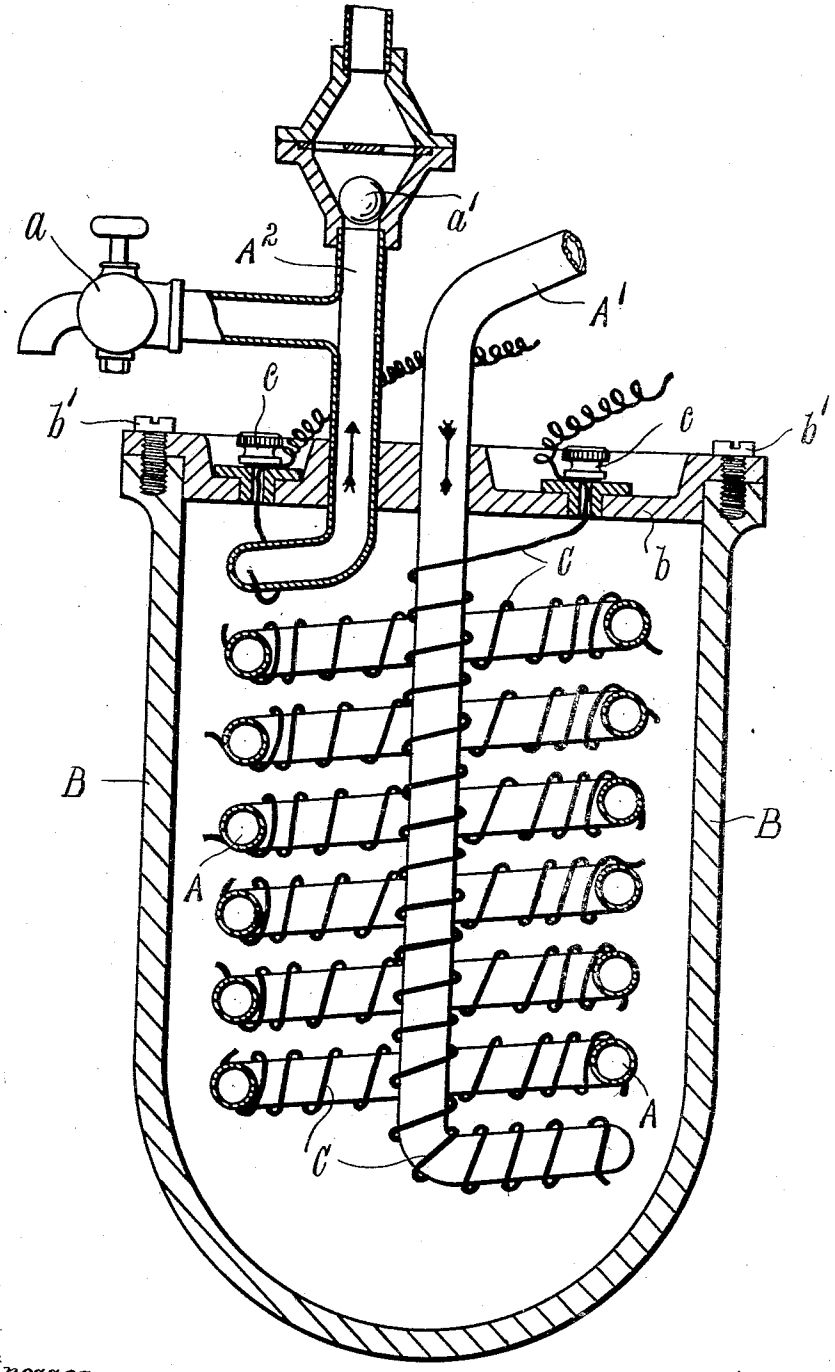
J. MANN.

ELECTRIC WATER HEATER.

APPLICATION FILED MAY 6, 1913.

1,120,830.

Patented Dec. 15, 1914.



Witnesses:-
E. Greenberger
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UNITED STATES PATENT OFFICE.

JOHN MANN, OF KILBURN, LONDON, ENGLAND.

ELECTRIC WATER-HEATER.

1,120,830. Specification of Letters Patent. Patented Dec. 15, 1914.

Application filed May 6, 1913. Serial No. 765,731.

