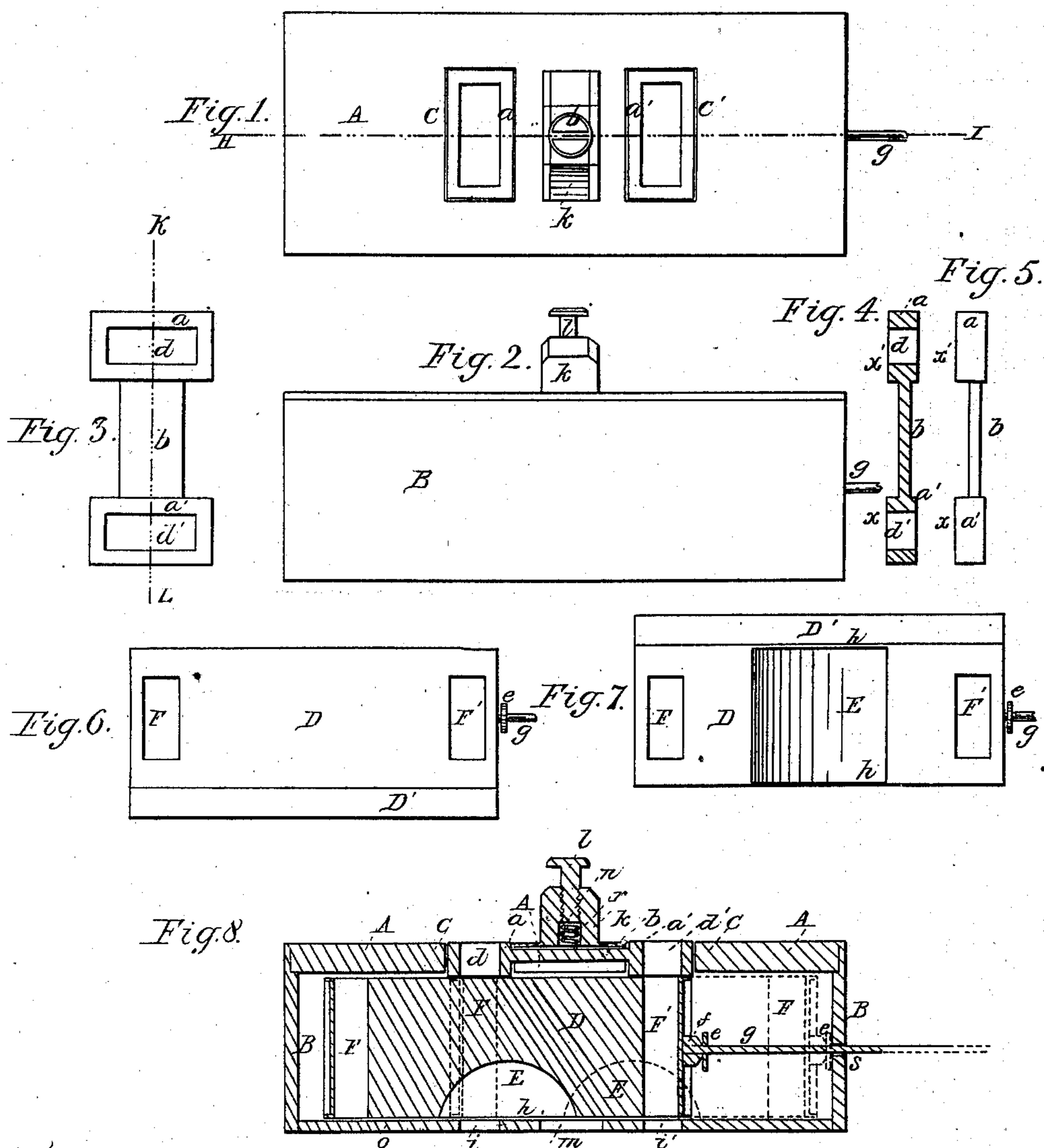


W. Curry,
Steam Balanced Valve.

No 68,713.

Patented Sep. 10, 1867.



Witnesses.
W. H. Spencer
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Inventor:
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United States Patent Office.

WAYNE CURRY, OF SPRINGFIELD, MASSACHUSETTS.

Letters Patent No. 68,713, dated September 10, 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, WAYNE CURRY, of Springfield, in the county of Hampden, and Commonwealth of Massachusetts, have invented a new and useful Improvement in Steam-Valves; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the annexed drawings, making a part of this specification, and to the letters of reference marked thereon, in which—

Figure 1 is a plan view of the valve and case.

Figure 2 is a side elevation of the valve-case.

Figure 3 is a plan view of the packing ports.

Figure 4 is a longitudinal vertical section through line K L of fig. 3.

Figure 5 is a side view of the packing ports.

Figure 6 is a top view of the valve.

Figure 7 is a reverse plan of the valve, and

Figure 8 is a longitudinal vertical section of the valve and case through line H I of fig. 1.

The nature of my invention consists in the construction and arrangement of a slide-valve and its case, whereby the pressure of the steam upon the outside of the valve may be almost entirely removed, or so nearly removed that the pressure upon the outside shall nearly balance the pressure upon the inside in its ordinary operation.

It is well known that as slide-valves are generally constructed, and as at present used, there is very great pressure at times exerted upon the outer surface of a valve, so much so that the valve generally carries upon its outer surface nearly the pressure per square inch indicated by the gauge attached to the boiler; this pressure operating to a great disadvantage in the successful working and wear of a valve and its seat, and the economical use of power.

