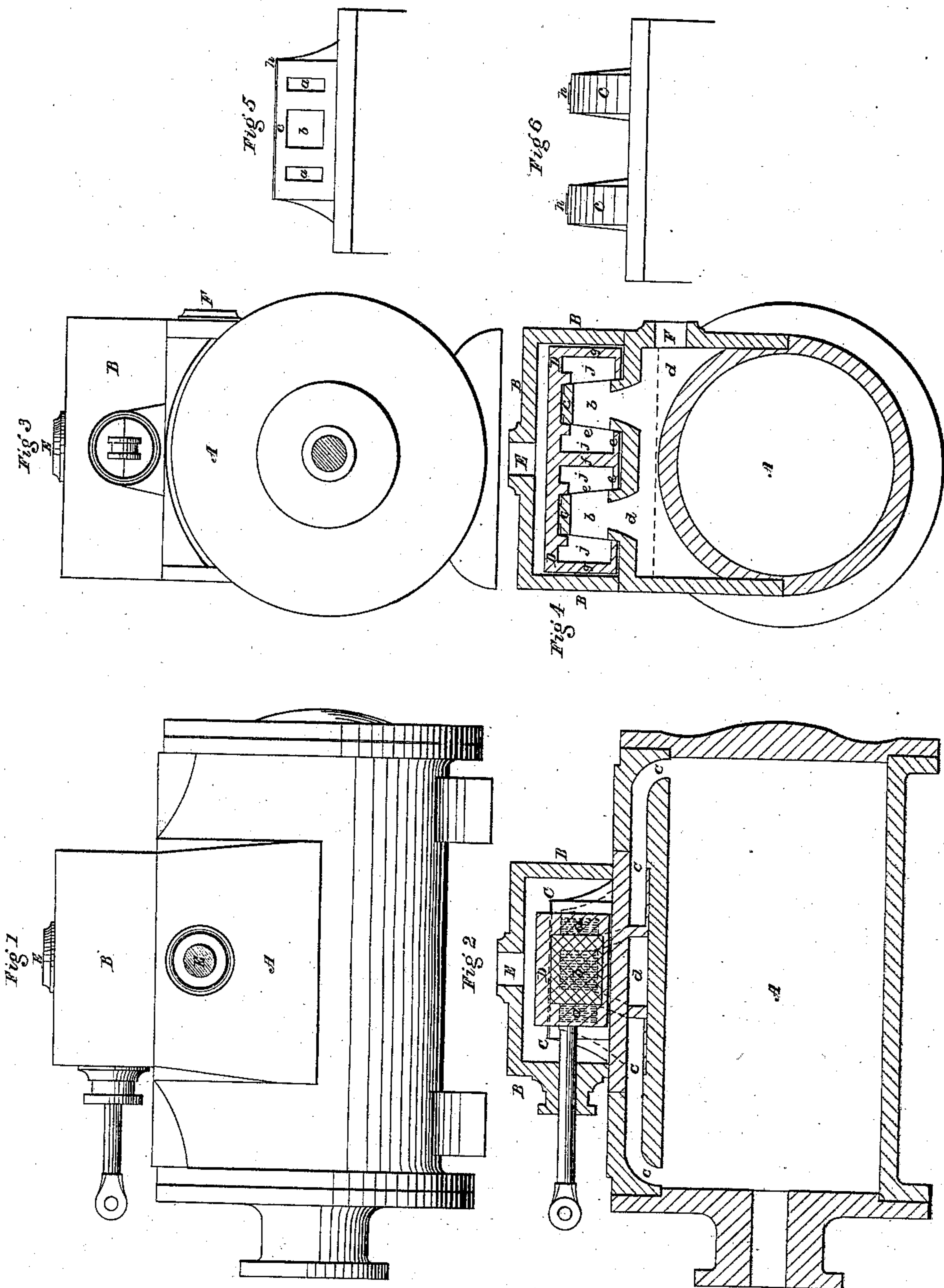


J. A. Woodbury,
Steam Balanced Valve.

N^o 43,250.

Patented June 21, 1864.



Witnesses

M. Stoughton.
Harv. French.

Inventor

James A. Woodbury

UNITED STATES PATENT OFFICE.

