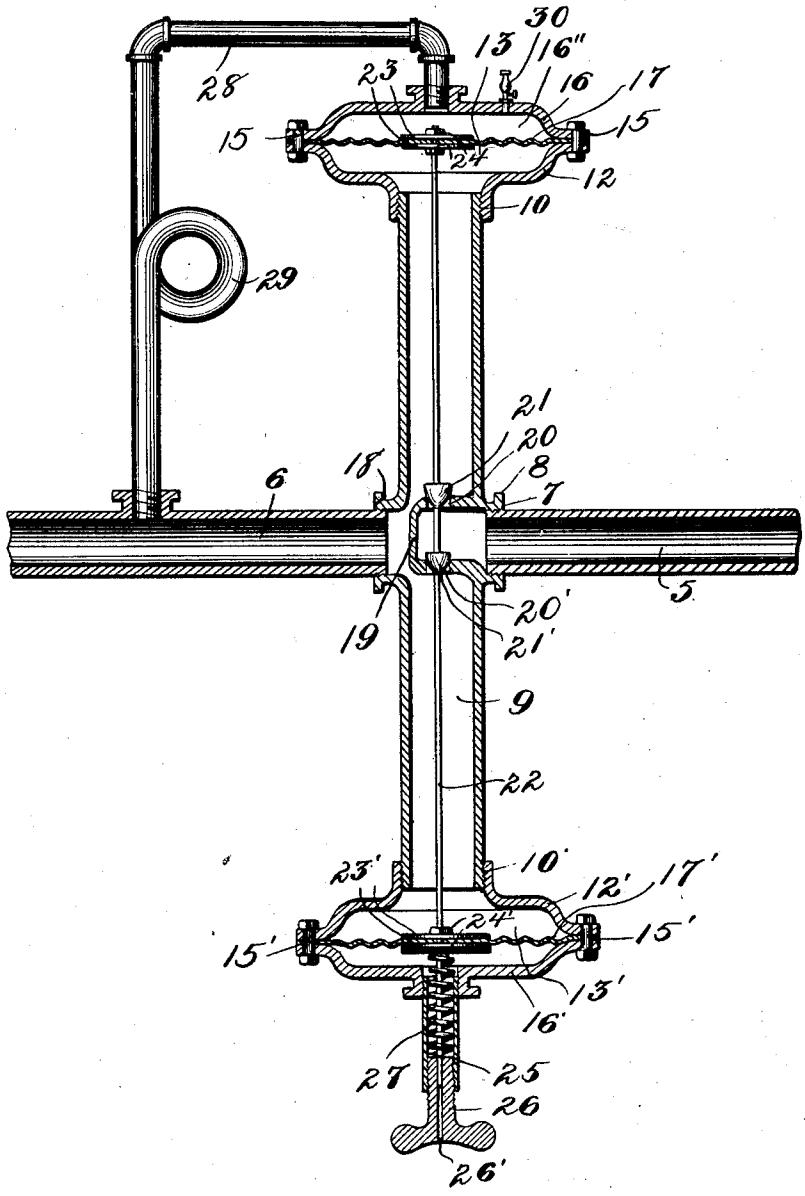
No. 757,881. PATENTED APR. 19, 1904.

J. J. BURKE.

REDUCING VALVE.

APPLICATION FILED JUNE 25, 1902.

NO MODEL.



Witnesses:

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 757,881. Patented April 19, 1904.

UNITED STATES PATENT OFFICE.

JAMES J. BURKE, OF HARTFORD, CONNECTICUT.

REDUCING-VALVE.

SPECIFICATION forming part of Letters Patent No. 757,881, dated April 19, 1904.

Application filed June 25, 1902. Serial No. 113,094. (No model.)

To all whom it may concern:

Be it known that I, JAMES J. BURKE, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Reducing-Valves, of which the following is a specification.

My invention relates to reducing-valves such as are usually employed in maintaining a lower pressure in one portion of a heating system than is exerted in the generator connected to said system, and has for its object the provision of a valve of this kind which while it will be very sensitive to variations in low pressure will not be affected by fluctuations of high pressure and one that may be readily adjusted to vary the pressure in the system which it controls.

Further objects and advantages of the invention will be set forth in the detailed description which now follows.

Referring to the drawing, in which the figure represents a partial longitudinal vertical section of the invention, the numeral 5 indicates the high-pressure steam-pipe which conducts live steam to the reducing-valve, the volume of steam the valve is adjusted to receive passing into the low-pressure pipe 6. The high-pressure pipe is threaded at 7 into a flange 8 of a tube or barrel 9, having unobstructed ends, said barrel being threaded at 10 10′ to receive the sections 12 12′ of chambered heads 13 13′. Secured to said sections 12 12′ by bolts and nuts 15 15′ are chambered caps 16 16′, and between said caps and sections are secured diaphragms 17 17′ for a purpose hereinafter described. The low-pressure pipe 6 is threaded into a flange 18 of the barrel 9, and the flange 8 is continued into the interior of said barrel to form a valve-casing 19, having ports 20 20′, the flow of fluid through said ports being controlled by valves 21 21′, mounted upon a valve-rod 22, carried by the diaphragms 17 17′, and to strengthen said diaphragms plates 23 23′ are provided, said plates being mounted upon the valve-rod 22 and clamped firmly upon each side of the diaphragm by nuts 24 24′.

