June 4, 1929. L. SHUMAN 1,715,520

ELECTRIC HEATER

Filed Jan. 29, 1926

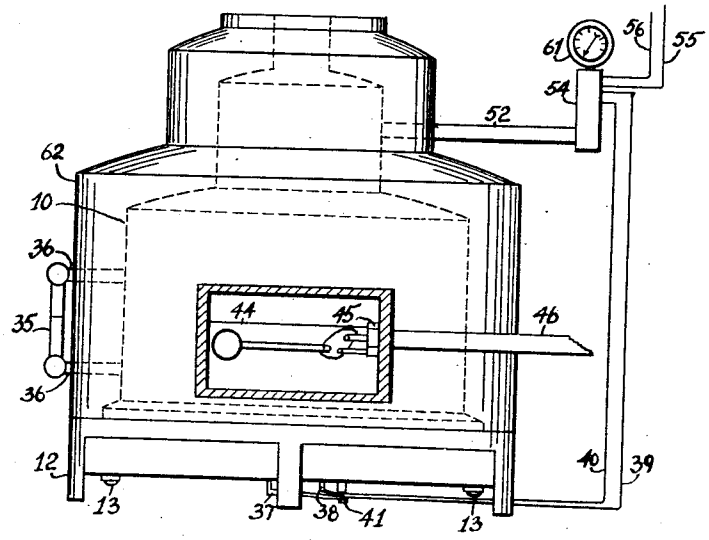


Fig. 1

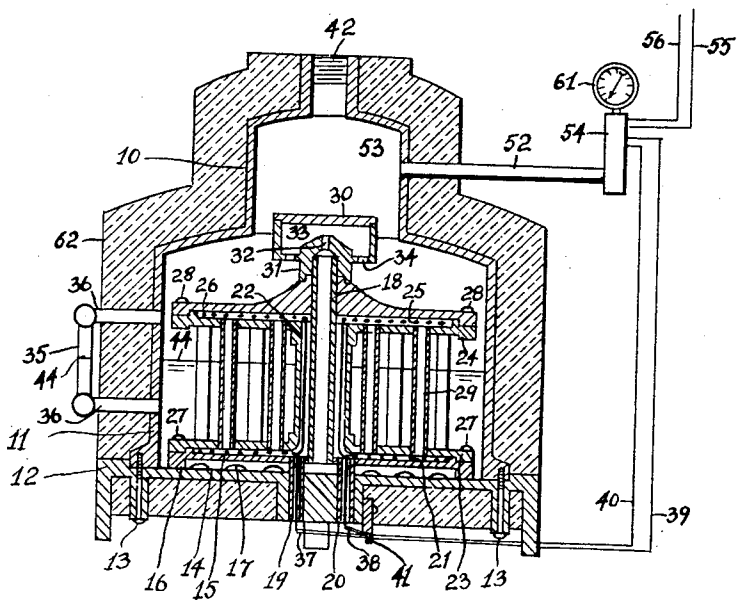


Fig. 2

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UNITED STATES PATENT OFFICE.

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ELECTRIC HEATER.

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This invention pertains to heating apparatus, and particularly to the use of electricity for the heating of water and circulating the steam generated therefrom through radiators for the raising of the temperature of rooms and buildings.

The object of the invention is to so combine electric heating units with a boiler and to so connect the boiler with radiators, that a measure of water may be filled into the boiler and distributed to the heating units in small quantities, so that small heating units will rapidly turn the water into steam within the boiler, from whence the same is distributed throughout the radiators and after condensation has taken place within the radiators, the same is returned to the boiler for re-heating.

Means are provided for distributing water for the boiler from a tank, to which the condensed steam returns for re-distribution to the boiler.

Automatic means are provided for maintaining a liquid level within the boiler and for maintaining a substantially uniform steam pressure therein.

It is recognized that in order to bring electric heating to a general commercial use, that the greatest possible efficiency must be obtained from the amount of electricity used, and it is with this idea in view that the details of the heater are constructed and arranged.

The invention will be hereinafter particularly described, illustrated in the accompanying drawings and pointed out in the appended claims. In the drawings, Fig. 1 is a side elevation of the heater and connections, with a plate removed, showing means for maintaining a liquid level within the boiler. Fig. 2 is a central vertical sectional view of the same.

