

Nov. 24, 1925.

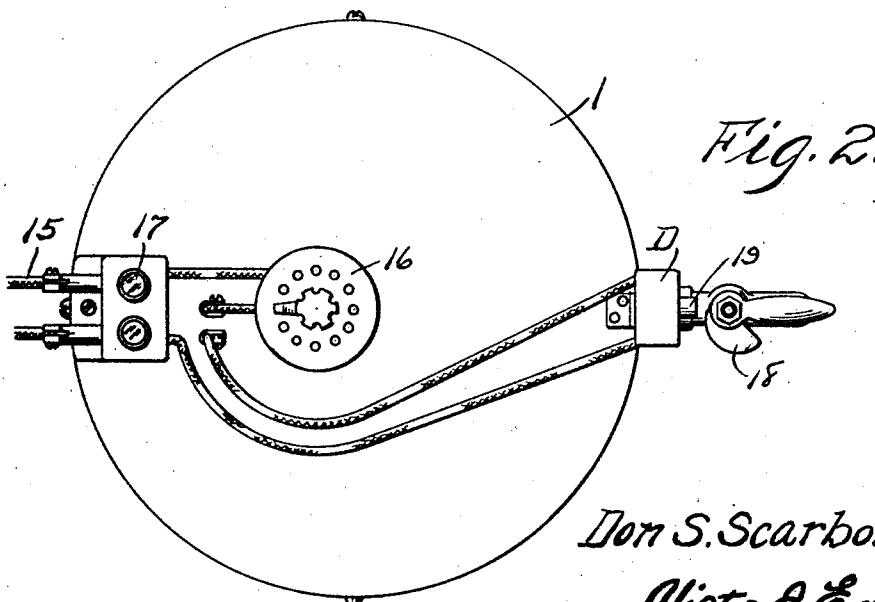
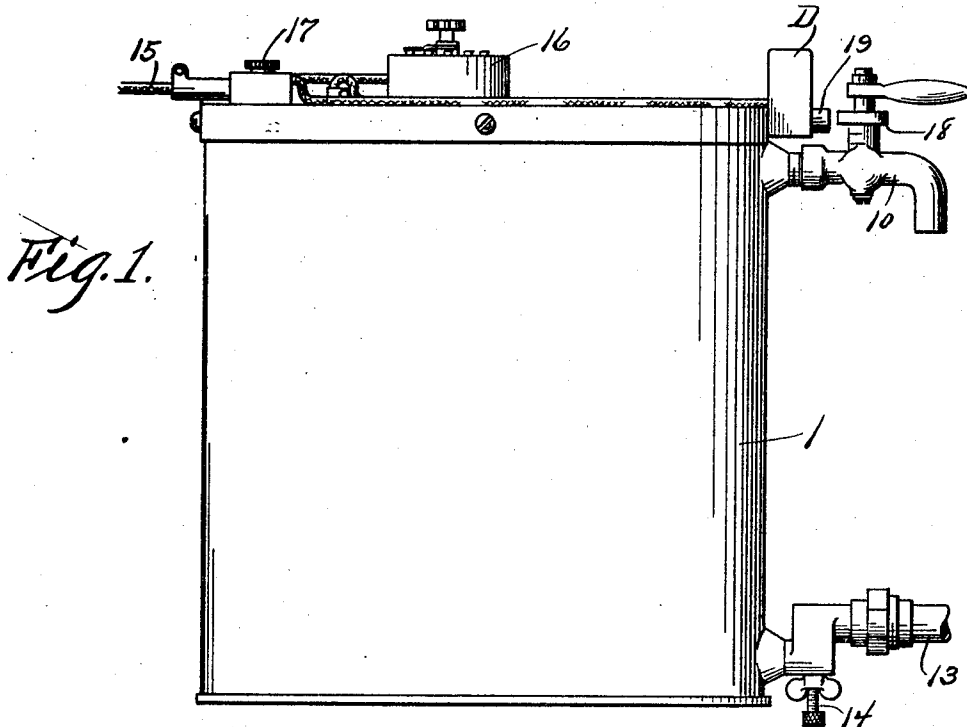
D. S. SCARBOROUGH

