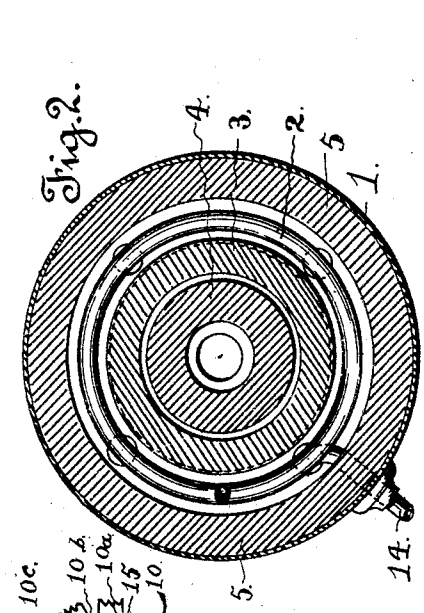
No. 764,674. PATENTED JULY 12, 1904.

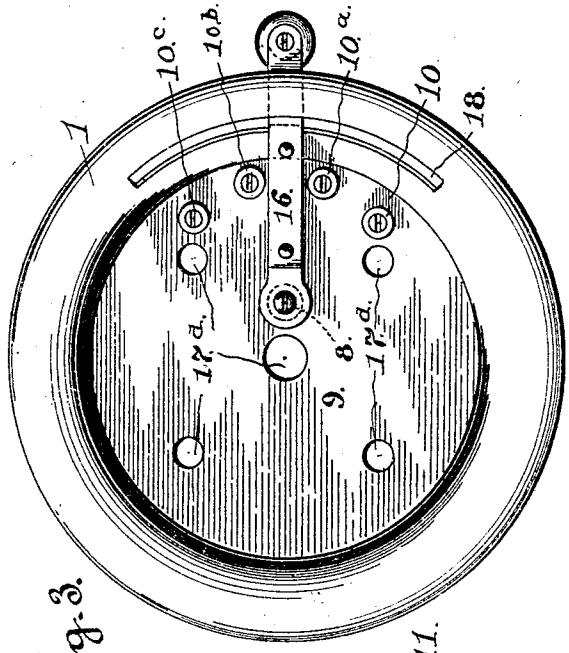
L. B. PEMBERTON.

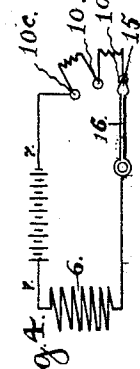
ELECTRICAL HEATER.

APPLICATION FILED JAN. 4, 1904.

NO MODEL.







Witnesses,
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No. 764,674. Patented July 12, 1904.

UNITED STATES PATENT OFFICE.

LOVELL B. PEMBERTON, OF REDONDO, CALIFORNIA.

ELECTRICAL HEATER.

SPECIFICATION forming part of Letters Patent No. 764,674, dated July 12, 1904.

Application filed January 4, 1904. Serial No. 187,659. (No model.)

To all whom it may concern:

Be it known that I, LOVELL BEARSE PEMBERTON, a citizen of the United States, residing at Redondo, in the county of Los Angeles and State of California, have invented a new and useful Electrical Heater, of which the following is a specification.

The object of my invention is the construction of an electrical heater which shall heat water as nearly instantaneously as may be, and I accomplish my object by means illustrated in the accompanying drawings.

Briefly, my invention consists chiefly of two cylindrical coils one within the other, one being a seamless metal pipe carrying water to be heated, the other a conducting-wire adapted to carry a current of electricity whereby heat is developed therein together with means of supporting said coils and of confining the distribution of heat from the conducting-wire to the water and of imparting the heat to all parts of the water simultaneously.

Referring to the drawings, Figure 1 is a perspective view showing the general construction of my apparatus, the lower right-hand part of which is drawn in section. Fig. 2 is a cross-section at the line A B of Fig. 1. Fig. 3 is an end view of my heater at the bottom, showing switch for switching current "on" and "off" and for regulating the strength of current. Fig. 4 is a diagram of the electrical current and connections in my heater, showing one way of regulating the heat. I do not confine myself to this way, as direct connections to various points of the resistance-coil with the contacts shown will accomplish the same result.

