

June 13, 1933.

L. W. WILLIAMS

1,913,622

HOT WATER SYSTEM AND VALVE THEREFOR

Filed May 23, 1932

2 Sheets-Sheet 1

Fig. 1.

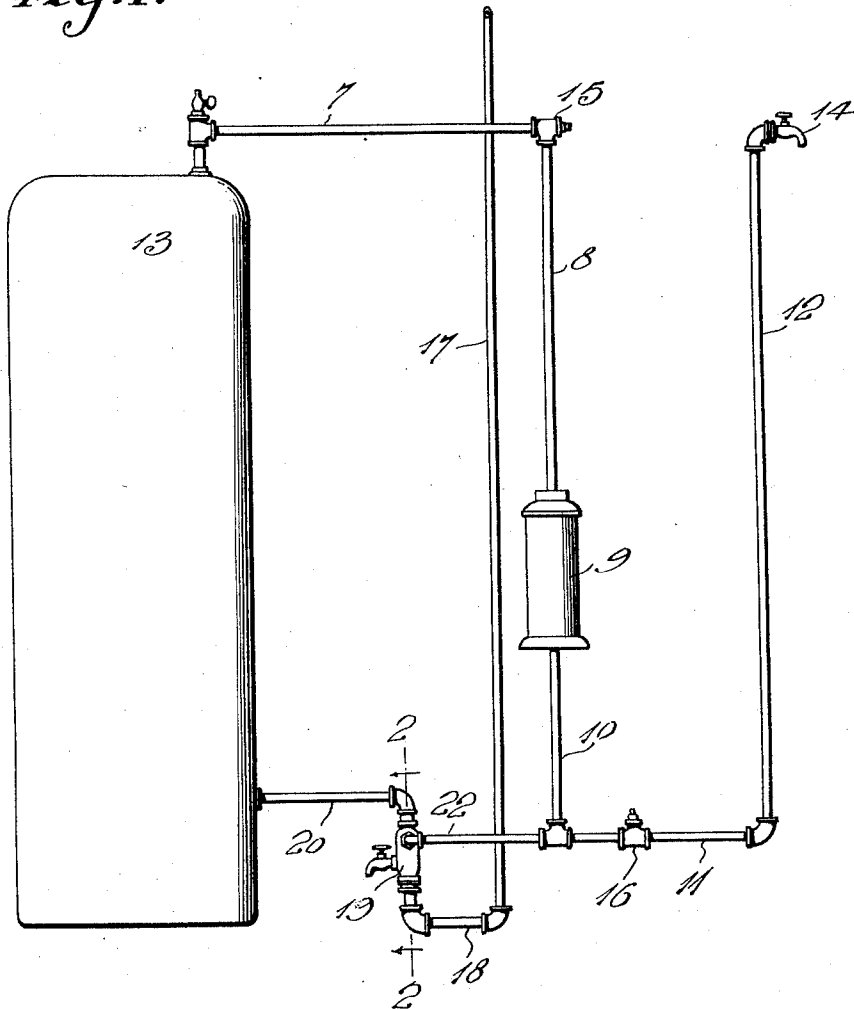
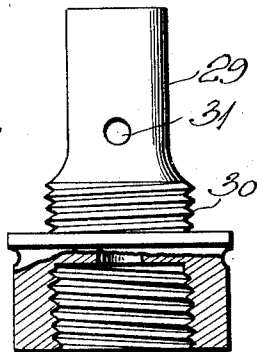


Fig. 5.



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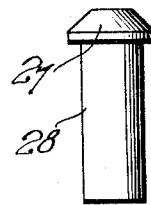


Fig. 6.

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2 Sheets-Sheet 2

Fig. 2.

