Jan. 18, 1938. S. D. ROBERSON 2,106,019

ELECTRIC WATER HEATER

Filed Aug. 5, 1935

FIG. 1

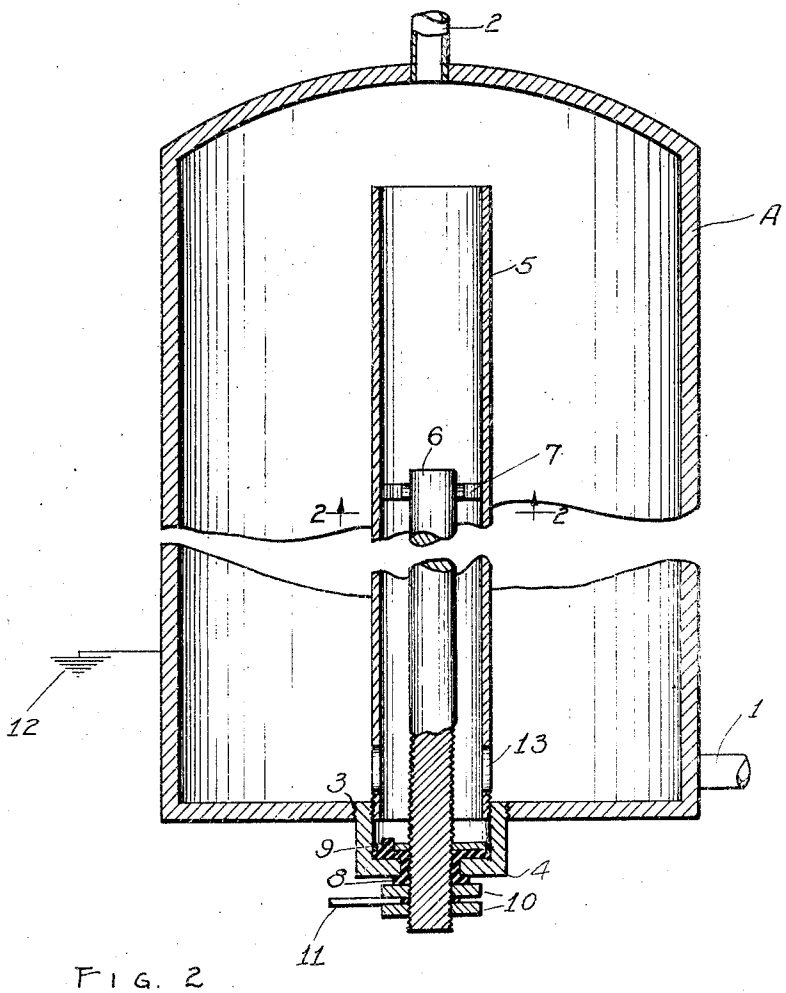
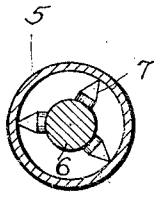


FIG. 2



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ELECTRIC WATER HEATER

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1 Claim. (Cl. 219—40)

My invention relates to improvements in electric water heaters, and has among its objects the production of such a heater that will be neat and attractive in appearance, simple and sturdy in construction, of a minimum number of parts, and which will be otherwise efficient and satisfactory for use wherever deemed applicable.

One of the objects of my invention is to construct such a heater, in which the electrodes will be extremely durable and sturdy, and will not easily chip, shatter, corrode, or otherwise lose their efficiency in service.

Another object of my invention is to provide a pair of electrodes, one within the other, and with means for spacing them in said spaced relation, the water traveling in this space between the electrodes to form a part of the electrical circuit and thereby become heated, the inlet for the water being located adjacent the lowermost ends of the electrodes, so that the water will have the longest possible travel between said electrodes.

A further object of my invention is to provide a duct for directing the flow of the water between said electrodes, both while the water is flowing directly between the electrodes, and after the water passes beyond the annular space between the electrodes, to thereby cause a more efficient circulation of the water through the heater.

Many other objects and advantages of the construction herein shown and described will be obvious to those skilled in the art to which this invention appertains, from the disclosures herein given.

To this end, my invention consists in the novel construction, arrangement, and combination of parts herein shown and described, and more particularly pointed out in the claim.

In the drawing, wherein like reference characters indicate like or corresponding parts throughout the views,

Figure 1 is a vertical sectional view through a water tank, with the heater installed therein; and

Figure 2 is a cross-sectional view, taken substantially along the line 2—2 of Fig. 1.

