(No Model.)

# I. M. SEAMANS.

## AUTOMATIC WATER HEATER.

No. 545,735. Patented Sept. 3, 1895.

Fig. 1.

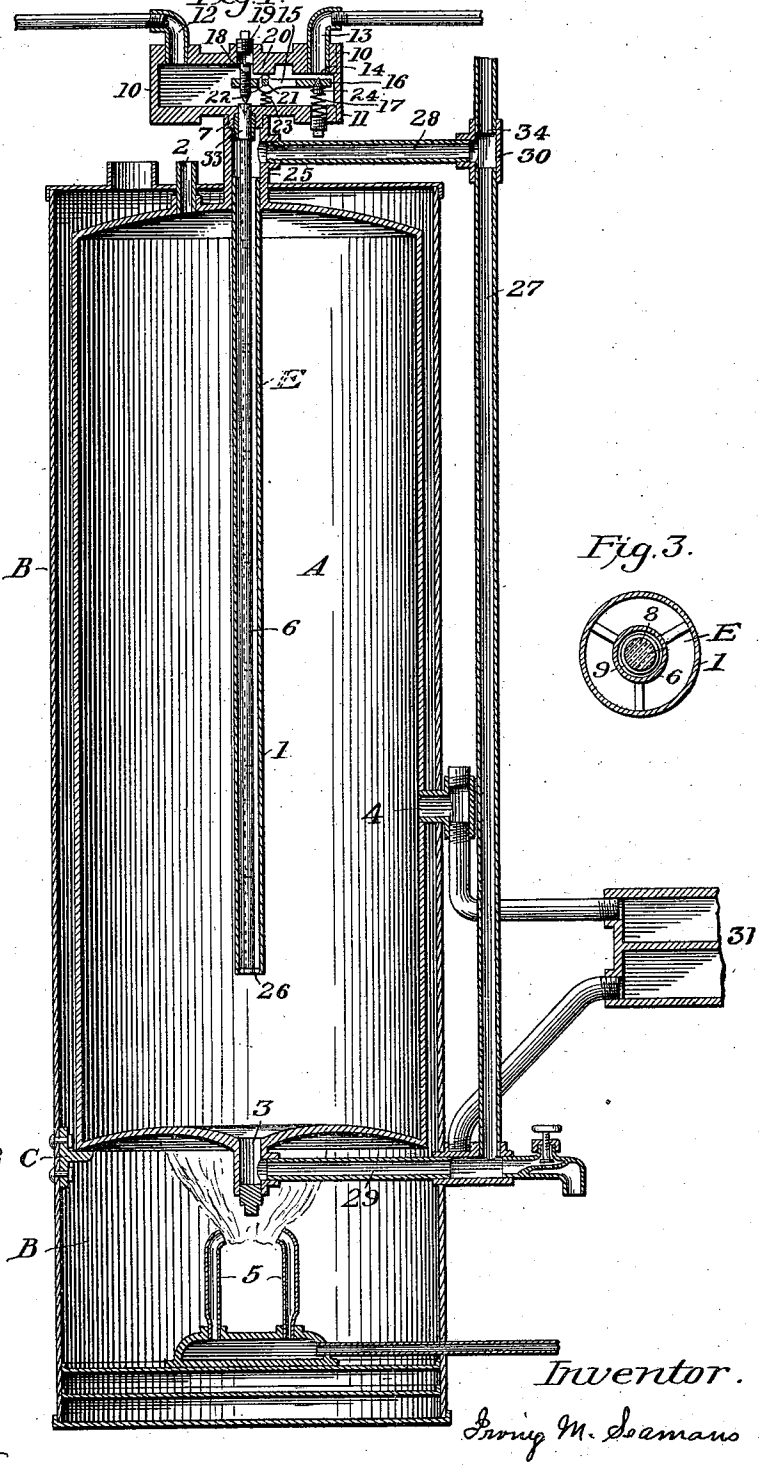


Fig. 2.

