Jan. 25, 1949. H. E. HANDLEY 2,459,816

WATER HEATER CONVERSION UNIT

Filed May 31, 1945

FIG. 1.

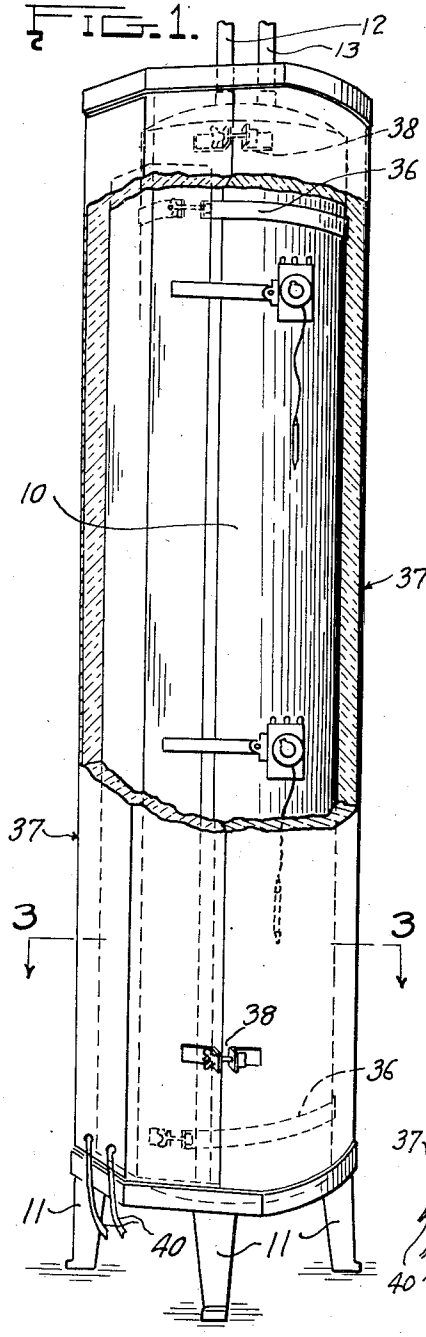


FIG. 2.

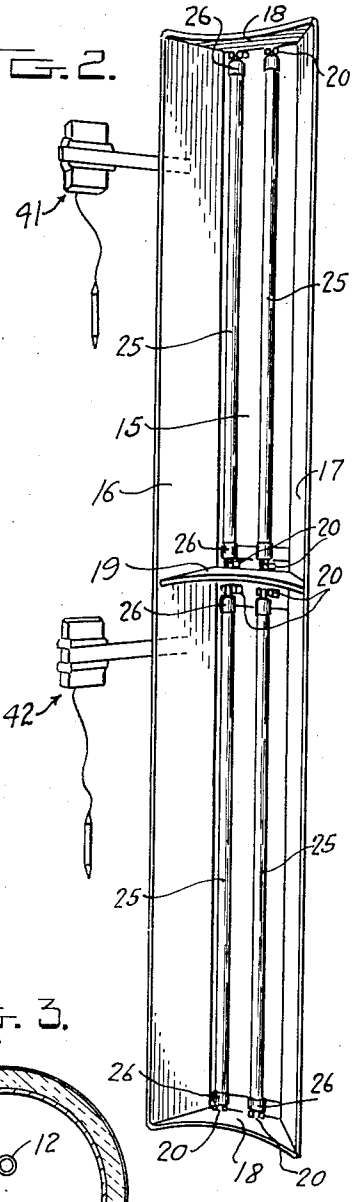


FIG. 4.

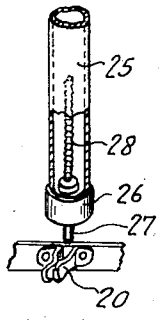
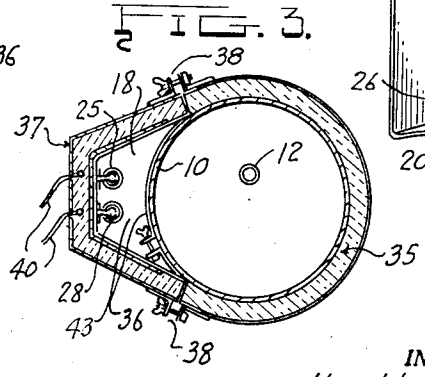


FIG. 3.



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Patented Jan. 25, 1949

2,459,816

UNITED STATES PATENT OFFICE

2,459,816

WATER HEATER CONVERSION UNIT

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Application May 31, 1945, Serial No. 596,900

1 Claim. (Cl. 219—38)

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This invention relates to a water heater.

It is an object of the present invention to provide an electrical heater construction which has many advantages over the ordinary types of electrical heaters now in general use. Most electrical heaters in common use today utilize what is called an immersion unit. That is, an electrical resistance device which is inserted directly in the tank surrounded by water. In communities where the water has a high lime content, the lime accumulation on these units is built up rapidly due to the fact that a high temperature must be used in the localized application of the heat. After a certain amount of lime accumulation a thermostat calls for almost continuous burning of the unit to keep the water at a proper temperature. The result is a burned out unit and the difficulty is that replacement of the unit is not an easy job. It involves destroying water seals and replacing water seals.

