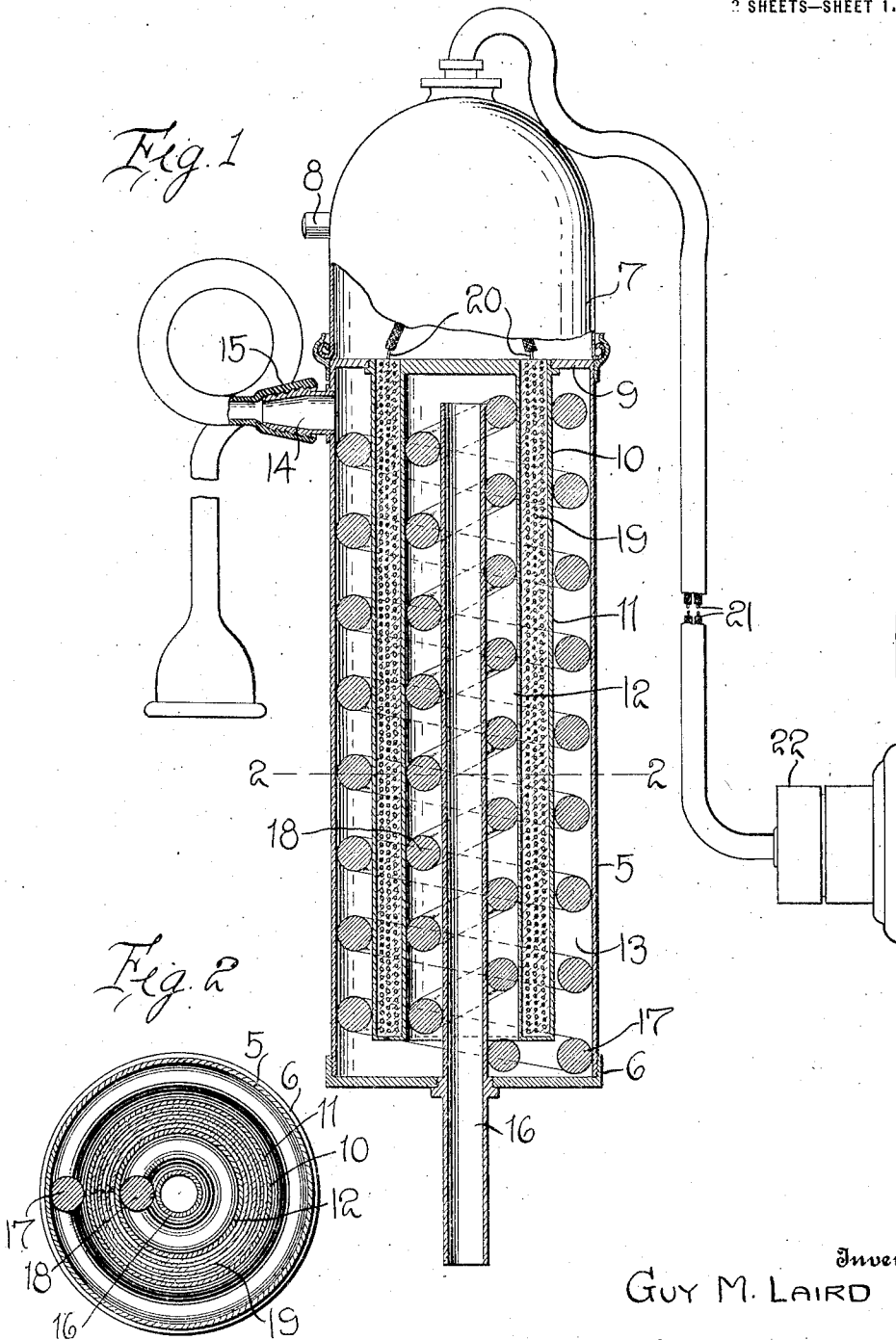


G. M. LAIRD.
ELECTRICAL WATER HEATER.
APPLICATION FILED AUG. 23, 1915.

1,188,952.

Patented June 27, 1916.

