

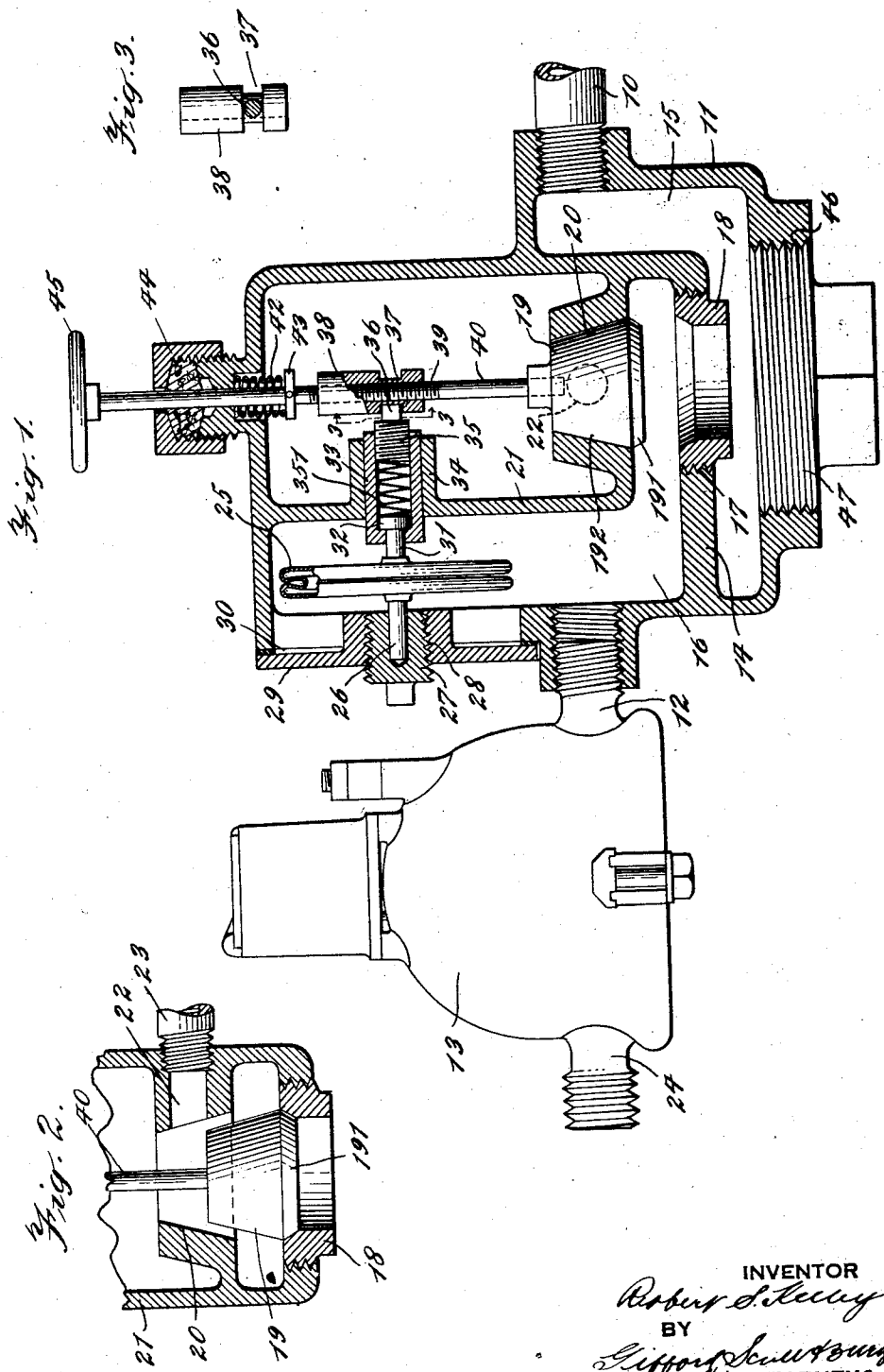
March 15, 1932.

