Feb. 15, 1927. 1,618,101

S. W. MALCOLM

ELECTRIC WATER HEATER

Filed Aug. 30, 1924

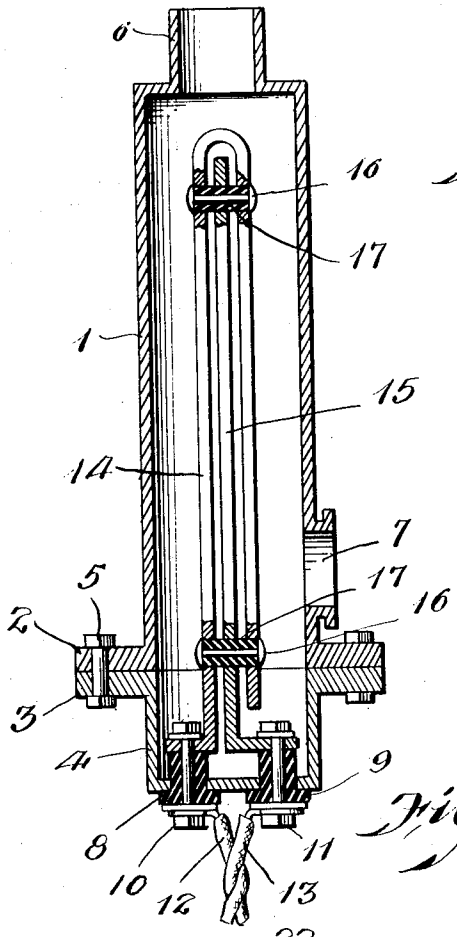


Fig. 1.

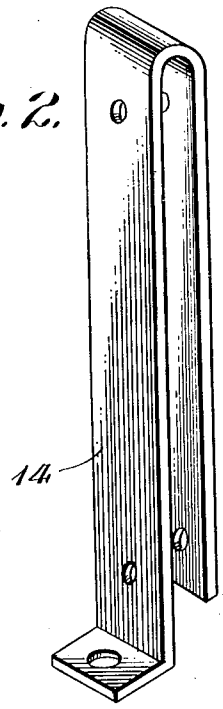


Fig. 2.

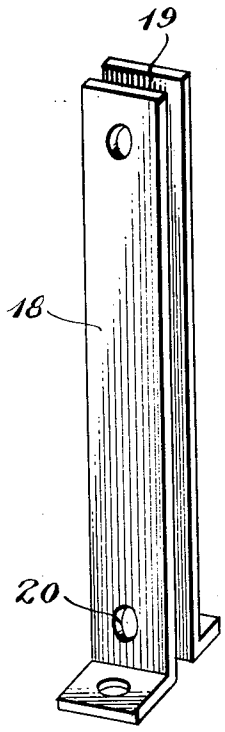


Fig. 3.

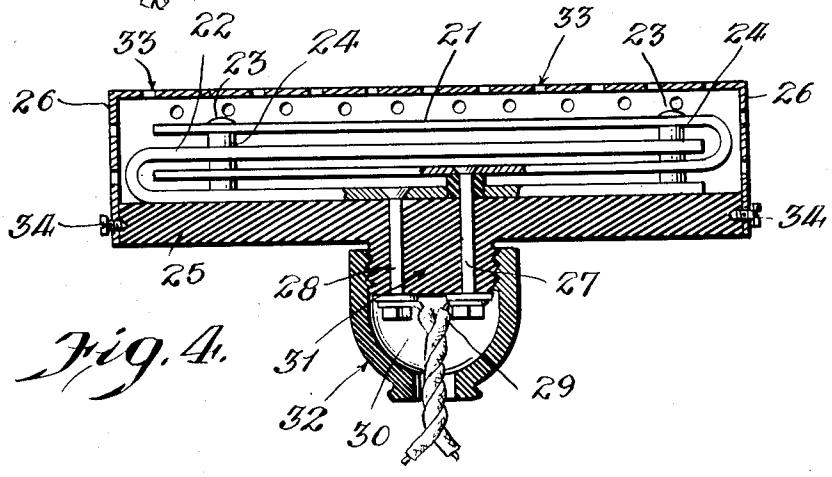


Fig. 4.

WITNESSES

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UNITED STATES PATENT OFFICE.

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ELECTRIC WATER HEATER.

Application filed August 30, 1924. Serial No. 735,130.

This invention relates to improvements in electric water heaters, and it consists of the constructions, combinations and arrangements herein described and claimed.

