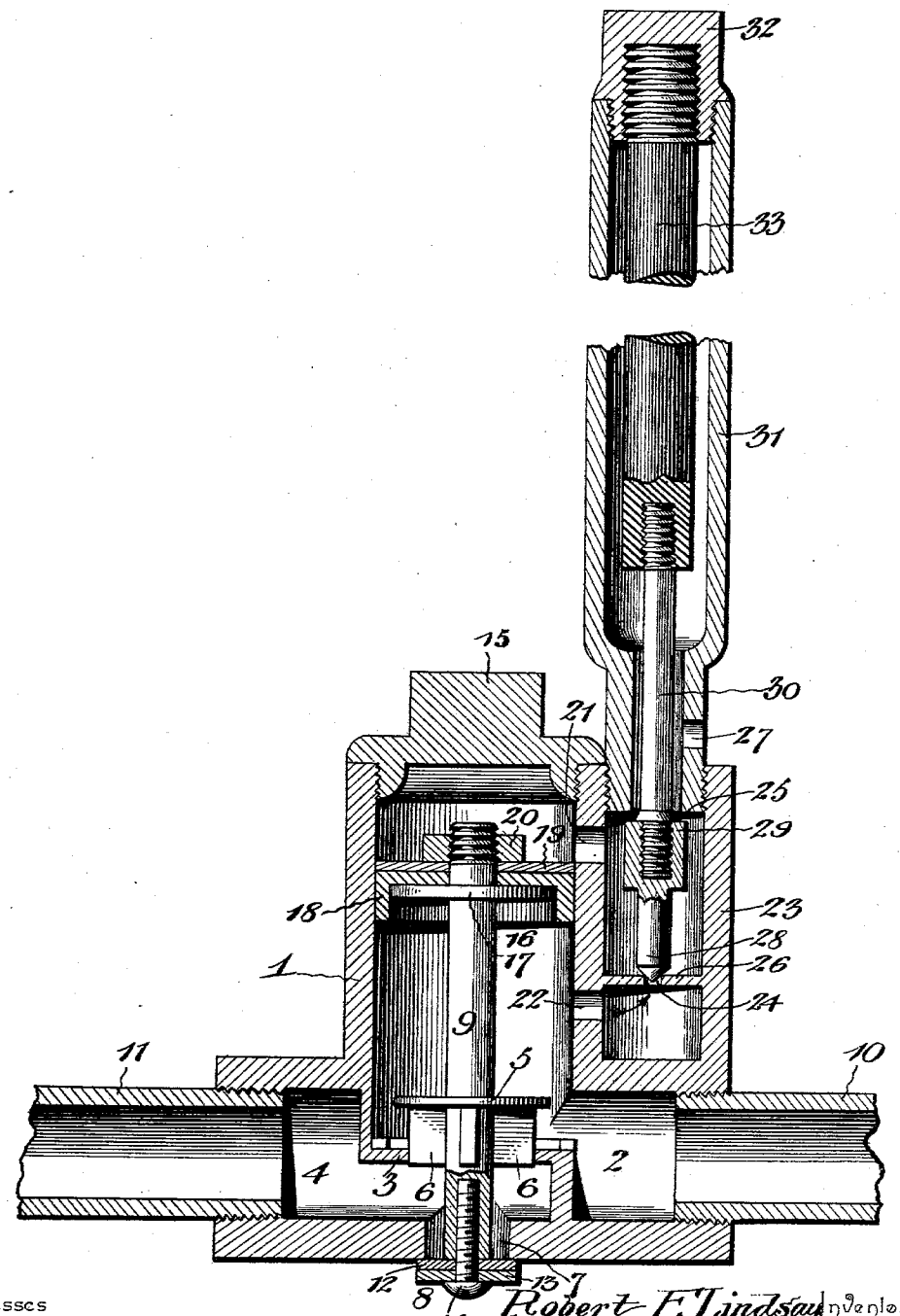
No. 629,794. Patented Aug. 1, 1899.

R. F. LINDSAY.

AUTOMATIC VALVE CUT-OFF.

(Application filed Aug. 8, 1898.)

(No Model.)



Witnesses

A. Roy Appleman Jr.

O. E. Hoyle

Robert F. Lindsay Inventor.

By his Attorneys.

C. A. Snow & Co.

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

UNITED STATES PATENT OFFICE.

ROBERT FRANKLING LINDSAY, OF GREENVILLE, SOUTH CAROLINA, ASSIGNOR OF ONE-HALF TO CILY & BROTHER, OF SAME PLACE.

