(Model.)

H. OTTO & P. F. BELL.

BALANCED SLIDE VALVE.

No. 290,650. Patented Dec. 18, 1883.

Fig. 1.

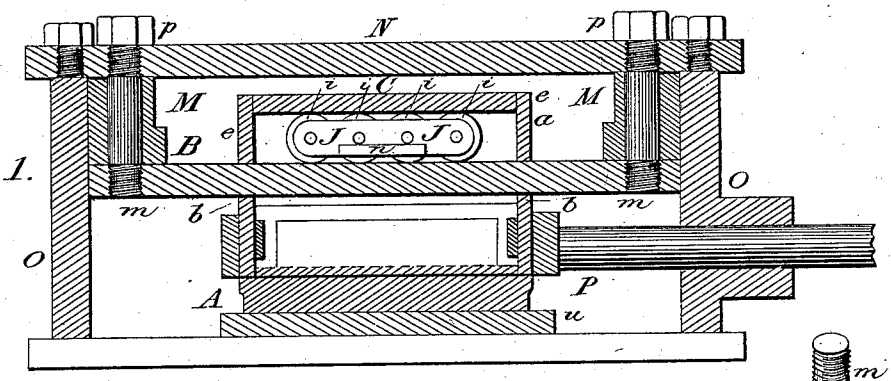
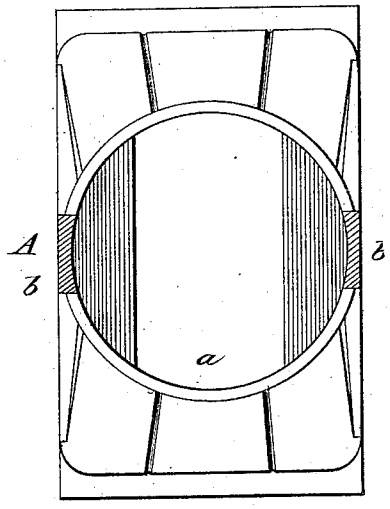


Fig. 4.



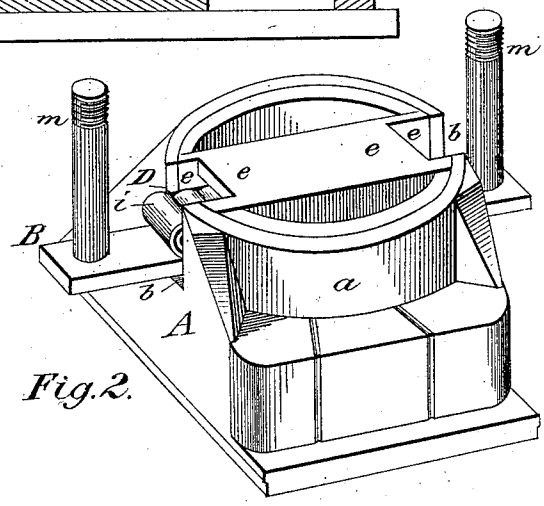


Fig. 2.

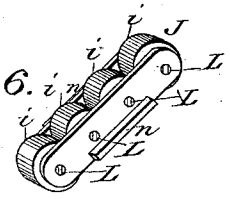


Fig. 6.

Fig. 5.

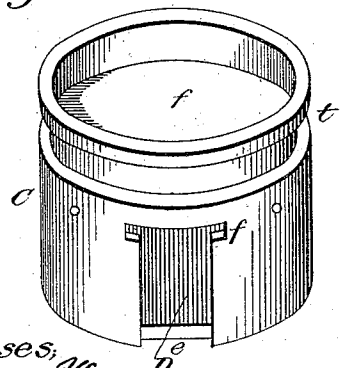
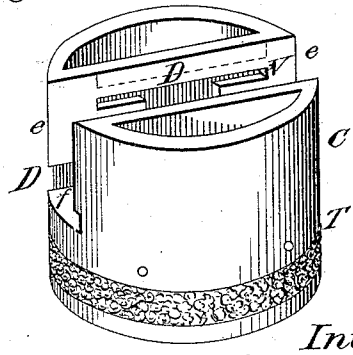


Fig. 3.



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UNITED STATES PATENT OFFICE.

HENRY OTTO AND PATRICK F. BELL, OF BLOOMINGTON, ILLINOIS.

BALANCED SLIDE-VALVE.

SPECIFICATION forming part of Letters Patent No. 290,650, dated December 18, 1883.

Application filed May 14, 1883. (Model.)