To all whom it may concern:

Be it known that I, JOHN MANN, subject of the King of Great Britain and Ireland, residing at 12 Kilburn Square, Kilburn, London, in the county of Middlesex, England, have invented certain new and useful Improvements in Electric Water-Heaters, of which the following is a specification.

My invention relates to improvements in apparatus for heating water by electricity whereby burning or fusing of the resistance wires or filaments is prevented, and the heat generated by the current in the resistance wires or filaments is conserved so as to utilize the whole of same for heating the water without unnecessary waste.

In order to distinguish my invention from the previous attempts to economically heat water by electricity, I append a brief description of the methods and apparatus previously employed which are as follows:—

(1) A coiled pipe through which the water passes is coated with vitreous enamel and a fine resistance wire is wound upon and embedded in the enamel on the pipe. A handle both operates a valve to control the flow of the water and switches on and controls the current in the resistance wire so that the latter varies with the volume of water passing and is totally cut off when the flow of water discontinues.

(2) An annular chamber having a resistance wire through which an electric current may be passed, coiled within it, and from which the air is more or less exhausted, is entirely submerged in the water to be heated.

(3) An exhausted chamber has a series of tubes passing backward and forward along the length through which the water to be heated is passed. Electrical resistance wires are wound upon the exterior of these tubes. A non-return valve has also been employed in a self contained apparatus to prevent the entrance of the liquid from the container to the top of the heating chamber but permitting circulation between them.

Each of the foregoing methods has serious defects in the first the great heat and the alternate expansion and contraction soon cause the enamel to crack and fly, thereby laying bare the wire which either oxidizes or shorts and fuses, moreover the heat generated is free to radiate in all directions and consequently much is lost; in the second, although the chamber containing the heating resistance is totally submerged in the water to be heated and consequently almost all the heat generated must be collected by the water; much heat will be lost by radiation and conduction from the water itself which has large surfaces exposed; in the third, the multiplicity of joints required to be made and maintained, causes undue difficulties and expense in the manufacture and renders the apparatus proportionately liable to break down.

Now to overcome the difficulties experienced with the foregoing apparatus I employ a copper or other tube bent to form a tubular helical coil through which the water passes. Around the tube which forms the helical coil and suitably insulated from it, is wound the resistance wire. This coil is placed within a suitable metal, glass, enameled clay or other cylinder or like container which is exhausted of air or other gases, so as to produce a vacuum therein. Suitable insulated terminals are provided on the cylinder or like container, which are connected to the electrical resistance wires or filaments which are wound on the water carrying coil.

The upflow of the tubular coil is fitted with a suitable check valve, so that when the fluid is being drawn off from the upflow the check valve closes preventing communication therethrough: but should the current be left on while the exit from the upflow was closed the water in the coil would circulate from the reservoir or tank through the coil to the upflow and back to the reservoir or tank by way of check valve.

In order that my invention may be more readily understood, reference is had to the accompanying sheet of drawings.

Referring to the drawings A is the helical tubular coil having inflow and outflow ends A^1 and A^2 projecting through the cover *b* of the container B in which the coil is situated. Resistance wires or filaments C are wound upon the tube forming the helical coil and connected to the terminals *c* on the cover *b*. On the upflow pipe is situated the draw off cock *a* and a check valve a^1 provided between it and the reservoir to allow circulation from the reservoir through the coil and back to the reservoir when the draw off cock *a* is closed, and to prevent water being drawn direct from the reservoir when it is open. The container B which is exhausted to a substantial vacuum is secured to the

cover b by screws b^1 by removing which the container and cover may be separated and the whole of the coil and its winding exposed for examination or repair.

What I claim as my invention and desire to secure by Letters Patent is:—

An electric water heater comprising the combination of a heating element consisting of a plate in which is fixed a helical tubular coil, the two ends of which extend through the plate on one side, forming an inlet and outlet to and from the coil, which coil is on the other side of the plate, an electric resistance wound upon said coil, two insulating plugs in said plate, each of which is fitted with a terminal, the ends of said resistance being attached to said terminals, a draw off cock upon the outlet end of said tubular coil and a one way valve in said outlet pipe beyond said draw off cock, with a cup shaped casing fitting over said tubular helical coil on to said plate with a gas tight joint, forming a chamber from which air and other gas is removed as set forth.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

JOHN MANN.

Witnesses:

FRANK W. PATTISON,

O. J. WORTH.