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R. R. ROOT

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WATER HEATING CONTROLLING DEVICE

Filed March 6, 1922

Fig. 1.

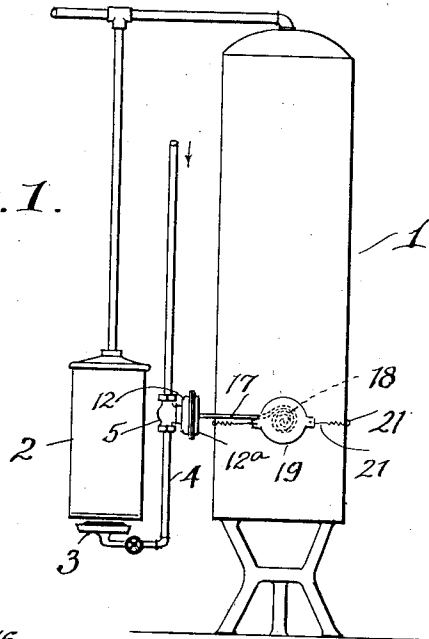


Fig. 2.

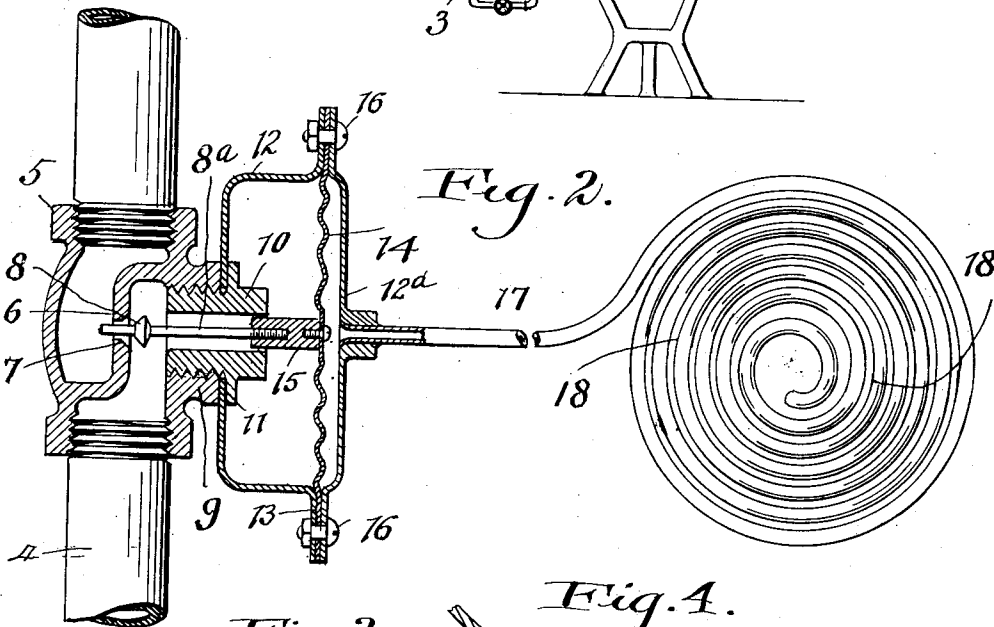


Fig. 3.

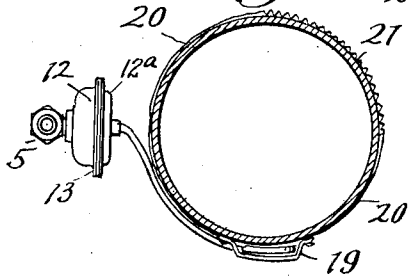
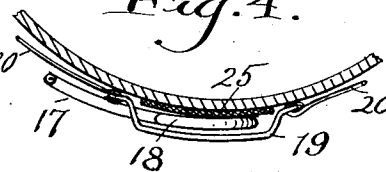


Fig. 4.



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WATER-HEATING CONTROLLING DEVICE.

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The present invention relates to a device and the combination thereof with a water tank for controlling the heating of the water within the tank to maintain the water at a desired temperature.

The object of the invention is to provide a device which may be associated with water tanks of usual construction and applied to the outside of a water tank, thereby necessitating no trapping of the water tank to permit insertion of the device as is required when using devices of similar nature.

Reference should be had to the accompanying drawings forming a part of this specification, in which Fig. 1 is an elevation of a water tank, a water heater and the controlling device; Fig. 2 is an elevation with portions in section of the controlling device, and its application to a fuel line; Fig. 3 is a plan view showing the water tank in section with the controlling device applied; Fig. 4 is a sectional view of a portion of the tank with the controlling device applied.

Referring to the drawings, 1, indicates a water tank which may be of usual or any preferred construction, 2 represents a water heater of any desired type which may be heated by gas or any other fluid fuel.

In the present instance, the heating device is a gas burner 3 which is supplied with gas through a pipe 4. The water heater 2 is connected with the water container in the usual fashion or in any desired and approved way.

