L. F. PARKHURST.

ELECTRIC WATER HEATER.

APPLICATION FILED NOV. 23, 1916.

1,270,198. Patented June 18, 1918.

Fig. 1.

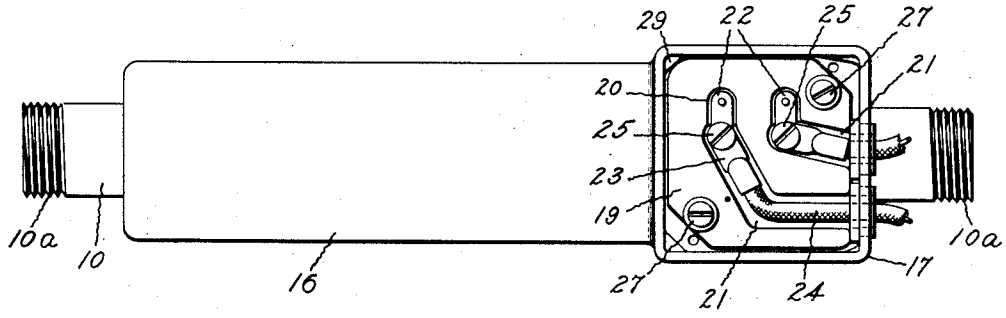


Fig. 2.

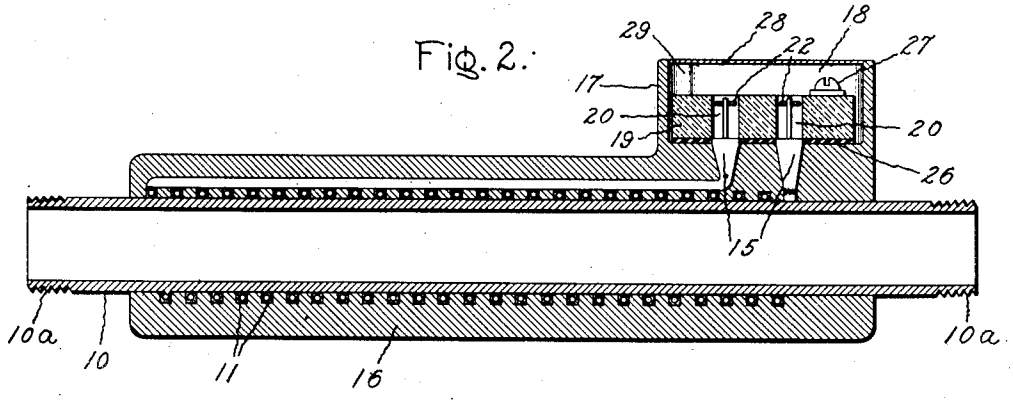


Fig. 4.

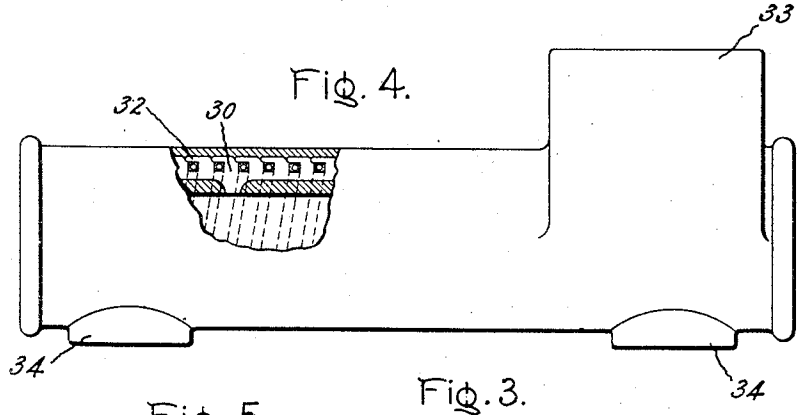


Fig. 5.

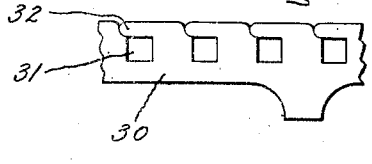
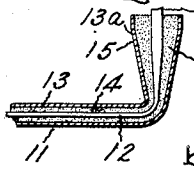


Fig. 3.



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UNITED STATES PATENT OFFICE.

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ELECTRIC WATER-HEATER.

1,270,198. Specification of Letters Patent. Patented June 18, 1918.

Application filed November 23, 1916. Serial No. 133,071.

To all whom it may concern:

Be it known that I, LEON F. PARKHURST, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Electric Water-Heaters, of which the following is a specification.

My invention relates to an electric heating device and more particularly to an electric water heater and has for its object the improvement of a device of this character.

In accordance with my invention, a body of metal which forms a good thermal path for conveying the heat from the heating unit to the water is cast directly around the sheathed wire unit, thereby greatly adding to the efficiency of the device. At the same time a simple and compact device is provided and one which is readily connected to and disconnected from the standard pipe fittings, with which a kitchen boiler is usually provided.

Another feature of my invention resides in the provision of a casing or housing for the terminals of the sheathed wire which is integral with the metal in which the sheathed wire is cast.

Other novel features of my invention will be apparent from the specification and will be particularly pointed out in the claims.

I have shown one embodiment of my invention in the accompanying drawing in which Figure 1 is a plan view of an electric heater with the cover for the terminal box removed; Fig. 2 is a longitudinal section of the heater shown in Fig. 1; Fig. 3 is a sectional view of a piece of sheathed wire and the terminal therefor which is suitable for the purposes of my invention; Fig. 4 is a side view partially in section showing another form of heater in which the terminal box for my invention may be embodied; and Fig. 5 is a detailed view showing a section of one of the plates on which the sheathed wire is mounted prior to being cast into the heater of Fig. 4.

