

(No Model.)

F. R. SKIDMORE.
BALANCED SLIDE VALVE.

No. 484,060.

Patented Oct. 11, 1892.

Fig. 1.

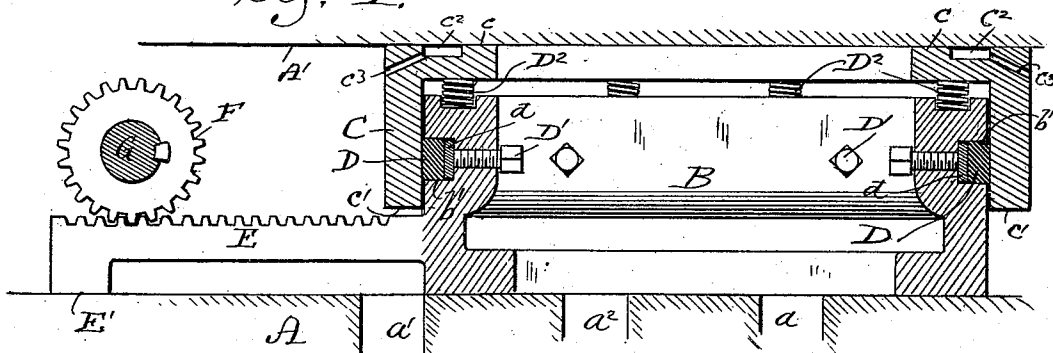


Fig. 2.

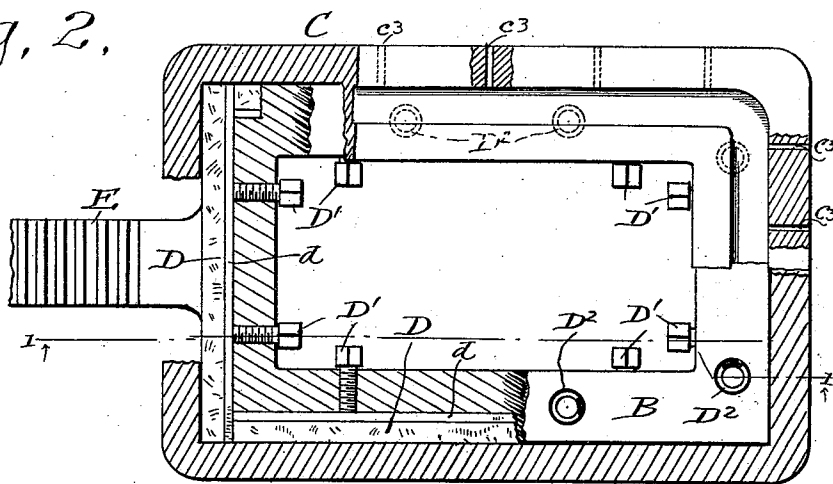
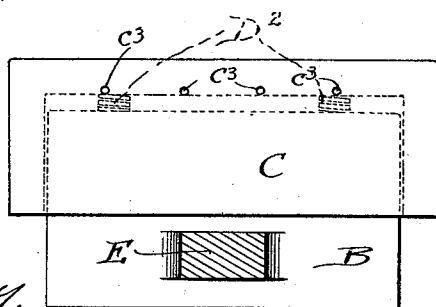


Fig. 3.



Witnesses
Geo. W. Young
John E. Wiles.

Inventor
Frederick R. Skidmore
By H. G. Underwood
Attorney

UNITED STATES PATENT OFFICE.

FREDERICK R. SKIDMORE, OF MILWAUKEE, WISCONSIN.

BALANCED SLIDE-VALVE.

SPECIFICATION forming part of Letters Patent No. 484,060, dated October 11, 1892.

Application filed August 21, 1891. Serial No. 403,346. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK R. SKIDMORE, a citizen of the United States, and a resident of Milwaukee, in the county of Milwaukee, and in the State of Wisconsin, have invented certain new and useful Improvements in Balanced Slide-Valves; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to certain new and useful improvements in slide-valves for steam-engines, and relates more particularly to that class of slide-valves known as "balanced valves."

The invention consists in the matters hereinafter described, and pointed out in the appended claims.

In the accompanying drawings, illustrating my invention, Figure 1 is a longitudinal vertical section of a slide-valve embodying my invention, taken on line 1 1 of Fig. 2. Fig. 2 is a top plan view of the same, showing portions broken away. Fig. 3 is an end elevation of my improved valve.

In said drawings, A indicates the valve-seat provided with the usual steam-inlet ports $a a'$ and exhaust-port a^2 , and A' the opposite wall of the steam-chest arranged in a plane parallel with said valve-seat. The slide-valve consists of a lower portion B, arranged to slide upon the surface of the seat A, and an upper portion C, expansibly engaged with said part B and arranged to bear against the under surface of the wall A' of the steam-chest. The upper movable portion C of the valve is arranged to fit closely around the outside surface of the lower portion B, as illustrated more particularly in Fig. 1 of the drawings. Any suitable means may be provided for making a steam-tight joint between the lower part B and the movable upper part C of the valve—as, for instance, as illustrated in the drawings, strips of packing material D D, arranged in horizontal channels or grooves $b' b'$ in the outer surfaces of the portion B. These packing-strips D D are preferably made of elastic material, and metallic strips $d d$ are provided upon the inner surfaces of said packing-strips, said metallic strips being adjusted outwardly by means of set-screws $D' D'$, which

are threaded through the side walls of the lower portion B of the valve and bear against the inner surfaces of the strips $d d$.