The present invention contemplates a heating unit which may be applied, either as original equipment or as a conversion unit, to ordinary range type boilers found in most homes today. The electrical resistance elements are incorporated in insulating pieces which are spaced at one point from the tank to provide a heating or absorption chamber. This chamber is preferably provided in the wall which faces the tank with a reflecting surface such as disclosed in Handley Patent 2,084,287, June 15, 1937.

It is an object to provide an electrical heating unit composed of a series of elements which are interchangeable and readily replaced in case of burn out. The construction contemplates a relatively large heating area which thus cuts down the intensity of the heat required and practically eliminates the lime deposit problem. The construction has an added advantage in that great standardization in production of the insulating assembly is possible; installations may be adapted to special wattage requirements and individual wants simply by arranging the proper wattage resistance at the proper points in the unit.

Other objects and features of the invention relating to details of construction, such as the manner of insulating the resistance units and mounting the same, and including special reflection surfaces, will be found in the following description and claim:

In the drawings:

Fig. 1 is a side elevation in perspective with a portion of the insulation cut away to show the general assembly.

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Fig. 2 is a perspective view of the heating unit with insulation removed.

Fig. 3 is a sectional view on line 3—3 of Fig. 1.

Fig. 4 is a partial view in perspective of an individual heating element showing the end connection.

If reference is made to the drawings, in Fig. 1 will be found a water tank 10 commonly referred to as a range type boiler. Suitable legs 11 support this boiler in a vertical position. Inlet and outlet pipes 12 and 13 enter the boiler at the top.

The heating unit for the boiler is shown in Fig. 2 preferably formed of sheet metal with a back plate 15, sides 16 and 17, ends 18 connecting the back and sides. A middle divider 19 also connects the back and sides. The ends 18 and the divider 19 are contoured on the free edges to correspond with the contour of the tank. On each side of divider 19 and adjacent each end 18 are pairs of clips 20 shown in detail in Fig. 4. These clips are each connected to an electrical conduit to serve as conducting members but they also serve as supporting members for tubes 25. The tubes 25 are preferably formed of a dielectric material such as glass with a metallic cap 26 at each end from which projects a conducting and supporting stud 27 shown in Fig. 4. Connected between the studs 27 in each tube is an electrical resistance wire 28 in coiled or straight form extending from end to end of the tube through the center thereof.

While numerous mountings may be provided for the heating unit shown in Fig. 2 one preferred construction is shown in Figs. 1 and 3. An insulating jacket 35 passes around the greater share of the tank extending slightly beyond the ends thereof and clamped in place by straps 36. The heating unit composed of the device shown in Fig. 2 is mounted within a jacket 37 which in turn is clamped to the jacket 35 by clamps 38, one at each end of each side of the unit 37. Thus the heating unit is drawn snugly up to the side of the tank 10. Suitable conduits 40 connect the conducting clips 20 to a source of electricity. Thermostatic units 41 and 42 may be connected into the circuits connecting up the resistance units in tubes 25 to control the passage of current therethrough in response to the load requirements of any particular installation.

The surface of sides 16 and the back 15 of the heating unit are preferably highly polished reflecting or mirrored surfaces which reflect the heat in the absorption chamber 43 toward the wall of the tank. The surface of the tubes 25 which subtend the tank may also be mirrored re-

flecting surfaces as shown in Fig. 4 to increase the efficiency of the unit.

The heating units for tubes **25** are designed to snap in and out of position by reason of the spring action of clamps **38** so that it is a simple matter to replace or change these units. The elements within the tubes **25** may be selected to have varying resistance such as 500 watts or 1000 watts. In many installations it is desirable to have higher wattage units at the lower portion of the tank than at the upper portion. In this case two 1000 watt units may be installed at the lower portion of the insulating device and two 500 watt units can be installed at the top. In other installations the exact reverse is desired, that is low wattage at the bottom of the tank and high wattage at the top. The removability of the front panel section **37** makes it easy for an ordinary householder to replace or exchange heating units. If it is found that the entire unit requires service, a substitute panel may be brought out and installed without the need of an experienced and skilled worker and the old unit returned to the service center for such repairs as it may need.

Water heating units are sold on the basis of capacity requirements which vary with local regulations and individual household needs. The construction above described has the advantage that the complete heating unit may be manufactured on a production basis with all parts standardized. As each unit is prepared for delivery the required capacity tubes may be inserted and the unit is tailored to the particular order.

Another advantage of the above construction lies in the low operating temperatures due to the fact that the heat input is distributed over a large area of the surface of the tank. Not only do the heating units have longer life but the lime concentration within the tank is materially reduced. Furthermore, if lime deposition becomes a problem it is necessary only to shift the location of the heating chamber with respect to the tank by rotating the outer shell of the heater.

What I claim is:

A water heater of the type having a heating element adjacent an outside surface of a water tank, comprising a circular upright tank, means including a separable shell insulating said tank throughout its length and around more than 180° of its circumference, fastening means for said insulating means releasable and available at the uncovered portion of the tank, and means completing the circumferential insulation and forming a heating chamber extending the length of said tank comprising two walls meeting the vertical edges of the first insulation means and extending substantially tangentially of the enclosed tank and a third enclosing wall joining the tangential walls spaced from the tank, four elongate heating units mounted in vertically aligned pairs on the inside of said third wall, each being independently mounted and removable, and each being composed of an electric resistance unit within a transparent di-electric tube, and fastening means for said last insulation means available at the outside of said joined insulation units, said first fastening means being enclosed within the second insulation means.

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