JAMES A. WOODBURY, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN SLIDE-VALVES FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. 43,250, dated June 21, 1864.

To all whom it may concern:

Be it known that I, JAMES A. WOODBURY, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Balanced Valves for Steam-Engines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a side elevation of the exterior of the steam chest and cylinder. Fig. 2 represents a longitudinal vertical section through the same. Fig. 3 represents an end elevation of the steam chest and cylinder, and Fig. 4 represents a vertical transverse section through the same. Fig. 5 represents a side elevation of one of the series of ports, and Fig. 6 an end view of one pair of elevated ports. Any other number more than two may be used.

Similar letters of reference, where they occur in the separate figures, denote like parts in all the drawings.

In wall or vertical ports for steam-engine valves, as heretofore used, several serious objections arise which render them of very doubtful utility. In the first place, where one or even two sets of ports are used, in order to get sufficient area of opening the steam-chest must have great vertical height. This begets other evil consequences—viz., it makes too much distance between the steam-chest and the cylinder for the steam to travel through; it requires the valve to be so high vertically as to make its sides spring or yield and thus produce great friction and uneven wearing, and it raises the valve rod inconveniently high, particularly in the larger class of engines, to gear to.

Where a single valve straddles the vertical ports, besides the difficulty of height, as above stated, there arises another—viz., to find a good position to attach the valve-rod centrally to.

The object and purpose of my invention is to overcome these heretofore serious objections; and it consists in the use of four or more sets of inlet and exhaust ports with one valve, whereby I get abundant port-area, bring the steam-chest close down to the cylinder, make a better steamway between the

chest and cylinder, and insure the valves or their sides against springing or yielding, while the valve-rod need not be any farther from the steam-cylinder than in other ordinary cases.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

A represents a steam-cylinder, and B the steam-chest attached thereto. On top of the cylinder are raised two walls, C C, in which are made the inlet-ports *a a'* and the exhaust-port *b*, the inlet-ports communicating with the interior of the steam-cylinder by or through the steam passages *c c'*, and the passage *d* communicating with the exhaust *b*, as in ordinary steam-engines. The valve D, as more clearly shown in Fig. 4, has a central piece, *e*, divided by a partition, *f*, to keep the ports in the separate walls C C distinct and without communication with each other. It has, moreover, sides *g g*, which work steam-tight against the outer sides of the wall-ports, while the central portion, *e*, works steam-tight against the inner sides, ports, or openings. The openings or ports are made clear through the walls or elevations C C, so that the steam may pass in and out from both sides of each wall, thus making abundant port area. The tops of the walls C are formed into ways *h h*, Fig. 6, having less area than the tops of the walls themselves, to reduce the friction of the valve thereon, but wide enough to make a firm support and prevent undue wearing away. The valve is ground to its seat, but its sides *g*, as well as its central portion, *e*, do not, or need not, touch the cylinder or portion thereof underneath them, as it rests solely upon the ways or elevations *h*, and when arranged within the chest it works with a uniform, or nearly so, pressure of steam all around it, and becomes thus what is termed a "balanced valve."

Steam may be introduced to the steam-chest from the boiler at E, and the exhaust-steam may pass off through F.

The valve opposite to the ports is recessed or chambered, as shown at *j j*, &c., so as to cause it to open and close the ports, as the case may be, and, if found desirable, it may be ribbed on the back to give it additional strength; and instead of a single valve and

series of ports arranged upon the central portion of the cylinder, I may duplicate the arrangement by placing a separate set of valves and ports at or near each end of the cylinder, and work both by the same rod or connection, or cast it all in one.

I have described the ports and sides of the valves as being vertical. They may incline slightly for the purpose of grinding the valve to its seat or bearings, otherwise they might be vertical or straight. I have also shown the cylinder as placed horizontal. It may stand vertical, which of course would bring the steam-chest upon the side instead of on top of the cylinder, in which case the sides of the valve-seat might be inclined

enough to give it sufficient pressure to keep the valve upon its seat.

If found desirable, a brace or bracket may be connected to the valve to prevent its sides from springing.

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

The balanced, or nearly balanced, slide-valve constructed and operating in connection with the ports substantially in the manner and for the purpose herein described.

JAMES A. WOODBURY.

Witnesses:

A. B. STOUGHTON,
XAVIER FENDRICH.