

R. WRIGHT.
Balanced Valves for Steam and other Engines.
 No. 158,191. Patented Dec. 29, 1874.

Fig. 1.

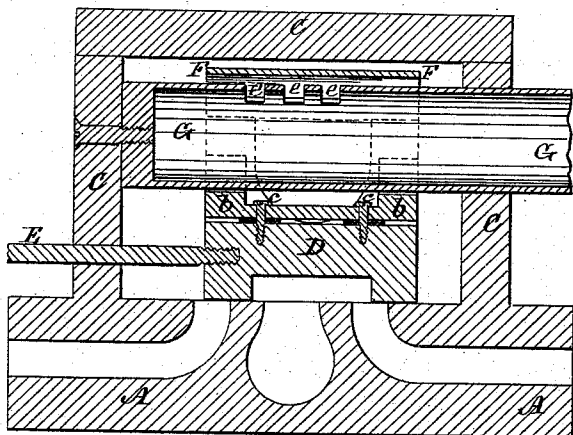


Fig. 2.

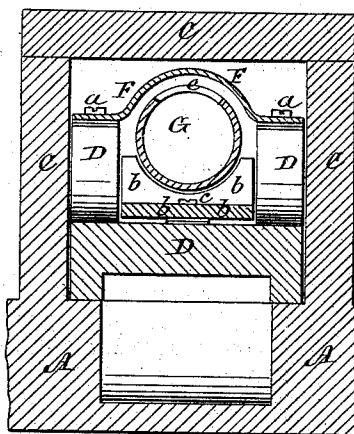


Fig. 3.

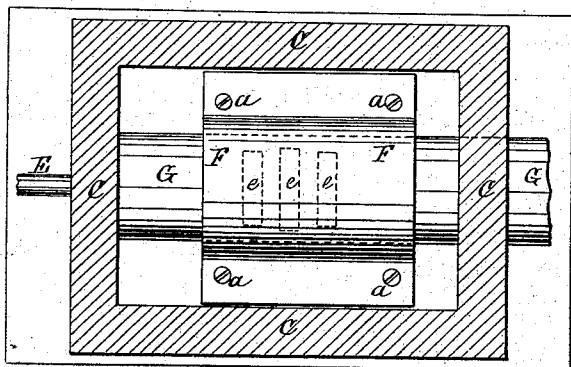
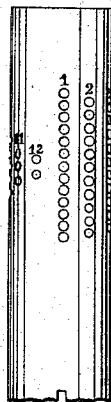


Fig. 4.



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IMPROVEMENT IN BALANCED VALVES FOR STEAM AND OTHER ENGINES.

Specification forming part of Letters Patent No. **158,191**, dated December 29, 1874; application filed November 19, 1874.

To all whom it may concern:

Be it known that I, ROBERT WRIGHT, of No. 706 Marshall Street, in the city of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Balanced Valves for Steam and other 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 vertical longitudinal section through the valve. Fig. 2 represents a vertical transverse section of the same. Fig. 3 represents a horizontal section through the valve below the cover and above the cap-plate of the valve. Fig. 4 represents a test-pipe for ascertaining or measuring the quantity of steam necessary to be admitted against the cap-plate of the valve to relieve said valve of its load and friction, as will be explained.

My invention relates to a floating balanced valve for steam or other engines, wherein the steam is carried from the boiler directly into the valve-chest, and through the center of the valve, and allowed to impinge against a cap-plate attached to the valve to relieve the latter of its load and friction; and my invention further relates to the combination of a valve, a steam-pipe passing therethrough, and an upper and under plate, both of which may, if desired, be made adjustable for regulating the quantity of steam necessary to float the valve, and to prevent the latter, from undue circumstances, from leaving its seat.

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 portion of a steam-cylinder, in which are the usual inlet and exhaust ports. C is the valve-chest, in which is placed the valve D, which is reciprocated in the common well-known way by the valve-rod E. The valve D has an arched cap-plate, F, connected to or with it by screws *a a*, so that said cap-plate may, if desired, be raised or lowered on the valve; and also an under block or bearing, *b*, connected to it by set-screws *c c*, so that said bearing may also, if necessary, be raised or lowered upon the valve. The valve thus

made is open throughout its central portion, so as to admit of a steam-pipe, G, which leads directly from the boiler into the valve-chest, and into the center of the valve. In the top or upper portion of this steam-pipe is an opening or openings, *e*, to allow the steam from said pipe to impinge directly against the under side of the cap-plate F, and so relieve the valve from load and pressure, and cause it to float, as it were, through this uniform and constant volume of steam.

It will be perceived that the valve is packed nowhere; that it touches nowhere except upon its seat, while the tendency of the steam against the cap-plate F is to relieve the valve from the frictional contact with its seat, and thus cause it to float, as nearly as such thing is possible, in and through the body of steam in the valve-chest.

Any tendency of the valve to leave its seat, which it will only do under some adverse or irregular working of the engine, is counteracted by the bearer *b* against the under side of the steam-pipe G; and though I have represented this pipe as round, it may be of other areal form, and, when flat, the cap-plate need not be arched; but I prefer the pipe, as more simple and more easily introduced into the valve-chest and valve.

In the present mode of working steam the difference of pressure between the live and the exhaust steam has very little effect in so far as any tendency of the valve to leave its seat is concerned. In fact the valve rather tends to keep its seat, and its weight increases that tendency, so that the difference of pressure between the live and the exhaust steam requires no further compensation than that provided for in the valve, as shown and described.

At Fig. 4 I have shown what I term a test-pipe to accurately measure and ascertain the amount of steam-opening necessary in the pipe G, and the quantity of steam-pressure on the cap-plate to counterbalance load and friction on the steam-valve D. This test-pipe is of the same diameter as the steam-pipe that is to be used, so that it will fit the opening into the valve-chest. It is furnished with a scale of holes regularly diminishing in number, but of uniform area. This test-pipe is introduced

into the valve-chest and into the valve, and, by turning it around so that any of the series of holes comes under the cap-plate, and a head of steam admitted, it can be ascertained which of the rows or series of openings admit the proper quantity of steam to float the valve, and the sum of their areas being ascertained, an opening or openings of corresponding area is made in the steam-pipe, the test-pipe removed, and the permanent pipe G is put in its place. This test-pipe is more important when my valve is to be applied to an engine already constructed, or to a valve-chest or valve already made.

Having thus fully described my invention, what I claim is—

1. In combination with the valve D, the steam-pipe G, leading directly from the boiler into the valve-chest, and into and through the center of the valve, and furnished with a steam opening or openings, *e*, to allow the live steam to impinge against the cap-plate of the valve, as and for the purpose described.

2. In combination with the valve D, and its cap-plate F, and the steam-pipe and its opening or openings *e*, the bearer *b* underneath the steam-pipe and attached to the valve, as and for the purpose described and represented.

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Witnesses:

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