F. WALKER.

ELECTRICAL WATER HEATER.

APPLICATION FILED SEPT. 10, 1906.

1,053,076.

Patented Feb. 11, 1913.

2 SHEETS—SHEET 1.

Fig. 2.

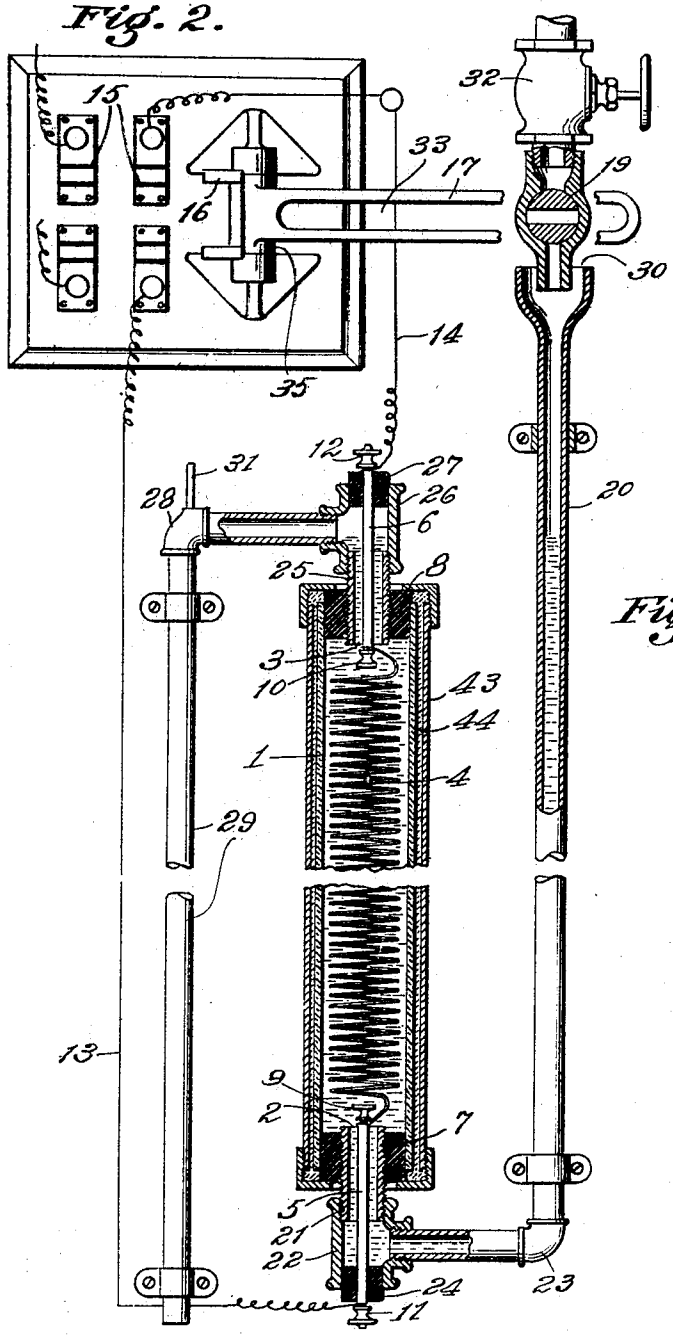
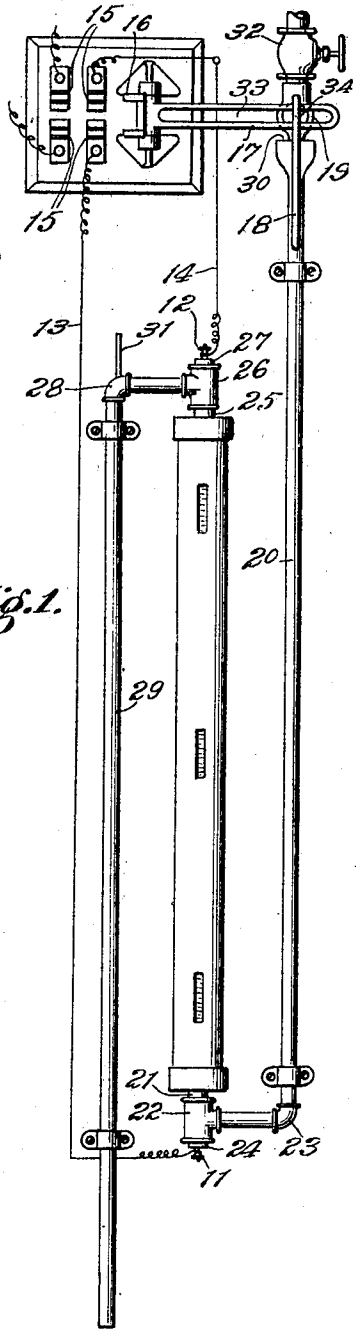


