W. STANLEY & H. M. SMITH.

ELECTRIC HEATER.

APPLICATION FILED JAN. 6, 1909.

1,063,614. Patented June 3, 1913.

Fig. 1

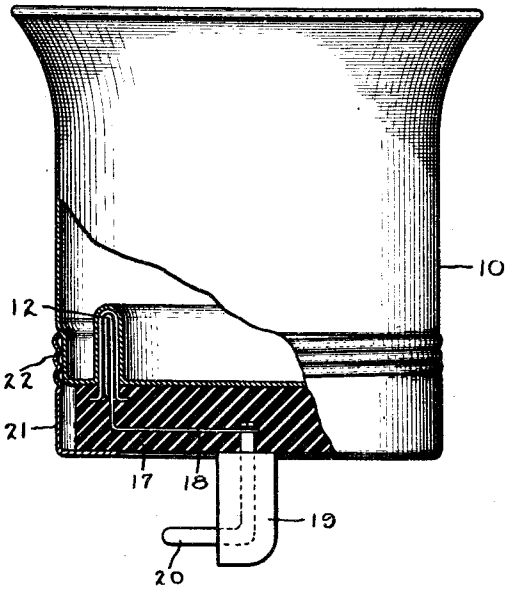


Fig. 2

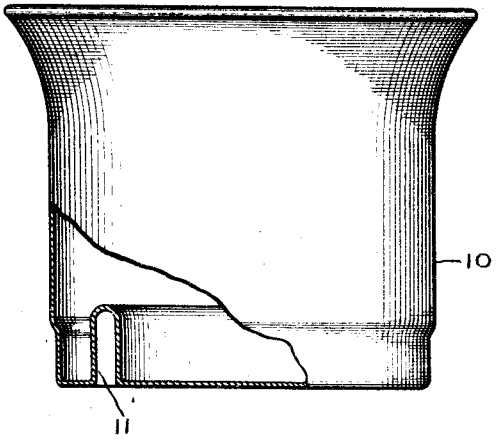


Fig. 3

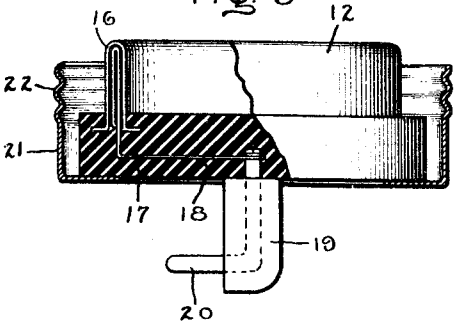
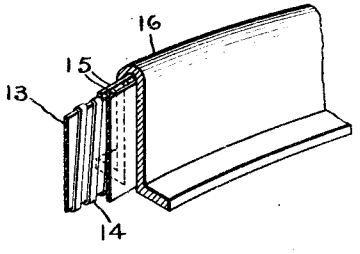


Fig. 4



WITNESSES:
Helen Orford
Benjamin B. Hull

INVENTORS
WILLIAM STANLEY.
HERBERT M. SMITH.
BY
Albert G. Davis
ATT'Y.

UNITED STATES PATENT OFFICE.

WILLIAM STANLEY AND HERBERT M. SMITH, OF PITTSFIELD, MASSACHUSETTS, ASSIGNORS TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTRIC HEATER.

1,063,614. Specification of Letters Patent. Patented June 3, 1913.

Application filed January 6, 1909. Serial No. 470,939.

To all whom it may concern:

Be it known that we, WILLIAM STANLEY and HERBERT M. SMITH, citizens of the United States, residing at Pittsfield, in the county of Berkshire, State of Massachusetts, have invented certain new and useful Improvements in Electric Heaters, of which the following is a specification.

This invention relates to electric heaters and has for its object the provision of a device of this character in which the heating unit is so arranged that the heat developed is conducted through the material to be heated in a very rapid and efficient manner, the construction of the heating unit being very simple and durable.

Another object of our invention is to produce an electrically heated receptacle for heating fluids in which the heating unit is, as nearly as possible, surrounded by the fluid to be heated.