R. S. KELLEY

1,849,491

CUT-OFF VALVE FOR WATER SUPPLY SYSTEMS

Filed Oct. 30, 1929



INVENTOR
Robert S. Kelley
BY
Gifford Smith & Morgan
ATTORNEYS

UNITED STATES PATENT OFFICE

ROBERT S. KELLEY, OF BROOKLYN, NEW YORK, ASSIGNOR TO NATIONAL METER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

CUT-OFF VALVE FOR WATER SUPPLY SYSTEMS

Application filed October 30, 1929. Serial No. 403,375.

My invention more particularly relates to such a cut-off valve which is controlled by the temperature of the water supply.

My invention will best be understood by reference to the accompanying drawings, in which I have illustrated a preferred embodiment and in which Fig. 1 is a vertical longitudinal section showing parts in side elevation of an automatic cut-off for a water supply embodying my invention; Fig. 2 is a fragmentary sectional view taken at right angles to Fig. 1 and illustrating the valve member when in its closed position, and the part leading to the drain connection open, and Fig. 3 is a detail side view.

Like reference characters indicate like parts throughout the drawings.

Referring now to the drawings, 10 is a water supply pipe for delivering water to a factory, dwelling or the like. The water supply pipe is connected to a casing 11 which would usually be located in the cellar or other portion of the building. A service pipe 12 is also connected to the casing 11, and is in turn connected to a water meter 13 which may be of standard form and the details of which, therefore, have not been illustrated. The water meter is preferably located adjacent to the casing enclosing the cut-off valve.

The casing 11 is provided with a partition 14 extending transversely and upwardly across the casing, as shown in Fig. 1, and forms, with the casing, a chamber 15 below and at the side of the partition with which the supply pipe 10 communicates, and a chamber 16 located above the partition. The partition 14 is provided with a tapped opening 17 in which is received a valve seat 18 formed with screw threads engaging the threads formed in the opening 17.

A valve member 19, provided with a lower conical portion 191 and an upper conical portion 192, is normally retained in its elevated position illustrated in Fig. 1, the conical portion 192 being in engagement with the valve seat 20 formed on a second partition 21 in the casing. The valve, when in its elevated position illustrated in Fig. 1, closes the port 22 leading to a drain con-

nection 23. With the valve in the open position, the water from the supply pipe 10 is free to pass through the chamber 15, through the valve seat 18, chamber 16, pipe 12, and the water meter 13, and thence through a pipe 24 supplying water to the building.

I will now describe the means for retaining the valve in its normally open position as shown in Fig. 1, and for releasing the same when the water supplied to the building reaches a predetermined low temperature.

A thermostat, which is here shown as of the bellows type, is placed in the chamber 16 where it is contacted by the water supplied to the building and controlled by the temperature thereof.

One end of the thermostat 25 is mounted upon a stem 26 which is, in turn, received in a screw plug 27, the threads of which are received in a tapped opening 28 in a cover plate 29 which closes an opening 30 in the casing 11, and through which the thermostat and associated parts may be removed. The screw plug 27 affords a ready means for adjusting the thermostat.

To the other end of the thermostat 25 is attached a stem 31 formed, in the embodiment illustrated, with a head 32 which is received in a cylindrical member 33 fitted within a boss 34 formed on the partition 21. A screw-threaded member or plug 35 is received in the end of the cylindrical member 33 opposite to that in which the head 32 is located. A spring 351 is preferably interposed between the member 35 and the head 32.

The member 35 is provided with a detent 36 which engages in an annular groove 37 with which a sleeve 38 is provided. The sleeve 38 is preferably screw-threaded on its interior, and is received on the screw-threaded portion 39 of a stem 40, the lower end of which is attached to the valve 19.

Means are provided which normally tend to force the valve 19 towards its closed position. In the embodiment illustrated, such means comprises a coil spring 42, the upper end of which engages the casing 11, and the lower end of which engages a collar 43 secured to the stem 40. The upper end of the

stem 40 passes through a stuffing box 44 and is provided with a handle 45.