Fig. 1.



Witnesses
G. C. Holly
J. Townsend.

Inventor
Frank Walker
by James R. Townsend
his Atty

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2 SHEETS—SHEET 2.

Fig. 3.

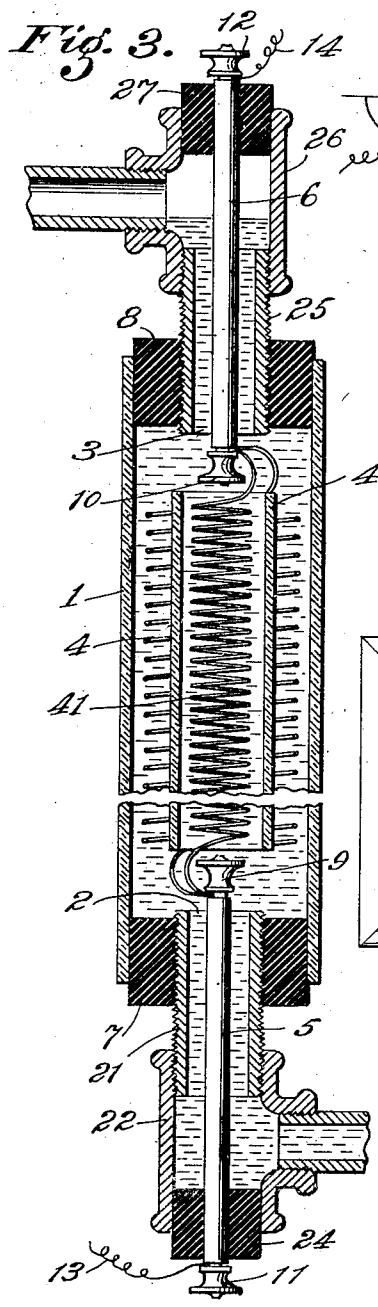


Fig. 4.

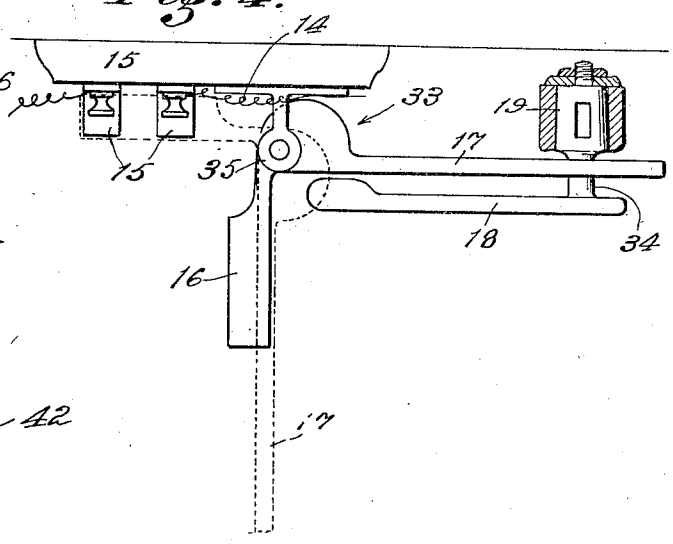


Fig. 5.

