATENT OFFICE.

B. W. HUDSON, OF ALLENTOWN, PENNSYLVANIA.

IMPROVEMENT IN STEAM SLIDE-VALVES.

Specification forming part of Letters Patent No. **71,618**, dated December 3, 1867.

To all whom it may concern:

Be it known that I, BRICE W. HUDSON, of Allentown, in the county of Lehigh and State of Pennsylvania, have invented certain new and useful Improvements in Valves for Steam-Engines; and I do hereby declare the following to be a full, clear, and exact description of the same, sufficient to enable others skilled in the art to which my invention appertains to make and use the same, reference being had to the accompanying drawings, which are made part of this specification.

This is an improvement in that class of steam-engine valves whose motion being mainly derived from the steam itself, great simplicity of parts, freedom of action, and promptness are secured; and my invention consists in a peculiar arrangement of the valve with duplicated passages, which it is believed secures the automatic stroke of the valve more effectually and with much greater promptness and certainty than heretofore.

In the drawings, Figure 1 is a horizontal section at line *x x* of a valve and steam-chest embodying my improvement. Fig. 2 is a vertical section thereof at line *y y*. Fig. 3 shows my invention applied to a valve adapted to move in a circular path. Fig. 4 is a diagram to illustrate the momentary action of the live steam operating to take the valve from the tappet and forward it for the action of the exhaust-steam. Fig. 5 is a diagram of the valve at one extremity of its stroke.

The same letters refer to like or corresponding parts throughout.

A represents a portion of the supply and exhaust passages of a customary reciprocating engine, the part included between 1 and 2 representing the port-face, of usual construction.

B is the steam-chest, and C and D are the steam supply and exhaust passages, of any suitable form.

E E′ are two customary side ports or passages to the respective ends of the cylinder.

F is a somewhat capacious cavity, forming the exhaust-port and communicating with the exhaust-passage D.

My valve consists of a rectangular box, G, separated into two equal parts, H H′, by an oblique or diagonal partition, I. J is a projection from the lower part of the valve, which plays to and fro in the exhaust-port F, for a purpose that will hereinafter appear. The respective extremities of the cylinder communicate alternately with the exhaust by means of the valve-passages K K′, which, commencing the full width of the box G, pass each other in opposite directions and on opposite sides of the partition I and empty into the exhaust-port on opposite sides of the projections J. In order to preserve a uniform area throughout the length of each passage K K′, the height thereof is increased toward the discharging end in proportion to the diminished width incident to the obliquity of the partition I.

The plates 6 7 are made a little smaller than the ports E E′, for a purpose that will presently appear.

The operation is as follows: The piston, as it approaches the end of its stroke in direction of black arrow, impels, by means of customary connection with its rod, a tappet upon the valve-rod L and shifts the valve to the position shown in Fig. 4, so as to enable the live steam from the chest to flash around the portion 6 and into the farther side, 4, of the exhaust-port F, where it acts to project the valve to the position shown in Fig. 2, in which position the steam from the now full end of the cylinder, rushing into the said farther side. 4, of the exhaust-port, completes the stroke of the valve (see diagram, Fig. 5) and acts to throw entirely open the (for the time being) exhaust-port E and steam-port E′, so as to reverse the piston and drive it to the other end, where, the valve-tappet being struck in the opposite direction, a corresponding action takes place through the other passage in the valve and its allied ports in and through the seat.

Among the many decided advantages of the above arrangement I will cite the following: The provision in the valve of two exhaust-passages separated by an oblique partition enables the engineer to secure any desired lead or lap without any interference with the other end. The availing of the momentary force of the live steam (see diagram 4) secures an automatic advance of the valve until the steam from the exhaust end can become effective and removes the possibility of any lodgment or uncertain action of the valve, especially with a light pressure and slow movement, such as are sometimes employed when it is merely desired to maintain a proper warmth in the passages, or in a slow motion of a steam-pump where a heavy body of water is being lifted,

for example. The provision of the ported projection I from the bottom of the valve, in combination with the wide exhaust-port and their described accessories, affords a simple and efficient means for the automatic throw of the valve with far greater promptness and delicacy than is believed possible with any so-called "positive" motion obtained by direct connection of eccentrics or other ordinary mechanical appliances.

I have spoken of the partition in the valve as being oblique or diagonal and have shown it of that shape; but the partition may be in a plane at the mid-width of the valve.

It is designed that the valve-chest shall be placed beneath the cylinder, and thus all water of condensation in the cylinder and passages will find its way out at the exhaust-port.

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

1. The valve G, having the exhaust-passages K K′, leading in reverse directions and on opposite sides of an oblique partition, I, and discharging through the projection J into the exhaust-port F, substantially as and for the purposes set forth.

2. The construction of the ends 6 and 7 of the valve in relation to the side ports, E and E′, to permit steam from the chest to flash around them and through the valve, substantially as and for the purposes set forth.

To the above specification of my improvement in valves for steam-engines I have set my hand this 24th day of April, 1867.

B. W. HUDSON.

Witnesses:
JAMES L. EWIN,
OCTAVIUS KNIGHT.