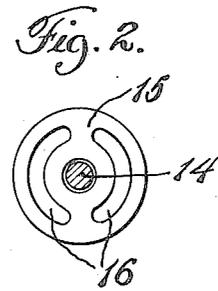
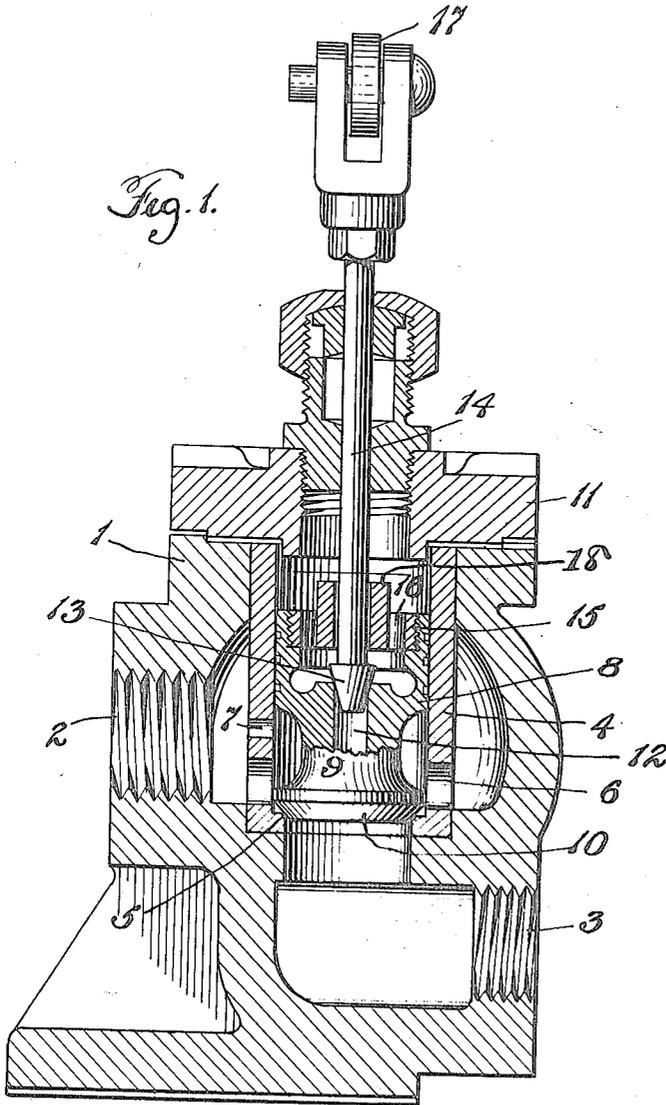


A. M. HOUSER.
PRESSURE CONTROLLED VALVE.
APPLICATION FILED JAN. 6, 1911.

1,157,870.

Patented Oct. 26, 1915.



WITNESSES
Harvey L. Lechner
W. Herbert Fowkes

INVENTOR
A. M. Houser
by atty
Paul Symonds

UNITED STATES PATENT OFFICE.

ARTHUR M. HOUSER, OF CHICAGO, ILLINOIS, ASSIGNOR TO CRANE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

PRESSURE-CONTROLLED VALVE.

1,157,870.

Specification of Letters Patent.

Patented Oct. 26, 1915.

Original application filed June 9, 1910, Serial No. 565,999. Divided and this application filed January 6, 1911. Serial No. 601,118.

To all whom it may concern:

Be it known that I, ARTHUR M. HOUSER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Pressure-Controlled Valves, of which the following is a specification.

The invention relates in general to valve mechanism and particularly to fluid pressure controlled valves, and is a division of my application No. 565,999, filed June 9th., 1910, which application has matured into Patent 1,114,141, Oct. 20, 1914. It has for its primary objects; the provision of an improved pressure controlled valve wherein the valve parts have a sensitive and quick operation and respond equally well under low and high pressures; the provision of a pressure controlled valve of the character specified of which the parts are simple and so constructed as to do away with the use of packing. These together with such other objects as may hereinafter appear, or are incidental to my invention, I attain by means of a construction illustrated in preferred form in the accompanying drawing, wherein

Figure 1 is a section through a valve embodying my invention, and

Figure 2 is a view of a detail of my invention.

In the practice of my invention, the numeral 1 represents a valve casing, provided with the usual inlet opening 2 and outlet opening 3. Removably mounted within the casing is a sleeve or bushing 4, having a lower terminal portion forming a valve seat 5 which fits in an annular recess formed in the rim of the casing diaphragm, its upper portion being held in place by the cap 11. The numeral 6 indicates a series of ports formed in the lower wall of the bushing, providing communication between the pressure side of the valve and the outlet through the opening in the diaphragm, which latter is surrounded by the integral valve seat 5, as will be apparent on reference to the drawings.