2 SHEETS—SHEET 1.



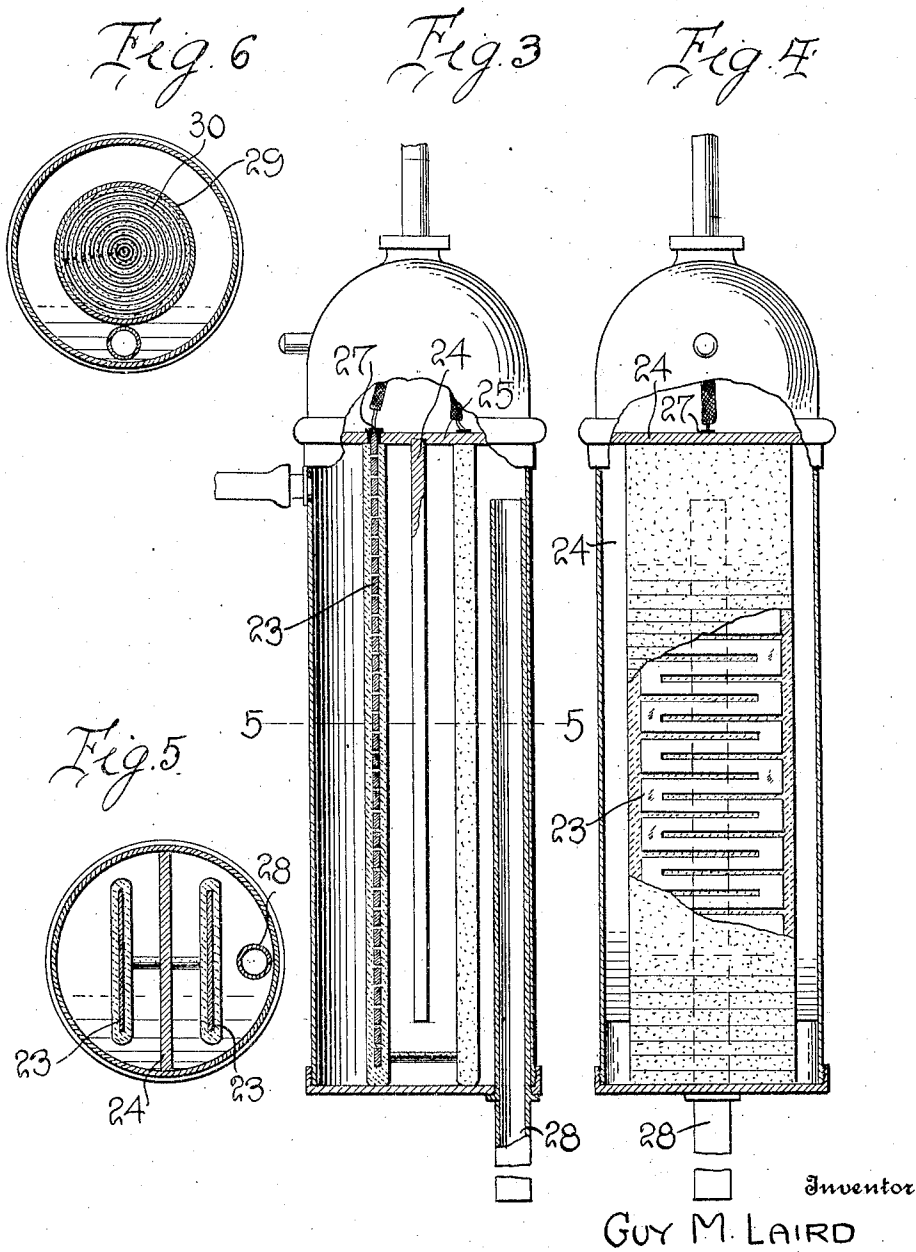
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UNITED STATES PATENT OFFICE.

GUY MORGAN LAIRD, OF HILLSBORO, ILLINOIS, ASSIGNOR OF ONE-HALF TO LEO B. LINCOLN, OF CHICAGO, ILLINOIS.

ELECTRICAL WATER-HEATER.

1,188,952.

Specification of Letters Patent. Patented June 27, 1916.

Application filed August 23, 1915. Serial No. 46,931.

To all whom it may concern:

Be it known that I, GUY M. LAIRD, a citizen of the United States, residing at Hillsboro, in the county of Montgomery and State of Illinois, have invented certain new and useful Improvements in Electrical Water-Heaters, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to electrical water heaters and has for its primary object to provide a device of this character which is so constructed that the same may be readily moved from place to place and attached to a water faucet, said device including electrical heating means and means for causing a circuitous flow of the water so that the same will be highly heated before passing into the outlet.

