J. W. Carhart,

Rotary Steam Valve.

No. 48,902. Patented July 25, 1865.

Fig 3.

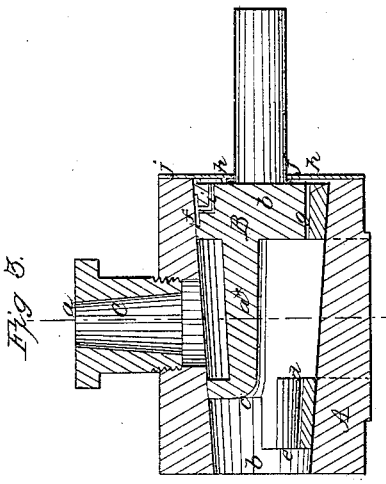


Fig 5.

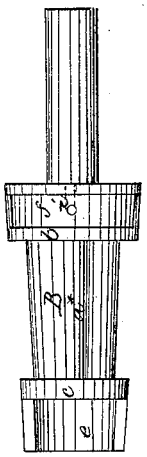


Fig 7.

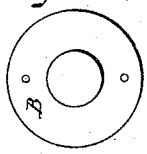


Fig 6.

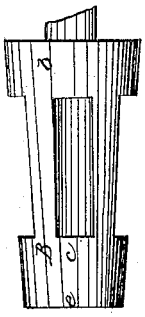


Fig 2.

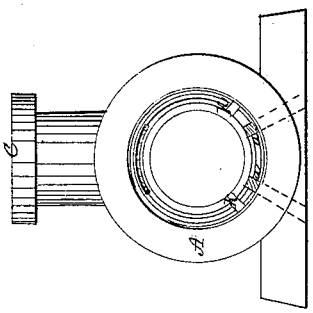


Fig 4.

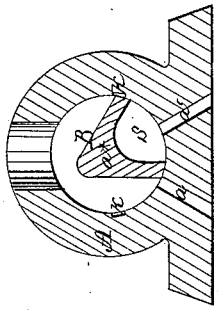


Fig 8.

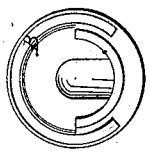


Fig 11.

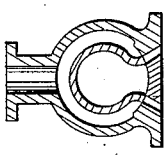


Fig 1.

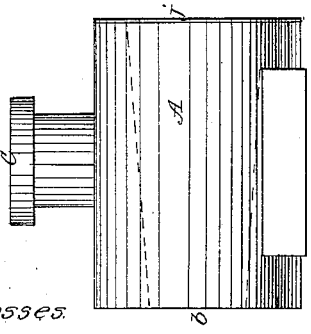


Fig 9.

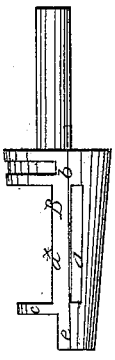
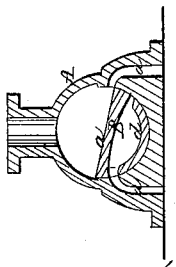


Fig 10.



Witnesses.

Theo Lusch

Wm Freiwin

Inventor.

J. W. Carhart

By Munn & Co Atty

UNITED STATES PATENT OFFICE.

J. WESLEY CARHART, OF COHOES, NEW YORK.

IMPROVEMENT IN VALVES FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **48,902**, dated July 25, 1865.

To all whom it may concern:

Be it known that I, J. WESLEY CARHART, of Cohoes, in the county of Albany and State of New York, have invented a new and Improved Steam-Valve; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a side elevation of the shell of my valve. Fig. 2 is an end view of the same. Fig. 3 is a longitudinal central section of the shell with the valve in position. Fig. 4 is a transverse vertical section of the same, the line *x x*, Fig. 3, indicating the plane of section. Fig. 5 is a plan or top view of the valve detached. Fig. 6 is an inverted plan of the same. Fig. 7 is an end view of the same, presenting its large end. Fig. 8 is an end view of the same, presenting its small end. Fig. 9 is a side elevation, and Figs. 10 and 11 transverse sections, of modifications of the valve.

Similar letters of reference indicate like parts.