Mounted for reciprocating movement within the bushing is a combined piston and valve disk, comprising the hollow piston portion 8 which has a comparatively loose fit in the bushing whereby pressure may leak

upwardly past it, and a reduced portion of stem 9 which defines the valve disk 10, the latter being adapted to close upon the valve seat and control the flow of pressure through the said diaphragm opening. Extending centrally through the stem 9 and valve disk 10 is a passage 12 provided for the purpose of exhausting accumulated pressure within and above the piston 8 to the discharge side of the valve. This passage is controlled by a pilot valve 13, carried by a stem 14 having a bearing in a bonnet threaded into the cap 11, which latter is secured to the casing in any suitable manner.

Screwed into the internally threaded portion of the piston 8 is a plug 15 provided with openings 16, and having an extended bearing portion 18 about the stem and spaced away from the pilot valve. This plug being threaded is capable of adjustment relative to the pilot valve, and the extended bearing 18 affords a convenient means for manipulating the plug to obtain this adjustment. The upper end of the stem is secured to an operating lever, or other connection 17. With the construction as shown, it will be apparent by forming in one piece the bushing which affords the bearing for the piston, and the valve seat which is held against lateral displacement in the diaphragm, that the piston and disk have accurate movement and positive seating action.

The operation of the valve is as follows: The pressure in the inlet chamber and piston stem chamber holds the valve disk 10 on its seat 5, and owing to the loose fit of the piston in the bushing the pressure bleeds or passes into the closed end of the valve chamber, thereby equalizing the pressure on both sides of the piston. When the pilot valve is opened by the operating lever 17, the accumulated pressure in the closed end of the valve chamber above the piston 8 is exhausted or escapes through the central passage 12 into the outlet 3. The preponderance of upwardly exerted pressure raises the piston and opens the valve, thereby establishing communication between the inlet and outlet openings. In order to assure prompt balancing of pressure on opposite sides of the piston 8, when the piston begins to move downward from upper position, I provide the port 7 which admits pressure to the

chamber around the reduced stem portion 9 of the piston from which it can readily bleed to the chamber above the piston. Quick and easy downward movement of the piston is thereby obtained. When the stem 14 is moved downwardly it moves the piston 8 downward and closes the valve.

It will be seen from inspection of the drawings that the pilot valve 13 has an enlarged shoulder portion which in operation takes against the plug 15 and raises the piston and opens the valve, thus providing a positive actuating means for the valve should the reduction of pressure above the piston fail to secure initial movement of the valve parts. This plug 15 has an additional office or function in that it slidably engages the pilot valve stem and serves to guide and control the operation of the pilot valve.

The provision of the loose fitting piston, besides permitting the equalization of pressure on both ends of the piston, has the additional function of affording free movement of the piston and valve when the pilot valve is opened, which is essential to the successful and accurate operation of pressure controlled valves. The provision of the unobstructed passage between the closed end of the chamber and the outlet of the valve, which permits of the rapid exhaust of the accumulated pressure, furthers the quick movement of the valve parts. It will be seen that the valve parts thus give a very sensitive response to the changes in pressure.

The construction is simple and effective and does away with packing, the use of which has been found objectionable in pressure controlled valves. The device because of the free movement of the valve parts works equally well under either high or low pressure, and is thereby rendered particularly applicable for use in connection with steam traps of heating systems, wherein it has heretofore been found difficult to secure an operating valve which would work equally well under both high and low pressures. The parts are easily assembled and

there is little liability of the valve parts sticking or binding.

While the device is designed particularly for use in connection with steam traps, it is obvious that it can be put to other uses requiring a sensitive and accurate response of the valve parts.

Other advantages will present themselves to those skilled in the art.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is the following:

A pressure controlled valve comprising a casing having a diaphragm provided with an opening therethrough, a bushing in the casing and constructed to extend therein to said opening, a piston valve movable in said bushing to control the opening and composed of a piston and a valve disk of similar diameter united by an intermediate reduced stem portion formed with a restricted exhaust passage extending axially therethrough and of the disk, said bushing forming with the said reduced stem portion an intermediate annular pressure chamber and having its lower end portion ported to admit pressure to the said intermediate chamber which normally is in register therewith, there being a back pressure chamber above the piston which is adapted to receive a leakage of pressure from the intermediate chamber and past the piston, and an auxiliary valve seated at the upper terminal of said restricted passage, actuation of which permits the piston and disk to have guided upward movement in the bushing to a position where the disk restricts the admission of pressure to the intermediate pressure chamber to balance the valve.

In testimony whereof I have hereunto signed my name in the presence of the two subscribed witnesses.

ARTHUR M. HOUSER.

Witnesses:

PAUL SYNNESTVEDT,
HARRY LECHNER.