1,563,296

WATER HEATER

Filed Feb. 27, 1925

3 Sheets-Sheet 1



Don S. Scarborough
INVENTOR

BY Victor J. Evans
ATTORNEY

WITNESS *John D. Moran*

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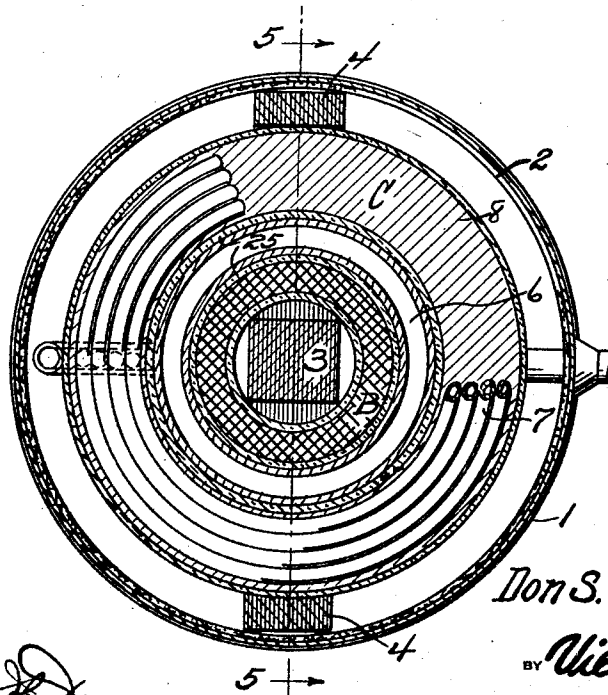
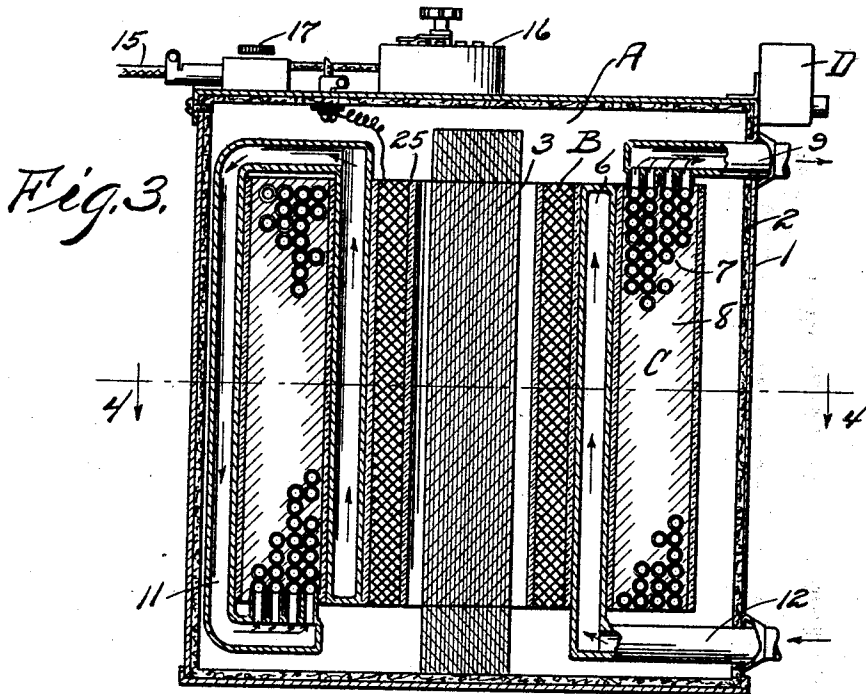
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

Fig. 5.

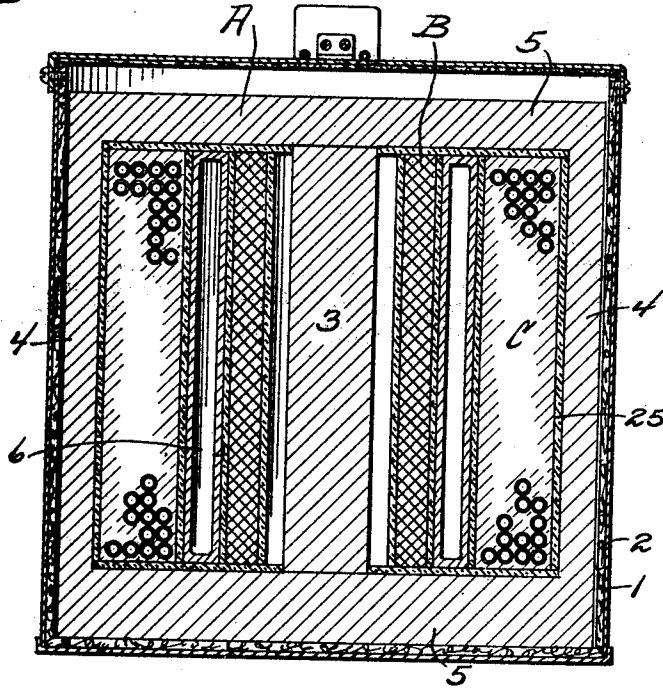


Fig. 6.

