(No Model.)

H. H. WESTINGHOUSE.

PISTON VALVE.

No. 303,084. Patented Aug. 5, 1884.

Fig. 1.

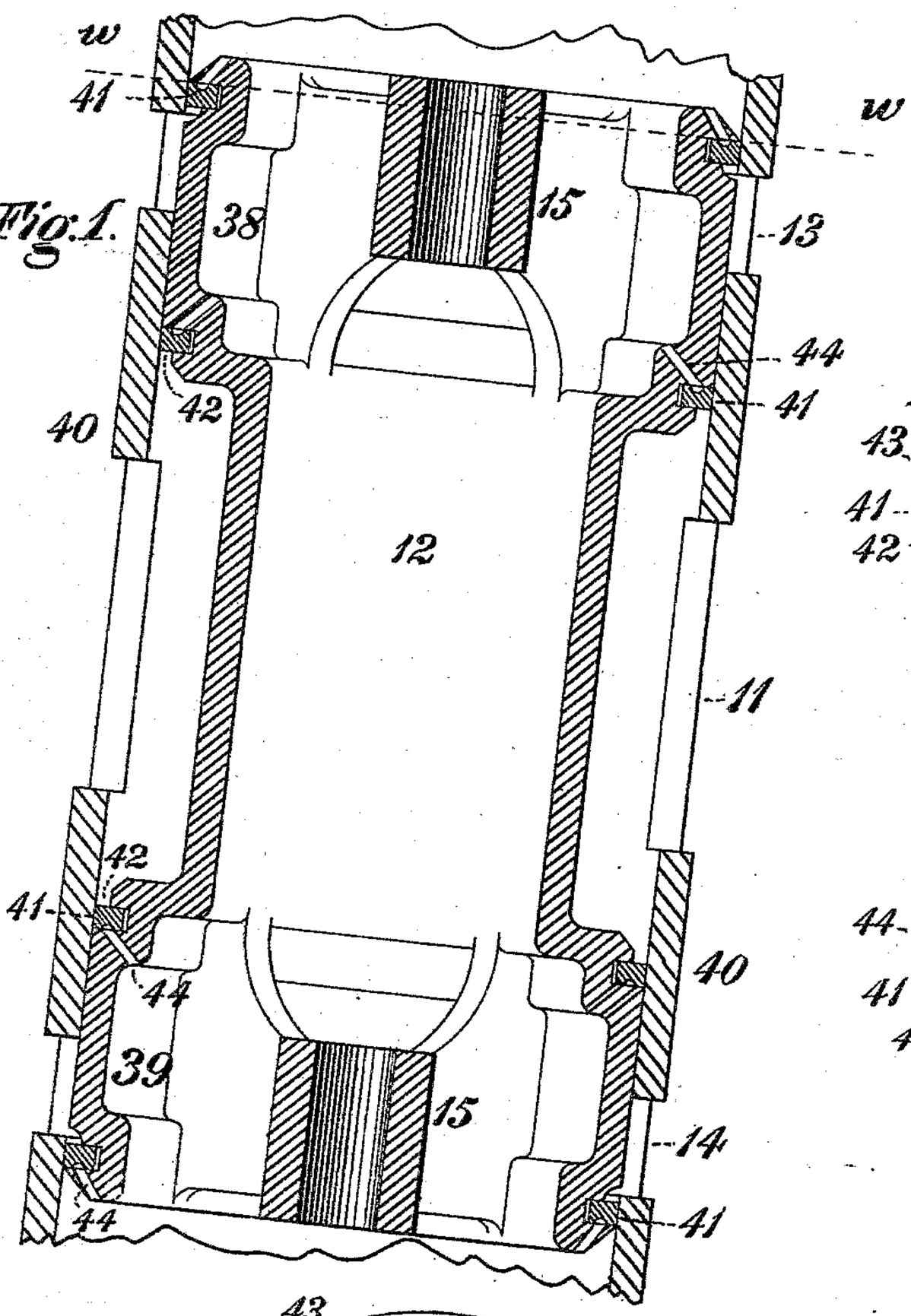


Fig. 3.

