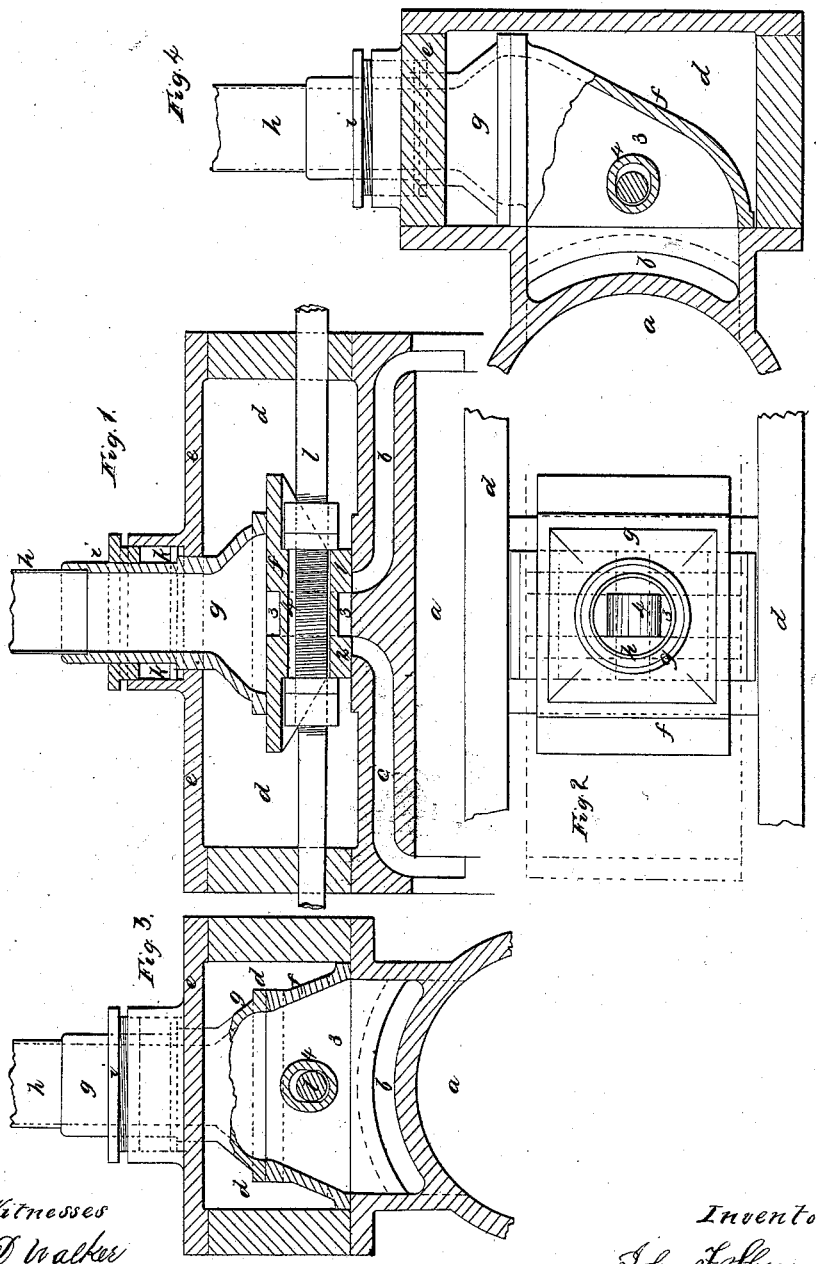
J. F. Shearman,

Steam Balanced Valve.

No. 54,968. Patented May 22, 1866.



Witnesses
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JOHN F. SHEARMAN, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN SLIDE-VALVES FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **54,968**, dated May 22, 1866.