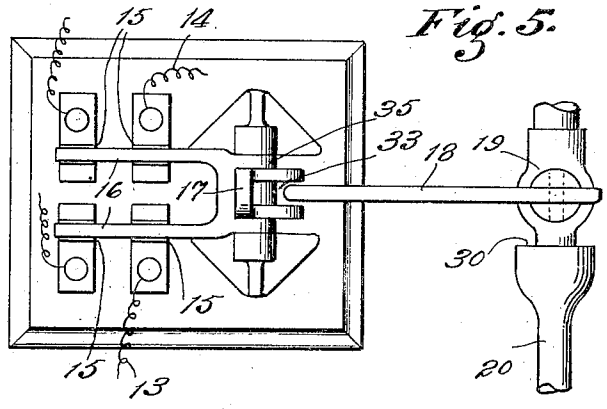
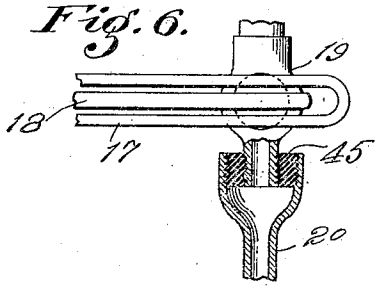


Fig. 6.



Witnesses

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his Atty

UNITED STATES PATENT OFFICE.

FRANK WALKER, OF LOS ANGELES, CALIFORNIA.

ELECTRICAL WATER-HEATER.

1,053,076. Specification of Letters Patent. Patented Feb. 11, 1913.

Application filed September 10, 1906. Serial No. 334,042.

To all whom it may concern:

Be it known that I, FRANK WALKER, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Electrical Water-Heater, of which the following is a specification.

An object of this invention is to provide a practical, satisfactory, safe and economical means for heating water by electricity for baths, toilet, domestic, and other purposes.

It is generally claimed that where electric energy is applied for the purpose of heating water, electrolysis or galvanic action is liable to take place in the pipes between the heater and the water mains, especially where galvanized pipe is used. I propose to avoid this action by insulating the pipe before it reaches the electric heater, and by making a break in the column of water in the supply-pipe. I propose to make this break by placing the shut-off valve at a point considerably higher than the hot-water discharge, and putting a vent in below the shut-off to admit air when the shut-off is closed, thus providing a column of air to separate between the water in the pipe and that in the heater, and I provide a vent over the hot-water discharge to prevent siphoning of water from the heater.

An object of my invention is simplicity and cheapness of construction, and in this connection I propose to heat the water by submerging a resistance in an insulated container provided with an inlet and an outlet whereby the resistance will be at all times submerged and surrounded on all sides by the liquid; large conductors being provided in the closures of the container to conduct the current through such closures to and from the resistance without evolution of heat in such closures.

Another object of my invention is to make a heater having a resistance all parts of which are in contact with the liquid to be heated, this I accomplish by holding the resistance in place in the chamber by connecting it to and between the electric current conductors.

Further objects are to construct a heater of minimum size and maximum capacity for heating water with a minimum expenditure of electric energy; to bring the flowing water into contact with the resistance in the most effective manner with the least obstruction of the water current.

The accompanying drawings illustrate the invention.

Figure 1 is a view of the water heater in one of its forms. Fig. 2 is a fragmental axial section of the heater showing the construction in detail. The current and water are both shut off. Fig. 3 is an axial section showing the heater constructed with two resistance coils to increase its heating capacity. Fig. 4 is an enlarged plan detail of the interlocking safety means for insuring the submergence of the resistance coil before and while the current is turned on. The parts are occupied in position shown when the water is turned on and the current turned off. Dotted lines indicate the position of the electric switch when the current is on. Fig. 5 is a view at right angles to Fig. 4, showing the position of parts with current and water both turned on. Fig. 6 is a fragmental detail showing the break in the supply pipe closed by solid insulating material.