This invention relates to certain improvements in conical plug-valves of that class on which a patent has been granted to me November 29, 1864, and which work in corresponding sockets, having an oscillating motion imparted to them by some suitable mechanism.

The object of the invention is to arrange the valve so that it is balanced in any pressure to which it may be exposed, and that it is kept in its seat by the action of the steam itself in such a manner that it will work free and easy under the heaviest pressure to which it may be exposed, and yet be perfectly steam-tight.

The improvements which form the subject-matter of this present invention consist in the application of a bearing-surface below or opposite the abutment of the valve for the purpose of balancing the upward pressure on said abutment; also, for the same purpose, in the use of a lip extending from the small end of the valve and of a recess in the large end to which steam is admitted through suitable channels farther in a recess or recesses in the socket above the valve or on the exhaust side of the abutment, so that the valve swings beyond the edge or edges thereof, thereby preventing it from wearing the shoulder; also, in thinning the valve at the exhaust side or thickening it at the steam-space side for the purpose of giving lead to the exhaust; finally, in a chamber in the large end of the valve for the purpose of keeping the valve in its seat by means of steam admitted to said chamber.

A represents the steam chest or socket, into which the valve B is fitted, as shown in Figs. 3, 4, and 10. Said socket communicates through ports *a a'* with the opposite ends of the cylinder, and steam is admitted to it at the small end *b*.

C is the exhaust-port.

The valve B is either shaped as shown in Figs. 5, 6, 7, and 8, or it may be constructed as shown in Figs. 9 and 10. In the latter case the abutment *a*, which forms the partition between the steam and the exhaust ports, is straight or slightly curved. In the former case said abutment is V-shaped or arched, and I will now proceed to describe this latter valve.

The abutment *a* forms the connection between the thick part or head *b* and the thin part *c* of the valve, and steam is admitted through the thin end under the abutment. The upward pressure of the steam on the abutment is partially balanced by a bearing-surface, *d*, below, and it is further balanced by a lip, *e*, which extends from the thin end of the valve, as clearly shown in Figs. 3 and 5 of the drawings. The bearing-surface *d* below the abutment, however, is shown more fully in Figs. 9 and 10, and will be further referred to in the description of said figures.

At the large end of the valve C the upward pressure of the steam on the abutment is balanced by a recess, *f*, in the head *b*. This recess communicates with the steam-space below the abutment through a channel, *g*, chamber *h*, and channel *i*, as shown in the drawings. The chamber *h* is formed between the thick end of the valve and the head *j* of the socket or steam-chest, and by the action of the steam contained in said chamber the valve is adjusted in its seat so that it works steam-tight and without friction.

In order to prevent the valve from wearing a shoulder in the socket, I provide the latter with two recesses, *k*, as shown in Figs 2 and 4 of the drawings, and I make the valve swing beyond the inner edges of these recesses. If

desired, these recesses may be continued so that the same form one continuous recess extending over the abutment, and in practice this arrangement may be preferable.

When the valve is formed as shown in Figs. 9 and 10 the bearing-surface *d* extends from the head *b* clear through to the thin part of the valve, and in this case the communications between the steam-space of the valve and the steam-ports is formed as shown in Fig. 10. In order to give lead to the exhaust I thicken the abutment on the steam-space side, or thin it on the exhaust side, as shown in Figs. 4 and 10.

A valve constructed according to this invention actually floats in the steam and works equally free and easy in a heavy or in a light pressure. It is easily fitted into its socket, and readily kept tight.

The whole valve is light, cheap, and compact, and can readily be attached to large or small cylinders.

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

1. The lip or projection *e*, extending from the small end of the valve, as and for the purpose set forth.

2. The recess *f*, located in the head *b* of the valve, and communicating with the steam-space of the valve through suitable channels, substantially as and for the purpose described.

3. The chamber *h*, located in the socket A above the thick end of the valve, substantially as and for the purpose specified.

4. The unequal thickness of the abutments on the steam and exhaust side, whereby to give lead to the exhaust.

5. The recess or recesses *k* in the socket, in combination with the valve, substantially as and for the purpose described.

J. WESLEY CARHART.

Witnesses:
E. G. MUSSEY,
W. FRANK JONES.