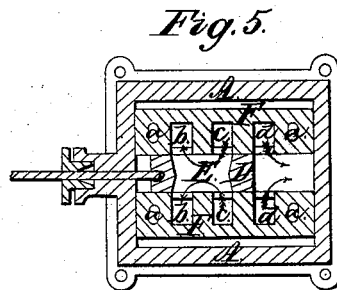
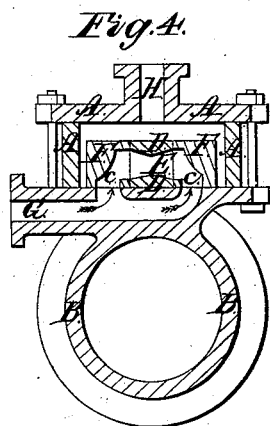
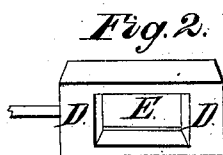
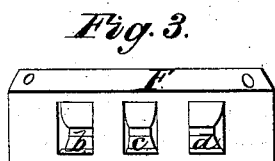
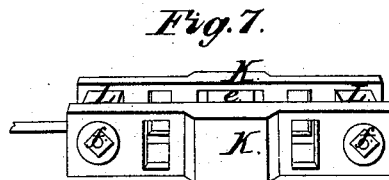
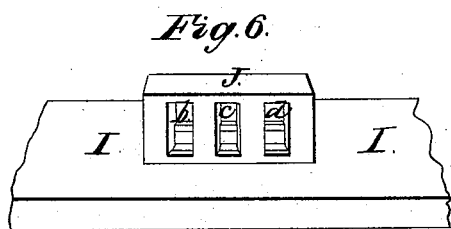
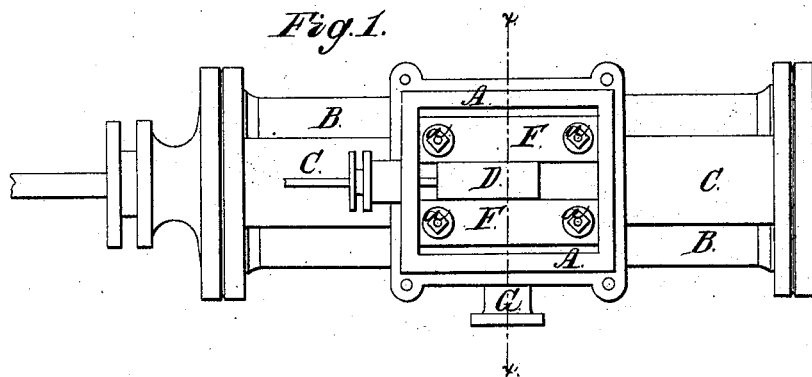


*Baker & Northington,*  
*Steam Balanced Valve.*  
*N<sup>o</sup> 4,542.      Patented May 28, 1846.*



# UNITED STATES PATENT OFFICE.

W. H. BAKER AND H. R. WORTHINGTON, OF BROOKLYN, NEW YORK.

## BALANCING VALVES OF STEAM-ENGINES.

Specification of Letters Patent No. 4,542, dated May 28, 1846.

*To all whom it may concern:*

Be it known that we, WILLIAM H. BAKER and HENRY R. WORTHINGTON, of the city of Brooklyn, in the county of Kings and State of New York, have made a new and useful Improvement in the Manner of Constructing a Balanced Slide-Valve for Steam-Engines; and we do hereby declare that the following is a full and exact description thereof.

In constructing our balanced slide valve, we so arrange the respective parts thereof as to cause the steam to operate equally on opposite sides of the sliding part thereof, allowing the steam to enter into, and to escape from the cylinder equally on each side of said valve. In effecting this we sometimes cause the valve to slide between two stationary cheek pieces, in each of which are contained three openings, operating in the ordinary way for the induction and eduction of steam.

