A. E. MILLER.

AUTOMATIC WATER HEATER.

APPLICATION FILED APR. 6, 1909.

959,573. Patented May 31, 1910.

Fig. 1.

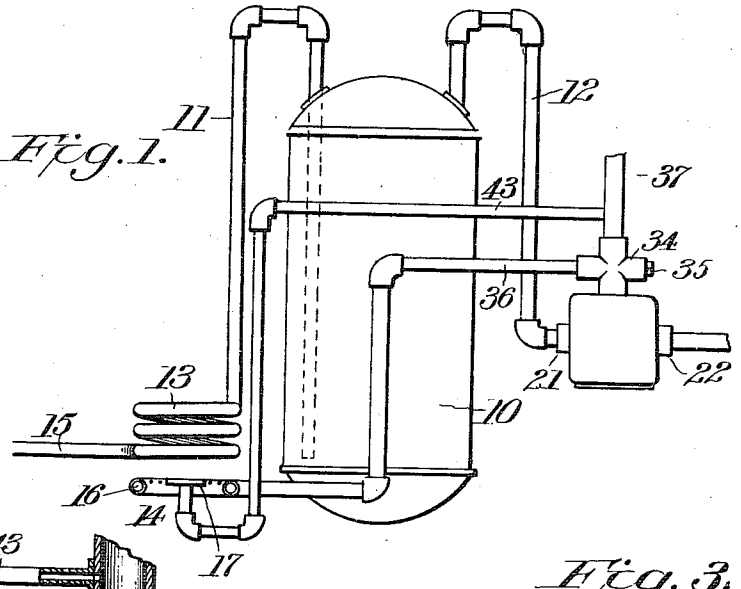
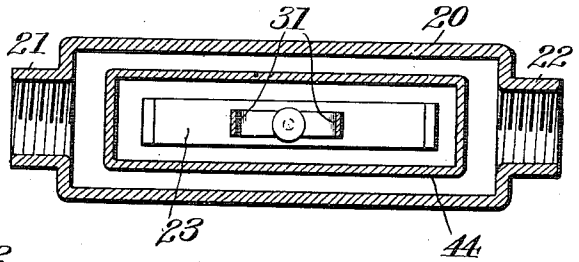


Fig. 3.



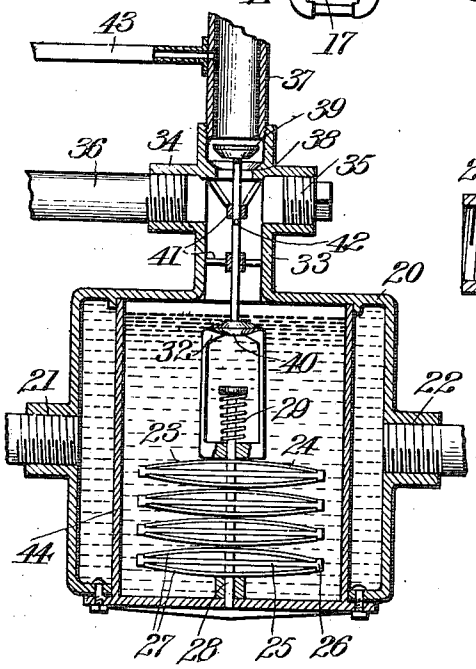


Fig. 2.

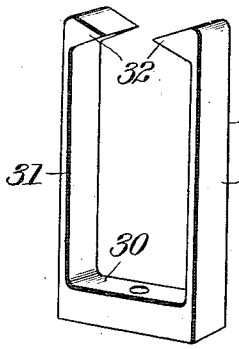


Fig. 4.

Witnesses

C. C. Walker.

M. E. Smith.

Inventor

Andrew E. Miller

By Wm. D. Hodges

Attorney

UNITED STATES PATENT OFFICE.

ANDREW E. MILLER, OF BALTIMORE, MARYLAND.

AUTOMATIC WATER-HEATER.