The means for controlling the pressure in the low-pressure pipe at which the flow of steam to said pipe will be automatically stopped comprise a tube 25, the inner end of which is threaded into the cap-plate 16′, a plug 26, which is threaded into the outer end of said tube and is provided with thumb-wings to permit of its ready rotation, and a coil-spring 27, mounted upon the lower end of the valve-rod 22 and inserted between the plug 26 and the diaphragm 17′. A bore 26′ is formed in the plug 26, in which the lower end of the valve-rod is mounted, this construction serving to permit the plug 26 to be screwed into the tube 25 without affecting the position of said valve-rod.

Threaded into the chambered cap-plate 16 and affording communication between a chamber 16″ formed in said cap-plate and the low-pressure pipe 6 is an equalizing-pipe 28, a coil 29 being formed in said pipe for a purpose hereinafter set forth.

An air-valve 30 affords communication between the chamber 16″ and the atmosphere, said valve serving a purpose which will be hereinafter described.

High-pressure steam enters the valve through pipe 5, at which time the spring 27 has acted upon the diaphragm 17′ and through said diaphragm upon the valve-rod 22 to cause the valves 21 21′ to be lifted from the ports 20 20′, thus permitting the passage of the steam into the unobstructed ends of barrel 9, where it exerts an equal pressure upon each of the diaphragms. It then passes into the low-pressure pipe 6, and as soon as the pressure in said pipe reaches a predetermined point such pressure acting upon the diaphragm 17 through the pipe 28 will cause the valves 21 21′ to seat themselves, thereby closing the ports 20 20′ against further passage of steam to the low-pressure pipe.

To increase the pressure necessary to cause the valves 21 21′ to close the ports 20 20′, the plug 26 is screwed into the tube 25, thereby increasing the tension of the spring 27, which will of course necessitate greater pressure upon the diaphragm 17 to overcome the action of the spring to accomplish said result, and it is obvious that to decrease said pressure it is only necessary to unscrew the plug 26, thereby decreasing the tension of said spring, and con-

sequently the pressure necessary to overcome the action of the same.

When steam is first admitted to the low-pressure pipe 28, the chamber 16″ will be filled with air, and to permit said air to readily escape the air-valve 30 is provided.

It is obvious that a certain amount of water of condensation will collect in the chamber 16″, and to aid in preventing said water from being drawn into the low-pressure pipe the coil or trap 29 is formed in pipe 28.

It is important in devices of the kind herein described that the full pressure of the steam or other fluid employed should be exerted without obstruction against the inner sides of the diaphragms, and these diaphragms must be very sensitive so that they will readily become susceptible to variations in pressure. In prior constructions where a piston of small diameter has been substituted for one of the diaphragms such a device would not operate to accomplish the results achieved by my construction. Furthermore, in such prior constructions known to me the ends of the casting containing the valve-rod have not been free and unobstructed to permit the full pressure of the motive fluid to act against the sensitive diaphragms, and, as stated, a solid piston of small area would not be sufficiently sensitive nor contain the necessary surface to enable the high-pressure fluid to act against the same in the manner that it does in the present case.

My invention is not limited to the exact details of construction shown and described, but includes such modifications thereof as may be requisite in practical experience, nor is it limited to employment of any particular fluid-pressure system.

Having thus described my invention, what I claim is—

1. The combination, with a tube having an intermediate valve-chamber, and provided with an unobstructed extension on each side of said valve-chamber, of diaphragm-chambers, one located at each end of said tube; flexible diaphragms covering said chambers; chambered caps removably secured to the chambers, and serving to connect the diaphragms thereto; a spring bearing against one of the diaphragms; means for regulating the tension of said spring; a high-pressure pipe communicating with the valve-chamber; a valve-rod passing through the tube and valve-chamber and secured to the diaphragms, a valve on said rod, coöperating with a port of the valve-chamber; a low-pressure pipe connected to the tube; and a pipe leading from said low-pressure pipe and entering the cap of one of the diaphragm-chambers.

2. The combination, with a tube having an intermediate valve-chamber, and provided with an unobstructed extension on each side of said valve-chamber, of diaphragm-chambers secured to the ends of said tube; flexible diaphragms covering the tops of said chambers; chambered caps for securing the diaphragms in place; a rod secured to each diaphragm; valves on the rod, and coöperating with ports of the valve-chamber; a spring bearing against one of the diaphragms; means for adjusting the tension of said spring; a high-pressure pipe entering the valve-chamber; a low-pressure pipe communicating with the tube; and a trapped conduit leading from the low-pressure pipe to one of said chambered caps.

3. In a reducing-valve, the combination, with an unobstructed barrel having chambers in each of its ends and provided with a casing having ports, of flexible diaphragms located in and extending across said chambers; chambered caps for securing the diaphragms in place; a rod connected to said diaphragms and having an extension passing through one of them; valves carried by the rod and coöperating with the ports of the casing; a high-pressure pipe connected to said casing; a low-pressure pipe communicating with the barrel; a conduit leading from the low-pressure pipe to one of the chambered caps; a tube secured to one of the caps of the diaphragm-chambers; a spring in said tube, said spring surrounding the rod; and a longitudinally-perforated screw fitted over the extension of the valve-rod, and threaded into the tube, said screw serving to adjust the tension of the spring.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES J. BURKE.

Witnesses:
FRANK G. CAMPBELL,
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