F. B. RICE.

VALVE-MOTION FOR STEAM-ENGINES.

No. 194,535. Patented Aug. 28, 1877.

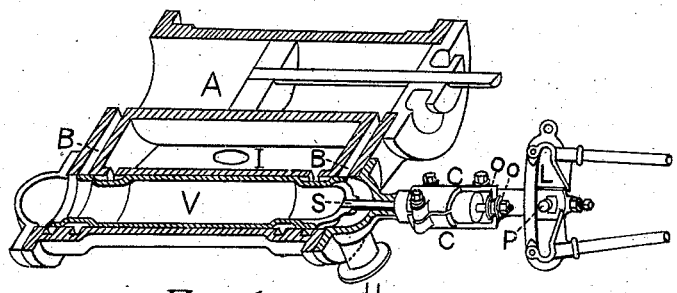

Fig. 1

Fig. 2

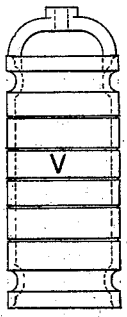

Fig. 3

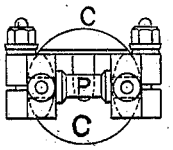

Fig. 4

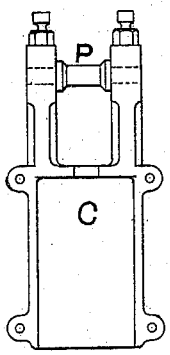

Fig. 5

Witnesses;

H. G. Watson

S. Hussey

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Fred B. Rice

UNITED STATES PATENT OFFICE.

FRED B. RICE, OF DUNKIRK, NEW YORK, ASSIGNOR TO MRS. M. J. TURRELL, OF SAME PLACE.

IMPROVEMENT IN VALVE-MOTIONS FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **194,535**, dated August 28, 1877; application filed June 30, 1877.

To all whom it may concern:

Be it known that I, FRED B. RICE, of Dunkirk, in the county of Chautauqua and State of New York, have invented certain new and useful Improvements in Valve-Motion for Steam-Engines, which improvements are fully set forth in the following specifications, reference being had to the accompanying drawings.

The objects of these improvements are to make an easily-moving valve and slide, cheap to construct, that will endure the hard usage incident to reversing the engine by a line from a distance, and that will be economical of steam.

In many engines now in use the valves are unbalanced. Little or no regard is paid to the exposure of the cylinder to exhaust steam. It is also a universal custom to use stuffing-boxes on the valve-stems, which add to the resistance of the valve, and consequently to the difficulties of reversing engines from a distance, all of which tend to wastefulness of steam, and trouble in handling.

Another serious fault in the common valve-motion is the arrangement of guides for the end of valve-stem. As generally constructed, severe strains are brought upon the slender stem, which not only keep stuffing-boxes leaky, but strain and often break the valve-stems when the engine is reversed, by throwing over a link.

My invention tends to obviate these faults, as will be seen by reference to the drawings.

Figure 1 shows a section through center of cylinder, steam-chest, and valve; Fig. 2, enlarged end view of valve; Fig. 3, enlarged side view of valve; Fig. 4, end view of the clamps that carry the valve-stem pin; and Fig. 5, top view of same.

The cylinder A is made in one piece with the steam or valve chest. The steam-chest is bored parallel with the main cylinder. The valve V is fitted practically tight inside of the chest, and is alike all around. The ports in the steam-chest also pass entirely around its inner circumference. The valve has a yoke or cross-piece at one end, to which is attached the stem S.

The valve is made as thin as practicable, and the passage through it is large enough to allow free passage for the exhaust steam. In addition to being very light, the valve has an unusually large bearing-surface, obtained by making the valve full size the entire length, except where the steam is admitted at each end. The head H is turned to fit the end of valve-chest, and has a strong projection on its outer side, which is turned parallel outside, and carries the clamps C C, while it is accurately reamed inside to carry the valve-stem. This head has a branch on its lower side for exhaust-pipe connection.

The clamps C are bored or lined, to fit the projecting end of the head H. They are free to turn around it, and to slide lengthwise over it. The two parts are held together by bolts, arranged in pairs, under the nuts of which are rubber washers and caps, designed to yield when a shock is received from either above or below on suddenly reversing the link.

The link and eccentric hooks are carried by the pin P in the end of lower clamp. Near the middle of the lower clamp is a slotted bridge, over which the collars O O on the valve-stem fit. The bridge is free to move between the collars in any direction, except that of the valve-motion, thereby relieving the end of valve-stem of any shocks or strains occasioned by reversing the link, or from any strains except those in the direction of its length. In fact, the projecting head receives without injury the strains and knocks that usually fall upon the valve-stem.

The long bearing of the stem in the head prevents the leakage of any steam through it, and obviates the necessity of a stuffing-box.

The steam is admitted to the valve through the opening I, and fills the space between the cylinder and valve-chest, generally filled with exhaust steam.

The movements of the valve are directly opposite to that of the common slide-valve. The exhaust on escaping from the cylinder is separated from it at the end of the passages B B, and passes through the valve and head to the exhaust-pipe, thus reducing the contact of exhaust to a very small surface at each

end of valve-chest, no part whatever of the outside of cylinder being exposed to it.

Thus it will be seen that this arrangement is economical of steam, not likely to get out of order, costs little, and moves with the very least amount of frictional resistance.

I do not claim to be the original inventor of round valves, nor of round guides for valve-stems, nor of valves arranged to work with exhaust-pressure only on the valve-stem; but

I claim as my invention—

1. The combination of clamps C C, the head H, and the valve-stem S, with its collars O O, substantially as set forth.

2. The combination of the clamps C C, the head H, the valve-stem, the pin P, and the link L, substantially as set forth.

FRED B. RICE.

Witnesses:
H. G. WATSON,
S. HUSSEY.