



# UNITED STATES PATENT OFFICE.

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## BALANCED SLIDE-VALVE.

SPECIFICATION forming part of Letters Patent No. 388,103, dated August 21, 1888.

Application filed March 2, 1888. Serial No. 265,951 (No model.)

*To all whom it may concern:*

Be it known that I, JAMES C. ASKREN, a citizen of the United States, residing at Coronado, in the county of Wichita and State of Kansas, have invented a new and useful Improvement in Balanced Slide-Valves for Locomotives, &c., of which the following is a specification.

My invention relates to an improvement in balanced slide-valves for locomotives and other reciprocating steam-engines; and it consists in the peculiar construction and combination of devices, that will be more fully set forth hereinafter, and particularly pointed out in the claims.

This invention is an improvement on the balanced valve for which Letters Patent of the United States No. 342,444 were granted to Lewes Kneeder, May 25, 1886, and on the balanced valve for which Letters Patent of the United States No. 356,148 were granted to J. T. Merrill, January 18, 1887, and in each of which patents I own an undivided fractional interest.

In the drawings, Figure 1 is a side elevation of a valve embodying my improvements, showing the same arranged in the steam-chest of an engine, said steam-chest being indicated in dotted lines. Fig. 2 is a vertical longitudinal sectional view of my improved valve. Fig. 3 is a top plan view of the same. Fig. 4 is a horizontal section taken on the line *xx* of Fig. 1.

A represents a cut-off valve, which is located in a steam-chest, *a*, of a locomotive or other steam-engine, and is adapted to slide back and forth therein in the usual manner. On the upper side of this valve is a rectangular recess, B, with which engages a yoke, C. The said yoke is provided with a rod, D, which constitutes the valve-rod, extends through a stuffing-box in the front end of the steam-chest, and is connected to the eccentric of the engine in the usual manner.

On the upper side of the valve A is arranged a circular disk, E, the sides of which project beyond the reduced upper portion of the valve and bear upon the upper side of the yoke, so as to retain the latter in position on the valve. This circular disk E is provided on its upper side with four radial openings, F.

G represents a series of flat springs, which are arranged at right angles to each other. These springs are arranged radially on the circular disk E and project through the openings F thereof, and have their outer ends bent upward at right angles to form arms H, which are provided at their upper ends with outwardly-extending lips I.

K represents supplemental springs, which are arranged on the springs G, the outer ends of said springs K extending upward and being nearly in contact with the vertical arms H.

L represents a circular plate or disk the diameter of which is equal to the diameter of the plate or disk E. Said disk L is arranged on the upper side of said disk E, and a set-screw, M, extends through a central opening in said disk L and engages a central threaded opening in the disk E.

M' represents four screws, which extend through openings in the disks L and E and engage threaded openings in the valve. The function of the said screws is to secure the disk L on the disk E and to secure the latter to the valve. In the upper side of the disk L is a circular recess, N, in which a packing, O, of cork or other suitable material, is placed, which packing bears against the under side of a plate, P, that is secured to the upper side of the steam-chest.

R represents an annular ring having a slit or opening, *r*, in one side, by means of which said ring is made expansible. The meeting ends of the ring on opposite sides of the slit or opening are provided with aligned inclined grooves *r'*, in which is located a link or tongue, S, which serves to connect the ends of the ring. The said tongue or link is firmly secured in one of the grooves and is free to work back and forth in the other as the ring is compressed or expanded. The normal interior diameter of said ring is equal to the exterior diameter of the disk L, and said ring is slipped over said disk and bears upon the ends of the spring K, and is retained within the vertical arms H of the springs G.

T represents another expansible ring of the same size and construction, which bears upon the ring S and encircles the disk L.

U represents a third expansible ring of the same construction, the normal interior diameter of which is equal to the normal exterior di-

ameter of ring T. Said ring U is slipped over said ring T and bears upon the lips I of the spring-arms G, and is forced upward by the resilience of said spring-arms and caused to bear snugly against the lower side of plate P and to effect a steam-tight joint with said plate. These rings are adapted to expand and contract under varying temperatures and to at all times effect steam-tight joints between each other and the disk L.

When steam is admitted to the steam-chest, it bears downward on the valve and bears upward against the projecting edges of the disk E and against the expansion-rings, the said upward pressure being equal to that exerted on the base of the valve, and thereby relieving the latter of the downward pressure of steam usual on slide-valves, and consequently balancing the valve in the steam-chest and greatly reducing the friction of the latter on the land or lower surface of the steam-chest.

The springs K serve to keep the rings S and R moved upward when the steam-pressure is cut off from the steam-chest, and the arms of the springs G serve to keep the ring U at all times in contact with the plate under the upper side of the steam-chest, so as to prevent steam from exerting a downward pressure on the upper side of disk L.

My improved balancing devices hereinbefore described are adapted to be attached to the slide-valve of any ordinary reciprocating engine now in use, as it is only necessary to provide the slide-valve with openings in its upper side to receive the lower ends of the screws M'.

Having thus described my invention, I claim—

1. The combination of the slide-valve, the disks arranged one on top of the other and removable from the valve, the upper disk having the central recess, the packing fitting in said recess and bearing against the top of the

steam-chest, the spring-arms projecting beyond the disks, the expansion-rings encircling said disks and bearing on the spring-arms, the latter serving to normally force the expansion-rings upward, substantially as described.

2. The combination of the valve, the disks secured on the upper side thereof, the spring-arms G, arranged on the lower disk, projecting beyond the sides thereof, and having their arms bent to form the arms H and lips I, the springs K on the upper side of arms G, the expansion-ring S, encircling the disk and bearing on the spring K, the expansion-ring T, bearing on the ring S, and expansion-ring U, encircling the ring T and bearing on the lips I, substantially as described.

3. The combination, with the slide-valve, of the disk E on the upper side thereof, said disk having the central recess or cavity and the radial openings F, communicating therewith, the springs G, arranged on disk E and having their outer ends extending through openings F and provided with the arms H and lips I, the crossed springs K on the upper side of springs G, the upper disk, L, the central screw extending through the same, through the centers of the springs, and through the lower disk and engaging the valve, the screws M, connecting the upper disk to the lower disk, the expansion-rings S T, encircling the disk, one of said rings bearing on the springs K, and the expansion-ring U, encircling the upper ring, T, and bearing on lips I, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

JAMES C. ASKREN.

Witnesses:

H. T. TROVILLE,  
W. S. TEMPLE.