1 designates an insulated liquid container preferably consisting of a glass tube having an inlet 2 at the bottom and an outlet 3 at the top for the purpose of passing water therethrough to be heated.

4 is resistance formed of a resistance wire which may be resilient and is out of contact with any support excepting the conductors 5, 6, that are low resistance binding posts, being of comparatively large diameter, connected with the ends of said resistance and inserted through the closures 7 and 8 which may be in the form of rubber stoppers inserted into the glass tube.

9, 10 designate binding screws to fasten the resistance coil 4 to the conductors 5 and 6.

11, 12 are binding screws connecting the conductors 5 and 6 with conductors 13, 14 of the electric circuit.

15 designates the contacts of a switch, and 16 is a contact blade operated by the slotted lever or handle 17 which is locked in the shut-off position by the handle 18 of the valve 19 which controls the flow of water from the water supply not shown, connecting through the supply pipe 20 to the inlet 2. Said inlet 2 opens into the chamber of the container 1 through a nipple 21 which surrounds the lower conductor 5 and is connected by a T 22 with pipe 20 through elbow 23.

24 is an insulating stopper or closure which may be of rubber to close the end of

the T 22 and to insulate the conductor 5 from said T. The outlet 3 is through a nipple 25 screwed into the insulated closure 8 and into an outlet T 26 the end of which is closed with an insulated closure 27 through which the conductor 6 passes.

28 is an elbow connecting the T 26 with the open end of the discharge pipe 29.

30 designates an air inlet for the purpose of supplying air to the supply pipe 20, and 31 is an air inlet into the outlet pipe 29 to prevent siphoning of the contents of the container 1.

32 is a regulating valve above the cut-off valve or faucet 19 for the purpose of regulating the flow of water into the heater.

The handle 17 of the electric switch is provided with a slot 33 which is large enough to pass forward and back over the handle 18 and the stem 34 of the faucet 19 when the faucet is open. The slot 33 extends along the handle 17 and partly around the hub 35 of the switch contact 16, so that when the handle 17 is moved to bring the contact blade into position connecting the contact points 15 of the switch, the handle 18 of the faucet will be held in said slot 33 against turning, as shown in Fig. 5, until the switch lever or handle 17 is again brought into the position shown in Fig. 4, whereupon the faucet may be turned to turn off the water. It is apparent that when the faucet is so turned, it locks the handle 17 so that it can not be moved to close the switch 15, 16.

The resistance coil 4 is preferably made of resilient resistance wire placed under a tension and held under tension by the position of the conductors 5 and 6 at the opposite ends of the insulated container 1. The tense coil maintains its central position in the container without any core or supporting means, and is entirely submerged and surrounded on all sides by the liquid which is to be heated.

In Fig. 3, 41 designates a second resistance coil for the purpose of increasing the capacity of the heater, allowing a greater flow of current and evolving a greater amount of heat.

In Fig. 3 I have shown two resistance coils which are separated from each other by a glass tube having one coil outside and the other coil inside of said tube which tube is supported in place by the lower part of the resistance coils. This construction shown in Fig. 3 is used where a greater heating capacity is needed.

42 is an insulator between the resistance coils, 4 and 41, to prevent short circuiting that might otherwise occur in the container. Said insulator may be a glass tube held in place by the resistance coils.

43 is a reinforcing jacket of metal or other strong material set on a coat 44 of plastic material around the glass tube 1 to protect the glass from breakage. Said jacket will be necessary in case the pipe 20 is connected with high water pressure as the same evidently may be by supplying a solid and strong insulator as 45 in Fig. 6 at the point which is shown insulated by the gap 30 in Figs. 1, 2 and 5, or at some other suitable point.