In carrying out our invention we provide a unit having its bottom recessed, the recess extending upward so that the fluid will be in both sides of the unit. The recess may be in the form of a ring and the unit is similarly shaped and adapted to fit into the recess. The unit is of the independent, self-contained type mounted upon a suitable base arranged to be screwed or otherwise secured in the recess.

Other objects of our invention will appear in the course of the following specification, in which we have shown our invention embodied in concrete form for purposes of illustration.

In the drawing Figure 1 is an elevation partly in section of a device embodying my invention; Fig. 2 is an elevation partly broken away of the receptacle forming part of the said device; Fig. 3 is a vertical section of the heating unit and base forming part of the said device, and Fig. 4 is a perspective partly in section of a portion of the heating unit.

Referring to the drawings, 10 represents a receptacle of suitable material having its bottom recessed as at 11. This recess may be of any desired form, but for the purpose of convenience we have shown it annular in form, the sides of the recess projecting upward parallel with the sides of the vessel. A ring shaped heating unit 12 is arranged so as to fit snugly into the recess 11, so as to be in intimate thermal relation with the metallic bottom of the receptacle. This unit we have shown for the purpose of illustration as made of a strip of insulating material 13, preferably mica, bent in the form of a ring. A high resistance ribbon 14 is wound spirally around this ring and placed between two outside strips 15 of mica or other insulating material and the whole surrounded by a metal casing 16, bent in the U-shaped form. This complete ring is then mounted in a base of insulating material 17, either by being molded in or in any desired manner. Terminals 18 are brought out through the insulating material to insulating block 19 from which project the usual terminal pins 20. A metallic casing 21 is secured to this block so as to project upward, as shown. This casing is made of such a diameter that it will engage the sides of the receptacle. Screw threads 22 are provided so as to screw the casing on to the receptacle. The unit is thus forced up into the receptacle so that the fluid substantially surrounds the unit, permitting heat to be delivered from both sides of the heated ribbon, thus insuring a minimum thermal lag in raising the temperature of the liquid in the vessel, and preventing damage to the unit from overheating even if the vessel runs dry and permitting the unit to be run at higher current density with greater heating capacity for the utensil.

While we have described our invention as embodied in concrete form for the purpose of illustration, it should be understood that we do not limit ourselves thereto, since various modifications of our invention will suggest themselves to those skilled in the art, without departing from the spirit of our invention, the scope of which is set forth in the annexed claims.

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

1. An electric heater comprising a receptacle having its bottom bent upward to form an annular recess, an annular heating unit arranged to enter said recess so as to be in intimate thermal relation with the walls thereof, and means for securing the unit within the recess.

2. An electric heater comprising a receptacle having a bottom provided with an upwardly extending annular recess whose walls are integral with the bottom of the receptacle and an annular heating unit secured

to the receptacle and extending into the recess.

3. An electric heater comprising a receptacle having its bottom bent upward to form an annular recess, an annular heating unit arranged to enter said recess so as to be in thermal relation with the walls thereof, a base for said heating unit, and means for securing the base to the bottom of the receptacle.

4. An electric heater comprising a receptacle having its bottom bent upward to form an annular recess, an annular heating unit arranged to enter said recess so as to be in thermal relation with the walls thereof, a base for said unit having fixed terminal connections secured thereto, and means for securing said base to the bottom of the receptacle.

5. An electric heating device, comprising a cylindrical heating unit providing metallic outer and inner walls, and means therebetween to heat said walls, a utensil having its bottom shaped to provide an upwardly extending, outwardly opening, annular chamber to receive said heating unit, the metallic walls of said heating unit contacting with the walls of said bottom chamber, and means to support said unit in such position of contact with the said walls of the bottom chamber.

6. An electric heater comprising a receptacle having an annularly continuous cylindrical recess with vertical inner and outer walls extended inwardly from the otherwise uniform wall of the receptacle to provide within the receptacle relatively wide unobstructed liquid spaces separated by the walls of the recess, and a cylindrical heating unit arranged to enter said recess.

In witness whereof, we have hereunto set our hands this thirty-first day of December, 1908.

WILLIAM STANLEY.
HERBERT M. SMITH.

Witnesses:
P. A. SMITH,
F. G. LARAMIE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."