AUTOMATIC VALVE CUT-OFF.

SPECIFICATION forming part of Letters Patent No. 629,794, dated August 1, 1899.

Application filed August 8, 1898. Serial No. 688,068. (No model.)

To all whom it may concern:

Be it known that I, ROBERT FRANKLING LINDSAY, a citizen of the United States, residing at Greenville, in the county of Greenville and State of South Carolina, have invented a new and useful Automatic Water Cut-Off, of which the following is a specification.

My invention relates to a water cut-off constructed to be affected by heat, whereby when the temperature falls below a certain point the parts of the device will be automatically operated to cut off the supply of water and drain the service-pipes, as of a building.

The object of my invention is to provide a simple and efficient construction of the class above indicated whereby promptness and accuracy of operation are obtained.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawing the figure represents a central vertical section of a cut-off constructed in accordance with my invention.

In the preferred embodiment of my invention 1 designates a cylinder communicating with a supply-port 2 and having a cut-off-valve seat 3, through which access may be had to the service-port 4, a cut-off valve 5 being arranged to fit said seat and having guide-wings 6. In the lower side of the casing in which the cylinder 1 is formed I provide a drain-port 7, fitted with a drain-valve 8, which is carried by the stem 9 of the cut-off valve 5. The cut-off and drain valves are oppositely opening, whereby as one is seated the other is opened, and hence when the cut-off valve is unseated to allow communication of liquid from the supply-port 2 to the service-port 4 (with which respectively communicate the supply-pipe 10 and the service-pipe 11) the drain-valve is seated to prevent the escape of liquid, whereas when the cut-off valve is seated to check the communication of liquid from the supply-port to the service-port the drain-valve is unseated, and as the drain-port is in communication with the service-port, and hence with the service-pipes, it is obvious that when the apparatus is used in connection with house-supply systems the water throughout the building may be drained out to avoid the dangers of freezing and the bursting of pipes, &c. Any suitable construction of drain-valve may be employed; but that which I have illustrated and prefer in practice embodies a packing-disk 12, held in place by a washer 13, which in turn is secured by a screw 14, passing through said washer and packing-ring and threaded into the lower end of the stem 9.

The upper end of the cylinder 1 is fitted with a removable cap 15, and mounted for reciprocatory movement in the cylinder is a piston or plunger 16, carried by the above-described valve-stem 9, to which are fixed the oppositely-opening cut-off and drain valves. In the construction illustrated the stem 9 is provided with a fixed disk 17, upon which is arranged a cup packing-ring 18, held in place by a washer 19, which in turn is secured by a nut 20, threaded upon the portion of the stem which projects above the plane of the disk 17.

Communicating with the cylinder 1 upon opposite sides of the plane of the piston 16 are feed-ports 21 and 22, which also communicate with a valve-casing 23, in which are arranged an inlet-valve seat 24 and an outlet or exhaust valve seat 25, the first being formed in a partition 26, transversely spanning the valve-casing 23 near the feed-port 22, and the latter being disposed in communication with an exhaust-port 27. Mounted to coöperate with said valve-seats 24 and 25 are inlet and exhaust valves 28 and 29, which are also oppositely opening and are carried by a stem 30. For instance, when the inlet-valve 28 is seated to cut off communication between the feed-port 22 and the interior of the valve-casing the exhaust-valve 29 is unseated to allow the exhaust of the contents of the cylinder above the piston through the feed-port 21 and the exhaust-port 27. On the other hand, when the positions of the valves 28 and 29 are reversed, the latter being closed, communication is opened between the cylinder below the plane of the piston and the interior of the casing 23, and hence with the portion of the cylinder above the piston, whereby the pressure upon opposite sides of the piston is

equalized. When this condition exists within the valve mechanism embodying my invention—namely, with the pressure upon the piston equalized—it is obvious that the positions of the parts will be determined by pressure upon some other element or, as will be readily seen, upon the drain-valve 8. The pressure is equalized upon opposite sides of the cut-off valve, and hence the only element upon which pressure may not be equalized is the drain-valve, which is exposed at only one side to the pressure of the contents of the casing. Hence when pressure is equalized upon opposite sides of the piston the pressure in the service-pipes will open the drain-valve and in so doing will close the cut-off and exclude liquid from the supply-pipe.

