

W. Birch,  
Steam Balanced Valve.

No 62,924.

Patented Mar. 19, 1867.

Fig. 1

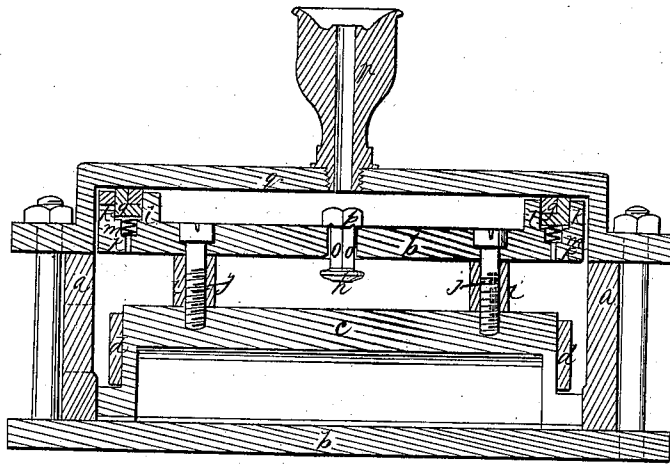


Fig. 2

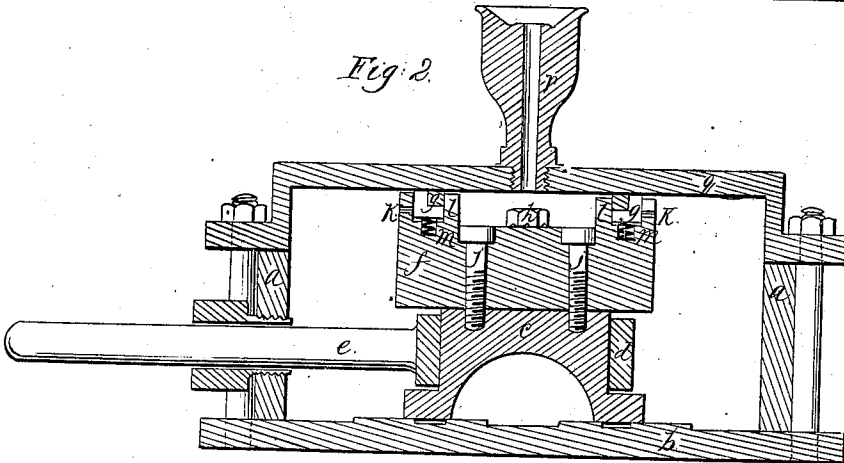
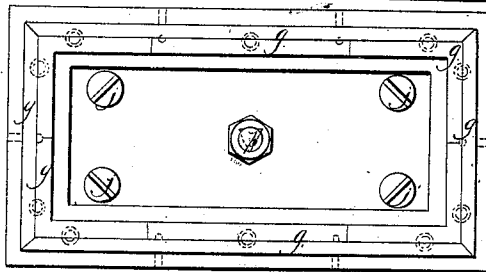


Fig. 3



Witnesses:

T. Smith  
S. Jones

Inventor:

Wm Birch

by atty Thos. J. Everett

# United States Patent Office.

WILLIAM BIRCH, OF CINCINNATI, OHIO. #

Letters Patent No. 62,924, dated March 19, 1867.

## IMPROVEMENT IN STEAM-ENGINE SLIDE VALVES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, WILLIAM BIRCH, of the city of Cincinnati, in the State of Ohio, have invented a certain new and useful Improvement in Balanced Slide Valves; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters and marks thereon. Of these drawings, forming part of this specification—

Figure 1 is a sectional front view of a valve chest, with a slide valve and yoke, having my invention as a part thereof.

Figure 2 is a sectional end view of the same; and

Figure 3 is a top view of a rectangular frame or box, which I call a packing frame, showing the packing strips, &c.

In each of these figures where like parts are shown like marks and letters are used to indicate the parts.

This improvement can be used in connection with any ordinary flat or slide valve to convert the same into a balanced valve by being cast solid or separately from the common slide valve just as parties using the invention may prefer; and the improvement is applicable to locomotive, stationary, marine, or any other engine using a slide valve.

The drawings show within a valve chest, the sides of which are marked *a* and the bottom plate *b*, a slide valve, *c*, with yoke, *d*, and stem, *e*, the exhaust and steam ports being indicated in fig. 2 by depressions in the bottom plate *b*, and the steam-pipe connection being indicated by dotted lines in fig. 1. A box or frame, *f*, is attached to the upper side of the valve containing packing strips or bars, *g*, and an oil and air valve, *h*, constructed with strong ribs, *i*, cast on to or extending from the bottom, to strengthen the packing frame and also afford protection to the bolts *j* that pass through the ribs fastening the packing box or frame to the top of the slide valve. The bolts thus protected will not be liable to be cut by the steam. Small holes, *k*, through the outside and bottom of the frame will admit the steam by which the packing will be kept steam-tight against the inside rib *l* of the frame and against the lid or cover of the valve chest. Small springs, *m*, are placed in cavities in the frame to aid in keeping the packing strips in place and against the under side of the lid of the valve chest. The packing strips are on the break-joint principle, as is shown by fig. 3, the inner bars being solid at the angles where the outer bars are broken or jointed and broken, or jointed at points where the outer bars are solid, thus presenting firm and tight packing at all parts to the pressure of the steam. A valve, *n*, is placed in a hole in the centre of the packing frame. The stem of this valve has three flat or hollow sides, *o*, in the form of a triangle and a nut or head on top of stem marked *p*, with grooves or arches on the under side of it. This valve is kept tight by the steam that passes underneath it, and between the packing frame and top of the slide valve, preventing any steam from getting through its seat to the top of the packing frame while steam is being used, but the moment that steam is shut off this valve drops down and rests on the points of the nut or head above, and the oil will then flow down under the nut or head and down the stem and sides of the valve and be deposited on the face of the slide valve and seat. This valve *n* forms a relief to the cylinder and dry or steam pipe in locomotive engines by admitting sufficient air to them to prevent any danger of the steam pipes collapsing, which will sometimes occur when the pipe is made of copper or wrought iron, which most of locomotive steam pipes are. The moment that steam is admitted into the chest the valve rises to its place again and becomes as tight as before. The steam or valve-chest cover *q* is shown with an offset sufficiently high to admit my improvement on the top of the slide valve. The cover should be planed true on the under side for the packing to work against. New chests may be made sufficiently high to use my invention without having the offset. A common oil cup, *r*, without a valve, is affixed in the cover of the chest, so that, while the oil may be fed through it, it will also serve, in case any steam should accumulate on the top of the packing frame by any means, for its immediate escape, thus leaving the packing frame entirely dry and free of steam, and allowing air to enter to the valve *n*. The admitting of air through the valve *n* into the steam chest and cylinder will prevent a vacuum in the cylinder when the piston travels after steam is shut off. The area of the packing frame should be equal to that of the face of the slide valve, and the steam will then exert the same pressure both up and down on to the slide valve and against the under side of the packing frame.

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

1. In the rectangular or square frame, the arrangement of the straight and angular packing strips, to be expanded by steam in the manner described.
2. The valve in the packing frame to admit oil to the steam or valve chest, and also admit air to prevent a vacuum in the cylinder and steam pipe.

This specification signed this 5th day of November, 1866.

WILLIAM BIRCH.

Witnesses:

GEO. W. CENNANY,

JAMES SAFFIN.

*Assist to Self & Thomas Birch.*