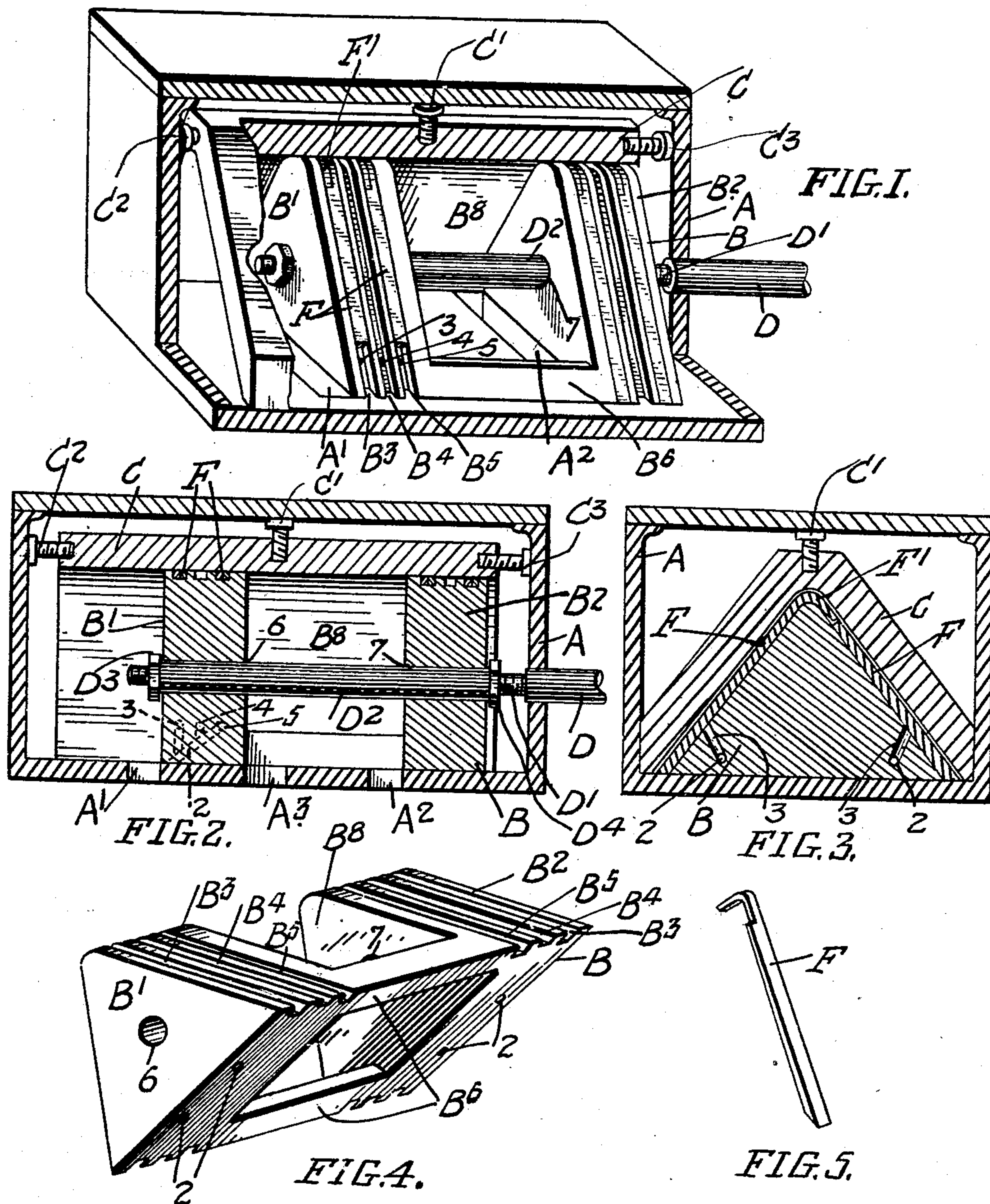


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BALANCE VALVE FOR STEAM ENGINES.  
APPLICATION FILED JULY 25, 1907.

904,631.

Patented Nov. 24, 1908.



WITNESSES.  
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# UNITED STATES PATENT OFFICE.

FRANCIS JOSEPH MEANLEY, OF MOSSLEY, ONTARIO, CANADA.

## BALANCE-VALVE FOR STEAM-ENGINES.

No. 904,631.

Specification of Letters Patent.

Patented Nov. 24, 1908.

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*To all whom it may concern:*

Be it known that I, FRANCIS JOSEPH MEANLEY, of the town of Mossley, in the county of Middlesex, in the Province of Ontario, Canada, mechanical engineer, have invented certain new and useful Improvements in Balance-Valves for Steam-Engines, of which the following is the specification.

My invention relates to improvements in balance slide valves, and the object of the invention is to devise a valve of this class which may be cheaply manufactured, which will not leak under any conditions and will utilize a minimum amount of steam pressure to keep the same steam tight and it consists essentially of a valve chest provided with the usual steam and exhaust ports, a slide valve triangular in cross section having a central portion forming the exhaust cavity and having a series of three grooves formed in the upper side of the valve, packing strips designed to fit in the outermost and innermost grooves the said strips being formed with reduced hooked ends designed to fit over the apex of the triangular valve and one beside the other to form a continuous strip over the top of the valve, bored passages extending from the bottom of the valve at an incline and bored passages extending from the bottom of each groove with the inclined passages. A cover corresponding to the form of the valve and held in position by suitable set screws and a suitable valve rod for the valve as hereinafter more particularly described by the following specification.

Figure 1, represents a perspective view of my valve partially broken away and in section. Fig. 2, is a longitudinal sectional view through my valve. Fig. 3, is a cross sectional view through my valve. Fig. 4, is a detail of the valve centered up to show the lower surface thereof. Fig. 5, is a detail of one of the backing strips.

