No. 835,841. PATENTED NOV. 13, 1906.

F. M. VOGEL.

ELECTRIC HEATER.

APPLICATION FILED MAR. 31, 1906.

Fig. 1.

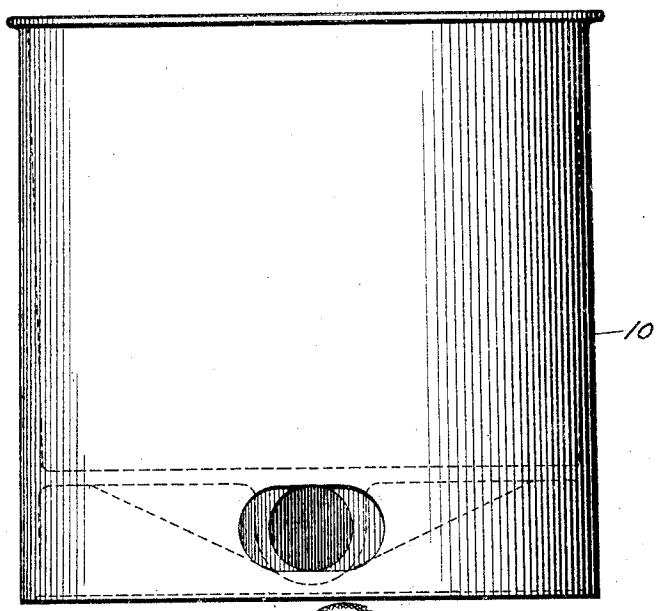
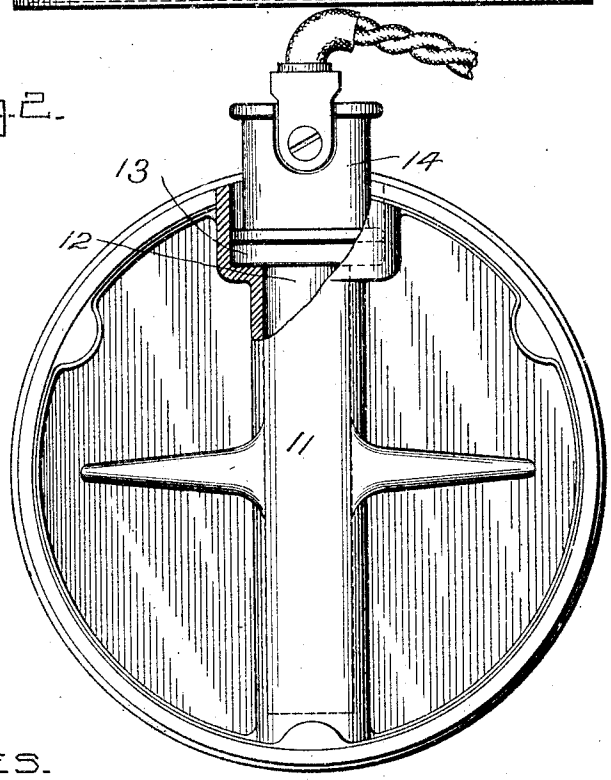


Fig. 2.



WITNESSES.

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ELECTRIC HEATER.

No. 835,841. Specification of Letters Patent. Patented Nov. 13, 1906.

Application filed March 31, 1906. Serial No. 309,079.

To all whom it may concern:

Be it known that I, FREDERICK M. VOGEL, a citizen of the United States, residing at Lynn, in the county of Essex, 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 which will have an even distribution of heat throughout the surface or area to be heated and which will be so arranged and constructed that the temperature will not rise above a definite predetermined point.

My invention relates more specifically to heating devices of the class in which it is desirable that the temperature shall never exceed the boiling-point of water (100° centigrade) and in which a very even distribution of the heat is necessary. In devices of this character it has been common heretofore to use a water-bath to bring about these results. This arrangement is perfectly satisfactory in so far as the results are concerned; but the use of the water-bath is exceedingly inconvenient. Constant attention is required to prevent the destruction of the vessel by burning out, due to the total evaporation of the water. Moreover, they are liable to cause damage by boiling over and are exceedingly inconvenient to carry from place to place. The particular device to which the principle of my invention is specially adapted is a vessel for melting glue, commonly known as a "glue-pot." It has been found that the proper temperature at which glue should be kept for ordinary use is about that of boiling water—*i. e.*, from 100° to 105° centigrade. It is further necessary that the temperature throughout the mass of glue be uniform, and the water-bath is very efficient in accomplishing this result. If the temperature were allowed to rise above, say, 105° centigrade, the glue would be burned. No heating device has ever been produced which would satisfactorily dispense with the use of the water-bath, which in this case is exceedingly inconvenient, as the glue-pot must frequently be moved from place to place. Moreover, great damage is sometimes caused by the boiling over of the glue-pots in such places as book-binderies, and a great deal of property can be destroyed in a short time. If the water were allowed to evaporate, the glue would burn, and the device thus needs to be constantly looked after.