To all whom it may concern:

Be it known that I, JOHN F. SHEARMAN, of Brooklyn, E. D., in the county of Kings and State of New York, have invented, made, and applied to use a certain new and useful Improvement in Valves for Engines; and I do hereby declare the following to be a full, clear, and exact description of the said invention, reference being had to the annexed drawings, making part of this specification, wherein—

Figure 1 is a longitudinal section of the valve-chest and valve. Fig. 2 is a plan of the valve and a portion of the chest. Fig. 3 is a cross-section of the valve-chest with the valve also in section, and Fig. 4 represents a modification of the valve adapted to being placed on the side of the chest, the exhaust passing off vertically.

Similar marks of reference denote the same parts.

In the ordinary slide-valve the exhaust passes off below the valve through a port formed in the valve-seat. In consequence of the tortuous passage through which the steam escapes much power is lost by the back pressure, particularly in high speeds, in consequence of the steam not escaping freely from the exhaust; besides this the valve is exposed to the pressure of the steam, greatly increasing its friction on the seat.

Efforts have been made to relieve the valve from pressure of the steam by what are termed "balanced valves," and the exhaust-port has has been increased in size to allow the steam freely to escape.

My invention combines a free and direct exhaust with the balancing of the valve; and it consists in an exhaust-port passing through the valve, in combination with a cover and exhaust-pipe, whereby the steam is given a direct and enlarged exhaust, and the valve is relieved of a large portion of pressure from the steam.

In the drawings, *a* represents a portion of the steam-cylinder. *b* and *c* are the steam-ports, made in any usual manner. *d* is the steam-chest, with any usual inlet or pipe for the steam, and *e* the cover of the steam-chest.

f is my improved valve, made with the port-closers 1 and 2, between which is an opening, 3, that passes through the valve.

l is the valve-rod, actuated in the usual way, so as to move the valve *f* at the proper time for admitting and exhausting the steam. The rod *l* passes through a hole in the valve *f*, and the exhaust-port 3 in said valve is bridged by a pipe, 4, through which the rod *l* passes.

g is the valve-cover, that passes through the cover *e* in the form of a pipe, connecting to the exhaust-pipe *h*; and the stuffing-box *i* is provided around the pipe-shaped portion of the cover *g* to keep the parts steam-tight.

I introduce a plate, *k*, in the form of a ring, that rests upon a shoulder on *g* and receives the packing of the stuffing-box, the object of this ring being to prevent the packing in the stuffing-box becoming wedged between the cover *g* and the top of the steam-chest. This ring or plate *k* might rest upon the top of the cover *e* within the stuffing-box *i*.

It will now be evident that as soon as the exhaust-port 3 comes over either of the steam-ports a direct and free escape is presented for the exhaust-steam, and that the space for the said exhaust can be much larger than can usually be introduced in the metal between the cylinder and the valve-seat. The cover *g* to the valve also prevents steam-pressure from increasing the friction of the valve on its seat by removing the pressure of steam from said valve to the extent of the area of the pipe *g h*.

The cover *g* is kept tightly to the valve by the steam, as the area of the portion of the cover that is in contact with the valve is greater than the portion of the cover that passes as a pipe through the cover *e*.

The modification shown in Fig. 4 will be understood to consist in placing the cover *g* at one side of the valve *f* instead of the top of the same. This will afford a direct passage for the steam, but will not relieve the valve from the friction due to the pressure of steam.

As the valve or cover, or both, wear by use, the parts will still remain steam-tight, because the stuffing-box *i* around the pipe-shaped portion of said cover *g* allows that cover to move down to, and continue to rest upon, the valve as the parts wear.

In place of the stuffing-box *i* an expansion-joint of any desired character may be employed with the cover *g*.

What I claim, and desire to secure by Letters Patent, is—

1. The cover *g*, forming a termination to the exhaust-pipe *h*, within the steam-chest, in combination with the exhaust-port 3, passing through the slide-valve, substantially as and for the purposes specified.

2. The arrangement of the exhaust-pipe *h* and cover *g* to the exhaust-port of the valve, and the expansion-joint or stuffing-box on the valve-chest around the exhaust-pipe, as and for the purposes specified.

In witness whereof I have hereunto set my signature this 4th day of November, A. D. 1865.

JOHN F. SHEARMAN.

Witnesses:
GEO. D. WALKER,
CHAS. H. SMITH.