(No Model.)

J. P. LIGHTBODY.

BALANCED SLIDE VALVE.

No. 489,128. Patented Jan. 3, 1893.

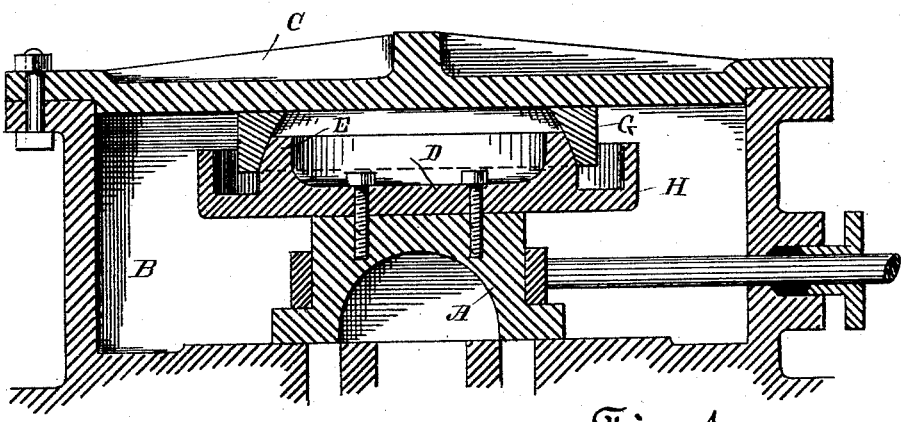

Fig. 1.

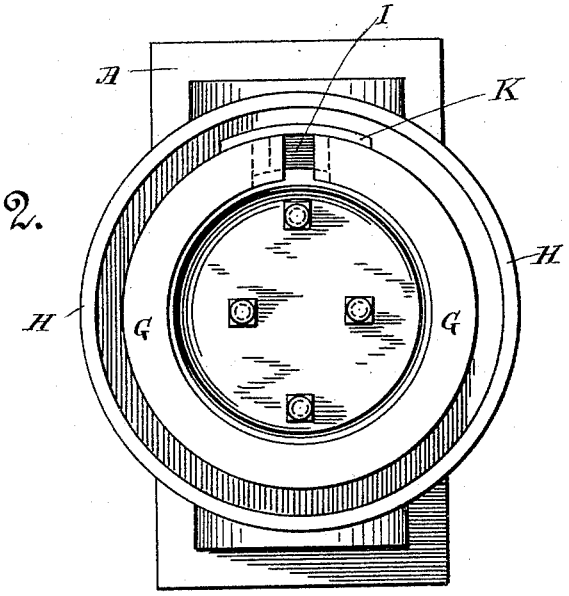

Fig. 2.

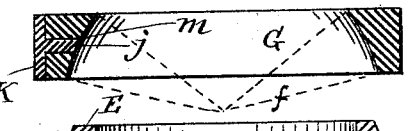

Fig. 3.

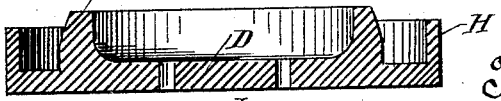

Fig. 4.

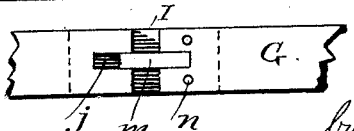

Fig. 5.

Witnesses.

H. Montevercle.

M. R. Bryan.

Inventor.

John P. Lightbody

by Spear & Seely

Attorneys

UNITED STATES PATENT OFFICE.

JOHN P. LIGHTBODY, OF SAN FRANCISCO, CALIFORNIA.

BALANCED SLIDE-VALVE.

SPECIFICATION forming part of Letters Patent No. 489,128, dated January 3, 1893.

Application filed November 16, 1891. Serial No. 412,077. (No model.)

To all whom it may concern:

Be it known that I, JOHN P. LIGHTBODY, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, 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 that class of balanced slide valves in which an expansible metallic ring is interposed between the top of the steam chest and a circular rib on the top plate of the valve, so as to make a close steam tight joint to exclude the steam pressure from the top of the plate. In the best form of this class of valves heretofore used, the outer face of the rib on which the ring rests is made conical. This is objectionable, because, in case the ring should become tipped a little to one side by wear or otherwise, the joint between the two coned surfaces is broken, and steam is admitted to the interior of the air space above the top plate of the valve, thus destroying the balance of the valve.