To all whom it may concern:

Be it known that we, HENRY OTTO and PATRICK F. BELL, citizens of the United States, both residing at Bloomington, in the county of McLean and State of Illinois, have invented a new and useful Improvement in Balanced Slide-Valves, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

Our invention relates to improvements in balanced slide-valves, in which the steam-pressure on the valve and valve-seat is reduced to a minimum by converting the sliding friction (to the most practical extent) into a revolving one. We attain this object by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of the entire mechanism of the slide-valve. Fig. 2 is a perspective side view of the combined active parts as they appear after the removal of the valve-seat, steam-chest, steam-chest cover, and yoke, with valve-stem. Fig. 3 is a perspective view of the piston as it appears after the removal of the cover on the tunnel. Fig. 4 is a top view of the valve only. Fig. 5 is a perspective view of the piston in an inverted position as it appears after the removal of the steam-packing. Fig. 6 is a perspective side view of the rollers with straps and pins.

Similar letters refer to similar parts throughout the several views.

The valve A is shaped on its sliding face similar to those in common use; but the upper part of it is formed into an upright cylinder, *a*, open on either end, and provided with an open passage, *b b*, from the top end downward through its front and back wall, to clear the suspended bar B, referred to hereinafter. (See Fig. 2.) The passages *b b* of the piston C is provided with a cover, *e e*, forming a tunnel or opening, D, wherein a set of rollers, *i i i i*, (three or more,) is placed, which are caused, by the travel of the valve A, to run either way on the top face of said suspended bar B, the inside top face of said tunnel D, on the piston C, bearing on the top faces of said rollers *i i i i*, so they will receive the whole steam-pressure on the top end of the piston C and transfer it to said suspended bar B. The rollers *i i i i* are connected by two outside straps, J J, with fixed pins L L L L, on which they are revolving loosely. Each strap is provided outside with a projecting shoulder, *n*, sliding in a groove, V, with an entrance from the lower end, on each of the inner side walls of said tunnel D, (see Fig. 3,) the length of said groove V being equal to the travel of said rollers *i i i i* by full stroke of the valve A, thereby securing the connection of the rollers *i i i i* and piston C. The rollers *i i i i* will travel on the suspended bar B only half the distance of the travel of the valve A, and will run without oiling. The suspended steel bar B is connected by strong studs *m m* or bolts on either end to the bottom faces of two pedestals, M M, or blocks, suspended from the inner face of the steam-chest cover N, and fastened by nuts *p p* outside. Said bar B may also be fixed to projecting shoulders on the inner walls of the steam-chest O, if preferred. The piston C has a groove, *t*, near its lower end, for the reception of the steam-packing T, and on its bottom end is formed into a cavity, reaching up to the bottom face of the aforesaid bottom plate *f*, to allow space for the exhaust-steam striking against it, thereby, with the addition of one atmospheric pressure, reducing partly the steam-pressure on top of the piston C. The suspended pedestals M M on the steam-chest cover N are of uniform breadth with the suspended bar B, to clear the passage *b b* of the cylinder *a* on the valve A. The area of the piston C ought to be equal to the three port-holes in the valve-seat *u*. The yoke P, with valve-stem, is shaped similar to the common one. Our valve is built higher than the common one; consequently the steam-chest has to be higher also, which is very favorable to work off the condensed water freely.

In repairing, if the faces of the chest and cover need replaning, the bottom ends of the suspended pedestals have to be reduced likewise, to keep the suspended bar in the same relation with the valve and piston as before.

Being both practical machinists for a number of years, we have had the opportunity to learn the results of all the different inventions for the same purpose up to the present time, thereby getting well acquainted with the peculiar faults of each of them, and we are well convinced that our invention is the only prac-

tical way to overcome all of those faults. Besides, our system is calculated for easy repair, and does not require first-class hands to put it in working order.

We are not strictly bound to parallel lines. By shaping the top surface of the suspended bar a little oval sidewise, the piston and valve will adjust themselves in case the valve-seat should be out of level sidewise, and any unevenness lengthwise will be overcome by the piston in lowering and raising itself for adjustment.

What we claim, and desire to secure by Letters Patent, is—

The combination, in a slide-valve, of a suspended fixed bar in connection with a piston in an upright central cylinder on the valve, said piston having a covered tunnel and a set of connected rollers placed within, bearing with their top faces to the inner top face of said tunnel and with their bottom faces to the top face of said bar, governed by the motion of the valve, substantially as shown, for the purpose specified.

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