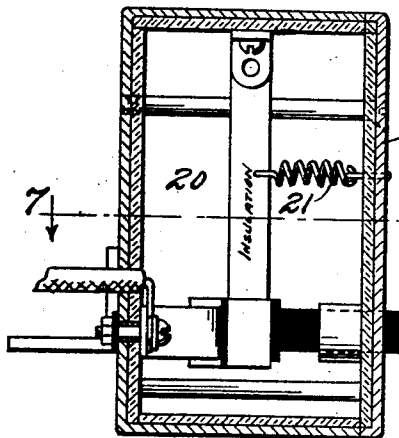
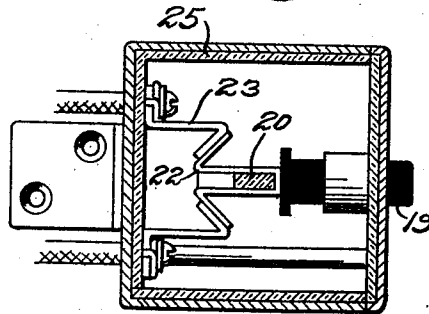


Fig. 7.



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[Signature]

UNITED STATES PATENT OFFICE.

DONALD S. SCARBOROUGH, OF ST. LOUIS, MISSOURI.

WATER HEATER.

Application filed February 27, 1925. Serial No. 12,090.

To all whom it may concern:

Be it known that I, DONALD S. SCARBOROUGH, a citizen of the United States, residing at St. Louis, in the county of St. Louis City and State of Missouri, have invented new and useful Improvements in Water Heaters, of which the following is a specification.

This invention relates to an electric heating device, the general object of the invention being to provide means whereby the device can be used with an alternating current, the device being mainly designed for heating water or other liquids.

Another object of the invention is to provide means whereby the current is caused to flow through the device when a cock is opened to secure a supply of hot water so that current will not be consumed while the device is inactive.

This invention also consists in certain other features of construction and in the combination and arrangement of the several parts, to be hereinafter fully described, illustrated in the accompanying drawings and specifically pointed out in the appended claims.

In describing my invention in detail, reference will be had to the accompanying drawings wherein like characters denote like or corresponding parts throughout the several views, and in which:—

Figure 1 is an elevation of the improved device.

Figure 2 is a plan view thereof.

Figure 3 is a vertical sectional view.

Figure 4 is a section on line 4—4 of Figure 3.

Figure 5 is a section on line 5—5 of Figure 4.

Figure 6 is a sectional view through the switch.

Figure 7 is a sectional view on line 7—7 of Figure 6.

In these views, 1 indicates a casing for enclosing the parts of the device, said casing having an interior lining 2 of asbestos or the like. A laminated core A is diametrically arranged in said casing and said core comprises the central leg 3, the outer legs 4 and the upper and lower pieces 5 which connect the legs together. A primary coil B is carried by the central leg 3 and an annular water chamber 6 surrounds said coil and a secondary coil C surrounds the water chamber, this water chamber acting to pre-

vent the heat from the secondary coil from affecting the primary coil. This secondary coil is composed of a number of coils 7 of tubes of copper or the like which are embedded in a filling 8 of lead, tin, babbitt or similar material. The upper ends of the tubes 7 are connected to an outlet pipe 9 which passes through the casing and has a faucet 10 connected thereto. The inner or lower ends of all the tubes are connected to a by-pass pipe 11 which is connected with the upper end of the water chamber 6 and the lower end of this chamber is connected to an inlet pipe 12 which passes through the lower part of the casing and is connected to a supply pipe 13. A controlling valve 14 is arranged in the outer part of the pipe 12 for regulating the flow of water into the water chamber. Conductors 15 connect the primary coil with a source of alternating current and a rheostat 16 is arranged in the circuit to control the flow of current to the coil. Fuses 17 are also located in the circuit for preventing injury to the parts if the supply of water should fail or the current should be of too great a voltage. A switch D is also arranged in the circuit and this switch is controlled by the opening and closing of the cock 10 through means of a cam 18 on the stem of the cock engaging a button 19 which is connected with the switch arm 20 of the switch. A spring 21 normally holds the switch arm in a position with its contacts 22 out of engagement with the stationary contacts 23 so that the circuit will be broken when the faucet 10 is closed but when the faucet is opened the cam 18 will strike the button 19 and thus throw the arm 20 to a position where the contacts 22 will engage the contacts 23 and thus permit current to flow to the primary coil. The switch arm is pivoted to the top part of a casing 24 which encloses the switch parts and the various electrical parts are provided with suitable insulation, as shown at 25.

