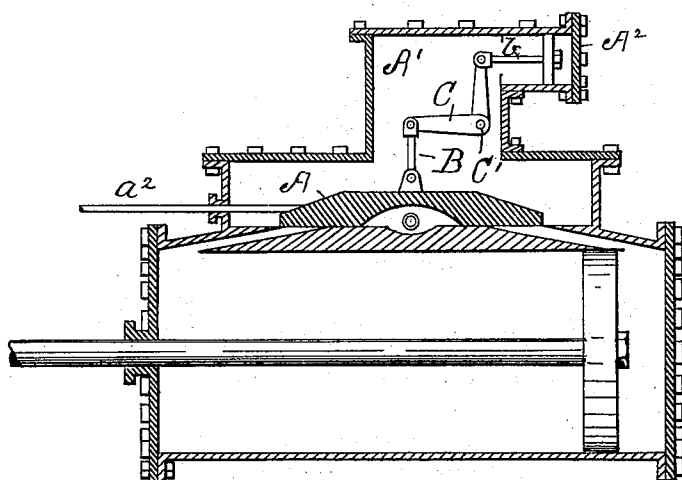


(No Model.)

E. LLOYD.
BALANCED SLIDE VALVE.

No. 513,119.

Patented Jan. 23, 1894.



Witnesses
Wm. G. Chittick Jr.
Ruford Franklin

Edwin Lloyd Inventor
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UNITED STATES PATENT OFFICE.

EDWIN LLOYD, OF HARVEY, ILLINOIS.

BALANCED SLIDE-VALVE.

SPECIFICATION forming part of Letters Patent No. 513,119, dated January 23, 1894.

Application filed January 3, 1893. Serial No. 457,177. (No model.)

To all whom it may concern:

Be it known that I, EDWIN LLOYD, a subject of the Queen of Great Britain, about to become a citizen of the United States, and a resident of Harvey, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Balanced Slide-Valves, of which the following is a specification.

My invention relates to slide valves which are balanced by means of resistance in an opposite direction, thus relieving the valve by taking the pressure caused by the steam away from the back of the valve, and it has for its object the provision of a device simple in construction, inexpensive in manufacture or application to an engine, and efficient in practical use.

To attain the desired end my invention consists in the construction and arrangement of parts first fully set forth and then pointed out in the claims.

In the drawing which is a view in vertical section of a balanced slide valve constructed according to my invention, A, represents a slide valve inclosed in a steam chest which is preferably provided with a horizontal steam cylinder A', in which works a plunger or balancing piston α , preferably working at right angles to the slide valve A, the balancing piston rod b, and the slide valve link B, being respectively pivoted to the ends of and connected by a vibrating bell crank C, journaled at C' to one or both sides of the horizontal steam cylinder A'. The relative areas of the slide valve A, and of the balancing piston α , should be equal, or in lieu thereof leverage should be allowed in the bell crank C. For instance if the horizontal end of the bell crank should be one and one half inches long, and the perpendicular end three inches the area of the balancing piston may be proportionately smaller say approximately one half that of the slide valve. The perpendicular end of the bell crank may be provided with a slot in order that in operation the balancing piston rod may at all times occupy a horizontal position. The slide valve link or lifter B, is preferably pivoted to the back of the slide valve midway of its length, although it may be rigid and the horizontal arm of the bell crank slotted, and serves to lift or relieve the slide valve A, from undue pressure against its

face or seat, by reason of the counteracting pressure of the steam against the balancing piston α . The end A² of the horizontal steam cylinder A', is provided with an air vent in order that the balancing piston may work freely. To the slide valve A, is connected a valve rod α^2 , constructed in the ordinary manner.

Great difficulty is encountered with the slide valve in present use on account of the pressure on the back of the same causing it to wear its seat, as for example when the engineer of a locomotive has a light load or is running down grade he hooks up the link and shortens the travel of the slide valve, whereas for heavy loads or going up grade the engineer throws the link down and lengthens the travel of the slide valve; thus the ordinary unbalanced slide valve in time wears its face or seat hollow, and consequently the steam flows through this opening and much fuel is wasted, which evil is obviated by the use of my invention.

With a balanced slide valve constructed according to my invention the lost motion caused by wear of the parts is taken up. Consequently the device is self-adjusting as when the parts become worn the balancing piston simply travels out a little farther. A slide valve thus balanced will work easily and smoothly on its seat without undue pressure upon the back of the same, and an engineer can reverse his engine easily with full pressure of steam on.

It is obvious that the relative positions of the slide valve and balancing piston may be varied according to the particular circumstances of their use. My balanced valve can be applied to any engine already in use at a comparatively small expense, and being simple in construction is not liable to get out of repair.

There is much less possibility of the eccentric slipping by my device as all it has to do is to move the weight of the valve, valve rod and eccentric rod to and fro.

My balanced valve reduces the friction and works easily both under high and low pressure of steam. It will be observed that the bell crank pulls against both the slide valve and balancing piston in lines approximately at right angles to their longitudinal axes, thus attaining the highest efficiency at a minimum expense.

Another advantage of my valve is that it is a great economizer of steam, as by reducing the burden of the engine—the amount of pressure on the valve each stroke—a smaller quantity of steam may be used than has hitherto been required and there is thus a great saving of fuel.

It will be observed that by my improved construction there is no weight of the piston *a* to be supported by the slide valve A, and only part of the weight of the rod connected therewith to be similarly sustained. In the old forms of balanced slide valves the pressure of the steam has to overcome the weight of the balancing piston, &c., which is a constant dead weight, and consequently the pressure against the slide valve and balancing piston will not be equal, or in the same ratio, as, the lower the pressure of steam, the greater in proportion will be the said dead weight to overcome. By the use of my horizontal steam cylinder this objection is overcome and my improved balanced valve is rendered more compact and therefore suitable for use on locomotives.

As it is evident that many slight changes in the construction and relative arrangement of parts might be resorted to without departing from the spirit and scope of my invention, I

would have it understood that I do not restrict myself to the particular construction and arrangement of parts shown and described but that I reserve the right to make such changes and that

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a steam engine slide valve and its inclosing steam chest, of a horizontal steam cylinder and of a balancing piston, and piston rod connected therewith, and of a link pivoted midway to the back of the slide valve, the said rod and link being respectively connected by a bell crank journalled within the said steam chest.

2. The combination with the slide valve A, and link B, and inclosing steam chest, and with the balancing piston *a*, and rod *b*, located within a horizontal steam cylinder, of the intermediate bell crank C.

In testimony of the foregoing specification I do hereby sign the same, in the city of Harvey, county of Cook, and State of Illinois, this 5th day of November, A. D. 1892.

EDWIN LLOYD.

Witnesses:

FRANK M. GROUT,
JASPER J. MULLIN.