An object of the invention is to provide an electric heater of the immersion type, that is to say, of the type which is immersible in water for the purpose of heating it.

Another object of the invention is to provide an electric heater which has heating elements or electrodes situated in a normally open circuit, said circuit being closed by the fluid in which the heater is immersed upon desiring to heat said fluid.

Other objects and advantages appear in the following specification reference being had to the accompanying drawing, in which,

Figure 1 is a central sectional view of an upright type of heater showing an overlapping type of electrode.

Figure 2 is a detail perspective view of the overlapping electrode in Figure 1.

Figure 3 is a perspective view of a parallel arrangement of electrodes.

Figure 4 is a central section of a type of heater slightly different from that shown in Figure 1.

Several forms of electrodes are illustrated in the drawing, but all are essentially the same in that they consist of parallel conducting plates in confronting arrangement.

These plates are spaced, and when immersed in the fluid to be heated become conductive of electricity and heat the fluid by virtue of the fact that the fluid, too, becomes a conductor.

In reference to Figure 1 the heater casing 1 is flanged at 2 so that the flange 3 of the cap 4 may be applied, and securing bolts 5 passed through. The casing is necessarily made separable in order that the electrodes on the inside may be got at. The casing 1 has fluid entrances 6 and 7 through which a circulation will become established when the heater is in use.

Suitably affixed in the bottom of the cap 4 are insulation posts 8 and 9 which carry the binding screws 10 and 11 to the exposed ends of which the conductors 12 and 13 are connected and by the inner and concealed ends of which the electrodes 14 and 15 are held.

The electrode 14 is called overlapping because it bends over the top of the central electrode 15 and passes down on the other side.

The plates of the electrodes are held in rigid spaced relationship by fastening means such as rivets 16, insulating bushings 17 being interposed between the plates of the electrode 14. A detail of the electrode 14 is well shown in Figure 2.

Figure 3 illustrates a pair of electrodes 18 and 19 on the order of the electrodes 14 and 15 but omitting the overlapping portion of one of the electrodes. The electrode plates are held in rigid spaced relationship by rivets 20 which have insulating spacers (not shown) similar to the bushings 17 in Figure 1.

Figure 4 illustrates a type of heater in which the electrodes 21 and 22 may be called of double overlapping arrangement in that each one is bent into a U-shape (like a tuning fork) the prongs or plates being fitted together as shown. They are held in spaced and insulated relationship by rivets 23 and bushings 24.

The electrodes 21 and 22 are secured upon the insulating base 25 of the casing 26 by screws 27 and 28 which serve as terminals for the wires 29 and 30. The wires are secured by nuts. The base 25 has a threaded lug 31 upon which the cover 32 is screwed to conceal and protect the terminal nuts.

Perforations 33 in the casing 26 permit of a free circulation of fluid when the heater is immersed and in operation. The casing is removably secured to the base at 34 so that the heater may be taken apart when required.

The operation is readily understood from the following additional description.

The electrical circuit of which the wires 12, 13 and 29, 30 in the respective instances in Figures 1 and 4 are conductors terminate at the various electrodes at which the circuits are open.

It is not until one or the other heater is immersed in water or other fluid that a flow of current is established. The water has a certain resistance and the current in crossing from one electrode to the other causes the heating of the water. The heater in Figure 1 is particularly adapted to heating water in tall vessels such as tumblers, glasses, etc., while the type of heater in Figure 4 is more appropriate for bath-tubs, pans, etc.

While the construction and arrangement of the improved heater is that of a generally preferred form obviously modifications may be made without departing from the

spirit of the invention or the scope of the claims.

I claim:—

1. A heater comprising a flanged casing, a flanged cap, means by which the flanges are separably connected, insulating means including posts carried by the cap, an electrode carried by one post being doubled upon itself to define a central passage, a single electrode carried by the other post occupying the center of said passage, insulated means for rigidly securing the electrodes together in parallel spaced relationship, and means including terminal screws for fastening the electrodes upon said insulating posts.

2. A heater comprising a casing, an electrode situated in the casing, a second electrode bent to present a plurality of portions in confronting relationship to the first electrode, and means upon which said electrodes are independently mounted preserving said relationship.

3. A heater comprising a casing, an electrode situated in the casing, a second electrode bent to present a plurality of portions in confronting relationship to the first electrode, means upon which said electrodes are independently mounted preserving said relationship, and means extending from the first electrode to the various portions of the second electrode holding the parts in spaced relationship.

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