

H. S. HUMPHREY.
WATER HEATER.
APPLICATION FILED OCT. 18, 1911.

1,033,896.

Patented July 30, 1912.
2 SHEETS-SHEET 1.

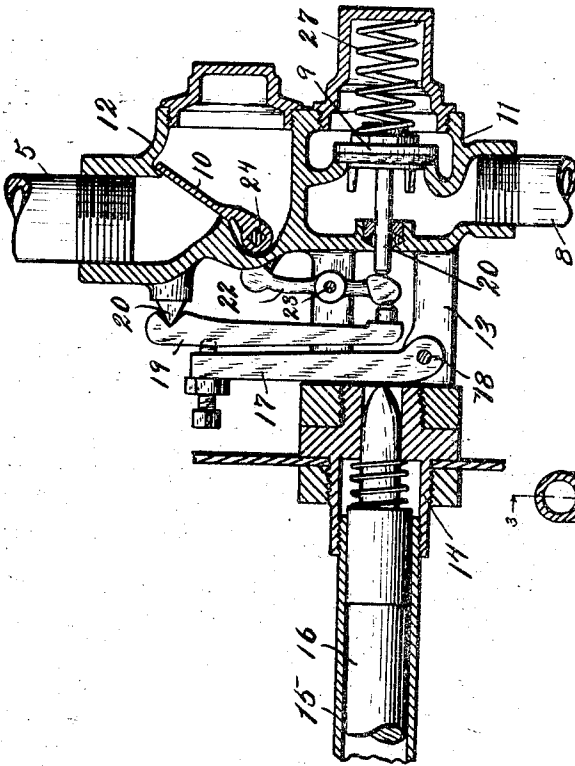


FIG. I.

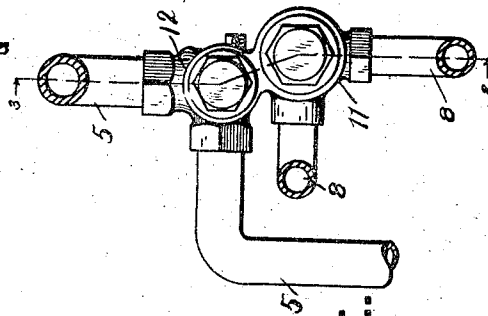


FIG. II.

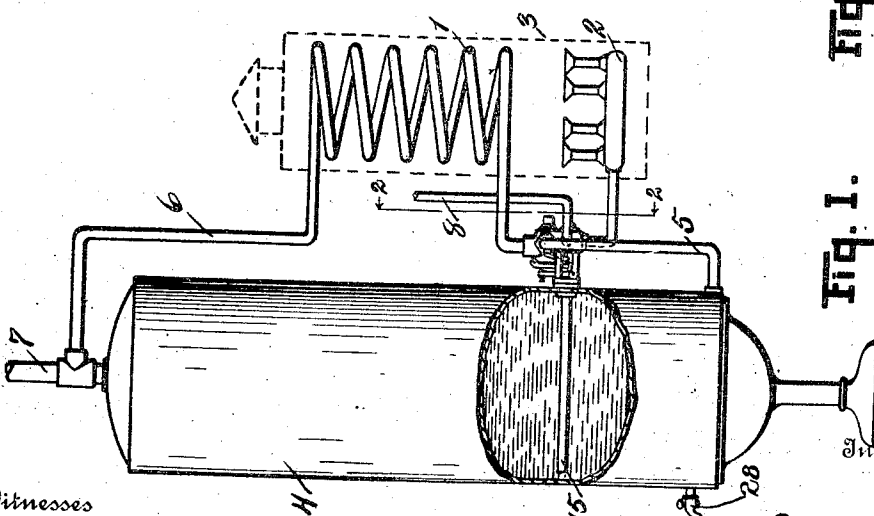


FIG. III.

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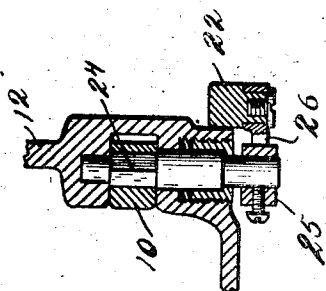


FIG. V.