From the foregoing it will be seen that when a supply of hot water is desired it is simply necessary to open the faucet 10 which will start the flow of water through the water chamber and the coils of tubing 7 and the opening of this faucet will close the switch so that current will flow through the primary coil B. The passage of the alternating current through this coil will produce a secondary current in the coil C which

is intensified by the laminated core so that the water passing through the tubing 7 will be heated.

The primary coil is wound with a large number of turns of small gauge wire and the secondary coil is composed of the turns of copper tubing and the filling of lead or the like which short circuits the tubing so that very low voltage and very high amperage is obtained. This construction of the secondary coil causes the tube through which the water flows to become very hot so that the water is intensely heated before it reaches the faucet. The heat from the secondary coil is prevented from reaching the primary coil by means of the water jacket placed between the two coils. The copper tubing being a very good conductor causes a current of very large amperage and low voltage to be inducted in the secondary coil and the metal in which the tubing is embedded offers a high resistance to the current and short circuits each turn of the tube and as each turn gives off a certain amount of amperage at low voltage, the whole secondary element acts as a multiple of low voltage high amperage coils, shorted by a resisting material and causes a very intense heat to be generated in and around the copper tubing. These small tubes are connected with the large inlet tube 12 and the large outlet tube 9. By using the small tubes the water is brought into contact with a large heating surface.

It will be seen that I have produced a simple and effective heating device for heating water and other liquids by an alternating current with means whereby the current is automatically turned on when the faucet of the device is opened and the current turned off when the faucet is closed, so that there is no waste of current. The rheostat provides means for controlling the amount of current passing through the primary coil and the fuses will prevent damage to the parts if the supply of water should fail. The asbestos lining for the casing will prevent damage to the building in which the device is used if the interior parts thereof should happen to catch on fire.

It is thought from the foregoing description that the advantages and novel features of my invention will be readily apparent.

I desire it to be understood that I may make changes in the construction and in the combination and arrangement of the sev-

eral parts, provided that such changes fall within the scope of the appended claims.

What I claim is—

1. A heater of the class described comprising a casing, a laminated core therein, a primary coil encircling a part of the core, a secondary coil composed of a plurality of coils of tubing embedded in a filling of resisting metal, a water chamber placed between the primary and secondary coils, means for connecting the chamber to a source of supply, means for connecting the chamber with the tubing, a delivery pipe connected with the other ends of the tubing and means for connecting the secondary coil to a source of alternating current.

2. A heater of the class described comprising a casing, a laminated core therein, a primary coil carried by the core, a secondary coil composed of a plurality of coils of tubing embedded in metal having resisting qualities to the passage of a current, a chamber placed between the primary and secondary coils, means for connecting one end of the chamber to a source of supply, means for connecting the other end of the chamber to the lower ends of the tubing, a delivery pipe connected with the other ends of the tubing, a valve in said pipe, conductors connecting the primary coil with a source of alternating current, a switch in the circuit and means for opening the switch when the valve is opened and for closing the switch when the valve is closed.

3. A heater of the class described comprising a casing, a laminated core therein, a primary coil carried by the core, a secondary coil composed of a plurality of coils of tubing embedded in metal having resisting qualities to the passage of a current, a chamber placed between the primary and secondary coils, means for connecting one end of the chamber to a source of supply, means for connecting the other end of the chamber to the lower ends of the tubing, a delivery pipe connected with the other ends of the tubing, a valve in said pipe, conductors connecting the primary coil with a source of alternating current, a switch in the circuit, means for opening the switch when the valve is opened and for closing the switch when the valve is closed and a rheostat and fuses placed in the circuit.

In testimony whereof I affix my signature.

DONALD S. SCARBOROUGH.