Feb. 19, 1924. 1,484,517

B. W. MACY

LIQUID HEATER OF THE ELECTRICALLY CONTROLLED TYPE

Filed March 27, 1922

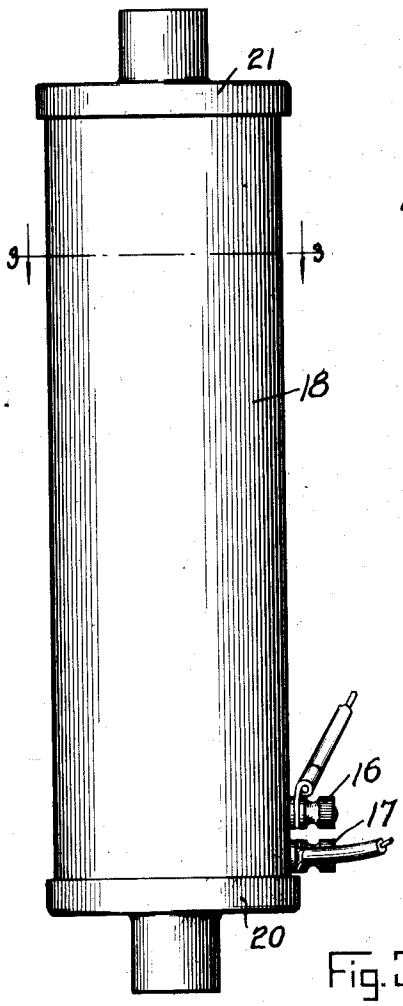


Fig. 1.

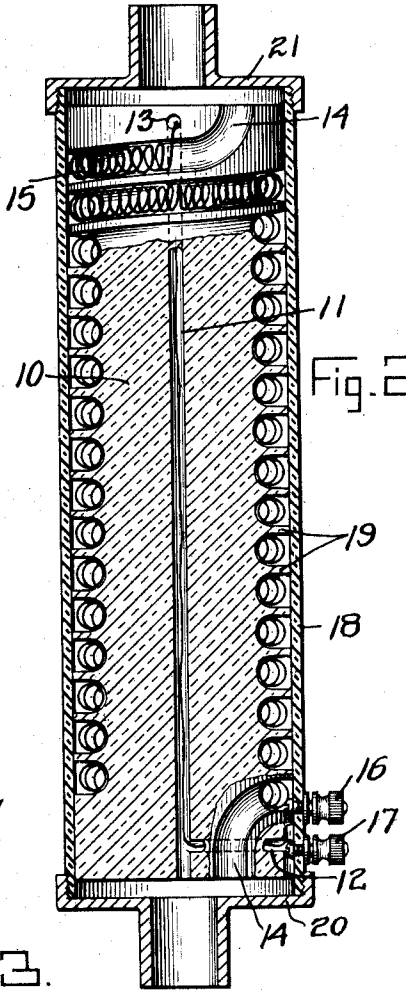


Fig. 2.

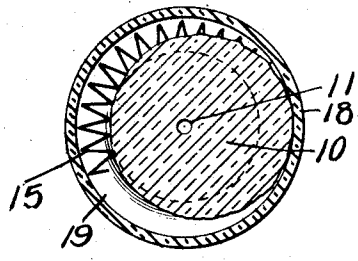


Fig. 3.

Inventor
Barnett W. Macy

By

Attorney

Patented Feb. 19, 1924. 1,484,517

UNITED STATES PATENT OFFICE.

BARNETT WRIGHT MACY, OF JACKSONVILLE, FLORIDA, ASSIGNOR TO ELECTRIC HEATING CORPORATION, OF JACKSONVILLE, FLORIDA, A CORPORATION OF FLORIDA.

LIQUID HEATER OF THE ELECTRICALLY-CONTROLLED TYPE.

Application filed March 27, 1922. Serial No. 547,089.

To all whom it may concern:

Be it known that I, BARNETT WRIGHT MACY, a citizen of the United States, residing at Jacksonville, in the county of Duval and State of Florida, have invented certain new and useful Improvements in Liquid Heaters of the Electrically-Controlled Type, of which the following is a specification.

My said invention is an improvement in liquid heaters of the electrical type and the invention has for its object the provision of a durable mechanism which shall be capable of heating the liquid to a high degree, this application being a substitute for my application No. 349,879, filed January 7, 1920.

It is an object of my invention to provide means whereby the liquid shall be heated by contact with a heated wire and also by the direct passage of electricity through the liquid.

Referring to the accompanying drawings which are made a part hereof and on which similar reference characters indicate similar parts,

Figure 1 is an elevation of my device,

Figure 2 a similar view with part of the casing omitted, the core being shown partially in central section, and

Figure 3 a section on line 3—3 of Figure 1.