My heater is inclosed in an outside metal case 1. A seamless copper coil 2 is connected with a source of water-supply 14 and with a tap at 13. I provide a composition cylinder 3, of earthenware, porcelain, or other non-conducting substance, arranged with a spiral groove for the resistance-wire 6 and with air-vents 17^a at top. Within this composition cylinder I provide a cylinder 4, of magnesia, asbestos, or other substance offering resistance to heat conduction. An outer cylinder 5 is constructed of similar material, similarly offering resistance to the dissipation of heat. 5^a is a washer of similar material having air-vent holes at 17^c.

The electrical conductor or resistance-wire 6 is made of iron, German silver, "Climax," or other alloy and is wound on cylinder 3 in the groove provided therein, said groove being of sufficient depth to prevent said wire from coming into contact with copper coil 2.

7 is a fireproof flexible cord connected with coil 6, switch-point 15, and provided with an attaching-plug for the ordinary incandescent-lamp socket.

8 is a hard-rubber or composition socket-bushing.

9 is a fiber or other non-conducting plate, with air-vent holes, as at 17^d.

10 is a metal switch-point mounted on the base of my heater and is the point of the off position of the switch 15. 10^a, 10^b, and 10^c are also metal switch-points, being the positions which in contact with switch 16 are respectively designated the "on" position and the "hot-water" position and the "boiling-water" position.

A knob 11 on the switch 16 is provided for the purpose of enabling it to be handled readily. I provide also a convex plate, of magnesia or other poor conductor of heat, which I rest on top of cylinders 3, 4, and 5. The switch 16 is provided with a metal contact-plate 15, adapted to make electrical contacts with the aforesaid switching-points 10, 10^a, 10^b, and 10^c, the part of said switch which I have marked 16 being made of fiber and projecting through a slot 18 in the cover 1 to allow for its movement.

To operate the heater, the water-coil 2 is attached to a source of water-supply and the conducting-coil to a source of electrical power by means of the attaching-plug aforesaid. The switch 16 normally rests on the contact-point 10, whereby the circuit through the coil 6 is broken. A movement of the switch-lever to 10^a connects the circuit through resistances shown in Fig. 4 and moderately heats the wires. If hot water is desired, the switch is moved to the point 10^b and if boiling water is desired to the point 10^c. The disposition of the source of electrical heat and of the water to be heated in parallel adjacent coils and

the use of heat-resisting cylinders to confine the heat produced to the space occupied by said coils tends to heat all parts of the water simultaneously and to give the maximum temperature to the water with the minimum evolution of heat, so that the practical required temperature may be obtained with practical instantaneousness.

It is obvious that my heater may be used for heating other fluids than water, and I do not confine its operation to that liquid alone.

While the coils are shown as cylindrical in shape, I do not confine myself to that particular shape, as a flat coil of conducting-wire and a flat water-coil placed adjacently to each other and protected by heat-resisting coverings may be operated in a similar manner, although I prefer the cylindrical form herein specified. It is also obvious that coils of conical, pyramidal, or rectangular section disposed similarly to my cylindrical coils are within the purview of my invention.

Having described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. An electrical heater comprising a conducting-coil, and a water-carrying coil disposed adjacently thereto.

2. An electrical heater comprising a cylindrical conducting-coil, and a cylindrical water-carrying coil disposed adjacently thereto.

3. An electrical heater comprising an electrical conducting-coil, a metal water-carrying coil disposed adjacently thereto, means of supplying electrical energy to said electrical conducting-coil, and means of supplying water to and discharging water from said water-carrying coil.

4. An electrical heater comprising an electrical conducting-coil, a metal water-carrying coil disposed adjacently thereto, and means of confining the heat evolved in said conducting-coil within the space occupied by said two coils.

5. An electrical heater comprising a cylindrically-coiled conductor, an outer cylindrically-coiled metal water-pipe concentric therewith, and means of supplying electrical energy to said conductor and water to said pipe.

6. An electrical heater comprising an inner cylindrically-coiled metal conductor, an outer cylindrically-coiled metal water-pipe concentric therewith, means of supplying electrical energy to said conductor and water to said pipe, and means of confining the heat evolved in said conductor to the space occupied by, and immediately surrounding said coils.

7. An electrical heater comprising an electrical conducting-coil, a metal water-carrying coil disposed adjacently thereto, and means of regulating the strength of current in said conducting-coil.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

L. B. PEMBERTON.

Witnesses:
A. C. HEWLETT,
EDWIN SHAW.