(No Model.)

T. H. BOURKE.

BALANCED SLIDE VALVE.

No. 375,724. Patented Jan. 3, 1888.

Fig. 1.

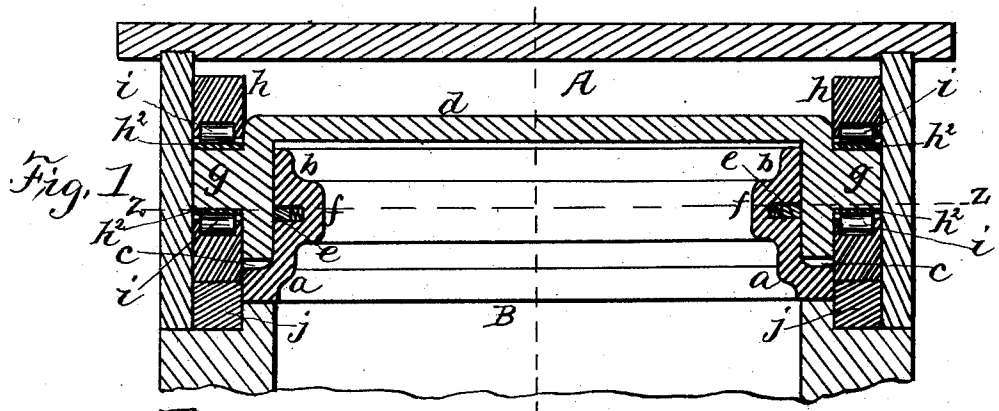


Fig. 2.

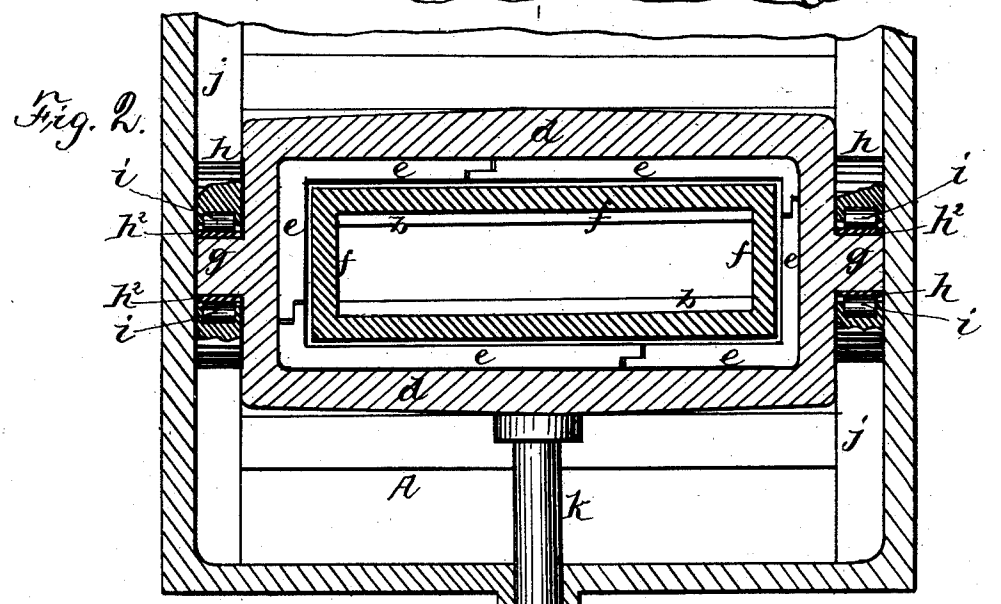


Fig. 3.

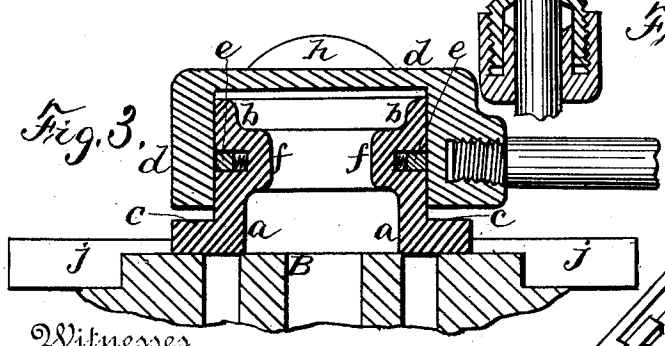


Fig. 4.

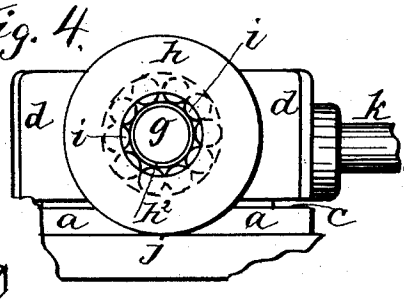
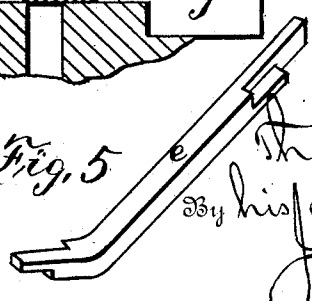


Fig. 5



Witnesses

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UNITED STATES PATENT OFFICE.