Instead of the two stationary cheek pieces above named, we sometimes employ one stationary valve seat, which is embraced on each of its sides by the slide valve, the stationary valve seat being furnished with three steam openings on each of its sides, so arranged as to produce the same result with that first named and in a manner substantially the same; the two modes being mere modifications of one principle.

In the accompanying drawing Figure 1 shows the steam box with its top plate, or cover, removed, exhibiting the sliding valve, the stationary cheek pieces, and the steam ways. Fig. 2 is a perspective view of the slide valve, and Fig. 3 a perspective view of one of the stationary cheek pieces removed from the steam chest. Fig. 4 is a section through the steam chest and the steam cylinder in the line  $x-x$  of Fig. 1. Fig. 5 is a horizontal section through the middle of the steam chest supposing the chest and cylinder to be in the position shown in Fig. 1; Figs. 2, 3, 6 and 7 are drawn on a larger scale than Figs. 1, 4 and 5.

A is the steam chest, B B the cylinder, and C C the side pipes.

D is the slide valve, which, instead of the ordinary cavity for the conveyance of steam on one side only, must be provided with such a cavity on both sides, or, in preference, have an opening E completely through it, which will insure a perfectly equal action of the steam on both of its sides.

F F are the cheek pieces between which the valve D is to slide. These cheek pieces operate as the ordinary valve seat, having each three steam ways through it for the induction and eduction of steam as usual. The steam ways on the under sides of each of these cheek pieces correspond with steam openings into the induction and side pipes; there are therefore under this arrangement six openings in the bottom of the steam chest instead of three, but their operation is the same as when there are three only, as each opposite opening leads to the same steam passage. The cheek pieces F F are made adjustable by means of the screws and nuts  $a a$  and should the valve or cheek pieces wear they may be readily taken out, ground true, and replaced.

In Figs. 3 and 5,  $b, c, d$ , are the steam ways in the cheek pieces; the center steam ways  $c c$  are also seen in the section Fig. 4, G being the induction pipe leading to these steam ways, which, it will be seen, operate in unison. H is the eduction pipe, leading from the steam chest into the atmosphere or to a condenser. The arrows in Fig. 5 show the course of the steam which is the same as in other slide valves, the only difference being that it operates on both faces of the slide instead of at the bottom.

In Figs. 6 and 7 I have shown the second modification of my slide valve. I, Fig. 6, shows the bottom of the steam chest and J a rectangular block or raised piece thereon answering in its action to the two cheek pieces F in the first modification. Fig. 7 is the slide valve, which consists of two similar side pieces K, K, that are to embrace the piece J between them. The steam ways  $b, c, d$ , in the piece J pass through it from side to side, and open below into the induction and side pipes in the ordinary way;  $e$  is the cavity in one of the side pieces K, there being a similar cavity on the opposite side for conveying the steam from the induction to the side pipes as usual. By means of the end pieces L L and the screws and nuts  $f$ , the distance of the sides K K from each other may be nicely adjusted whenever it is necessary.

It will be seen that under the foregoing arrangement there will not be any pressure whatever of steam upon the steam chest, consequent upon the effecting a perfect balance on each side of the valve, it being subjected to the action of the effluent or escape steam

only on its way into the atmosphere or to a condenser; and that when it is not to be condensed the valve itself would operate equally well were the top of the steam chest removed.

5 Having thus fully described the nature of our improvement in the manner of constructing a balanced slide-valve for steam engines, what we claim as new therein and desire to  
10 secure by Letters Patent, is—

The causing of the steam to operate equally on and through its two opposite sides under and arrangement of the respective parts such as is herein set forth; that is

to say, by the employment of cheek pieces 15 between which the valve may slide or of an elevated block, such as is marked J in the accompanying drawing; on each side of which the sliding valve is to operate, together with any such modification thereof as 20 shall be substantially the same in its structure and operation, producing the same effect by like means.

WILLIAM H. BAKER.

HENRY R. WORTHINGTON.

Witnesses:

J. W. CARRINGTON,

JOHN JAMES NEWTON.