The invention has for an additional object to provide an electrical water heater which may be either of the portable or stationary type and in which there is embodied one or more electrical resistance elements included in the heating circuit, and spirally coiled wire rods having their coils arranged in reverse directions so as to cause a circuitous flow of the water substantially along the entire length of the resistance, whereby the same will become highly heated, one of the coiled rods serving to direct the heated water into the outlet.

It is a further object of the invention to provide an electrical water heater of the above type, which consists of very few parts capable of being quickly assembled or disassembled and in which the several cooperating elements are very compactly arranged so that the entire heater may be carried in a suitcase or hand bag.

With the above and other objects in view, my invention consists in the novel features of construction, combination and arrangement of parts to be hereinafter more fully described, claimed and illustrated in the accompanying drawings, in which,

Figure 1 is a vertical sectional view of an electrical water heater illustrating the preferred embodiment of the invention; Fig. 2 is a section taken on the line 2—2 of Fig. 1; Fig. 3 is a vertical section showing a slightly modified form of the invention; Fig. 4 is a vertical sectional view taken at right angles to Fig. 3; Fig. 5 is a horizontal section taken on the line 5—5 of Fig. 3;

Fig. 6 is a horizontal section, illustrating a further modification of the device.

Referring in detail to the drawings and more particularly to Figs. 1 and 2 thereof, 5 designates the outer casing or shell, the lower open end of which is adapted to be closed by a removable threaded bottom plate or cap 6. This outer shell 5 is exteriorly threaded at its upper end for the connection of a detachable head 7 thereto. This head is equipped with an electric switch of any approved type, 8 designating the movable element of the switch which projects exteriorly of the head 7. The upper end of the casing 5 is closed by the head plate 9 which is formed with a threaded opening to receive an inner removable resistance container or holder 10. This resistance container includes an outer cylindrical shell 11 which is integrally connected at its lower end to the inner concentrically spaced shell 12. The upper end of the outer shell 11 is exteriorly threaded for engagement in the threaded opening of the head plate 9 on the outer casing. The lower end of the inner shell 12 is open and in communication with the interior of the casing 5 which constitutes a water receiving chamber 13. Adjacent to the upper end of the casing 5, the same is provided upon one side with an outwardly extending inlet nipple 14, to which one end of a tube or hose 15 is adapted to be connected. The other end of this tube is provided with suitable means for connecting the same to a water faucet. 16 designates the water outlet pipe which is centrally threaded in the bottom plate or cap 6 of the casing and extends upwardly within the inner shell 12 of the resistance container, the upper open end of said pipe being spaced from the closed upper end of said shell. A spirally coiled wire rod 17 is arranged within the casing 5 and surrounds the shell 11, said coils contacting with the shell. A second smaller coiled wire rod 18 is also arranged within the inner shell 11 and around the outlet pipe 16. It will be observed that the coils of this rod are reversely turned with respect to the coils of the outer rod 17. Between the inner and outer walls 11 and 12, a resistance element, indicated at 19, is arranged and embedded in asbestos or other suitable insulating material, the terminals of the resistance being connected to the switch within the head 7 by the wires indi-

cated at 20. 21 designates the conducting wires and 22 a plug which is adapted to be engaged in the lamp socket of a lighting circuit. It is, however, apparent that a separate or independent electric circuit may be provided if desired. When the electric circuit is closed, the resistance element 19 is soon heated to a high temperature and the walls of the inner and outer shells 11 and 12 thus also become highly heated. When the water is turned on, the same is first directed downwardly in the casing 5 by the turns of the coiled wire rod 17. This water flowing upwardly into the inner shell 12 is caused to flow around the outlet pipe 16 by the spiral rod 18. By the time the water reaches the upper end of this outlet pipe, it is obvious that the same will become highly heated, as it is, at all times, in contact with one or the other of the shells 11 or 12. The coiled rod 18 finally directs the hot water into the upper end of the outlet pipe 16, from which it is discharged into a bowl or basin. The temperature of the water may be varied and controlled by opening the faucet to a greater or less extent so that the water will slowly flow downwardly and then upwardly to the outlet pipe 16 and become very highly heated or flow more rapidly so that the water may contact with the walls of the shells 11 and 12 for a comparatively short length of time before being discharged into the outlet pipe.