By my invention I am enabled to overcome or remove many of the objections and disadvantages incident to the ordinary slide-valve, and at the same time retain the three great requisites, viz, cheapness, simplicity, and durability.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and mode of operation.

In the drawings, D represents the valve, which may be prismatic in form, having the apertures or ports F and F' of the required size, near each end of the valve, its upper surface being made perfectly flat and plane, and having upon its lower or under side the chamber E, which may be of a semicircular form, the lower surface of the valve being also made perfectly flat and plane to fit well to its seat. The guide D' may be attached to the side of the valve D, if desirable, to assist in keeping it in position. The valve-rod *g* may be secured to one end of the valve D at *f*, or the valve-rod may be attached to the valve by passing through the valve, and the holes in the valve D may be elongated vertically, to allow the valve sufficient vertical play upon its rod, as is generally the case.

Fig. 8 represents the valve D in its case A, one end, B, having an aperture, *s*, which, in practice, should be packed, through which aperture passes the valve-rod *g*. Introduction ports, *i* and *i'*, are made in the bottom of the valve-case A, and also the exit port *m*. The apertures *c* and *c'* are made in the top of the case A, and also the space A', to receive the bar *b*. These apertures *c* and *c'*, and the space A', are made to receive the packing ports *a* and *a'*, and bar *b*, which connects them together, these packing ports consisting of the two pieces *a* and *a'*, having the apertures *d* and *d'*, of about the same form as the introduction ports F and F', and firmly connected by the bar *b*. These packing ports *a* and *a'* have their lower edges, *x* *x'*, made perfectly level and true, so as to present a perfectly even and true face to the upper surface of the valve D, which must be also made perfectly even and true. To the top of the case A is attached the piece *h*, which, in practice, would be cast solid with the top of the case A, said piece *h* having the space *r* underneath, into which to insert any suitable spring, *n*, which may be regulated in its pressure upon the top of the bar *b* by means of the screw *l*.

Having now described its construction, I will proceed to describe its mode of operation. The valve D having been inserted in its case A and the rod *g* attached, the packing ports *a* and *a'* are inserted in their places in the apertures *c* and *c'*, and the top of the case A is then put on and secured firmly in place. This

case A, containing the valve D, is placed in the steam-chest, or a steam-chest or reservoir may be placed on top of the case A and covering both ports, and steam being let into the chest, and the valve being in the position shown in fig. 8, the apertures $d' i'$ and the port F' being in a direct line, or one above the other, steam is admitted through the port F', while the exhaust steam from the other end of the cylinder passes into the chamber E through the aperture i , and out the exhaust port m . When the valve is in the position shown in red lines, the apertures $d i$ and the port F being in a vertical line, steam is admitted through the port F, while the exhaust steam enters the chamber E through the aperture i' , and passes out the exit port m .

It will be seen that in the operation of this valve there is no pressure upon the valve D from the steam in the steam-chest, except where the upper surface of the valve D is exposed through the apertures d and d' , the maximum pressure being at the point where both ports F and F' are closed. The valve being steam-tight, no steam can get to the valve D except through the packing ports a and a' , and these being held down firmly upon the upper surface of the valve D by the action of the screw l and the spring n , all access is shut off to any other portion of the surface of the valve D, except that portion exposed through the packing ports a and a' , the steam passing directly through the valve D into the cylinder whenever the introduction ports F or F' are in a vertical communication with the packing ports a or a' . The pressure exerted by the steam upon such portion of the valve as may be exposed through the packing ports a and a' , is sufficient to keep the valve steady and in place during its action, as some little pressure is an advantage to the successful working of a slide-valve. The packing ports a and a' being of sufficient thickness vertically, when they are in place, their under surfaces bear upon the top of the valve D, and their upper surfaces, together with the upper surface of the bar b , having no bearing upwards, except at the point immediately under the spring n , said packing ports and bar are free to rise, so that if the valve D should work unevenly upon its seat, or one end of the valve should rise more than the other from its seat, the spring n would serve as a pivot upon which the bar b could turn, so that the packing ports a and a' are always in constant and complete contact with the top of the valve D, thus accommodating themselves to any position of the valve D in its case. In use in a locomotive, when the engine is suddenly reversed, the great pressure of the air in the cylinder overcomes the elasticity of the spring n , which being compressed, allows the valve, with the packing ports a and a' , to rise slightly in the valve-case A, and permits the air in the cylinder to escape through either port i or i' , pass underneath the valve D and out at the escape port m . Any amount of vertical play may be given the valve in its case A by the arrangement of the screw l and spring n .

I am aware that various devices have been used to remove the pressure of steam from the outer surface of a slide-valve, as in Letters Patent granted to Charles H. Parshall, bearing date December 1, 1863, and numbered 40,796; also in Letters Patent granted to R. P. Bailie, bearing date October 25, 1864, and numbered 44,777, and also others; but my invention differs very materially from said devices, both in construction and operation, and I disclaim any and every part of said devices, irrespective of my construction and arrangement.

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

The valve D, having the vertical ports F and F', in combination with the valve-case A, the packing ports a and a' , and a spring, n , all constructed and operating substantially as described, and for the purposes herein specified.

WAYNE CURRY.

Witnesses:

J. P. BUCKLAND,
W. H. SPENCER.