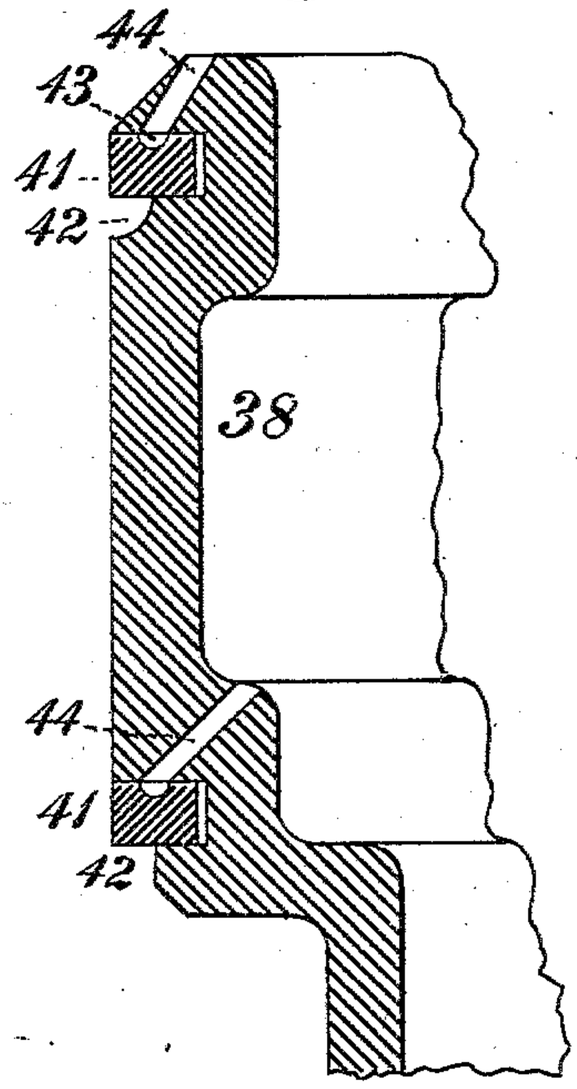


Fig. 4.

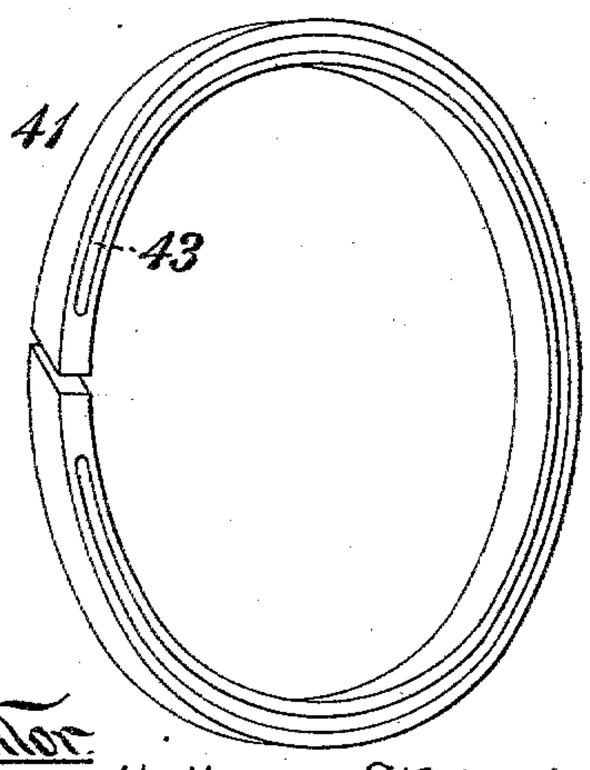
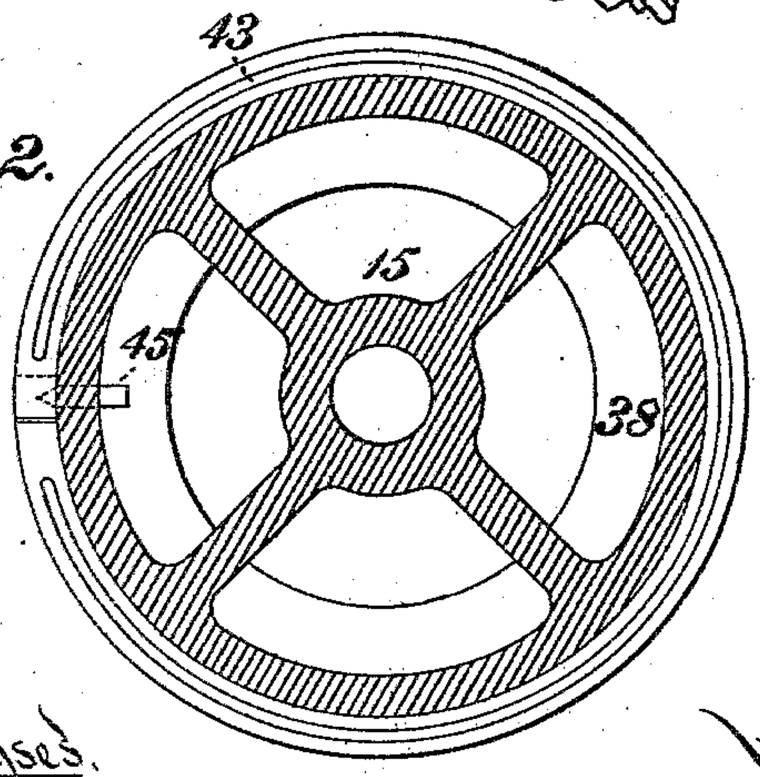


Fig. 2.



