

A. W. HARRIS.

Improvement in Steam Engine Valves.

No. 124,817.

Patented March 19, 1872.

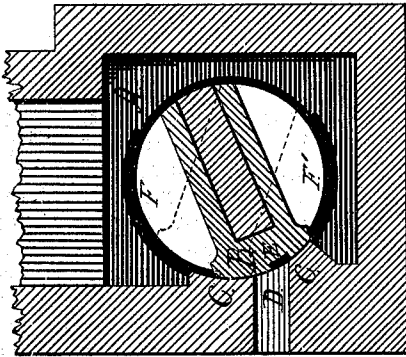


FIG. 1.

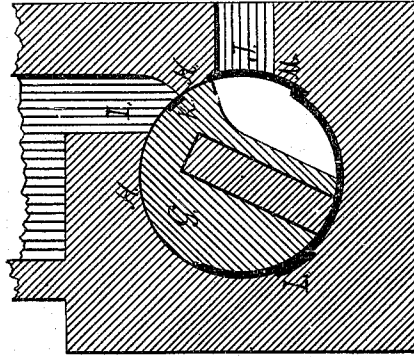


FIG. 4.

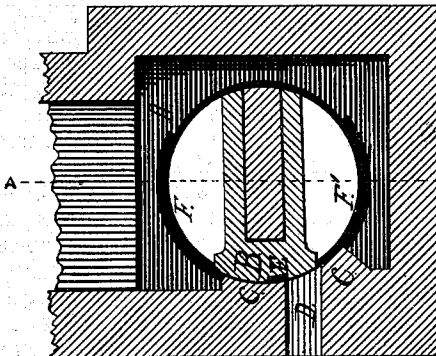


FIG. 2.

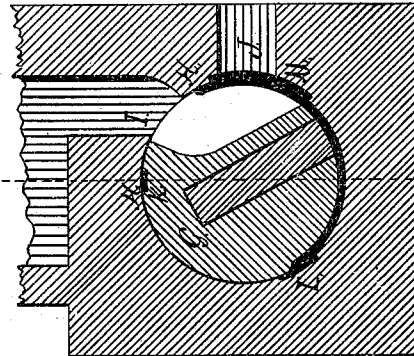


FIG. 5.

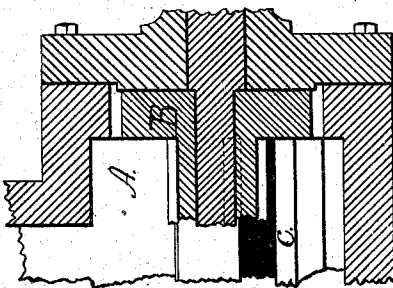


FIG. 3.

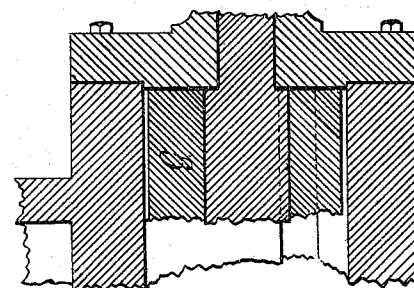


FIG. 6.

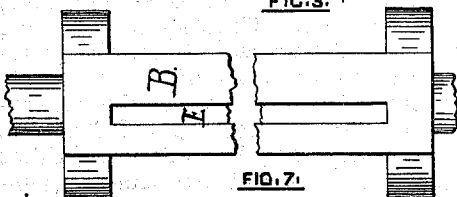


FIG. 7.

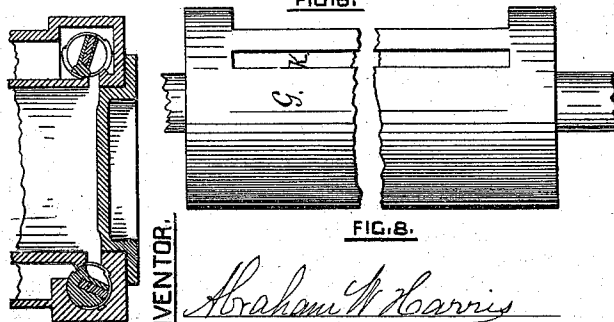


FIG. 8.

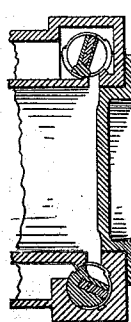


FIG. 9.

WITNESSES:

*Walter B. Vincent*  
*John F. W. Taylor*

INVENTOR:

*Abraham W. Harris*

# UNITED STATES PATENT OFFICE.

ABRAHAM W. HARRIS, OF PROVIDENCE, RHODE ISLAND.