My improvement consists in forming the outer face of the rib, and the inner face of its surrouding ring on curved or spherical lines, so that the rib and ring form a section of a ball joint. When constructed in this manner a close fit and consequently a steam tight joint will always be preserved, no matter how much the top plate of the valve may be tipped to one side or the other.

My invention is illustrated in the accompanying drawings, in which—

Figure 1, is a vertical section of the steam chest and slide valve with the balance plate and elastic ring in working position; Fig. 2, is a plan view of the balance plate and ring; Fig. 3, is a cross section of the elastic ring, in which is indicated by dotted lines the radii of a circle of which its inner surface forms an arc; Fig. 4, is a similar section of the balance plate of the valve; Fig. 5, is a broken side elevation of the elastic ring.

A is an ordinary slide valve, B the walls of the steam chest, and C the steam chest cover.

D is a circular plate secured to the top of the valve in any suitable way, as by bolts or screws, or formed in one piece with the valve if preferred. The plate D is provided with an annular rib E, raised on its upper face, and of such height as to leave a clear space between such rib and the steam chest cover of from an eighth to a quarter of an inch according to the size of the valve and plate. The exterior face or periphery of the rib E is shaped in the form of a segment of a sphere, the center of which is indicated by the dotted radii in Fig. 3.

G is an elastic or expansible ring, cut through as shown at I, and having its inner surface made concave, to fit the exterior face of the rib E and thus form a spherical steam tight joint. The interior diameter of the ring G is slightly less than the exterior diameter of the rib E, so that when in working position, the upper face of the ring will press against the steam chest cover, while the steam pressure against the outside surface of the ring, forces the ring against the spherical face of the rib, and thus both joints are held constantly tight.

H is a flange upturned upon the outer edge of the plate D, which forms a trough to prevent pieces of ring, in case of breakage, from falling into the steam ports. At the point where the ring is cut through transversely as shown at I, its ends are slotted horizontally as shown at *j*. A curved strip *k*, made of the same vertical thickness as the ring G is formed with a tongue *m* on its inner face which fits the slotted ends of the ring. The strip *k* is riveted to one end of the ring as shown at *n* in Fig. 5. The upper edge of the strip *k* pressing against the steam chest cover, forms a tight joint in the ring horizontally, while the rib or tongue *m* extending through the side of the ring, presses against the rib E and thus forms a tight joint vertically.

I am aware that balances for slide valves have been heretofore made by means of plates and surrounding rings, and I therefore do not claim such devices broadly.

The leading features of my invention consist, in the peculiar joint between the plate and ring made in the form of a section of a ball joint; and further in the peculiar tongue and slot joint in the ring, which permits it to expand and contract freely as may be required, and at the same time produces a perfectly steam tight joint at the point where the ring is cut transversely. By the use of these devices the joints remain absolutely tight no

matter how much the wear of the valve or any of its parts may change its position.

What I claim is:—

1. In a balanced slide valve, a top plate secured to the valve having an annular rib, and an expansible ring inclosing said rib, said rib and ring forming a section of a ball and socket joint, substantially as described.

2. In a balanced slide valve the combination with the steam chest, and valve, of a top plate secured to the valve, an annular rib on said plate, the outer face of which is shaped in the form of a segment of a sphere, and an expansible ring inclosing said rib and having a concave inner face, substantially as set forth.

3. In a balanced valve, the combination of the steam chest cover, the top plate secured to the valve and having an annular rib, the ring G, surrounding said rib, said ring being cut transversely and having slotted ends, and the curved plate K, having the tongue *m*, and secured to one end of the ring, all constructed and arranged so as to produce steam tight joints both vertically and horizontally, substantially as set forth.

In testimony whereof I have affixed my signature, in presence of two witnesses, this 6th day of November, 1891.

J. P. LIGHTBODY.

Witnesses:
L. W. SEELY,
F. C. GLADDEN.