What I claim is:—

1. In an electrical heater an insulated liquid container having an inlet and an outlet; an electrical resistance consisting of a tense coil in the container and means to support the coil at the ends only respectively; said coil from end to end being free from any core or supporting means, thus allowing free circulation of water substantially as set forth; and said supporting means being free from contact with the container and passing through the inlet and outlet respectively.

2. In an electrical heater, an insulated liquid container, an insulator tube in the container, and resistance coils inside of and surrounding the insulator tube; said coils being free from contact with any support from end to end of the insulator tube.

3. An electric water heater provided with a supply pipe having an air opening in same at a point above the top of the heating chamber.

4. An electric heater provided with a heating chamber and having liquid supply and discharge pipes communicating with said chamber, the supply pipe being provided with an air inlet at a point which is above the top of the heating chamber.

5. An electric heater provided with a heating chamber and having liquid supply and discharge pipes communicating with said chamber, the supply pipe being provided with an air inlet at a point which is above the top of the heating chamber, said discharge pipe opening from the top of the chamber and provided with a vent at or near its top for the purpose set forth.

6. In an electric water heater, a glass tube, insulating closures in the ends of the glass tube and forming a heating chamber, pipe-nipples in the insulating closures, T's upon the pipe-nipples, insulating closures for the alined openings of the pipe-nipples, the side opening of one T serving as an inlet and the side opening of the other T serving as an outlet; conductors through the closures of the T's and through the nipples into the ends of the heating chamber, and two independent resilient resistance coils insulated from each other, the one coiled within the other connecting the conductors.

7. In an electric water heater, a glass tube, insulating closures in the ends of the glass tube and forming a heating chamber, pipe-nipples in the insulating closures, T's upon the pipe-nipples, insulating closures for the alined openings of the pipe-nipples, the side

opening of one T serving as an inlet and the side opening of the other T serving as an outlet; conductors through the closures of the T's and through the nipples into the ends of the heating chamber, a resistance coil connecting the conductors, a glass tube around the resistance coil, and a second resistance coil independent of the first coil around the glass tube and connected to the conductors.

8. In an electric water heater, a glass tube container, insulating closures for the container, conductors extending through the closures, a heating coil connecting the conductors, a glass tube insulator around the heating coil, and a second heating coil around the glass tube insulator independent of the first coil and connected to the conductors, said glass tube insulator being suspended by the heating coil.

9. The combination with a container having an inlet and an outlet, of a resistance coil in the container, a faucet to supply water to the container, an electric conductor for the resistance coil, a switch for said conductor, a slotted handle for the switch adapted to swing over the handle and stem of the faucet to allow the faucet to turn when the switch is fully open, the faucet handle being adapted to engage the switch handle to prevent it from opening when the faucet is closed, and the switch handle forming a stop to prevent the faucet from closing while the switch is closed.

10. The combination with a container, a supply pipe, a resistance in the container and a conductor for supplying electrical energy to said resistance, of a pivoted switch for the conductor provided with a slotted handle, a faucet provided with a stem and a handle narrower than the slot to enter the slot when the switch is open to thereby prevent closing of the faucet until the switch is open.

11. The combination with a container, a resistance therefor and a conductor for the resistance, of a supply pipe, a faucet therefor, a pivoted switch for the conductor, the faucet stem extending at right angles to the pivot of the switch, the switch having a slotted handle, the slot of which extends part way around the hub of the switch and the handle and stem of the faucet projecting through the slot to allow the faucet handle to turn when the switch is open and the faucet handle being adapted to extend over the switch handle to prevent the switch from being closed when the faucet is closed and the faucet being open and the faucet handle in the slot whenever the switch is closed.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 5th day of September 1906.

FRANK WALKER.

In presence of—

JAMES R. TOWNSEND,

JULIA TOWNSEND.