Referring now to the drawings, and first to Figs. 1 and 2, which disclose the preferred form of my invention, 10 is a metal tube through which the water or other liquid passes. This tube is preferably formed of copper, as I have found in practice that deposits from the water, and particularly alkaline deposits, are less likely to form on copper than on other materials, and any deposit that may occur is more readily removed. This pipe is screw threaded at its ends 10^a for connection with other pipes or standard fittings such as those with which a circulation kitchen boiler is usually provided. A coil of sheathed wire 11 comprising a core resistance wire 12, inclosed in a metal sheath 13 with an intervening layer of insulating material 14, is coiled around the pipe 10 and provided with enlarged terminals 15 of the character disclosed in Patent #1,093,512, which was issued to Willis R. Whitney on April 14, 1914, the enlarged portions of the core, sheath, and insulating material being indicated by the reference numerals 12^a, 13^a and 14^a respectively. The tube with the surrounding sheathed wire and with the terminals extending to one side, is then placed in a suitable mold and a metal jacket 16 having a lower melting point than that of the tube, is cast around the sheathed wire and the tube, and constitutes a thermal path of good conductivity for carrying the heat from the resistance unit to the water. When the tube in the heater is formed of copper, then the cast jacket may consist of aluminum, since the melting point thereof is lower than that of copper and this material is at the same time a good conductor of heat. A casing or housing 17 provided with a suitable opening 18 for the reception of the terminals of the sheathed wire and for the connections therefrom to the supply conductors, is preferably cast integral with the jacket 16. An insulating slab or plate 19 is preferably provided in the bottom of the opening in the terminal box, and is formed with openings 20 into which the terminals of the sheathed wire are brought. The insulating slab 19 is also provided with suitable grooves 21 leading from the openings 20 to suitable openings in the side of the terminal box, as indicated in Fig. 1, for the reception of the ends of the supply conductors and the connections therefor to the sheathed wire terminals. Suitable clips or plates 22 are electrically connected to the outer ends of the core terminals of the sheathed wire and are preferably brazed thereto and the terminals 23 at the ends of the supply conductors 24 may be connected to the clips 22 by means of binding posts 25 of usual form. A second insulating plate 26 may, if desired, be

interposed between the plate 19 and the cast material of the jacket 16. The insulating plates 19 and 26 may be held in place by screws 27. The terminal box is closed by a cover 28 which engages lugs 29 formed in the inner corners of the terminal box and which are depressed below the upper face of the terminal box sufficiently to allow the cover to drop flush with or slightly below the top of the terminal box.

In Figs. 4 and 5 I have shown certain features of my invention embodied in a water heater of a slightly different type. In this heater the metal of the pipe, which forms the passage for the water, is cast around the sheathed wire resistance member. In this case, the sheathed wire is first coiled upon a plurality of plates 30, provided with suitable openings 31, the sheathed wire being secured in place by fingers 32 which extend over the sheathed wire and hold the same in position. The terminal box 33 is here also made integral with the cast material surrounding the sheathed wire, the same as in Figs. 1 and 2. In this form of heater, the connection with other pipes may be made at the sides, as at 34.

While in Figs. 4 and 5 I have shown my invention embodied in a device in which the casting around the sheathed wire also forms a passage for the water, I prefer the structure shown in Figs. 1 and 2, inasmuch as the copper tube is never porous to the water as is likely to be the case with a casting, due to the blow holes formed during the casting process.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative, and that the invention can be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. The method of making an electric heating device comprising sheathed wire formed with a resistance core inclosed in a metal sheath with an intervening layer of insulating material, which consists in winding the sheathed wire on a metal tube and then casting a metal jacket around the sheathed wire and the tube.

2. An electric heating device comprising a cast metal tube having therein a passage for water, a sheathed resistance unit cast directly in the metal tube, said tube being in good thermal relation with the unit and the water flowing through the passage.

3. An electric heating device comprising a tube for the water, a resistance unit, comprising a resistance core inclosed in a metal sheath with an intervening layer of insulating material, wound on said tube, and means for establishing a good thermal path between said resistance unit and said tube.

4. An electric heating device comprising a metal tube surrounded by a sheathed resistance wire formed of a core wire inclosed in a metal sheath with an intervening layer of insulating material, and a jacket composed of a material having a lower melting point than said tube cast around the tube and the sheathed wire.

5. An electric heating device comprising a metal tube surrounded by a sheathed resistance wire formed of a core wire inclosed in a metal sheath with an intervening layer of insulating material, and a metal jacket cast around the tube and the resistance wire, the terminals for the sheathed wire being brought through the jacket.

6. An electric heating device comprising a copper tube surrounded by a sheathed resistance wire comprising a core wire inclosed in a metal sheath with an intervening layer of insulating material, and a jacket of aluminum cast around the tube and the sheathed wire.

7. An electric heating device comprising a metal tube, a sheathed resistance wire comprising a core wire inclosed in a metal sheath with an intervening layer of insulating material wound on the tube, and a metal jacket cast around the tube and the resistance wire, the ends of the tube projecting beyond the casting and formed for connection with other pipe.

8. An electric heating device comprising a metal tube, a sheathed wire having a core wire inclosed in a metal sheath with an intervening layer of insulating material, and a metal jacket cast around the tube and the sheathed wire, the casting being provided with an integral housing for the terminals of the sheathed wire.

In witness whereof, I have hereunto set my hand this 22nd day of November 1916.

LEON F. PARKHURST.