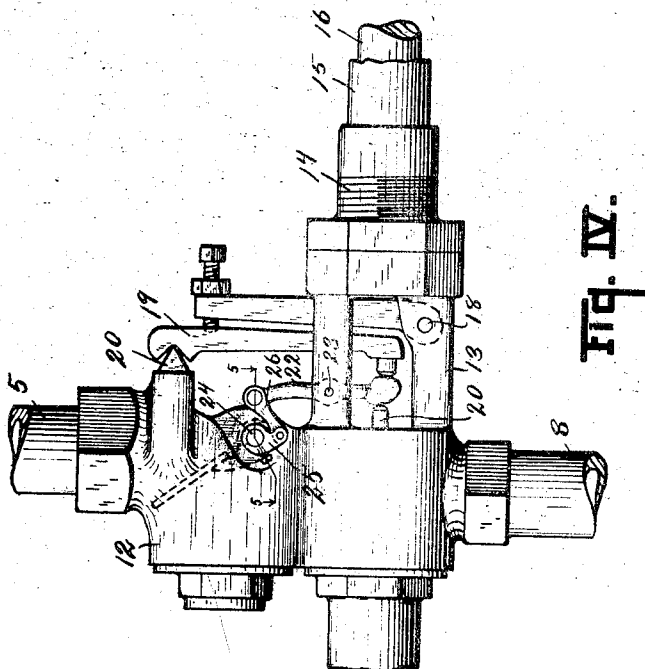


FIG. IV.

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UNITED STATES PATENT OFFICE.

HERBERT S. HUMPHREY, OF KALAMAZOO, MICHIGAN.

WATER-HEATER.

1,033,896.

Specification of Letters Patent.

Patented July 30, 1912.

Application filed October 18, 1911. Serial No. 655,415.

To all whom it may concern:

Be it known that I, HERBERT S. HUMPHREY, a citizen of the United States, residing at the city of Kalamazoo, county of Kalamazoo, and State of Michigan, have invented certain new and useful Improvements in Water-Heaters, of which the following is a specification.

This invention relates to improvements in water heaters.

In water heating systems where the water is maintained at a comparatively uniform temperature by means of a thermostat located in the system which controls the fuel valve, much heat is lost owing to the heater becoming a radiator through which the water circulates when the heat is cut off.

It is the main object of my invention to provide an improved valve mechanism by which the circulation of the water through the heater is cut off when the temperature of the water in the reservoir or system is above a predetermined point and the fuel valve is cut off.

A further object is to provide a structure possessing these advantages which is simple and economical and not likely to get out of repair.

Further objects, and objects relating to structural details, will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification.

The invention is clearly defined and pointed out in the claims.

A structure which is a preferred embodiment of my invention is clearly illustrated in the accompanying drawing, forming a part of this specification, in which:

Figure I is a detail side elevation of a structure embodying the features of my invention, the heater being shown in conventional form, the casing being indicated by dotted lines, and a portion of the reservoir wall being broken away to show the arrangement of the thermostat therein. Fig. II is a detail vertical section taken on a line corresponding to line 2—2 of Fig. I. Fig. III is an enlarged detail vertical section taken on a line corresponding to the broken line 3—3 of Fig. II, the parts being shown in full lines for convenience in illustration. Fig. IV is a detail side elevation looking from

the right of Fig. II. Fig. V is a detail sec-

tion taken on the broken line 5—5 of Fig. IV.

In the drawing, similar reference characters refer to similar parts throughout the several views, and the sectional views are taken looking in the direction of the little arrows at the ends of the section lines.

Referring to the drawing, the heater is provided with coils 1 which are shown in conventional form and with burners 2. The casing 3 is indicated by dotted lines. The heater is connected to the reservoir or tank 4 by the pipes 5 and 6, pipe 5 being the inlet pipe for the heater and the pipe 6 the discharge pipe. The water supply is delivered to the reservoir 4 through the pipe 7. The water is drawn off from the reservoir through the faucet 28. The burners 2 are supplied from the gas supply pipe 8. The supply of fuel to the burners is controlled by the valve 9, while the water pipe 5 is controlled by the circulation valve 10.

The fuel valve casing 11 and the water or circulation valve casing 12 are preferably formed integrally as illustrated and are also preferably provided with an integrally formed bracket 13 which is provided with a nipple-like projection 14 arranged through the wall of the reservoir to receive the outer thermostat member or tube 15. Within this tube 15 is a second thermostat member 16. This rod member 16 acts upon the thermostat lever 17 which is pivoted at 18 on the bracket 13. The lever 17, in turn, acts upon the thermostat lever 19 which is pivoted at 20 on the water valve casing 12. The water valve actuating lever 22 is pivoted at 23 and interposed between the thermostat lever 19 and the stem 23 of the fuel valve 19 (see Fig. III).

The water valve 10 is of the hinged type, its stem 24 being pivoted in the valve casing. On the outer end of the stem 24 is an arm 25 which is connected by the link 26 to the lever 22. The fuel valve is returned to its seat by the spring 27 and as the lever 22 is engaged by the stem 23 of the fuel valve, the water valve is also closed by this spring.

