June 24, 1930. G. C. DE LANNOY 1,766,068

INSTANTANEOUS ELECTRIC WATER HEATER

Filed Sept. 14, 1928

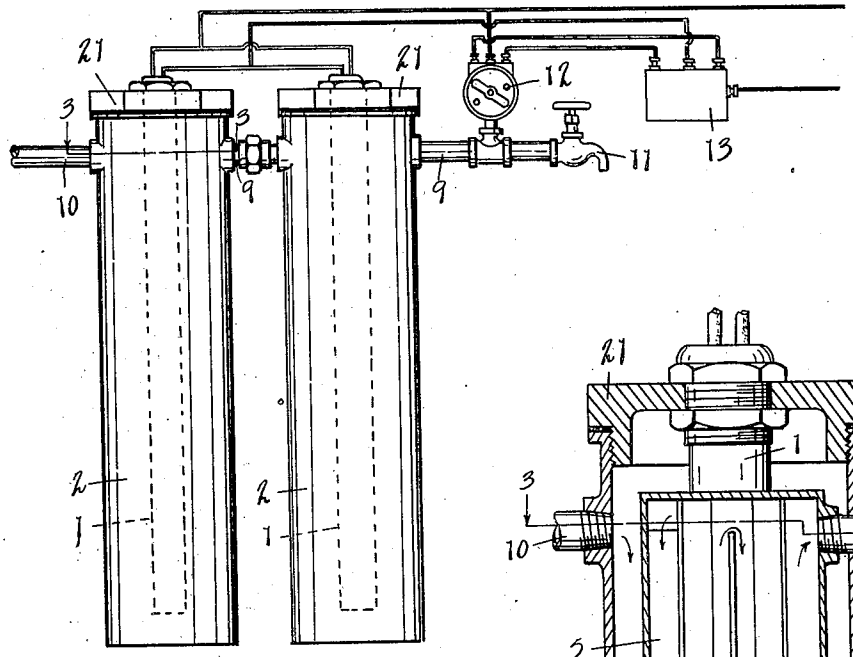


Fig. 1

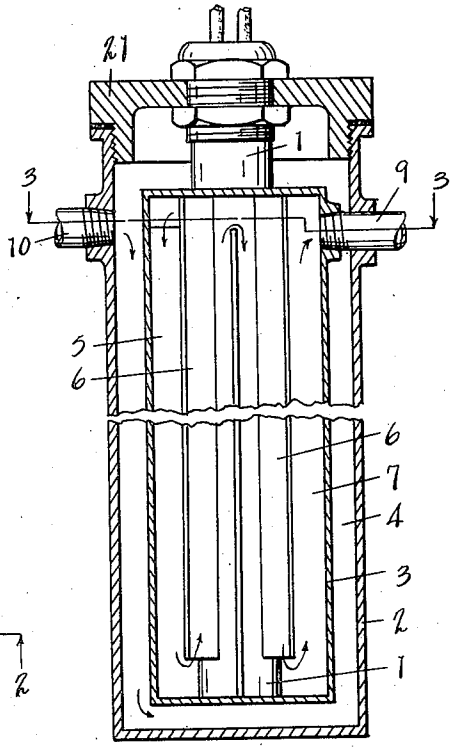


Fig. 2

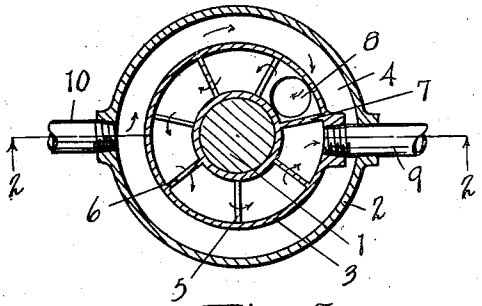


Fig. 3

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UNITED STATES PATENT OFFICE

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INSTANTANEOUS ELECTRIC WATER HEATER

Application filed September 14, 1928. Serial No. 305,890.

This invention relates to improved instantaneous electric water heaters.

The objects of the invention are:

First, to provide an improved construction and installation of the heating unit to insure circulation of a stream of water in contact with the heating element for a period long enough to insure the desired degree of heat.

Second, to provide an improved construction of water circulating reservoir for such instantaneous heater.

Third, to provide an improved control for the electric current making the heater automatic on opening the faucet.

Objects pertaining to details and economies of construction and operation will definitely appear from the description to follow.

A structure which is a preferred embodiment of my invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a conventional illustration of my improved electric water heater.

Fig.. 2 is an enlarged detail vertical fragmentary section on a vertical plane through the water intake and discharge showing details of construction and arrangement.

Fig. 3 is a detail transverse sectional view on line 3—3 of Fig. 2 with the circulation indicated.

The parts will be identified by their numerals of reference which are the same in all the views.