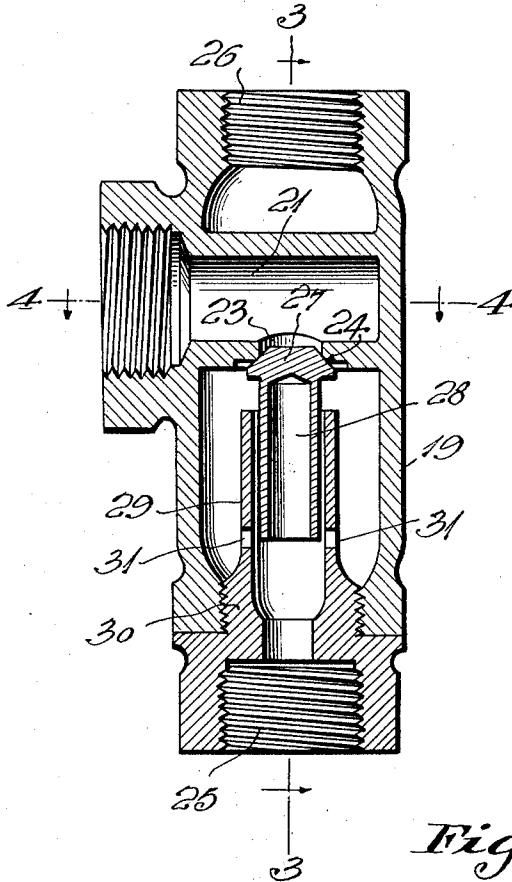


Fig. 3.

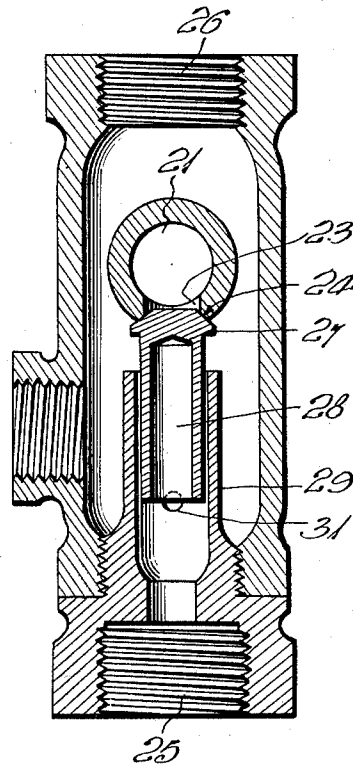
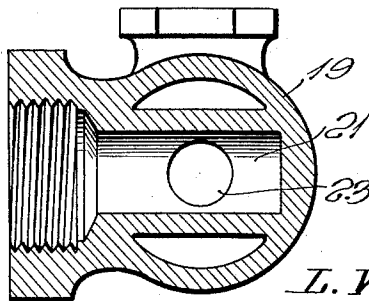


Fig. 4.



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UNITED STATES PATENT OFFICE

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HOT WATER SYSTEM AND VALVE THEREFOR

Application filed May 23, 1932. Serial No. 613,025.

The invention relates to systems for furnishing hot water to the faucets of hot water draw-off lines leading from hot water storage tanks. Very often, due to a leaking faucet or faucets, or to one or more faucets not entirely closed, hot water is continually discharged from the storage tank, and as the leakage is replaced by cold water entering the tank from the supply line, the supply of hot water is often more or less exhausted. My invention however, aims to overcome this difficulty by providing novel automatic means for by-passing cold water sufficient to compensate for leakage, directly into the hot water draw-off line from the cold water supply line, so that the only water lost from leakage, will be cold water.

A further object is to provide a novel automatic valve for co-action with proper piping in attaining the above end, and a still further object is to provide an arrangement in which the valve casing and piping act as means for conducting water which circulates through the tank and through a water heater (gas, liquid fuel, electric, furnace coil, range coil, etc.).

With the foregoing in view, the invention resides in the novel subject matter herein-
after described and claimed, description being accomplished by reference to the accompanying drawings.

Fig. 1 is a side elevation of a system in accordance with the invention.

Fig. 2 is an enlarged vertical sectional view through the valve, on line 2—2 of Fig. 1, the pipes being omitted from this view.

Fig. 3 is a vertical sectional view on line 3—3 of Fig. 2.

Fig. 4 is a horizontal sectional view on line 4—4 of Fig. 2.

Fig. 5 is a side elevation partly in section showing the plug which closes one end of the valve casing, and the valve-guiding sleeve carried by said plug.

Fig. 6 is a side elevation of the pressure-closed valve.

A preferred construction has been illustrated and will be specifically described, with the understanding however, that within the

scope of the invention as claimed, minor variations may be made.

The numerals 7, 8, 9, 10, 11 and 12 denote various portions of a hot water draw-off line leading from the upper end of a hot water storage tank 13, said line being provided with one or more faucets 14. The part 9 of the draw-off line is formed by a water heater which, due to the valve and other piping hereinafter described, furnishes hot water for the tank 13 and keeps said water circulating, as long as the heater is in operation. Other means however, could be provided for heating and circulating the water, and at 15 and 16 I have shown plugged connections which may, by suitable piping, be connected with the ends of a furnace coil, a range coil, or the like.

