(No Model.)

E. A. BURNAP.

BALANCED SLIDE VALVE.

No. 259,666. Patented June 20, 1882

Fig. 1

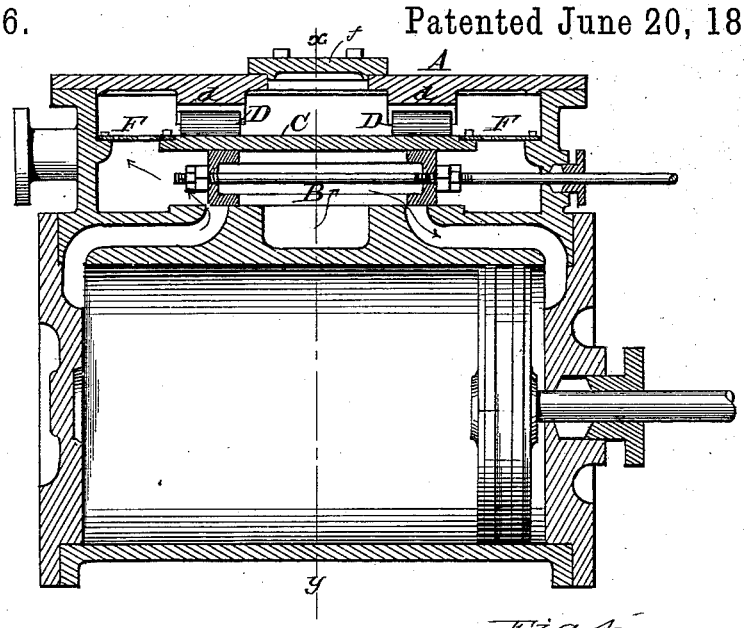


Fig. 2.

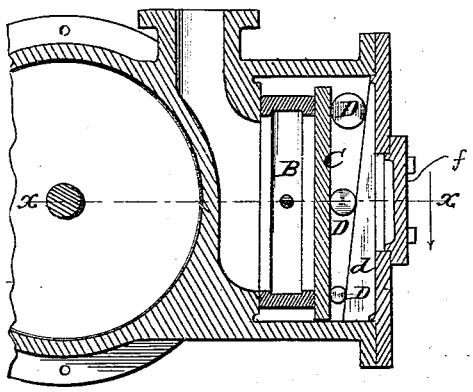


Fig. 4.

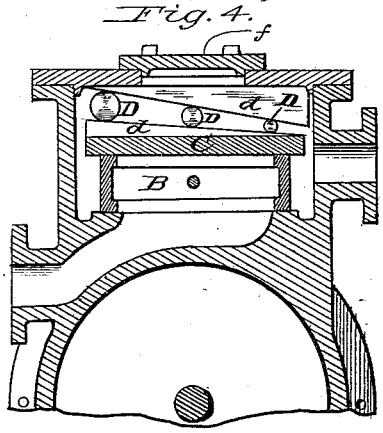


Fig. 3.

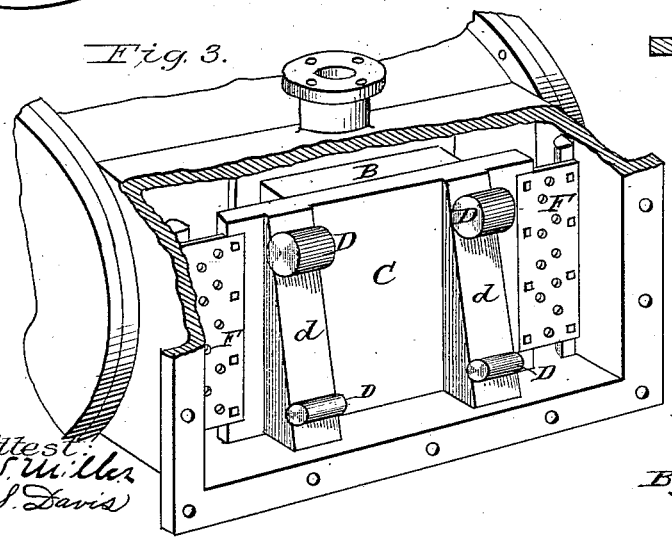
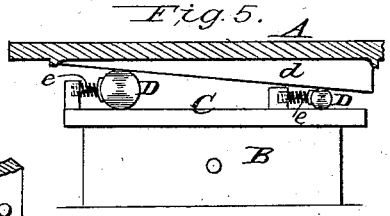


Fig. 5.