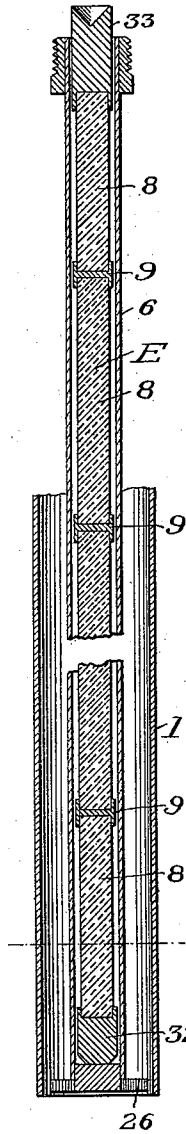


Fig. 3.




Witnesses.
Charles E. Clark
Edward G. Adolff

Inventor.
Irving M. Seamans

# UNITED STATES PATENT OFFICE.

IRVING M. SEAMANS, OF BUFFALO, NEW YORK.

## AUTOMATIC WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 545,735, dated September 3, 1895.

Application filed October 20, 1894. Serial No. 526,530. (No model.)

*To all whom it may concern:*

Be it known that I, IRVING M. SEAMANS, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Automatic Water-Heaters, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a section of an ordinary kitchen-reservoir with my improved devices attached thereto. Fig. 2 is a section of my improved thermostat. Fig. 3 is an end view of the same, showing how it is supported at the lower end.

This invention relates to devices employed in connection with kitchen boilers or reservoirs when heated by gaseous fuel.

It has for its object the control of the flow of gas, so that a full flame will be produced whenever hot water is drawn from the reservoir and checked as soon as the incoming water is heated, thus preserving a uniform temperature, as near as may be, to the contents of the reservoir and preventing its overheating.

The invention consists in the novel features and in the combination or arrangement of parts hereinafter described, and pointed out in the claims following the description.

Devices for the control of the temperature of hot water by regulating the flame by which it is heated are in common use, but in many of them the apparatus is situated outside of the reservoir, and is operated by either the flow or circulation of the water, or both. When the gas is turned on by the incoming cold water, a considerable interval of time must elapse before the hot water can re-establish its flow and check the gas-flame, and in consequence if water is drawn in small quantities and at frequent intervals there is danger of the reservoir being overheated. My invention is intended to overcome this difficulty.

The reservoir A is inclosed in the jacket B, being supported therein by means of a number of brackets C. The boiler is supplied with the usual central supply-pipe 1, through which cold water is delivered near its lower part, and has the escape-orifice 2 into which the hot-water pipe for supplying the house is screwed, and the usual openings 3 and 4 below and at the side, to which connections are made with the range water-back 31. Below the boiler is a gas-burner 5 by which it is heated.

The tube 6 is preferably made of brass, as being a metal which expands freely when heated, and is closed at its lower end. Its upper end is screwed tightly into the hub 7, making a water-tight joint therein.

In the tube 6 is the rod E, of some non-expansible material, such as wood, glass, or porcelain. I usually make it of glass, and to provide in it a certain amount of flexibility and prevent risk of its breakage I make it in short sections 8, connected by the double-cupped pieces 9, which will enter freely into the tube 6 without much lateral play. The lower end of this composite rod E is shod with a metal cap 32, bearing upon the closed end of the tube 6, and its upper end is surmounted by a conically-cupped metal piece 33, in which is received the point of the adjusting-screw 18. As the tube 6 will expand more by heat than the rod which it contains, the upper end of the latter will lower when the tube 6 is heated or rise as its cools. This movement is used to operate a valve for controlling the flow of gas to the burner 5. The valve may be of any construction which will open as the rod E rises or close as it descends. I prefer, however, the one I show, which is constructed as follows: A casing 10 has a cover 11, fitting gas-tight, a gas-inlet 12 and gas-outlet 13, the entrance to the latter from the interior of the casing being provided with an annular valve-seat 14. A lever 15 has upon one end a flat circular valve 16, which is held against its seat 14 by a spiral spring 17. At the other end of the lever is the adjusting-screw 18, which is received into the cupped end of the rod E. Access to this for its adjustment is had by removing the plug 19. The lever fulcrums upon a cross-rib 20 in the casing 10, which has fastened in it a taper pin 21. The part of the lever forming the fulcrum is cylindrical with a hole 22 loosely fitting the pin 21. The fulcrum thus has a rolling movement on the rib 20, which is nearly frictionless. It is sustained against the rib 20 by the spring 23. The valve 16 will therefore be opened by the thrust of the rod E, and will be closed as it recedes by the spring 17. The