In a detail description, in which like numerals refer to like parts throughout the several views, the boiler 10 has side walls 11 connected with a base 12 by means of bolts 13. A central cavity 14 is formed on the base 12 by means of a plate 15 elevated by means of an annular rim 16, through which are openings 17. Mounted in an opening through the center of the plate 15 is a tube 18, the same being open at both ends, the lower end thereof opening into the cavity 14. Passing through the base 12, cavity 14 and plate 15, are conduits 19 and 20. Mounted on top of the plate 15 is an annular electric heating element 21. Surrounding the tube 18 is a conduit 22, having an annular flange 23 at the bottom thereof, the same forming a covering for the heating element 21, and an annular flange 24 near the top thereof, forming a base for an electric heating element 25. An annular basin 26 surrounding the tube 18 forms a covering for the heating element 25. Bolts 27 secure the flange 23 and the plate 15 together and bolts 28 secure the basin 26 and the flange 24 together. Flues 29, open at both ends, extend through the flanges 23 and 24 and through the water area of the boiler 10 and reach to the heating elements 21 and 25. Mounted over the top of the tube 18 is a cap 30 having a connecting portion 31. An opening 32 through the portion 31 connects with a cavity 33 in the cap 30. Openings 34 are provided in the bottom portion of the cap 30. A transparent gage 35 has connections by reaching to the interior of the boiler 10, and indicates the liquid level therein. Electric connection 37 is made through conduits 19 and 22 with the heating element 25 and electric connection 38 through the conduit 20 with the heating element 21. The electric connections 37 and 38 are jointed to external wiring 39 and 40, respectively, at the binding posts 41. A threaded aperture 42 is provided at the top of the boiler 10 as a means for connection with a conduit leading to the point where the steam is used.

A liquid level 44 (Fig. 1) is maintained in the boiler 10 by means of a float controlled valve 45, mounted in the feed pipe 46 leading from a superimposed tank. A conduit 52 (Fig. 1) leads from the dome 53 of the boiler 10, whereby the steam pressure therein operates an electric switch mounted in a casing 54, wherein the wires 39 and 40 are operatively connected with wires 55 and 56 leading to a source of electric supply.

A gage 61 indicates the steam pressure in the boiler 10. It is estimated that substantially a one pound pressure will be required to maintain a proper and suitable temperature in a living room.

The boiler 10 is covered by a heavy insulation 62 to prevent undue radiation of heat therefrom.

In the practical operation of the heater,

the flues 29 scattered throughout the water area of the boiler 10 and extending from one heating element 21 to the other 25, keeps the water at a high temperature and water entering the cavity 14 therefrom through the openings 17 will be rapidly thrown up through the tube 18 in small quantities and forced through the opening 32 into the cavity 33, thence passing downwardly through the openings 34 and dropping onto the heated basin 26, where the transformation into steam takes place.

What is claimed is:

1. An electric heater comprising a boiler, an electric heating element mounted in the boiler near the bottom thereof, an enclosure to said heating element, means for a water circulation around said enclosed heating element, a tube, open at both ends, extending through said enclosed heating element and upwardly therefrom to a point above the water area therein, an enclosed electric heating element mounted near the upper end of said tube and surrounding the same, the upper surface of the enclosure of such heating element being receptive to heat, electric connections with the heating elements, a steam outlet and a water inlet to the boiler and flues extending from one heater to the other and connected therewith.

2. An electric heater comprising an enclosure adapted to hold water, a pair of enclosed electric heating elements mounted in the enclosure, flues reaching from one element to the other, said flues being partially surrounded by the water in the heater, a water connection leading from the lower element to the upper element, said flues assisting in heating the water forced up through said connection.

3. A heating system including an electric heater comprising an enclosure adapted to hold water, two separated electric heating elements in said enclosure, one below the water and the other above the water in said enclosure, a plurality of flues having a portion of their exterior surfaces immersed in the water in the heater and extending from the lower heating element and projecting above the water and connecting with the other heating element a plurality of radiators and connections between said radiators and the upper part of said enclosure.

4. An electric heater comprising an enclosure adapted to hold water, two separated electric heating elements mounted in said enclosure, one immersed in the water therein and the other outside of the water, and a plurality of flues having a portion of their exterior surfaces immersed in the water in the heater and connecting the two heating elements.

5. An electric heater comprising an enclosure adapted to hold water, two electric heating elements, one above the other, a tube extending through the upper heating element and projecting downwardly therefrom, and a plurality of flues having a portion of their exterior surfaces immersed in the water in the heater and interposed between the two heating elements.

6. An electric heater comprising an enclosure adapted to hold water, two electric heating elements, one above the other, a tube extending through the upper heating element and projecting downwardly therefrom, a plurality of flues interposed between the two heating elements, means for preventing the water from entering said flues, and means for moving water through said tube.

7. An electric heater comprising an enclosure adapted to hold water, a plate spaced from the bottom of the enclosure, an electric heating element mounted on said plate, a tube extending through said plate, a conduit surrounding said tube having an annular flange at the bottom which projects over and projects said heating element, said conduit having an annular flange at the top, a second heating element mounted on said annular flange, a series of flues open at both ends and extending through said annular flanges, so as to be heated by said heating elements, said tube passing up through said upper heating element, an annular basin surrounding said tube and acting as a cover for the upper heating element, and means for delivering heated water through said tube to said basin.

In testimony whereof, I affix my signature.

LEO SHUMAN.