THOMAS H. BOURKE, OF CLEVELAND, OHIO.

BALANCED SLIDE-VALVE.

SPECIFICATION forming part of Letters Patent No. 375,724, dated January 3, 1888.

Application filed March 15, 1887. Serial No. 231,001. (No model.)

To all whom it may concern:

Be it known that I, THOMAS H. BOURKE, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented new and useful Improvements in Balance Slide-Valves for Steam-Engines, of which the following is a specification.

My invention relates to balanced valves for steam-engines in which the excessive pressure is relieved from the top of the valve by means of a covering-yoke mounted upon rolling supports and controlling the movements of said valve. I have so improved this particular type of engine-valve as to render it more effective, less liable to get out of order, to render it more durable, and to reduce the friction of its rolling supports. The precise improvements to which these advantages are due I will describe and specifically make the subject of my claims.

Referring to the drawings, Figure 1 represents a vertical section of the steam-chest with my improved valve, the section being taken through the rolling supports of the valve-controlling yoke and at right angles with the center line of the engine. Fig. 2 is a horizontal section taken on the line *z z* of Fig. 1, showing the sectional packing for the valve and its controlling-yoke. Fig. 3 is a vertical cross-section of the valve and its controlling-yoke, taken parallel with the engine, and showing the valve-seat ports in partial section. Fig. 4 is a side view of the valve-controlling yoke and its rolling support, and Fig. 5 is a detail of the metallic sectional packing for the valve.

The steam-chest A and its valve-seat B are of the ordinary construction for slide-valves working with the usual steam and exhaust ports.

The valve *a* is formed of a skeleton rectangular metal frame, *b*, and is therefore open all around the inner vertical walls of the frame, like a picture-frame, while its seat-forming surface is extended all around from its outer walls to form lips or horizontal surfaces *c*, extending into the steam-chest to receive only sufficient pressure of the live steam to maintain a proper seating of the valve in relation to the seat-ports.

The yoke *d* is of a form corresponding with the valve, and fits loosely over and covers the upper portion of the valve, but does not rest upon it. The joint between the vertical walls of the valve and its covering-yoke is rendered steam-tight by a packing, *e*, made of sectional interlocking strips, preferably of cast-iron, joined with break-joints, as shown in Figs. 2 and 5, and which is constantly pressed out against the inner walls of the yoke by springs. For this purpose the vertical walls of the valve are formed with an interior thickened part or rib, *f*, to form a groove surrounding and opening at the outer walls of the valve to receive said packing. This packing is also set out by the steam behind it and cuts off all pressure and leakage of the steam in the chest from the top and from the interior of the valve. The jointing of the packing-strips may be formed by double laps, as shown in Fig. 5, or in any suitable manner that will form a close joint and compensate for wear. The yoke is preferably made of cast-steel, with trunnions *g* on its ends in line centrally with the valve at right angles to its rod, and upon these trunnions are placed wheels *h*, preferably of steel, fitting closely between the inner walls of the steam-chest and the outer walls of the valve-yoke. The bearing-surfaces of these trunnions I prefer to form of steel thimbles h^2 and the bearing-surfaces of the wheels I prefer to form of steel rolls *i*, seated in a groove formed within and around the eye of the wheel. Steel ways *j* are seated in the steam-chest for the rolling supports of the valve-controlling yoke, and it is by this construction of ways for the wheels and journal-bearings for the latter that the friction and wear are reduced to a minimum and the parts need no oiling.

The valve-rod *k* is screwed into a hub on the side of the valve-controlling yoke and passes through the stuffing-box of the steam-chest, and, as the valve-controlling yoke is held upon its ways by the pressure of the steam in the chest, the valve-rod will work in a straight line and be independent of the valve, which is free to rise and to maintain its seating, as stated, producing a valve working comparatively free of the pressure of the steam in the chest.

The freedom of the valve for vertical movement independent of its connecting-rod and of its covering-yoke prevents all accidents from compression in or back-pressure from the en-

gine, because the valve is always free to relieve the latter, which would not be the case if the valve and its rod were rigidly connected.

Between the open top of the valve and the closed top of its controlling-yoke there is sufficient space to allow the valve to rise from its seat within the yoke, and connecting the latter rigidly to the valve-rod gives the advantage of using only one set of rolling supports for the yoke, and the latter is prevented from tilting upon such supports.

I claim—

1. In a slide-valve for steam-engines, the combination of the open-frame valve, the covering-yoke having the integral trunnions *g*, arranged in line centrally lengthwise of the valve, and the supporting-wheels, all constructed and arranged as shown and described.

2. The combination of the steam chest, the open-frame slide-valve, the covering-yoke having integral trunnions provided with steel thimbles h^2, the supporting-wheels, the bearing-rolls *i*, and the steel ways *j*, all arranged as shown and described.

3. The combination of the slide-valve, of open rectangular form, the covering-yoke, the supporting-wheels for the latter, and the packing-strips of angular form, having interlocking ends, all constructed and arranged as shown and described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

THOMAS H. BOURKE.

Witnesses:
S. Q. KERRUISH,
JNO. T. BOURKE.