cold-water pipe 1 is furnished at its upper end with a T 25, into which the hub 7 is screwed. The thermostatic tube 6 is placed in the tube 1, being held centrally therein by the wings 26 at the lower end, and its connection with the hub 7 at the upper end, and the rod E is placed within it. Suitable connections for gas and water being made and the reservoir being heated the valve 16 will be closed as the tube 6 expands by the heat, and the gas supply to the burner will be cut off, a by-pass 24 being provided to prevent extinguishment of the flame. When hot water is drawn, cold water enters through 1, chilling 6, and causing it to contract. The rod E is raised, opening the valve 16, giving a full flame to the burner 5. As soon as the flow of water stops, heat is transmitted to the cold water in 1, expanding 6, and allowing the valve 16 to again close. It is evident that by this arrangement the valve 16 will be quickly opened, and that the time of its closure will depend upon the time required to heat the layer of cold water remaining between 1 and 6, and if small quantities of water should be repeatedly drawn the flame may be on so much of the time as to overheat the boiler. In order to remedy the evil, I introduce the circulating-pipe 27, extending from the horizontal supply-pipe 28 to the horizontal pipe 29, which enters the bottom of the boiler at 3. A part of the cold water will pass downward through 27 and the tube 6 will be less quickly chilled, while as soon as the flow stops hot water will rise in 1, driving the cold water downward through 27 and quickly heating 6. In this manner the opening of the valve 16 may be delayed and its closure accelerated.

I contemplate using the apparatus when arranged in this manner as an auxiliary to the ordinary water-back of the kitchen-range. The cold water being delivered entirely in the bottom of the boiler will be heated by circulating through the water-back 31, and when either on account of the quantity of water drawn or from the range being out of use the cold water reaches the lower end of pipe 1 the gas will be turned on to heat it.

There are two advantages gained by the use of the lever-valve, as shown. One is the increased movement given to the valve by properly proportioning the lever, the other from the non-liability of the parts to be strained. The valve opens by the thrust of the rod E, and space is easily made to accommodate any possible amount of movement, while any movement in the opposite direction after the valve is closed simply causes the parting of the head 33 from the adjusting-screw 18. Then by the rolling movement of the fulcrum the action of the valve is nearly frictionless.

I now claim as my invention—

1. In a device for automatically controlling the temperature of a hot water reservoir, the combination with the reservoir, of the cold water supply pipe having a prolongation projecting within the reservoir, a tube of expansible metal disposed within said prolongation, a rod of non-expansible material arranged within said tube, a valve chamber having a gas inlet and outlet, a valve arranged therein and operated by the expansion and contraction of said tube for controlling the flow of gas used for heating the reservoir, and a circulatory pipe leading from the supply pipe to the bottom of the boiler, substantially as described.

2. In a gas valve, the combination with a casing having a gas inlet and outlet, a lever having a rolling fulcrum near its center, and provided at one end with a valve face having a by-pass and adapted to control the outlet, an adjusting screw at its other end by which it is operated, and a spring for holding the valve face to its seat, substantially as described.

IRVING M. SEAMANS.

Witnesses:
CHARLES E. CLARK,
GEORGE B. SNOW.