In the drawings like letters of reference indicate corresponding parts in each figure.

A is a valve chest of any suitable form provided with the usual steam ports A' and A<sup>2</sup> and the exhaust port A<sup>3</sup>.

B is the slide valve formed with the end portions B' and B<sup>2</sup> triangular in cross section with a slightly round apex and each having a set of grooves B<sup>3</sup> B<sup>4</sup> and B<sup>5</sup> which extend from each end of the base upwardly over the apexes of such triangular portions. It will be noticed that the grooves B<sup>3</sup> and B<sup>5</sup>

are formed deeper towards the base of the valve for a purpose which will hereinafter appear.

2, 2 are inclined bored passages which extend upwardly into the valve as shown by dotted lines in Fig. 2.

3, 4, 5 are bored passages which extend down from the base of each of the grooves B<sup>3</sup> B<sup>4</sup> and B<sup>5</sup> into the inclined passages 2.

The end portions B' and B<sup>2</sup> of the valves are connected by the portions B<sup>6</sup> thereby forming between the portions B' and B<sup>2</sup> the exhaust cavity B<sup>8</sup>.

C is the valve cover corresponding in form to the shape of the valve B. The valve cover C is held in place by set screws C' and C<sup>2</sup> and C<sup>3</sup>.

D is the valve stem formed with a reduced threaded portion D'.

D<sup>2</sup> is a sleeve held in the orifices 6 and 7 extending through the ends B' and B<sup>2</sup> of the valve. The sleeve extends slightly beyond the end of the valve and the reduced threaded portion D' of the valve stem extends through the sleeve and is held therein by the jam nuts D<sup>3</sup> and D<sup>4</sup>. By making the sleeve D<sup>2</sup> slightly longer than the valve perfect freedom of movement of the valve is assured.

F are the backing strips formed with a hooked upper end F' which is reduced in width to the main body of the strip as clearly shown in Fig. 5. The strips so formed are arranged in pairs in the grooves one strip being located to each side of the valve and the reduced portion thereof fitting one beside the other thereby forming a hinge like arrangement. Although I show this form of connection as a preferable one the strips may be hinged without using the hooked portion of the strip. Also the top of the valve might be brought to a sharp angle and the hook formed correspondingly.

The strip is gradually thickened towards the bottom as greater wear takes place at that portion of the strip than at the top. The groove is therefore formed deeper at the bottom as hereinbefore described.

Having described the principal parts involved in my invention I shall briefly describe the operation of the same.

The valve is shown in the exhaust position for the ports A<sup>2</sup> and is feeding steam to the cylinder through the ports A'. As the valve is moved over to feed steam through the ports A<sup>2</sup> and to exhaust through the



port A', steam enters the bored passages 3, 4, and 5 into the grooves B<sup>3</sup> B<sup>4</sup> and B<sup>5</sup>. The steam in the grooves B<sup>4</sup> serves to seat the valve by expanding between the valve  
 5 and the cover C. Steam enters the grooves B<sup>3</sup> and B<sup>5</sup> through the passages 3 and 5 and forces the strips F contained in the grooves B<sup>3</sup> and B<sup>5</sup> simultaneously against the inner face of the valve cover thereby preventing  
 10 any escape of steam contained in the groove B<sup>4</sup> to the exhaust cavity B<sup>8</sup>.

The cover C of the valve serves to relieve the valve from the boiler steam pressure thereby allowing the valve to work freely,  
 15 just sufficient steam being admitted into the groove B<sup>4</sup> to seat the valve. The amount of steam thus required is therefore proportionately small and such steam is prevented from leaking from the groove B<sup>4</sup> into the exhaust  
 20 by means of the backing strips 3 and 5 which are expanded against the cover simultaneously.

I am aware that there are balance valves in which a semi-circular valve and cover is employed with semi-circular backing strips. Strips of this form however require a greater steam pressure to expand them and are liable to wear unevenly and become leaky; also they are not expanded simultaneously and there-  
 30 fore allow steam to escape to the exhaust. In my valve the steam pressure required is small, the wear on the strips is comparatively even, and all leakage is prevented whereby steam is wasted.

35 What I claim as my invention is:

1. A balanced slide valve comprising a casing, a valve triangular in cross section and having end members with a space therebetween, each of said end members having  
 40 grooves therein, packing strips located in said grooves, said strips having their upper

ends bent and engaging the apex of the triangle so as to act as a hinge, and means for introducing steam under the strips in the grooves.

2. A balanced slide valve comprising two triangularly shaped end portions having grooves in their sides, and two bottom side members connecting the ends together and forming a space between the ends, packing  
 50 strips located in the innermost and outermost grooves of each end portion, said strips having their upper ends bent and reduced in width and engaging the apex of the triangle, the reduced ends of the strips on opposite  
 55 sides contacting with each other, and means for introducing steam into all the grooves.

3. A slide valve comprising triangularly shaped ends, and bottom side members connecting said ends together and forming a  
 60 space therebetween, a sleeve passing through said ends, a bar passing through the sleeve, and nuts holding the bar in place, said ends having grooves in their upper faces, packing strips in said grooves hinged at the apex of  
 65 the triangle, and means for introducing steam into said grooves.

4. A slide valve comprising end portions of triangular shape, bottom side members connecting said ends together, grooves in the  
 70 upper sides of said end portions, the lower portion of said grooves being deeper than the upper portions thereof, packing strips having bent upper ends fitting in said grooves, said strips being of greater thickness at the  
 75 lower ends and having their bent ends engaging the apex of the triangle, and means for introducing steam into the grooves.

FRANCIS JOSEPH MEANLEY.

Witnesses:

EDMUND WELD,  
 VINA SHIPPS.