Referring more particularly to the drawing, wherein I have illustrated one of the preferred embodiments of my invention, A indicates a tank of any desired size, shape, material and construction, as for example one of the hot-water storage tanks commonly installed in homes, and in which the cold water enters at 1 and discharges at 2. The tank shown is substantially diagrammatic, as there is generally more piping from the same, and the provision of heat insulating material about the tank is quite common.

The electric heater may be installed as a unit into this tank or receptacle A, through an opening 3 at one end, there being a cap 4 screw-threaded exteriorly to fit into said opening 3, and screw-threaded interiorly to receive the lower end of the outer electrode 5, so that the latter projects or extends substantially for its entire length thereabove, somewhat as shown.

The inner electrode 6, is surrounded by the outer electrode, in spaced relation therewith at its upper end by the insulating-material spacer elements 7 arranged in circumferentially spaced relation about the electrode 6 and projecting substantially radially therefrom into engagement with the outer electrode shell or sleeve 5. The electrode 6 is preferably made of a non-corrosive material, such as Monel metal, stainless steel, etc., so as not to have any chemical reaction with the water in the tank. Thus, there is substantially no corrosion of the electrode 6, and the passageway that the water travels through will not become clogged with precipitations, incrustations, or other chemically caused formations, and hence will permit of a longer period of utmost efficiency for the heating elements.

The electrodes are insulated from one another by means of the insulator 8, somewhat in the shape of a spool whose ends overlie the inner and outer faces of the bottom of the cap element 4, the hub portion of the insulator extending through a hole provided in the bottom of the cap for the purpose. A washer 9 adjustably interlocks with the lower end of the electrode 6, and on the outermost end of the latter may be arranged the pair of contact nuts 10 for connection to the positive lead wire 11 from any suitable source of electrical energy.

The outer electrode 5 is insulated from the inner or positive electrode 6, as hereinbefore set forth, but is preferably in metal-to-metal contact with the tank, so that the latter or any portion of the piping thereof, may be grounded as indicated at 12 to complete the full electrical circuit. When water is in the space between the electrodes in place as shown, and the positive wire of the electrical system is contacting the positive lead 11, then said water will necessarily become heated as the current passes from the inner or positive electrode to the outer or negative electrode 5.

Inlets 13 are provided through the outer electrode 5, adjacent the lower end or base of the latter, so that the water between said electrodes will have as long a path of travel as possible between the opposed electrode areas, and hence improve

the heating efficiency of the device. To further improve the efficiency of the device, the outer electrode may be extended far beyond the upper end of the inner electrode, to adjacent the top of the tank, so as to direct the hottest water to practically the top of the latter adjacent the outlet 2, and without causing an undue amount of turbulation, eddies, etc., at localized points within the tank.

It is sometimes desirable to adjust the length of the electrode 6, to thereby increase or decrease the electrical load on the circuit, for one reason or another, and in order to do so simply, without removal of the device after it has once been installed, the electrode 6 may be screw-threaded for a considerable portion of the length thereof, this threaded end projecting outwardly beyond the closure cap 4, and engaging in threaded, adjusted relationship with the washer 9 and the pair of nuts 10. Obviously, when it is desired to shorten the electrode within the outer electrode, all that is required is to loosen the nuts 10 and then rotate the electrode accordingly, with any suitable tool, after which the nuts 10 may be retightened, the washer 9 being preferably non-rotatable within the cap.

Any preferred form of control may be used for regulating the flow of current through the system, as for example, a hand-thrown switch, or a temperature-controlled thermostat.

Having thus described my invention, it is obvious that various immaterial changes and modifications may be made in the same without departing from the spirit of my invention; hence I do not wish to be understood as limiting myself to the exact form, arrangement, construction and combination of parts herein shown and described, except as limited by the state of the art to which this invention appertains, or the claim hereunto appended.

What I claim as new and desire to secure by Letters Patent is:

In an electric water heater, the combination with a container having an opening therethrough; of a closure cap for said opening; an outer shell electrode secured at its lower end from said cap and projecting into said container, and provided with water passage openings through its side wall adjacent its lowermost end; an inner electrode carried by said cap and spaced from and within said outer electrode, the lowermost end of said inner electrode being threaded and extended outwardly beyond said cap; an insulation element intermediate the ends of said water passage between and constantly engaging both of said electrodes; a washer within said cap and longitudinally engageable with said inner electrode but prevented against rotational movement relatively thereto; and rotatable locking means threadedly engageable with said inner electrode exteriorly of said cap, whereby the inner electrode may be held locked in its longitudinal adjustment.

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