Witnesses.

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F. M. Clarke.

Inventor.

H. Herman Westinghouse,

By Attorney George H. Christy

UNITED STATES PATENT OFFICE.

H. HERMAN WESTINGHOUSE, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO THE WESTINGHOUSE MACHINE COMPANY, OF SAME PLACE.

PISTON-VALVE.

SPECIFICATION forming part of Letters Patent No. 303,084, dated August 5, 1884.

Application filed April 10, 1884. (No model.)

To all whom it may concern:

Be it known that I, H. HERMAN WESTINGHOUSE, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Piston-Valves, of which improvements the following is a specification.

In the accompanying drawings, which make part of this specification, Figure 1 is a vertical longitudinal central section through a piston-valve embodying my invention; Fig. 2, a transverse section through the same at the line *w w* of Fig. 1; Fig. 3, a longitudinal section, on an enlarged scale, through a portion of the valve; and Fig. 4, a view in perspective of one of the packing-rings detached.

My invention relates more particularly to main or distribution valves for steam-engines of the class in which steam is admitted to a valve-chest between a pair of pistons located upon opposite ends of a hollow body or sleeve, and is exhausted through said body, as in the engine described and shown in Letters Patent of the United States No. 240,482, granted and issued to me under date of April 19, 1881.

The object of my present invention is to effectively prevent leakage between a piston-valve of such character and its chest or casing without inducing undue friction or wear, and the improvements claimed are hereinafter fully set forth.

In the practice of my invention the valve proper is, as heretofore, composed of a hollow body or sleeve, 12, and a pair of hollow pistons, 38 39, formed on or secured to the ends of the body, each of said pistons being connected by radial arms to a central hub or boss, 15, by which the valve is secured to a stem, by which it is reciprocated within a casing, 40, communicating by openings 11 between the end pistons, with the steam-supply pipe, and by openings 13 14, which are alternately covered and uncovered by said pistons, with induction and eduction passages leading into opposite ends of the cylinder of a double-acting engine, or into adjacent ends of two double-acting cylinders, as the case may be, the exhaust of said cylinder being effected from the openings 13 and 14 alternately through the body of the valve and into an exhaust-pipe communicating with one end of the casing 40.

The pistons 38 and 39, which constitute the bearing-surfaces of the valve, are packed by split rings 41, of metal, which are sprung into circumferential recesses in the pistons, and, as heretofore constructed, have been without provision for insuring a tight bearing longitudinally upon their seats in the pistons, as is desirable in preventing leakage of steam past the pistons and preventing undue friction. Under my present invention the requisite degree of tightness of the packing-rings 41 is assured by forming circumferential grooves 42 in the pistons 38 and 39 on the steam side of each packing-ring 41, so as to expose a portion of one of the sides of each ring to the pressure of the steam in the valve casing or chest, and placing the opposite sides of the rings in communication with the exhaust-passage through the center of the valve, such communication being effected by forming a channel, 43, on the exhaust side of each ring, above one or more openings, 44, leading through the metal of the piston from the adjacent seat of the ring to the inside of the piston, as shown in Figs. 1 and 3. The rings are thus held to their seats by the pressure of the steam upon an area equal to that of the channels 43, and consequently move with the valve as if made solid therewith, without tendency to release or relief by such movement of their outward bearing upon the lining 40 of the valve-chamber. The rings 41 should be fixed as against rotation upon their pistons, to prevent steam blowing through their joints into the openings 44, by dowel-pins 45, or in any other suitable manner.

In an application for Letters Patent filed by me February 16, 1884, Serial No. 120,690, I have illustrated the employment of my improvements as above described in a double-cylinder single-acting steam-engine, and it will be obvious that they may, without change of principle, be similarly applied in engines of construction differing from that shown in said application.

I claim herein as my invention—

1. The combination, substantially as set forth, of a main or distribution valve composed of two hollow pistons connected by a tubular body, and packing-rings sprung into peripheral recesses in the pistons, each of said rings having a groove on one side fitting against a seat which communicates by a passage with the interior or exhaust side of the valve, and being exposed on its opposite side by a circular recess cut in the valve to the pressure on the steam side thereof.

2. The combination, substantially as set forth, of a hollow piston-valve having circumferential packing-recesses, which are grooved or relieved on one side and communicate on the other side by a passage or passages with the interior of the valve, and packing-rings which fit in the packing-recesses, and are provided with grooves communicating with the passages therein.

In testimony whereof I have hereunto set my hand.

H. HERMAN WESTINGHOUSE.

Witnesses:

J. SNOWDEN BELL,

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