The numbers 17, 18, 19 and 20 denote various portions of a cold water supply line leading to the lower end of the tank 13, the part 19 being a valve casing which is detailed more particularly in Figs. 2, 3 and 4.

A by-pass for cold water, is provided from the casing 19 to the hot water discharge line 7—12; said by-pass in the present showing, consisting partly of a passage 21 extending across the interior of the casing 19, and partly of a pipe 22 which connects the outer end of said passage 21, with said hot water draw-off line. The passage 21 is provided with an inlet opening 23 which is normally in open communication with the casing 19, said opening being provided with a valve seat 24 which is preferably co-axial with the cold water inlet 25 and the cold water outlet 26 of said casing, said seat 24 facing said inlet 25. A normally open, pressure-closed valve 27 is provided in the casing 19 for co-operation with the seat 24. In the present showing, this valve is provided with a hollow stem 28 extending toward the inlet 25 and loosely received in a guide sleeve 29, said sleeve being carried by a plug 30 which forms one end of the casing 19. While water conducting space exists between the stem 28 and the sleeve 29, the latter is preferably formed also with water conducting openings 31.

With all faucets tightly closed, the valve 27 descends by gravity and remains open. If

the heater 9 (or other heater) be then operating, water will flow from this heater through the line portions 8, 15 and 7 into the upper end of the tank 13 and will flow back to said heater from the lower end of said tank, through the line portion 20, the casing 19, the passage 21, the by-pass pipe 22, and the line portion 10.

If one or more of the faucets 14 be open for normal discharge of hot water, the difference between the pressures at opposite sides of the valve 27, causes the latter to immediately close. Then, as hot water is being drawn off through the line 7—12 and the open faucet, cold water enters the tank 13 through the line 17—20, flowing through the casing 19, around the passage 21. As soon as the faucet is again closed, valve 27 again drops so that circulation of water may continue.

If any faucet or faucets should not be entirely closed, or should leak, instead of the leakage exhausting hot water from the tank 13, such leakage will be only cold water, for with the valve 27 open, cold water from the casing 19 forming part of the cold water supply line, may pass through the opening 23, through the passage 21 and through the cold water by-pass pipe 22, into the hot water discharge line, with less resistance than the cold water could enter the tank 13 from the supply line to force a discharge of hot water from the latter. It is thus insured that the supply of hot water shall not be exhausted if any faucet or faucets be sufficiently open to permit a subnormal discharge of water.

Another advantage for the system, is that each time hot water is drawn from the line, such water must travel through the water heater, keeping the latter internally clean and preventing "liming" thereof to a large extent.

Excellent results are obtainable from the specific construction herein disclosed and such construction is therefore preferably followed. However, attention is again invited to the fact that variations may be made within the scope of the invention as claimed.

I claim:—

1. A valve of the class described comprising a casing having an inlet and an outlet whereby it may be connected in a cold water supply line of a storage tank, said casing having a permanently open water course from said inlet to said outlet, said casing being further provided with an additional outlet passage for connection with a hot water draw-off line from the tank, the inner end of said additional outlet passage having a valve seat alined with and facing said inlet, a normally open valve co-operable with said seat and having a stem extending toward said inlet, and a guide sleeve slidably receiving said stem, said sleeve being secured to said casing and extending around said inlet.

2. A valve of the class described comprising a vertically elongated casing having an

inlet at its lower end and an outlet at its upper end whereby it may be connected in a cold water supply line of a storage tank, said casing being further provided with a tubular outlet passage extending horizontally across its interior, said casing having a permanently open water course from said inlet to said outlet extending at opposite sides of said tubular passage, said tubular passage being closed at one end, being open at its other end for connection with a hot water draw-off line from the tank, and between its ends having an opening in its lower side provided with a valve seat, a normally open valve adapted to engage said seat when raised by pressure, said valve having a downwardly projecting stem, and an apertured guide sleeve within said casing and slidably receiving said stem, said guide sleeve being secured to the lower end of said casing and extending around said inlet.

In testimony whereof I affix my signature.

LYMAN W. WILLIAMS.