I have found that a successful glue-pot heated by electricity can be produced without a water-bath. In order to accomplish this, three things are essential—first, that the vessel be so designed that the heat will be conducted away from the heating unit rapidly and distributed uniformly throughout the receptacle; second, it is necessary that the radiating-surface be so proportioned that the losses by radiation at substantially 100° centigrade will equal the energy supplied, and, third, the metal from which the pot is made must have a high thermal conductivity. I have found that aluminium is a good material for this purpose, as it may be cast and shaped to any desired form. Other good thermal conductors—such, for instance, as copper, which is a better conductor of heat—might be used, although the expense would be somewhat increased. It is important that the portion of the vessel containing the electric heating unit or units shall be massive to diffuse the heat uniformly and enable it to be properly and readily imparted to the lateral walls and that the walls shall be of substantial thickness both to draw the heat from the bottom and to equalize it at different levels, so that one part may not be at a temperature which would destroy the glue while another is normal.

In the accompanying drawings I have illustrated one embodiment of my invention, although, of course, it will be very clear that various other methods may be employed to accomplish this result without departing from the spirit of my invention.

In the drawings, Figure 1 is a side elevation of a receptacle embodying my invention. Fig. 2 is a bottom plan view thereof, a portion being broken away to show the electric heating unit and connector.

Referring to the drawings, 10 is a receptacle designed as a glue-pot and preferably cast from aluminium. The bottom of the receptacle, which is massive and has considerable heat capacity, has on its under side a boss 11, which is cored out so as to receive a heating unit 12, which may be of any of the well-known types of heating units—such, for instance, as the edgewise unit disclosed in the patent to Stevens, No. 803,795. The boss is

enlarged at one end 13, so as to admit the connector 14 for closing the electric circuit through the heating-coil. The vessel is extended below the bottom of the receptacle, so as to form a base therefor and to assist in drawing the heat from the heating unit out toward the circumference. As an important aid in distributing the heat I make the lateral wall or walls thick. I prefer to cast the glue-pot; but it might be made in other ways, provided my specification be followed of proportioning the surface relatively to the watts lost in the heating unit, so that radiation will maintain the temperature within safe limits, and, further, in distributing the metal as herein described to equalize the temperature. The proper extent of surface may be provided by increasing the size to the proper relative degree or by providing ribs or other means of increasing the surface exposed to the air.

It has been found that with my device the temperature within the receptacle may be kept from rising above a desired point—in this case about 105° centigrade—and that the temperature throughout the receptacle is sufficiently uniform. This will prevent the glue from burning and sticking to the side of the vessel.

By doing away with the water-bath in the glue-pot I have produced a very much more desirable article, which can be manufactured at a very low cost and which is practically indestructible, while at the same time there is no danger of destruction of property by spilling or boiling over of water.

It should be of course understood that I do not limit my invention to the precise means which I have shown and described for carrying out my invention; but I consider that it embraces all means whereby it may be carried out which fall within the scope of the claims annexed hereto.

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

1. An electric heater comprising a metallic receptacle having high thermal conductivity and electric heating means therefor, said receptacle being so proportioned and arranged that the energy lost by radiation at substantially 100° centigrade equals the energy supplied.

2. An electric heater comprising a receptacle of high thermal conductivity and thick walls, an electric heating device in intimate thermal relation therewith, and means whereby the energy supplied and the energy lost by radiation at substantially 100° centigrade are maintained equal.

3. An electric heater comprising a receptacle having a massive bottom, an electric heating device therein, and a superficial area exposed to the atmosphere whereby the energy supplied and the energy lost by radiation at 100° centigrade are maintained substantially equal.

4. An electric heating device comprising a receptacle for material to be kept heated to a substantially definite temperature, said heating device having an additional surface so proportioned and arranged as to radiate the excess of energy supplied and limit the temperature to some definite amount such as substantially 100° centigrade.

5. An electric heating device constructed of material of high thermal conductivity and having a receptacle for material to be heated and in addition thereto a massive bottom containing a heating unit, an extended surface for radiating or dissipating any excess of heat supplied so as to limit the temperature of the heating-receptacle and maintain it at substantially 100° centigrade or other definitely-chosen amount.

6. An electrically-heated glue-pot comprising a cast-aluminium receptacle having a massive bottom, an electric heating unit in intimate thermal relation with the bottom, means for maintaining a constant temperature throughout said receptacle, and means whereby the energy supplied and the energy lost by radiation at 100° centigrade are maintained substantially equal.

In witness whereof I have hereunto set my hand this 29th day of March, 1906.

FREDERICK M. VOGEL.

Witnesses:
JOHN A. MCMANUS, Jr.,
HENRY O. WESTENDARP.