959,573. Specification of Letters Patent. Patented May 31, 1910.

Application filed April 6, 1909. Serial No. 488,228.

To all whom it may concern:

Be it known that I, ANDREW E. MILLER, of Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Automatic Water-Heaters, of which the following is a specification.

This invention contemplates certain new and useful improvements in automatic water heaters, and relates more particularly to that class of devices in which a gaseous fuel is employed as a heating medium and in which the supply of fuel is automatically regulated in accordance with the temperature of the water.

The invention has for its object the provision of improved means for controlling the gas supply to a burner, whereby the latter will be automatically ignited or extinguished when the water attains a minimum or maximum temperature, as the case may be.

A further object is to provide an improved thermostatic device for controlling the gas supply, whereby the heating medium is controlled solely by the temperature of the water to be heated.

A further object is to provide means for positively operating the gas controlling valve without the interposition of levers.

The invention will be hereinafter fully set forth and particularly pointed out in the claims.

In the accompanying drawing:—Figure 1 is a view, partly in elevation, illustrating the application of my invention. Fig. 2 is an enlarged sectional view illustrating the gas controlling apparatus. Fig. 3 is a horizontal sectional view. Fig. 4 is an enlarged detail perspective view of the spring yoke.

Referring to the drawing, 10 designates a storage tank of any preferred construction, provided with the water inlet pipe 11, and the outlet pipe 12.

In the drawings I have conventionally illustrated a heater 14 comprising the heating coils 13 for the water, the gas burner 16 for heating said coils, and a pilot burner 17 of any suitable or preferred form located adjacent the burner 16. Water is fed to the coils 13 by a suitable pipe 15 connected with the street main or other source of supply, and from said coils passes through the supply pipe to the tank 10.

The gas controlling apparatus comprises a casing 20 provided with an inlet opening 21 communicating with pipe 12, and an outlet opening 22 leading to the point at which it is desired to deliver the hot water, such for instance as the bath room of a dwelling, or the rooms of a large apartment house or other building. Located within the casing 29 is a thermostat 23 made up of a plurality of elements 24, each element comprising a central bar 25 provided with shoulders 26 at each end in which are stepped the ends of bowed pieces 27 formed of a metal of a different coefficient of expansion from that of the bar 24. Each bar is provided with a central hole or opening whereby the several thermostatic elements may be strung upon a rod 28, and freely move thereupon, the upper end of said rod being headed to form an abutment for a spring 29 encircling said rod and bearing upon the top element of the thermostat. By this arrangement the spring serves as a cushion for the thermostat and aids in returning the parts to their normal positions under contraction.

Secured to the top thermostatic element 24 is a spring yoke 30 provided with resilient arms 31 the free ends of which are provided with inwardly extended wedge shaped heads 32. The top of the casing 20 is provided with a neck 33 carrying the usual T-coupling 34, one branch of which I have illustrated as closed by a plug 35, the other branch receiving one end of the pipe 36 leading to the burner 16. The gas main 37 leads into the top of said coupling and is provided with a valve seat 38 against which a valve 39 is adapted to seat for the purpose of controlling the supply of gas to the burner 16. Said valve is provided with a depending stem having a flange 40 at its lower end provided with oppositely beveled or wedge-shaped faces, the angle of the bevel conforming to the angle of the faces of heads 32. Suitable guides 41 are provided for the valve stem, and a stop 42 is provided to limit the upward movement of the valve. The pilot burner 17 is supplied by a pipe 43 leading from the main 37 at a point above the valve 39. In practice, I also prefer to inclose the thermostatic elements within a supplemental casing 44 adapted to contain oil, or the like, the water from the tank passing around the supplemental casing. In this manner the thermostatic elements are protected from the corrosive action of the water and at the same time are rendered more sensitive to the temperature of the latter.

