(No Model.)

W. S. HUGHES.

STEAM PISTON VALVE.

No. 260,985. Patented July 11, 1882.

Fig. 1.

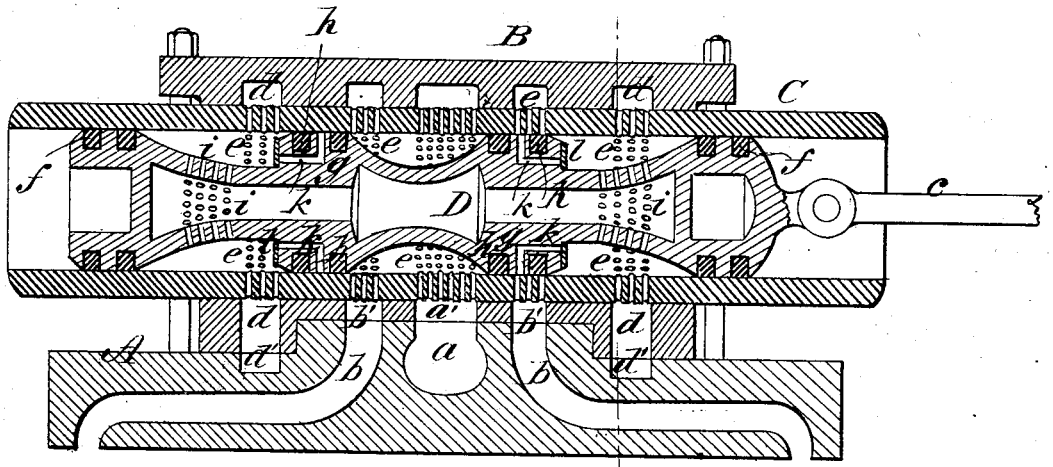


Fig. 3.

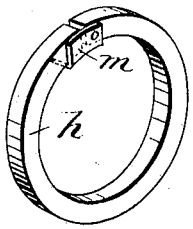
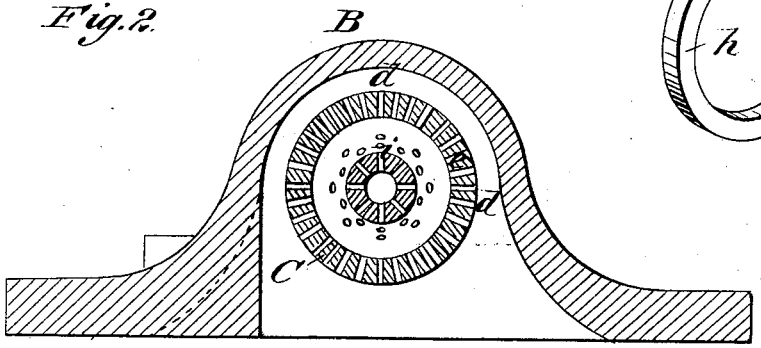


Fig. 2.



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WILLIAM S. HUGHES, OF LONG ISLAND CITY, NEW YORK.

STEAM PISTON-VALVE.

SPECIFICATION forming part of Letters Patent No. 260,985, dated July 11, 1882.

Application filed December 1, 1881. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. HUGHES, of Long Island City, Queens county, New York, have invented a new and Improved Steam-Valve, of which the following is a full, clear, and exact description.

My invention consists in a certain construction of a noise-reducing balanced slide-valve working steam-tight in its case, and thereby dispensing with the usual stuffing-box and gland, as hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a longitudinal section of my improved valve and case. Fig. 2 is a cross-section of the valve, and Fig. 3 is a perspective view of one of the packing-rings.

A represents one side of the engine-cylinder, formed with exhaust-port *a* and steam-ports *b b*.

B is the valve-case, cored longitudinally.

C is a tube fixed in the case to form a seat for the valve; and D is the valve, formed as a hollow piston, to one end of which the rod *c* is directly jointed.

The case B is formed with side flanges, by which it is bolted to the cylinder, and is formed with ports *a' b'*, corresponding to the steam and exhaust ports of the cylinder, such ports being connected by internal grooves on the case, which allow passage of the steam around the tube C. The case is also formed with ports and grooves *d* near the ends, corresponding to recesses *d'* in the cylinder, which receive the steam from the boiler.

The tube C projects at its ends outside of case B to give length for the movement of the valve, and within the case is formed with annular rows of perforations *e* in line with the ports *a' b' d* of the case, to allow the free passage of the steam.

The valve D is provided at its ends with packing-rings *f f*, which work steam-tight against the inner surface of tube C. Between its packed ends the valve is made with two annular flanges, *g g*, that are packed by rings *h h*, set in grooves to work steam-tight against the inner surface of the tube. The rings *h* form the admission and cut-off edges, and are of a width to cover the perforations *e* and give the required lap. The recessed space between the two flanges *g* is of a width to lap from the exhaust to either steam-port, and thereby establish communication between them.

The valve D has perforations *i* near each end, so that steam from either port *d* may pass through the valve to ports *a b*. When there are two ports *d* connecting with the boiler the perforations *i* are not essential; but with only one steam-connection they are required.

By the piston-valve D working steam-tight externally of the steam-chest, stuffing-boxes and glands are dispensed with and the rod is connected externally to the valve, so that a yoke is not required. There is also no pressure on the valve-rod, as it is external to the steam-spaces. The valve is perfectly balanced, and the exhaust-steam, being carried through perforations, is regulated so that the noise is reduced on the principle of similar arrangements shown in Letters Patent heretofore issued to me.

To relieve compression when the engine is running without steam, the flanges *g* are formed with apertures *k*, that connect the steam and exhaust spaces. At the steam side the apertures *k* are covered by rings *l*, which allow escape of compressed air from the cylinder when steam is cut off.

The packing *f h* are preferably metallic rings split to allow of their expansion, and covered at their split ends with L-shaped strips *m*, as shown in Fig. 3. These strips *m* are attached to one end of the packings and lap upon the other end, so that the spaces between the ends are rendered steam-tight.

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

1. The combination, with the tube C and the case B, having steam and exhaust passages, of the hollow piston-valve D, having enlarged packed ends, and provided with the intermediate annular flanges, *g*, forming a space between them and spaces between them and the ends, substantially as and for the purpose set forth.

2. The piston-valve D, formed between its packed ends with steam and exhaust cavi-

ties, and the tube C, formed with perforations *e*, in combination with the case B, formed with the connected ports *a' b' d*, substantially as shown and described.

3. The combination of case B, having steam-ports *b' d* and exhaust-port *a'*, tube C, apertured to correspond with the steam and exhaust ports of the case, and the hollow piston-valve D, formed with steam and exhaust cavities and with perforations *i*, substantially as described, for operation as set forth.

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