Any suitable means may be provided for holding the movable portion C of the valve against the wall A' of the steam-chest—as, for instance, spiral springs $D^2 D^2$, arranged in sockets in the upper surfaces of the side walls of the lower part B, and bearing against the under surface of an inwardly-directed flange c at the upper portion of the movable part C. By this construction live steam is excluded from the interior of the valve, and by reason of the engagement of the upper movable portion thereof with the wall A' of the chest, steam-pressure is kept off from the upper side of the valve. A groove or channel c^2 is provided in the upper surface of the inwardly-directed flange c of the movable upper part of the valve, and live steam is admitted to said groove or channel by means of ducts $c^3 c^3$, extending to the outside of the said upper portion C. Steam also bears against the lower edge c' of the vertical side walls of the part C, and the area of the lower surface of the channel c^2 is made substantially equal to the area of the surface c' of the lower side of said vertical walls of the part C. By this construction the pressure of the steam upon the upper and lower sides of the movable part C of the valve is rendered equal, while steam being excluded entirely from the interior and from the upper surface of the part B of the valve, there will obviously be no pressure of the steam against any of the surfaces, which would tend to cause the valve to bind or drag, the valve being constantly in a state of equilibrium and the friction reduced to a minimum.

My improved valve may be arranged to operate in connection with any desired form of valve-actuating mechanism, the particular form of construction illustrated in the drawings being designed to operate in connection with actuating mechanism of the form shown in a separate application for patent, Serial No. 397,852. In this particular form of construction the lower part B of the valve is provided with a projecting arm E, upon one side of which is provided a rack e , which en-

gages with the teeth of a pinion F, mounted upon a rock-shaft G, by means of which a reciprocating movement is imparted to the slide-valve to open and close the ports in the usual manner. The outer end of the arm E is provided with a bearing E', upon the surface of the valve-seat A, so as to afford a support for said arm and prevent any liability of its springing out of engagement with the pinion F. The greater portion of the under side of the arm E is exposed to the direct pressure of the steam, as is the entire upper surface of said arm. It will thus be seen that my improved slide-valve is very perfectly balanced and the frictional resistance of the valve is reduced to a minimum.

By the expansible engagement of the upper part C of the valve with the lower part B, said part C is permitted to automatically adjust itself so as to always maintain a contact with the surface A' of the wall of the steam-chest, thus operating to take up all wear upon the bearing-surfaces of the valve and at the same time to prevent the access of live steam to the interior of the valve and the upper surfaces of the lower portion B thereof.

I would have it understood that I do not desire to limit myself to the exact form of construction illustrated in the drawings and herein described, as various modifications may be made in the details of construction without departure from my original invention.

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

1. The herein-described slide-valve, comprising a lower part movably engaged with the valve-seat and adapted to cover and uncover the ports, said lower part being provided with an upwardly-extending marginal flange and having a central opening, and an upper part adapted to engage with the side of the steam-chest opposite to the seat and provided with a downwardly-extending flange adapted to be movably engaged with the flange on the lower part, a circumferential groove in one of said flanges, an elastic packing located in said groove, a non-elastic backing located between said packing and the base of said groove, and set-screws extending through said flange and engaged with said backing and operating to crowd the packing against the surface of

the flange on the other part, substantially as described.

2. The herein-described slide-valve, comprising a lower part movably engaged with the valve-seat and adapted to cover and uncover the ports, said lower part being provided with an upwardly-extending marginal flange and having a central opening, and an upper part adapted to engage with the surface of the steam-chest opposite to the seat and provided with a downwardly-extending marginal flange adapted to be movably engaged with the flange on the lower part, a circumferential groove in one of said flanges, an elastic packing located in said groove, a non-elastic backing located between said packing and the base of the groove, set-screws extending through said flange and engaged with said backing and operated to crowd the packing against the surface of the flange on the other part, and suitable springs or cushions located between the lower surface of the upper part and the upper surface of the lower part, and adapted to press said upper part against the wall of the steam-chest, so as to exclude live steam from the open central portion of the lower part of the valve, substantially as described.

3. An improved slide-valve comprising a lower part movably engaged with the valve-seat and adapted to cover and uncover the ports and provided with an extension adapted for operative engagement with a suitable rock-shaft, a central opening in said lower part, an upwardly-extending marginal flange outside of the same and provided with a circumferential groove, an elastic packing in said groove, an upper part adapted to bear against the wall of the steam-chest opposite to the valve-seat and provided with a downwardly-extending flange adapted for movable engagement with the outside of the flange on the lower part, and suitable springs for pressing said upper part against the said wall of the steam-chest, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

FREDERICK R. SKIDMORE.

Witnesses:

JOHN E. WILES,
N. E. OLIPHANT.