

(No Model.)

C. E. ROEHL, S. Z. MITCHELL & E. P. WETMORE.
ELECTRIC HEATER.

No. 500,272.

Patented June 27, 1893.

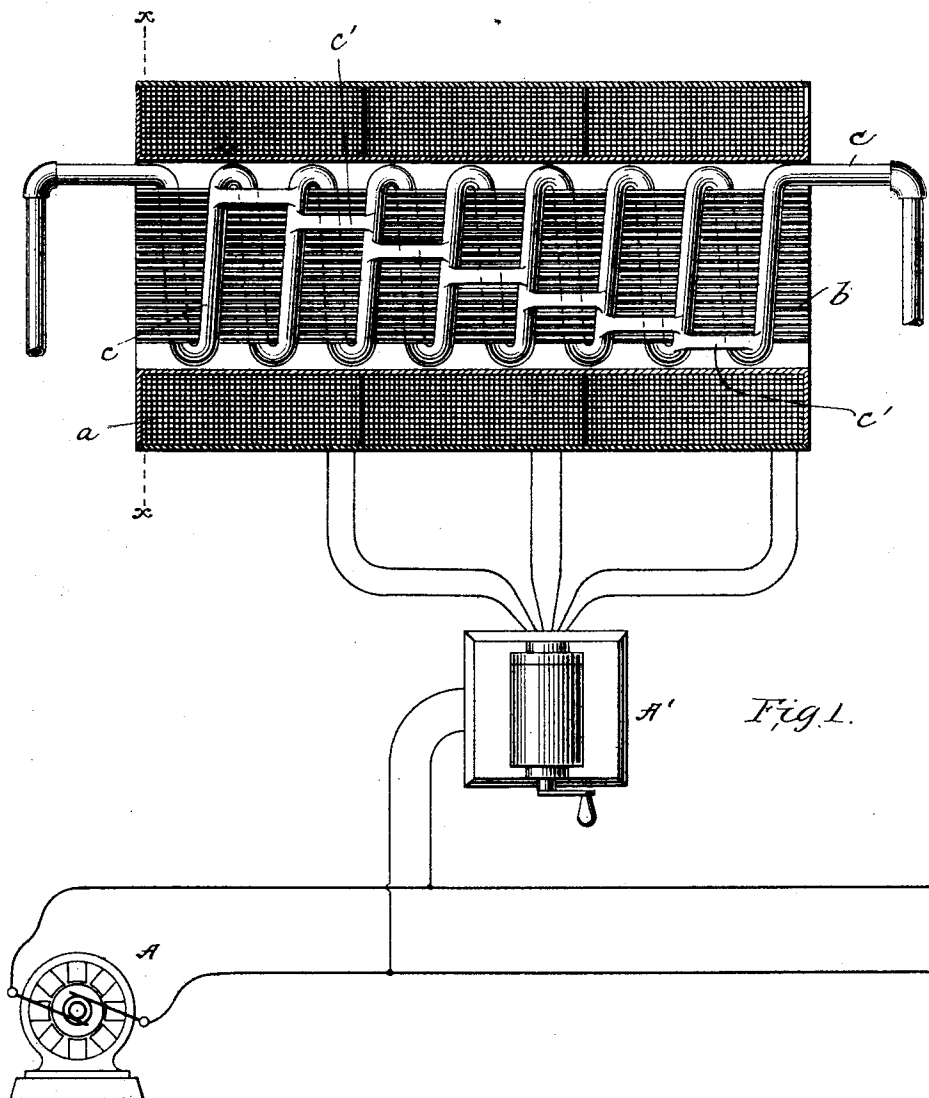
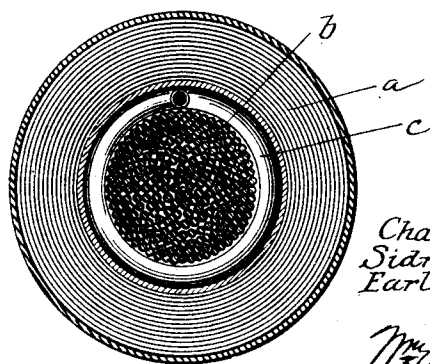


Fig. 2.