The valve-casing 23 is extended to form a tubular sheath 31, fitted at its upper end with a removable cap 32, and within the sheath and preferably supported at its upper end by said cap is a thermostat-rod 33, having sufficient expansion qualities when affected by heat to cause the operation of the feed and exhaust valves 28 and 29. The form of thermostat-rod which I prefer to employ is constructed of hard rubber specially treated to adapt it for use in connection and arranged in alinement with and attached to the valve-stem 30. As above indicated, the upper end of said thermostat-rod is adapted to be attached to the cap 32 and may in practice be threaded thereinto, as indicated in the drawing. In operation, the cut-off valve being unseated to allow a communication of liquid from the supply-port 2 to the service-port 4 and the drain-valve 8 being seated, it will be understood that the members of the apparatus will retain such positions as long as there is an excess of pressure upon the under side of the piston 16, the portion of the cylinder 1 above the piston being in communication with the exhaust 27, and this excess of pressure upon the lower side of the piston will obtain as long as the temperature maintains the thermostat-rod in an expanded condition, and hence maintains the inlet-valve 28 seated. The falling of the temperature sufficiently to contract the thermostat-rod will unseat the valve 28 and simultaneously seat the valve 29 to cut off communication between the upper portion of the cylinder and the exhaust-valve and at the same time open communication between the supply-port 2 and portion of the cylinder below the piston and the valve-casing 23. This equalizes the pressure upon the opposite sides of the piston, and hence allows pressure upon the upper side of the drain-valve to unseat the latter and seat the cut-off valve. By adapting the thermostat-rod to contract before the temperature reaches the freezing-point it will be seen that freezing in the service-pipes may be efficiently prevented.

An advantage of the specific construction of thermostat-rod which I employ resides in its simplicity, the cheapness with which it may be manufactured, its lightness, and its accuracy in operation, and the only preparation necessary to adapt it for the purpose described herein consists in boiling the rubber at a high temperature until soft and then condensing the same by a pressing force about one-sixth of its original size. This produces a compactness which renders the rod susceptible to variations of temperature sufficient to fulfil the conditions of the described operation.

Changes may be made in the form of some of the parts while their essential features are retained and the spirit of the invention embodied. Hence I do not desire to be limited to the precise form of all the parts as shown, reserving the right to vary therefrom.

Having described my invention, what I claim is—

1. An automatic cut-off having connected oppositely-opening cut-off and drain valves, of which the latter is exposed at one side to service-pressure, a piston connected with said valves for simultaneous operation and permanently exposed at one side to supply-pressure, valve mechanism for controlling inlet and exhaust ports in communication with the piston-cylinder at the opposite side of the piston, and a thermostat-rod for controlling said valve mechanism, substantially as specified.

2. An automatic cut-off having connected oppositely-opening cut-off and drain valves, the latter being exposed to service-pressure, a piston connected with the cut-off and drain valves for simultaneous operation and having its cylinder provided with feed-ports arranged upon opposite sides of the plane of the piston, said piston being permanently exposed at one side to supply-pressure, a valve mechanism having inlet and exhaust valves for controlling the ports of the piston-cylinder, whereby service-pressure may be applied to the opposite side of the piston to equalize the permanent pressure thereon, and a thermostat-rod connected with the stem of said inlet and exhaust valves, substantially as specified.

3. An automatic cut-off having a casing including a piston-cylinder, supply and service ports, of which the former is in permanent communication with the interior of the cylinder, a cut-off valve controlling the communication between the supply and service ports, a drain-valve connected with the stem of the cut-off valve and controlling a drain-port in communication with the service-port, said drain-valve being arranged to open in the opposite direction from the cut-off valve, a piston operating in said cylinder and connected with the cut-off-valve stem, a valve-casing having inlet and exhaust ports, and being arranged in communication with feed-ports formed in the cylinder at the opposite sides of the plane of said piston, oppositely-opening inlet and exhaust valves controlling said inlet and exhaust ports and having a com-

mon stem, and a thermostat-rod connected with the common stem of the inlet and exhaust valves, substantially as specified.

4. An automatic cut-off having a casing including a piston-cylinder provided with lateral feed-ports, a valve-casing with which said feed-ports communicate, and provided with inlet and exhaust ports, a tubular sheath connected with said valve-casing, a cut-off valve for controlling communication between supply and service ports, a piston operating in said cylinder and connected with the stem of the cut-off valve, inlet and exhaust valves operating in the valve-casing to control said feed-ports of the cylinder, and having a stem extending into said sheath, and a hard-rubber thermostat-rod arranged in the sheath, connected with said inlet and exhaust valve-stem, and carried by a removable cap fitted upon the outer end of the sheath, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

ROBERT FRANKLING LINDSAY.

Witnesses:
J. F. DORROH,
HENRY BRIGGS.