Associated with the fuel pipe 4 is a valve which is generally indicated at 5. This valve comprises a body portion with an inner partition 6 in which is a valve seat 7 and a valve 8 which is adapted to co-operate with said seat thereby to control the passage of a fluid through the seat.

The valve casing has a neck 9 which is interiorly threaded, and this co-operates with a nut 10 which has a flange 11 and between the flange 11 and the end of the neck 9 there is held a casing 12.

This casing has at its outer portion a flange 13 and overlying the flange 13 is a diaphragm 14 which in the present instance is made of light gauge metal corrugated to make it more flexible.

The valve 8 is carried upon a valve stem 8^a, and this valve stem is adjustably secured to the diaphragm 14. In the present instance this is accomplished by securing a block 15 to the inner side of the diaphragm 14 and providing the same with a threaded opening

which receives the threaded end of the valve stem 8^a. Relative movement of the valve stem 8^a and the block 15 will provide an adjustment for the valve 8 with respect to the valve seat 7.

A cover member 12^a is provided which has a flange at the edge thereof, the same overlying the edge of the diaphragm 14, and by any suitable means such as by bolts and nuts as indicated at 16, the flange 13 on the casing 12, the edge of the diaphragm 14, and the flange on the cover 12^a are secured together and form a tight joint.

Extending through the cover 12^a is one end of a tube 17, the inside of the tube communicating with the space between the cover 12^a and the diaphragm 14. This tube 17 may be of any desired length, and in order to obtain increased surface for contact with the water container a portion of the tube 17 may be formed into a coil such as indicated at 18.

The end of the tube 17 opposite to that which co-operates with the cover 12^a is closed, and within the tube and the space between the cover 12^a and the diaphragm 14 there is placed a fluid which is sensitive to heat and will respond readily and quickly to the presence of heat by the expansion of the fluid and the quick contraction of the same when the heat is removed. A fluid which is suitable for the purpose is ether, but I do not confine myself to this substance only.

The tube 17 or a part thereof is brought into contact with the outside surface of the water container 1, and for the purpose of securing contact between the tube 17 and the water container I provide a holding device which consists of a part 19 that co-operates with the tube 17 or a portion thereof, such as the coil portion 18. This holding member 19 is retained on the water container by means of a holding device 20 which extends around the water container, and as a part thereof may have a coil spring 21 which will resiliently hold the member 19 in position.

The member 19 also serves to protect the tube 17 or at least, the part thereof which is in contact with the water container from the influence of the surrounding air, so that the tube 17 is substantially only affected by the heat transferred to it from the water within the water container through the wall of the container itself.

In order to modify the sensitiveness of the device, a sheet of paper or other material may be inserted between the tube 17 or the

portion thereof contained within the member 19, which will serve to make the device slower in responding to the heat change which may take place in the water within the water container 1.

The position or place of contact between the tube 17 and the water container will determine the amount of hot water which will be contained within the water container. If the tube 17 be placed in contact with the water container at the lower part of the water container, then the quantity of hot water maintained within the water tank will be represented by the capacity of the tank from the top to the place where the tube 17 is contacting therewith. The same is true for any other position of the tube 17.

In operation the gas or other fuel being supplied to the water heater 2 will cause the water to heat and accumulate in the water tank 1. As the water in the tank 1 becomes heated it will affect the liquid within the tube 17 causing it to expand, and thereby moving the diaphragm 14 in a direction to seat the valve 8, and thus shut off the supply of fuel to the water heating tank 2. When the temperature of the water becomes lower than the fluid within the pipe 17 contracts and the diaphragm 14 returning to its initial position unseats the valve 8 and permits the passage of fuel to the burner of the water heater 2.

By placing a sheet of paper or other substance between the pipe 17 and the outer surface of the water container as shown at 25 in Fig. 4 the fluid within the pipe 17 is slower

to respond, that is to say, the water in the tank will reach a higher temperature before it affects the fluid within the pipe 17. Therefore, and in this manner, the temperature at which the water within the tank is to be maintained may be very effectually controlled.

Having described my invention, I claim:—

1. A thermostatic device for controlling a valve in the gas pipe leading to a burner for heating water in a container comprising a member having a chamber with a flexible diaphragm connected to the valve and supported on said pipe and a flexible tubular extension extending laterally from said chamber, connected therewith and supported thereby, said tubular extension and chamber being filled with a thermally responsive substance, and said extension terminating in a substantially flat spiral coil adapted to be held in contact with the outer surface of the container, and a cup-shaped holding member detachably secured to the container and enclosing said coil.

2. A thermostatic device for controlling the operation of a device for heating water in a container comprising a chamber having a flexible diaphragm wall and a tube communicating at its inner end with the interior of said chamber and closed at its outer end, the outer portion of said tube being bent into a flat spiral coil adapted to lie against a wall of the container, said chamber and tube being filled with a thermally responsive substance.

In testimony whereof, I hereunto affix my signature.

RALPH R. ROOT.