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UNITED STATES PATENT OFFICE.

ELA A. BURNAP, OF DENVER, COLORADO.

BALANCED SLIDE-VALVE.

SPECIFICATION forming part of Letters Patent No. 259,666, dated June 20, 1882.

Application filed April 7, 1882. (No model.)

To all whom it may concern:

Be it known that I, ELA A. BURNAP, a citizen of the United States, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Balanced Slide-Valves, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention is in the nature of improvements in balanced slide-valves; and the objects of the invention are to hold the balance-plate against end or side thrust or displacement, and to automatically keep the plate up to the valve, so as to insure a steam-tight joint.

To these ends my invention consists, first, in securing the ends of the balance-plate to the ends of the chest by spring-metal plates to prevent end or side thrust thereof, and perforating said plates to permit the exhaust-steam to escape; and, second, in holding the plate steam-tight against the back of the valve by rolls acting against them by gravity, thereby automatically retaining the plate in position, all substantially as hereinafter specified and claimed.

In the accompanying drawings, illustrating my invention, in the several figures of which like parts are similarly designated, Figure 1 is a section on line *x x*, Fig. 2, of a cylinder with the valve-chest at the side. Fig. 2 is a cross-section on line *y y*, Fig. 1. Fig. 3 is a perspective view with the chest broken and its front plate removed to expose the interior, and showing the inclines on the balance-plate instead of the front plate. Figs. 4 and 5 are vertical sections of modifications.

In my valve the steam is preferably admitted through the center or ordinary exhaust-port, which of itself is not a novelty, and the valve-chest A and valve B may be of any approved pattern, such chest being arranged in a vertical position, as upon the side of the cylinder.

C is a balance-plate secured over the back of the valve by elastic plates F, affixed thereto, and attached to the chest, as by bolts or other fastenings let into flanges projecting inwardly from the shell of such chest. These plates F may be of thin spring metal, and while elastic, so as to permit the balance-plate C to hug the valve, are sufficiently rigid to prevent all end-wise or sidewise thrust of the balance-plate, thereby holding it in position on the valve.

In the form of valve shown in the drawings, which is but one form of my invention, the elastic plates are perforated to permit the exhaust-steam to escape or pass around them.

The balance-plate is held steam-tight by means of a number of rolls, D, acting by gravity against it, thereby automatically keeping it in position upon the valve. These rolls preferably move upon vertical inclines *d d* in the valve-chest, disposed at or about opposite the ends of the balance-plate; and said rolls preferably vary in size in accordance with the proximity of the surfaces of the inclines and the balance-plate, whereby they are wedged in between the inclines and balance-plate, and so secure perfect automatic adjustment and obviate the necessity of all external manipulation for setting the balance-plate or compensating for wear. Two or more rolls may be employed at each end of the balance-plate, or rolls long enough to extend across the plate may in some instances suffice. The inclines *d d* may be made with, attached to, or abut against the outer plate of the chest, as in Figs. 1 and 2, or they may be similarly disposed with relation to the balance-plate, as in Fig. 3.

Where the steam-chest is on top the cylinder gravitating rolls may be employed between reversed inclines, as in Fig. 4, or springs *e* may be employed to keep the rolls in position.

A removable plate, *f*, may be employed for covering a hand-hole in the chest-plate to afford access to the interior for inserting or removing or otherwise arranging the rollers without taking off the chest-plate.

I am aware that the balance-plate of valves has been suspended by a flexible diaphragm attached to the chest; but such an arrangement does not effect the prevention of end thrust; nor does a diaphragm subserve the purposes of spring-plates at the end of a balance-plate in any other sense.

What I claim is—

1. In a balanced slide-valve, a balance-plate provided with elastic plates at its ends connected with the valve-chest, so as to prevent end or side thrust or displacement thereof, substantially as shown and described.

2. In a balanced slide-valve, a balance-plate held against end or side thrust or displacement

by elastic plates arranged at its ends, and perforated to permit the escape of exhaust-steam, substantially as shown and described.

3. In a balanced slide-valve, a balance-plate and rolls acting thereupon by gravity to hold such plate steam-tight, substantially as shown and described.

4. In a balanced slide-valve, a balance-plate held against endwise or sidewise displacement, combined with gravitating rolls to keep it steam-tight, substantially as shown and described.

5. In a balanced slide-valve, the valve-chest, provided with inclines, and a balance-plate, combined with gravitating rolls interposed between them, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ELA A. BURNAP.

Witnesses:

GEO. F. HIGGINS,
E. H. KLING.