With the parts thus arranged, when the temperature of the water falls below a predetermined point, the thermostat levers are actuated and they in turn act upon the fuel and water valves through the connections described to open the same. The thermostat holds the valves in their open position until

the temperature of the water in the reservoir or circulating system rises above a predetermined point when the thermostat member 16 is retracted allowing the spring 27 to close the valves. This stops the circulation through the water heater. This results in a substantial saving of fuel.

The operation of the device is entirely automatic and as the fuel valve cannot be opened without the opening of the water valve, no injury can result to the heater as might occur if the fuel valve were turned on without the circulation of water through the heater.

I have illustrated and described my improved valve mechanism in a simple and practical form. I have not attempted to illustrate or describe the various modifications which are possible as such modifications will no doubt be readily understood by those skilled in the art to which this invention relates. I desire, however, to be understood as claiming my improvements specifically in the form illustrated as well as broadly within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. The combination of a water heater; a reservoir having a circulating connection with said heater; a hinged circulation valve; a thermostat arranged in said reservoir; a fuel valve for said heater; a return spring for said fuel valve; circulation and fuel valve casings formed integrally and having an integrally formed supporting bracket to which said thermostat is secured, mounted on said tank; a thermostat lever pivoted on said bracket; a second thermostat lever pivoted on the circulation valve casing, the first lever being arranged to act on the second; a circulation valve actuating lever pivoted on said bracket and interposed between said second thermostat lever and the stem of the fuel valve; an arm on the stem of the said circulation valve; and a link connecting said arm to said circulation valve actuating lever.

2. The combination of a water heater; a reservoir having a circulating connection with said heater; a hinged circulation valve; a thermostat arranged in said tank; a fuel valve for said heater; a return spring for said fuel valve; a circulation valve actuating lever interposed between said thermostat lever and the stem of the fuel valve; an arm on the stem of the said circulation valve; and a link connecting said arm to said circulation valve actuating lever.

3. The combination of a water heater; a hinged valve; a thermostat arranged in said tank; a fuel valve for said heater; a return spring for said fuel valve; a water valve actuating lever interposed between said

thermostat lever and the stem of the fuel valve; an arm on the stem of the said water valve; and a link connecting said arm to said water valve actuating lever.

4. The combination of a water heater; a circulation system including said heater; a thermostat arranged in said circulation system; a thermostat actuated member; a fuel valve; a hinged circulation valve; a circulation valve actuating lever interposed between the stem of the fuel valve and said thermostat actuated member; an arm on the stem of said circulation valve; a link connecting said arm to said lever; and a return spring for said fuel valve.

5. The combination of a water heater; a circulation system including said heater; a thermostat arranged in said circulation system; a thermostat actuated member; a fuel valve; a circulation valve; a circulation valve actuating lever interposed between the stem of the fuel valve and said thermostat actuated member whereby the fuel and circulation valves are simultaneously opened by the thermostat; and a spring for closing said valves acting on said fuel valve.

6. The combination of a water heater; a reservoir having a circulating connection with said heater; a thermostat in said reservoir; a circulation valve; and a fuel valve, said thermostat being arranged to simultaneously open and close said fuel and circulation valves.

7. The combination of a water heater; a reservoir having a circulating connection with said heater; a thermostat; a circulation valve; and a fuel valve, said thermostat being arranged to actuate both said fuel and said circulation valve whereby they are simultaneously opened.

8. The combination of a water heater; a circulation system including said heater; a thermostat in said circulation system; a circulation valve controlling the passage of water from the circulation system to said heater; and a fuel valve for said heater, said thermostat being arranged to actuate said fuel and circulation valves to simultaneously open and close the same.

9. The combination of a water heater; a circulation system, including said heater; a thermostat in said circulation system; a circulation valve controlling the passage of water from the circulation system to said heater; and a fuel valve for said heater, said thermostat being arranged to close said circulation and fuel valves when the temperature of the water in the circulation system exceeds a predetermined point.

10. The combination of a water heater; a circulation system, including said heater; a thermostat in said circulation system; and a circulation valve controlling the passage of water from the circulation system to said heater, said thermostat being ar-

ranged to cut off the delivery of fuel to the heater and to close said circulation valve when the temperature of the water reaches a predetermined point.

11. The combination of a water heater; a fuel delivery means; a thermostat; and a circulation valve controlling the passage of water from the circulation system to said heater, said thermostat being arranged to cut off the delivery of fuel to the heater

and to close said valve when the temperature of the water reaches a predetermined point.

In witness whereof, I have hereunto set my hand and seal in the presence of two witnesses.

HERBERT S. HUMPHREY. [L. s.]

Witnesses:

F. A. LEMKE,

E. S. ELLIOTT.