The lower portion of the casing 11 is provided with a tapped opening 46 in which is received a screw plug 47. By removing the screw plug 47, the valve seat 18 and the valve 19 with its stem may be removed or replaced. Removal of the plug 47 gives access to the threaded valve seat 18, which may then be removed. Removal of this seat in turn gives access to the valve 19, and this may be removed through the threaded opening from which the seat has been removed. In case the detent 36 is engaged in the groove 37, it will be necessary to loosen the plug 27 of the thermostat to an extent sufficient to cause the withdrawal of the detent from the groove. If the valve is to be removed entirely, it will also, of course, be necessary to loosen the gland forming part of the stuffing box 44 and to remove the handle 45.

The operation of the device embodying my invention will readily be understood from the foregoing description and is as follows:

Normally, the stem 40 is retained in its elevated position illustrated in Fig. 1 by the detent 36 engaging the groove 37 on the sleeve 38. When the water reaches a predetermined minimum temperature at which it is likely to freeze in the water meter which is located adjacent to the valve casing, or in other parts of the building, the thermostat 25 contracts and withdraws the detent 36 from engagement with the groove 37, thereby permitting the spring 42 to force the valve 19 downwardly into engagement with the valve seat 18 and thus cutting off the water supply both to the meter and to the pipes of the building. At the same time, the seating of the valve 19 opens the port 22 leading to the drain connection 23, thereby permitting the water which is in the casing 11 in the water meter and in the pipes of the building to drain from the system and preclude its freezing and bursting the pipes, and particularly avoiding injuring the parts of the water meter which are both expensive and difficult of replacement.

To return the valve 19 to its open position, it is lifted by the handle 45 until the detent 36 again engages the groove 37. The handle 45 may then be turned to raise the valve 19 sufficiently to cause it firmly to engage the seat 20. It will be understood that at this time the sleeve 38 threaded on the stem 40 is prevented from rotating by the detent 36 which is in engagement with the groove 37. As the sleeve cannot rise because of the detent, it cannot rotate.

The provision of the lost motion connection between the detent 36 and the thermostat 25 permits the expansion of the latter when the temperature within the casing rises, without injury or breakage of parts. It will be noted, for example, that if the thermostat

with the parts in the position shown in Fig. 1 expands, the head 32 on the stem 31 will merely compress the spring 351 without disturbing the detent 36. The same operation takes place in case the stem drops and seats the valve 19.

My invention provides means for preventing freezing of water in water pipes in buildings such as factories and the like, where the temperature is likely to reach the freezing point, and particularly prevents the freezing of water in the water meter in which the parts are comparatively expensive and replaceable with more or less difficulty. It is well known that flowing water will not immediately freeze, although its temperature may be considerably below the freezing point.

In accordance with my invention, the thermostat which controls the operation of the cut-off valve is contacted by the water supplied to the system, and when the water reaches such a temperature that the water in the meter which is located adjacent to the cut-off valve, or in the pipes in the building, is likely to freeze, the automatic cut-off valve is operated and simultaneously cuts off the water supply both to the meter and to the building, and opens the drain connection which empties the water from the water meter and from the pipes.

I claim:

1. In combination, a water supply system comprising a water supply pipe, a valve casing and a service pipe connected to said casing, a valve and its seat located in said casing, said valve controlling the flow of water from the supply pipe through said casing to the service pipe, means for normally retaining said valve in its open position, means for closing said valve when said retaining means is rendered inoperative and means controlled by the temperature of the water in said casing for rendering said retaining means inoperative to thereby permit the closing of said valve

2. In combination, a water supply system comprising a water supply pipe, a valve casing and a service pipe connected to said casing, a valve and its seat located in said casing, said valve controlling the flow of water from the supply pipe through said casing to the service pipe, means for normally retaining said valve in its open position, a drain connection normally closed when said valve is in its open position, means for closing said valve when said retaining means is rendered inoperative and means controlled by the temperature of the water in said casing for rendering said retaining means inoperative to thereby permit the simultaneous closing of said valve and the opening of said drain connection.