In Fig. 2 the parts are illustrated with the valve open and a supply of gas flowing

to the burner, the flange 40 resting upon the heads 32, the weight of the valve being sustained in this manner. As the water is heated in tank 10 it flows around the supplemental casing 44 and as the latter becomes heated the thermostat expands, creating a pressure against the underside of the flange 40. Inasmuch as upward movement of the valve is prevented by the stop 43 the continued expansion of the thermostat will effect a gradual separation of the heads 32 by reason of the pressure against the underside of flange 40 until the extremities of said heads pass beyond the outer edge of said flange, whereupon said heads will spring back over the top face of said flange, suddenly changing the direction of pressure on valve 39 and bringing the latter quickly and sharply to its seat and cutting off the supply of gas to burner 16. As the water is drawn off and the temperature is reduced, the thermostat contracts, whereupon a pulling pressure is exerted on the top face of flange 40, causing the heads 32 to spread until they snap beneath the under face of said flange, forcing the valve off its seat and permitting a flow of gas to the burner 16 where it will be automatically ignited by the pilot burner 17. In this manner a uniform supply of hot water is automatically obtained.

I claim as my invention:—

1. A controlling device for automatic gas heaters comprising a valve, a thermostat, and means formed to impart a sudden movement to said valve to open and close the latter, said means being carried by the thermostat and movable with respect to said valve.

2. A controlling device for automatic gas heaters comprising a valve, a thermostat, and a resilient member formed to impart a sudden movement to said valve to open and close the latter, said member being carried by the thermostat and movable with respect to said valve.

3. A controlling device for automatic gas heaters, comprising a valve, a thermostat, and spring fingers carried by said thermostat and constructed to actuate said valve.

4. A controlling device for automatic gas heaters, comprising a valve, a thermostat, spring fingers carried by said thermostat and adapted to operate said valve, and means for spreading said fingers and suddenly releasing the same as the thermostat expands and contracts.

5. A controlling device for automatic gas heaters, comprising a valve, a thermostat, spring fingers carried by said thermostat, and a flange carried by said valve and arranged to engage said fingers.

6. A controlling device for automatic gas heaters, comprising a valve, a thermostat, spring fingers carried by said thermostat, and a flange carried by said valve, said flange being provided with inclined surfaces.

7. A controlling device for automatic gas heaters, comprising a valve, a thermostat, spring members carried by said thermostat and provided with heads, and a flange carried by said valve and adapted to engage said heads.

8. A controlling device for automatic gas heaters, comprising a valve, a thermostat, spring members carried by said thermostat and provided with heads, and a flange carried by said valve, said flange being provided with inclined faces adapted to engage said heads.

9. A controlling device for automatic gas heaters, comprising a valve, a thermostat, spring members carried by said thermostat and provided with inwardly-extended wedge-shaped heads, and a flange carried by said valve, said flange being provided with inclined faces adapted to engage said heads.

10. A controlling device for automatic water heaters, comprising a valve, a thermostat made up of a plurality of thermostatic elements each capable of independent movement, and means formed to impart a sudden movement to said valve to open and close the latter, said means being carried by the thermostat and movable with respect to said valve.

11. A controlling device for automatic water heaters, comprising a valve, a thermostat made up of a plurality of thermostatic elements each capable of independent movement, and a resilient member formed to impart a sudden movement to said valve to open and close the latter, said member being carried by the thermostat and movable with respect to said valve.

12. A controlling device for automatic gas heaters comprising a casing provided with an inlet and an outlet, a supplemental casing located therein, a thermostat located within said supplemental casing, a valve located exteriorly of both of said casings, and means formed to impart a sudden movement to said valve to open and close the latter, said means being carried by the thermostat and movable with respect to said valve.

13. A controlling device for automatic gas heaters comprising a valve, thermostatic means for creating a pressure upon said valve tending to hold the latter immovable, and means connected with the valve for suddenly changing the direction of pressure and coöperating with said thermostatic means to operate said valve.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

ANDREW E. MILLER.

Witnesses:
JOHN A. HENKUS,
WM. S. HODGE.