



# United States Patent Office.

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Letters Patent No. 96,499, dated November 2, 1869.

## BALANCE SLIDE-VALVE.

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

To all persons to whom these presents may come:

Be it known that I, WILLIAM M. STEVENSON, of Sharon, in the county of Mercer, and State of Pennsylvania, have invented a new and useful Improvement in Balance Slide-Valves for Engines; and do hereby declare the same to be fully described in the following specification, and represented in the accompanying drawings, of which—

Figure 1 is a vertical section of a steam-chest and the valve thereof, as provided with my invention;

Figure 2 is a transverse section of the same;

Figure 3 is a top view; and

Figure 4, a bottom view of the valve.

In carrying out my invention, I provide the slide-valve with extra walls and a chamber between each main wall and its next adjacent extra wall, and over each of the chambers I arrange another long chamber or groove, and place therein two triangular prisms, or their equivalents, arranged in manner as represented in the drawings. I also open a slit or passage through the bottom of each of the said chambers.

The additional wall to each main wall of the valve may be arranged on either side of such wall, the extra wall being extended somewhat beyond the port-lap, or flange for covering a port.

In the drawings—

A denotes the steam-chest, constructed in the usual manner, and with two induction-ports, C C, and one eduction-port, D, leading out of the lower valve-seat, or bottom of the chest.

The two main walls of the valve are shown at *a a*, their port-laps or flanges being represented at *b b*.

The auxiliary walls, denoted at *a' a'*, are parallel, or about so, to the main walls, with a chamber, B, between each two walls *a a'*.

There is an opening or space, *c*, at the bottom of each chamber B, and there are other openings or holes, *d*, made through the top of such chamber, so as to lead into an auxiliary packing-chamber or groove, E, arranged directly over the chamber B, and with respect to another packing-groove, F, in manner as represented. This latter groove extends around the whole valve, at its top, and carries a packing composed of a series of bars, *f*, of metal.

Holes *g*, made through the outer sides of the last-mentioned packing-groove, F, serve to let steam pass from the chest into the groove in order to force its packings up to the top of the chest.

Within each of the grooves E there are placed two right-angled triangular prisms or packings, *h h*, which are arranged with their hypotenusal sides in contact.

When the steam passes up through the passages *d*, it will act against the lower of the two strips *h h*, and force it and the upper one upward, so as to crowd the latter up against the cap of the steam-chest, thereby sealing the valve at top, so as to prevent the escape of steam over the valve.

While passing across a port, the port-lap will be subjected to an upward pressure of the steam, and the steam will flow into the chamber B, and thence into the groove E. The steam, by acting against the bottom of the groove, and also the bottom of the packing thereof, will counterbalance the said upward pressure on the port-lap. The triangular prismatic packing-strips, by being pressed against one another, will be moved laterally in opposite directions, against the sides of their groove, so as to make close joints therewith.

The valve is chambered, as shown at *s*, and is, as shown at *t*, open at top, and at bottom, as shown at *u*, in consequence of which, the exhaust-steam, after escaping into the middle chamber *s*, will strike directly against the cap of the steam-chest, and thus does not act to produce any upward pressure, tending to force the valve off its seat, as would result were the chamber *s* of the valve closed at top, as in other balance-valves.

I herein make no claim to a balance-valve constructed with a cavity between its walls, with packing-strips and grooves for their reception at the upper portions of the walls, and with one or more passages leading out of each of such grooves, so as to open into the steam-chest, such being as shown in Letters Patent No. 83,336, dated October 20, 1868, and granted to me.

What I claim, as my present invention, is as follows:

The arrangement and combination of the two chambers B B, their packing-grooves E E, packings *h*, and openings *c d*, with the balance-valve, having the chamber *s* open at top and bottom, and the grooves F and their packings *f*, the whole being substantially as described.

WM. M. STEVENSON.

Witnesses:

R. H. EDDY,  
J. R. SNOW.