In the drawings reference character 10 indicates a core preferably of insulating material, such core having a central passage 11 extending from end to end thereof, this passage being connected by lateral passages 12 and 13 to the exterior of the core. On its peripheral surface the core has a spiral groove 14 extending substantially from one end to the other of the same. A spirally coiled wire 15 is laid in the external groove and is connected at one end to a terminal 16, the other end of the wire comprising an elongated uncoiled portion extending through passages 13, 11 and 12 to a terminal 17.

The two terminals are secured in a casing 18 closely surrounding the core and preferably contacting therewith throughout its length so as to separate the convolutions of the spiral groove and prevent direct communication of one with the other across the partitions 19. The casing 19 has end pieces 20 and 21 secured thereto as by screw threads and they having reduced extensions adapted for connection to suitable pipes to admit water or other liquid at the lower end and discharge it at the upper end.

The conducting wire in my heating device is made of some material or alloy which shall have a resistance substantially equal to that of the liquid or somewhat less than that of the liquid according to the necessities of the case. So far as I am aware it has been customary heretofore to employ material of high resistance for such wire so as to produce intense heat in the heating element itself. Such wires are soon destroyed in use and must be replaced besides having other undesirable features. For example if the liquid is a combustible or carbonizable one such as petroleum or lard it becomes impracticable to permit such highly heated wires to contact therewith. In another application No. 422,224 dated November 6, 1920, I have illustrated the use of a wire of this type in a doughnut frying apparatus. In such an apparatus the wire is formed of material preferably having a less resistance than the liquid to avoid all danger of carbonization of liquid.

In the use of my device the liquid entering at one end of the casing passes around the core along the spiral groove and passes along coil after coil of the wire. In this progress it receives increasing increments of heat since all of the wire is heated and the temperature of the liquid gradually increases. As the wire is not highly heated the core does not become excessively hot nor is much heat wasted in heating the core. The current will pass through the wires but at the same time may also pass to some extent from one convolution of a coil to another thus heating the liquid due to its resistance to the passage of current.

It will be obvious to those skilled in the art that my device may be modified in various ways and applied to many uses all without departing from the spirit of the invention, the true scope of which is set forth in the appended claims.

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

1. In an electric heating device, a container for liquid and a conductor immersed in the liquid and formed of material having less electrical resistance than the liquid, substantially as set forth.

2. In an electric heating device, a container for liquid and a coiled wire immersed therein, the electrical resistance of the wire being less than that of the liquid, substantially as set forth.

3. An electric heating device comprising a casing, a core therein having a spiral external groove and a coiled wire lying in said spiral groove and formed of material having less electrical resistance than that of the liquid, substantially as set forth.

4. An electric heating element comprising a casing, a core having an external spiral groove with ridges between the convolutions of the groove engaging the walls of the container, and a coiled wire in said groove having electrical resistance less than that of the liquid, substantially as set forth.

5. A heating element for immersion in liquid comprising a spirally coiled wire of a material having electrical resistance less than that of the liquid, substantially as set forth.

6. A heating element for immersion in liquid comprising a spirally coiled wire of a material having electrical resistance less than that of the liquid, substantially as set forth.

7. A water heater of the character described comprising a cylindrical casing provided at its opposite ends with inlet and outlet ports, a core of insulating material within said casing in contact with the peripheral wall thereof, the core terminating short of the ends of the casing to define water spaces, the core being formed in its periphery with a spiral groove extending throughout its length with the ends of the groove leading into the water spaces, spirally coiled resistance wires wound within said groove, a pair of binding posts near one end of the casing, one terminal of resistance wire being connected with one binding post, said core being provided with a passage having its ends opening onto the periphery thereof, the other terminal of the resistance wire passing through said passage and being connected with the other binding post, substantially as set forth.

8. An electric heating device comprising a casing having an inlet adjacent one end thereof and an outlet adjacent the other end thereof, a core within the casing grooved to cause the liquid (to be heated) to travel in a spiral path in passing from the said inlet to the said outlet, and a heating element in contact with the liquid, substantially as set forth.

9. An electric heating device comprising a casing having an inlet and an outlet, a core within the casing, means associated with the core and casing whereby the fluid is caused to travel in a spiral path in passing from the said inlet to the said outlet, and a heating element in contact with the liquid, substantially as set forth.

10. An electric heating device comprising a casing having an inlet and an outlet, a core within the casing, means associated with the core and casing whereby the fluid is caused to travel in a spiral path in passing from the said inlet to the said outlet, and a heating element in contact with the liquid during its entire spiral travel, substantially as set forth.

11. An electric heating device comprising a heating element for immersion in water consisting of a wire of a material having a low resistance relative to that of the water, substantially as set forth.

In witness whereof, I have hereunto set my hand and seal at Jacksonville, Florida, this 18th day of March, A. D. nineteen hundred and twenty-two.

BARNETT WRIGHT MACY. [L. S.]

Witnesses:

W. R. HOWARD, Jr.,

W. G. MOYLAN.