3. In combination, a water supply system comprising a water supply pipe, a valve casing and a service pipe connected to said cas-

ing a valve and its seat located in said casing, said valve controlling the flow of water from the supply pipe through said casing to the service pipe, means for normally retaining said valve in its open position, means tending to force said valve to its closed position, and means controlled by the temperature of the water in said casing for releasing said valve.

4. In combination, a water supply system comprising a water supply pipe, a valve casing and a service pipe connected to said casing, a valve and its seat located in said casing, said valve controlling the flow of water from the supply pipe through said casing to the service pipe, means for normally retaining said valve in its open position, means tending to close said valve, a thermostat contacted by the water in said casing and subjected to the temperature thereof, and means controlled by said thermostat for releasing said valve.

5. In combination, a water supply system comprising a water supply pipe, a valve casing and a service pipe connected to said casing, a valve and its seat located in said casing, said valve controlling the flow of water from the supply pipe through said casing to the service pipe, means for normally retaining said valve in its open position, means tending to close said valve, a detent for normally retaining said valve in its open position, a thermostat located in said casing and contacted by the water therein, said detent being connected to said thermostat, the parts being constructed and arranged to withdraw said detent and permit the valve to close when the water in the casing reaches a predetermined temperature.

6. In combination, a water supply system comprising a water supply pipe, a valve casing and a service pipe connected to said casing, a valve and its seat located in said casing, said valve controlling the flow of water from the supply pipe through said casing to the service pipe, means for normally retaining said valve in its open position, a drain connection normally closed by said valve when in its open position, a detent for normally retaining said valve in its open position, a thermostat located within said casing and contacted by the water therein, and connections for withdrawing said detent when the temperature of the water in said casing reaches a predetermined temperature, thereby permitting the simultaneous closing of said valve and the opening of said drain connection.

7. In combination, a water supply system comprising a water supply pipe, a valve casing and a service pipe connected to said casing, a valve and its seat located in said casing, said valve controlling the flow of water from the supply pipe through said casing to the service pipe, means for normally retaining said valve in its open position, a stem connected to said valve and provided with a groove, means associated with said stem tend-

ing to close the valve, a detent adapted to engage in said groove and normally retain the valve in open position, a thermostat located within said casing and contacted by the water therein, and connections between said detent and said thermostat whereby the detent is withdrawn from engagement in said groove when the water in the casing reaches a predetermined temperature.

8. In combination, a water supply system comprising a water supply pipe, a valve casing and a service pipe connected to said casing, a valve and its seat located in said casing, said valve controlling the flow of water from the supply pipe through said casing to the service pipe, a stem connected to said valve and provided with a groove, a detent adapted normally to engage in said groove and retain the valve in open position, a thermostat located within said casing and contacted by the water therein, a connection between said detent and said thermostat constructed and arranged to withdraw the detent from engagement in said groove when the water in the casing reaches a predetermined temperature, said connection comprising lost motion parts whereby the thermostat may expand without moving said detent.

9. In combination, a water supply system comprising a water supply pipe, a valve casing and a service pipe connected to said casing, a valve and its seat located in said casing, said valve controlling the flow of water from the supply pipe through said casing to the service pipe, a stem connected to said valve and provided with a groove, a detent adapted normally to engage in said groove and retain the valve in open position, a thermostat located within said casing and contacted by the water therein, a connection between said detent and said thermostat constructed and arranged to withdraw the detent from engagement in said groove when the water in the casing reaches a predetermined temperature, said connection comprising lost motion parts and a spring interposed between said parts whereby said thermostat may expand without moving said detent.

10. In combination, a water supply system comprising a water supply pipe, a valve casing and a service pipe connected to said casing, a valve and its seat located in said casing, said valve controlling the flow of water from the supply pipe through said casing to the service pipe, means for normally retaining said valve in its open position, a water meter to which said service pipe is connected and through which the water flows, means for closing said valve when said retaining means is rendered inoperative and means controlled by the temperature of the water in said casing for rendering said retaining means inoperative to thereby permit the closing of said valve.

ROBERT S. KELLEY.