1 is the central heating unit of any well-known construction adapted for connection to either direct or alternating current. 2 is the outer reservoir casing, cylindrical in form, embracing the said heating unit, the same having a head 21 to which the heating unit is secured, being suitably insulated therefrom.

The heating unit is of the encased type and is surrounded by a labyrinthine reservoir 3, forming an annular space 4 between the unit and the said reservoir 3. This annular space is divided by longitudinal partitions 5, 6. Each partition 5 extends from the bottom of the casing to a point near the top and the partitions 6 alternate therewith and extend from the top of the casing into spaced relation with the bottom. A partition 7 extends from top to bottom.

8 is an inlet opening in the bottom of the shell 3 opening into one of the longitudinal passages next partition 7. 9 is the discharge connection from the top of the shell 3 out through the side of the shell 2. 10 is the inlet into the top of the shell 2 preferably diametrically opposite the outlet passage 9.

Water enters at 10, circulates around the shell 3 where it is partially heated, passes up through the opening 8 and then successively over and under the partitions 5 and 6 around to the opposite side of the complete partition 7 when it passes up and is discharged through the outlet pipe 9.

I have thus described one of my water heating units complete. The capacity of the electric heating unit is such that to insure the required amount of hot water at the rate of ordinary domestic use, a single unit is not sufficient. I, therefore, connect as many units in series as are necessary to secure the required capacity and temperature, connecting the discharge 9 from the first unit to the inlet 10 of the second unit and so on until the required number and capacity is reached.

At the final discharge pipe 9, whether one or more units are used, I provide a faucet 11. I connect to this discharge 9 a pressure gauge 12 where I substitute a switch arm in place of the usual indicator arrow, making the same a pressure controlled switch to alternately operate a reverse relay 13 to turn the current off or on as the case may be.

On opening the faucet 11 the pressure drops and the circuit is closed and the water is immediately heated. When the faucet is closed the pressure goes up and the switch arm is operated and controls the relay and cuts out the current.

I preferably use an improved relay recently patented and owned and controlled by the Holland Furnace Company. It is, therefore, unnecessary to show the details of this relay as my invention does not pertain to it but simply to the matter of the con-

trol of the current to the relay by the pressure switch gauge means.

The control means is capable of variation and my device is adapted for use with a manually operated switch. I, however, desire to claim the structure in the specific form in which I have illustrated it and also to claim it broadly as pointed out in the appended claims. The automatic pressure control could be adapted to instantaneous electric water heaters generally and I wish to claim it broadly.

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

1. The combination in an instantaneous electric water heater of a centrally disposed encased cylindrical electric heater unit, an outer surrounding shell with a head to which said heater unit is connected forming an outer reservoir, an inner labyrinthine reservoir comprising a cylindrical shell within the outer shell and embracing the said heating unit and held in spaced relation to the said electric heating unit by alternating longitudinal partitions extending from top to near bottom and from bottom to near top of the said space, a water supply connection leading to the outer shell and connecting to one end of the labyrinthine passage of the said labyrinthine reservoir, a discharge connection from the end of the labyrinthine reservoir out through the outer shell, a faucet to control said discharge, a pressure gauge with reverse switch means controlled thereby connected to said discharge, and a reverse relay for switching the current off and on.

2. The combination in an instantaneous electric heater of a centrally disposed encased cylindrical electric heater unit, an outer surrounding shell with a head to which said heater unit is connected forming an outer reservoir, an inner labyrinthine reservoir comprising a cylindrical shell within the outer shell and embracing the said heating unit and held in spaced relation to the said electric heating unit by alternating longitudinal partitions extending from top to near bottom and from bottom to near top of the said space, a water supply connection leading to the outer shell and connecting to one end of the labyrinthine passage of the said labyrinthine reservoir, a discharge connection from the end of the labyrinthine reservoir out through the outer shell, a faucet to control said discharge, and a switch for the current supply.

3. In an instantaneous electric water heater, the combination of a central electric heater unit, an outer shell forming an outer reservoir, an inner shell surrounding the said heater unit in spaced relation, partitions radially disposed within the inner shell forming water passages in contact with the heater unit and within the outer reservoir, a supply connection to the outer reservoir and a discharge connection from the inner reservoir, a faucet in the discharge, an electric switch, pressure connections to control the switch on the opening and closing of the faucet, as specified.

4. In an instantaneous electric water heater, the combination of a central electric heater unit, an outer shell forming an outer reservoir, an inner shell surrounding the said heater unit in spaced relation, partitions radially disposed within the inner shell forming water passages in contact with the heater unit and within the outer reservoir, a supply connection to the outer reservoir and a discharge connection from the inner reservoir, as specified.

5. In an instantaneous electric water heater, the combination of a central encased electric heater unit cylindrical in form, a shell surrounding the said heater unit in spaced relation, and radially disposed partitions forming labyrinth water passages in contact with the heater unit, as specified.

In witness whereof I have hereunto set my hand.

GEORGE C. DE LANNOY.