In Figs. 3, 4 and 5 I have illustrated a slightly modified form of the invention, wherein the flat type of metal resistance grids 23 is employed. Two of these grids, metallically connected at their lower ends, are arranged in parallel relation within the casing of the heater and upon the opposite sides of the central longitudinal plate 24 which is fixed at one of its ends to the closed upper end 25 of the casing and spaced at its lower end from the removable bottom plate 45 or cap. Each of the resistance grids is incased within an insulating material and the upper ends of the metal grids are insulated from the end wall 25 of the heater casing, as shown at 27, and connected to the switch 50 within the removable head of the heater casing. 28 designates the outlet pipe which extends upwardly through the removable closure cap on the lower end of the casing and within said casing to a point adjacent its upper end. It will be noted that the longitudinal edges of the resistance grids are spaced from the wall of the heater casing while the central longitudinal division plates 24 extends diametrically across the same and contacts with the body walls of the casing. Thus, when the water is admitted to the upper end of the casing, it will flow downwardly around one of the resistance grids and then around the lower end of the plate 24 and upwardly around the other

resistance until finally the heated water will pass into the upper end of the outlet pipe 28.

In Fig. 6 of the drawings, I have shown a resistance container or holder consisting of a single tube or shell 29 filled with insulating material, in which a coiled resistance wire 30 is embedded. In any of the several forms of the invention above referred to, it will be understood that, if desired, the outlet pipe for the heater casing may be provided with a suitable valve so that said outlet can be closed and the water retained in the heater for a greater or less length of time.

From the foregoing description, taken in connection with the accompanying drawings, it will be seen that the construction, manner of use and several advantages of the invention will be clearly and fully understood. It will be seen that I have produced a very simple construction of electrical water heater which may be employed in connection with the ordinary lighting circuit, whereby hot water may be readily obtained in sufficient quantities for all purposes of the traveler. As the heater consists of very few parts which are compactly arranged when in operative relation, it will be seen that the device can be conveniently carried in a hand bag or suit case and transmitted from place to place. In the use of the device, by simply turning the water off at the faucet and opening the switch in the head 7, it will be apparent that the heater will remain filled with the water up to the top of the outlet pipe 16, thus avoiding all possibility of burning out the resistance, as the steam generated from this water within the heater will indicate to the user that the switch had not been opened while the flow of water had been cut off. By giving a downward and then upward flow to the water entering the heater, the same is caused to travel over a maximum extent of heated surface so that it will absorb all the heat possible from the resistance element. The spiral guides also serve as heat conductors, as they are in contact with the walls of the resistance container. The device may be advantageously used in connection with the ordinary house lighting circuit of low voltage without placing an excessive demand upon the circuit, although, of course, a slightly longer time will be required for the proper heating of the water than if a separate and distinct electrical circuit were at hand.

While I have above referred to the preferred embodiment of the invention at present contemplated, it is to be understood that the device is susceptible of still further changes in the form, construction and arrangement of the several parts and I, therefore, reserve the privilege of adopting all such legitimate modifications as may be

fairly embodied within the spirit and scope of the invention as claimed.

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

1. An electrical water heater including a casing having heads on its opposite ends and a water inlet port in one side of said casing adjacent the top thereof, a water outlet pipe extending longitudinally into the casing through the bottom of the same and having its open end disposed adjacent to the top of the casing, electrical heating means mounted in the top head of the casing and extending longitudinally within said casing, and additional means within the casing between the outlet pipe and said heating means to retard the flow of the water in its passage from the inlet upwardly in the casing and into said outlet pipe.
2. An electrical water heater including a casing, water supply means connected to the side of the casing adjacent its top, a double-walled shell arranged within said casing in spaced concentric relation thereto, an outlet pipe extending through the bottom of the casing and axially into the shell, the open end of said pipe being also disposed adjacent the top of the casing, an electrical re-

sistance arranged between the walls of said shell, and means for directing the water exteriorly and interiorly of the double-walled shell and finally into the outlet pipe.

3. An electrical water heater including a casing, water supply means connected to the casing, a double-walled shell mounted within the casing in spaced concentric relation thereto, the inner wall of the shell being open at its lower end and closed at its upper end, a water outlet pipe extending axially into the shell and having its open end disposed adjacent to the closed end thereof, an electrical resistance arranged between the walls of the shell, means arranged exteriorly of said shell and contacting with the outer wall thereof for directing the water in a circuitous path around the shell and in one direction, and additional means arranged within the shell around the outlet pipe and in contact with the inner wall of the shell to direct the water in an opposite direction and into the open end of the outlet pipe.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

GUY MORGAN LAIRD.

Witnesses:

HENRY R. CRAWFORD,
EDNAH G. GORDON.