

(No Model.)

I. YOUNGER.
BALANCED SLIDE VALVE.

No. 579,691.

Patented Mar. 30, 1897.

Fig. 1.

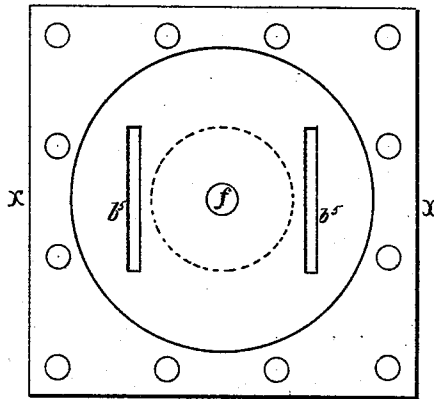
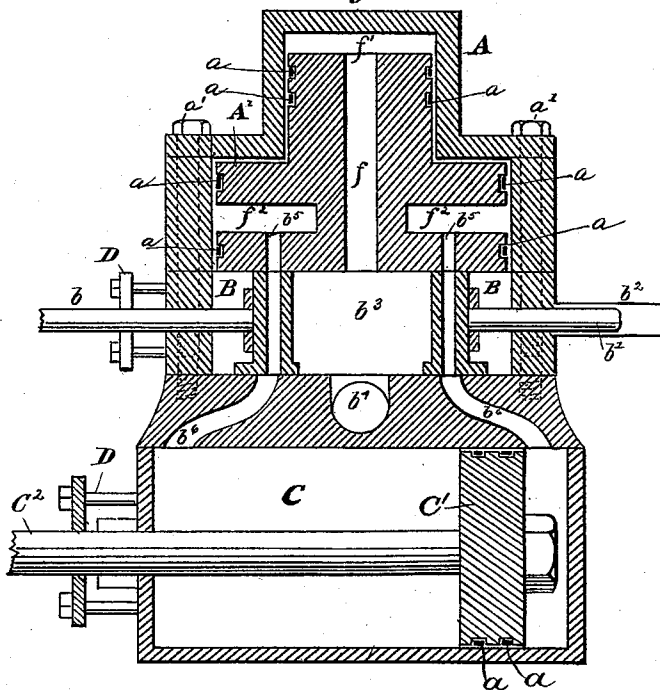


Fig. 2.



Witnesses

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ISAAC YOUNGER, OF LOUISVILLE, KENTUCKY.

BALANCED SLIDE-VALVE.

SPECIFICATION forming part of Letters Patent No. 579,691, dated March 30, 1897.

Application filed August 23, 1895. Serial No. 560,220. (No model.)

To all whom it may concern:

Be it known that I, ISAAC YOUNGER, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Balanced Slide-Valves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of my invention is to provide means whereby, first, steam is so introduced as to maintain economical transmission to the cylinder; second, the slide-valve is maintained in a perfect balance; third, proper equalization of pressures is produced on either side of the piston at predetermined points in the stroke of the latter, thereby increasing the efficiency and saving expense by these several economies. I accomplish this by the means illustrated in the accompanying drawings and hereinafter described, and specifically set forth in the claims.

In the drawings, Figure 1 is a bottom plan view of my valve-balancer. Fig. 2 is a sectional view of my balancer through a line from *x* to *x* in Fig. 1, showing its relations to the valve, steam-chest, and cylinder when in position.

C designates the cylinder, to the top of which is secured a case A by bolts *a'*, having threads on their lower ends.

C' designates the piston-head, C² the piston-rod, and D D packing-boxes.

The upper wall of cylinder C has inlet and outlet ports *b⁶ b⁶* near its opposite ends, leading from and to the interior of case A, and also has a main supply-port *b⁴*, which is in open and direct communication with a chamber *b³*, formed in a slide-valve B, which latter reciprocates in the valve-chest B', forming the lower end of case A, and has passages *b⁷ b⁷* at its opposite ends. This valve is also provided with a stem *b⁶* and a guide *b⁷*, which latter is received by a shield *b³*.

A' designates the head of a balancing-piston for the slide-valve, and said balancing-piston is located in the upper part of said case A. It is made steam-tight within the case, except at its top, by packing-rings, and its lower end is of greater diameter than its

upper part, the case being correspondingly shaped, as shown. It is of such size relative to the case as to leave a steam-chamber *f'* above it. Through its center is formed a circular opening *f*, affording communication of said chamber *f'* with the chamber *b³*, formed in the slide-valve.

Around the larger lower half of said balancing-piston is cut a groove—rectangular in cross-section—forming a steam-chamber *f²*, and extending from said chamber to the bottom of the piston are steam-ports *b⁵*, which are adapted to open communication at a predetermined point in the stroke of the slide-valve between passages *b⁷* in the slide-valve and said chamber *f²*.

The operation of my device when placed in position for work is as follows: The first steam admitted enters directly into the valve through the supply-port *b⁴* and passes upward through chamber *b³* in said valve and passage *f* in the balancer proper to the steam-space *f'* above said balancer, and keeps the latter down on the valve, thereby preventing the live steam from leaking from the inside of the valve into the steam-chest. The steam that now enters the valve will pass through the passage *b⁶* at one side of the cylinder (which has been uncovered by the movement of said valve) and operate upon the piston with maximum power, and the steam in the space at the other side of said cylinder flows into the steam-chest B' through the port *b⁶* at said side and thence exhausts into the atmosphere through an exhaust-pipe. (Not shown.) Thus it will be observed that the steam is taken into the valve, flows thence into the cylinder, and exhausts into the steam-chest, and that the balancer is held down upon the valve by a pressure of steam. When the piston is near the limit of its stroke in either direction, the valve will for an instant be in the position shown in Fig. 2 and will open up communication of the chamber *f²* in the balancer with the cylinder C at both sides of the piston-head. At this instant the steam will rush from the cylinder by way of one of the ports *b⁶* into and through one of the openings through the valve and thence into the chamber *f²*, through which it flows to the other side thereof and back into the cylinder through the passages and ports in the balancer, valve, and cylinder-wall, en-

tering said cylinder at the end thereof remote from that which it left. This passage thus formed is for the purpose of leading the residue of the steam from one side of the
 5 piston to the other side thereof in order to equalize the pressure at predetermined points in the strokes of the piston.

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

1. The combination of a steam-chest, having a steam-inlet, a balancer in said chest, of such size relative thereto as to provide a steam-space above it, said balancer having a longitudinal passage open at one end to said steam-space and being also formed with a chamber
 15 having steam inlet and outlet, the cylinder having ports at its opposite ends, the piston in said cylinder, and the slide-valve, having
 20 a chamber into which the steam-inlet opens directly and also having steam-passages at opposite sides of said chamber, substantially as described.

2. The combination of a steam-chest, having a steam-inlet, a balancer in said chest of such size relative thereto as to provide a steam-

space above it, said balancer having a steam-passage opening at one end into said steam-space and also being formed with a chamber having steam inlet and outlet, the cylinder
 30 having ports at its opposite ends, and the slide-valve for controlling entrance and exit of steam to and from said cylinder and balancer.

3. The combination with the cylinder having ports at its opposite ends, and the slide-valve, having passages near its opposite ends, of a balancer for said valve, having a chamber in its interior and being formed with passages, substantially as described, whereby a
 40 continuous passage from the space in the cylinder at one side of the piston to the space therein at the other side therein is formed at predetermined points in the movements of said slide-valve and piston, as specified. 45

In testimony whereof I affix my signature in presence of two witnesses.

ISAAC YOUNGER.

Witnesses:

JNO. B. TILFORD,
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