## IMPROVEMENT IN STEAM-ENGINE VALVES.

Specification forming part of Letters Patent No. 124,817, dated March 19, 1872.

*To all whom it may concern:*

Be it known that I, ABRAHAM W. HARRIS, of the city and county of Providence, in the State of Rhode Island, have made certain new and useful Improvements in "Steam-Engine Valves;" and I do hereby declare that the following specification, taken in connection with the drawing making a part of the same, is a full, clear, and exact description thereof.

Figure 1 is a longitudinal vertical section through upper valve-box. Fig. 2 is a longitudinal vertical section, showing valve about to open. Fig. 3 is a horizontal section of Fig. 2 on line A B. Fig. 4 is a vertical section through lower box. Fig. 5 is a vertical section through lower box, showing valve open. Fig. 6 is a horizontal section of Fig. 5 on line B C. Fig. 7 is a bottom view of upper valve, showing slot. Fig. 8 is a bottom view of lower valve, showing slot. Fig. 9 is a long vertical section through cylinder, &c., of engine, showing valves in position.

The object of my invention is to so construct the valves and their seats that the ridges usually formed upon their wearing-surfaces by the constant action of the former will be entirely avoided; and consists in the recessing of the steam and exhaust valves and their seats, in the manner hereinafter described.

To illustrate my invention I will take the construction of the induction and eduction valves of the "Corliss engine" and their seats. These valves are four in number, the two at the top of the cylinder being the steam-valves, and serving both as induction and cut-off valves, and the two at the bottom of the cylinder being the eduction or exhaust valves. These valves are circular, and have an oscillating or rolling motion imparted to them by a single eccentric through the intervention of levers. The stems of these valves oscillate on fixed bearings in the front and back "bonnets" of their respective valve-chests, and have keyed to them, upon the outside, short levers, which connect them with the wrist-plate, motion being imparted to the wrist-plate by the eccentric.

It is well understood that the constant forward and backward motion of the valves upon their seats will in a short time, by wearing away that portion of the seats over which they actually pass, leave at the points where their

movements cease a ridge upon the seat, as well as upon the valve at a point in its wearing-surface near the opening edge of the port. These ridges make it necessary to "turn off" the valves and bore out the seats whenever it is desired to alter the connections—such alterations involving much delay and expense—otherwise the valves will be thrown up by these ridges and separated from their seats, thus allowing the steam to blow under, the effect of which it is not necessary for me to describe.

My invention, which is particularly adapted to what is known as the "Corliss engine," and in connection with which I will now proceed to describe it, is intended to provide against the possibility of wearing ridges upon the valves or seats, and, consequently, the unsatisfactory results arising therefrom.

In the drawing, Figures 1, 2, 3, and 7, which represent the steam or induction valves, A is the valve-box, B the valve, C the valve-seat, and D the port. The valve B is constructed with a recess, E, running the entire length of the port, and the valve-seat C with two recesses, F and F', both running its entire length.

The operation of this portion of my invention is as follows: Commencing with the valve B closed, as shown in Fig. 1, it will be seen that, as it moves toward the position indicated by the dotted lines and opens the port, it will, before reaching its extreme throw in that direction, run off its seat a portion of its width and overlap the recess F; and again, upon resuming its former position, it will run off and also overlap a portion of the recess F'; at the same time the recess E of the valve will overlap the opening edge of the port D.

In Figs. 4, 5, 6, and 8, which represent the exhaust or eduction valves, G is the valve, H the seat, and I and J the ports. The valve G is provided with a recess, K, and the valve-seat with two recesses, L and M.

The operation of this portion of my invention is as follows: Commencing with the valve closed, as shown in Fig. 4, it will be seen that the recess K in the valve G overlaps the opening edge of the port I; and when the valve has attained its extreme throw in the opposite direction, as shown in Fig. 5, it will be found that the valve has run off its seat and slightly overlaps the recess L; and again, upon its re-

suming its former position, as shown in Fig. 4, it will run off and overlap a portion of the recess M.

Thus, by recessing the valves and seats, as herein described, so that the valves at their extreme throw each way will run off their seats, the formation of ridges is effectually prevented.

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

I claim as my invention the within-described recesses in the valves and valve-seats of steam-engines, which conjointly operate with each other substantially as and for the purpose set forth.

ABRAHAM W. HARRIS.

Witnesses:

WALTER B. VINCENT,  
JOHN D. W. TAYLOR.