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CHARLES E. ROEHL, OF CHICAGO, ILLINOIS, SIDNEY Z. MITCHELL, OF PORTLAND, OREGON, AND EARL P. WETMORE, OF HELENA, MONTANA.

ELECTRIC HEATER.

SPECIFICATION forming part of Letters Patent No. 500,272, dated June 27, 1893.

Application filed December 23, 1892. Serial No. 456,139. (No model.)

To all whom it may concern:

Be it known that we, CHARLES E. ROEHL, of Chicago, in the county of Cook and State of Illinois, SIDNEY Z. MITCHELL, of Portland, in the county of Multnomah and State of Oregon, and EARL P. WETMORE, of Helena, in the county of Lewis and Clarke and State of Montana, citizens of the United States, have invented certain new and useful Improvements in Electric Heaters, of which the following is a full, clear, and exact description.

Our invention relates to electric heaters, the object being to provide a heater which shall be simple and cheap in construction.

The invention utilizes alternating or pulsating continuous currents and a novel form of transformer, in which the secondary coil is a continuous pipe or tube through which water or air may pass and be heated. The coils of tubing are connected across by metallic bridges so that a series of closed circuits are formed, in which the secondary currents travel and are confined, and thereby heat the pipe.

The details of the invention will be described with reference to the accompanying drawings, in which—

Figure 1 represents a sectional view of the heater and the electric circuits, and Fig. 2 represents a transverse section of the heater.

Referring to the drawings by letter, *a* represents the primary coil of a transformer of alternating currents. This coil we prefer to wind in sections as shown, so that any number of them may be utilized at once, or they may be connected in various ways with respect to each other, in order to vary the heating effects of the apparatus.

b represents a cylindrical bunch of iron wires constituting one of the usual forms of iron core for transformers and converters. This iron core is inclosed by a coil of pipe *c*, the convolutions of which may be any desired number to fulfill the requirements of the heater. This coil of pipe is preferably of brass or other material, and is adapted to convey water, gas or other liquid, which is to be heated and utilized at any desired distance

from the heater. The adjacent convolutions of the pipe are bridged across by strips *c'* of conducting material. Each strip may span one or more coils as desired. This divides the entire coil into a number of closed circuits.

A represents a generator of alternating currents.

A' represents any well-known form of switching apparatus to which branches from the feeding circuit and the wires from the several sections of the coil of the transformer lead, and by which any number of sections of the primary coil may be put into circuit or the sections connected in series or multiple with each other, as desired.

In operation the alternating or pulsating continuous currents which are directed into the sections of the primary coil by the switch *A'* induces alternating currents in the pipe coil *C* which circulate in the several closed circuits, and as their quantity will be very great they will rapidly heat the convolutions of the pipe, which heat will be transferred to the water or gas passing through the coil.

This apparatus will be found useful in various places. The heated water may be passed through radiators and used to heat an apartment, or the water may be used in its free state. If air is forced through the pipe it may be used for heating houses in the same way in which the heated air from furnaces is utilized.

Although we have shown and described a cylindrical form of heater and have used the word "cylinder" in the claims which follow, it is to be understood that our invention comprehends rectangular or other forms of apparatus. It is also to be understood that the form or type of transformer is not material to our invention, the primary feature of which is a closed secondary in the form of a tube, located in inductive relation to a primary coil and with or without an iron core.

Having described our invention, we claim—

1. An electric heater consisting of a transformer, converter or other inductorium having a tubular secondary coil closed electrically upon itself, substantially as described.

2. An electric heater consisting of a transformer, converter or other inductorium, the secondary coil of which is a tube the convolutions of which are bridged by strips of electric conducting material, for the purpose set forth.

3. An electric heating apparatus consisting of the combination of a generator of alternating or pulsating continuous currents, a primary coil through which such currents circulate, an iron core inside of said primary coil, a secondary coil in the form of a tube through which there is a continuous passage for fluids, said tubesurrounding the iron core and its convolutions being bridged to divide the coil into a number of closed circuits, substantially as described.

In testimony whereof we subscribe our signatures in presence of two witnesses.

CHARLES E. ROEHL.
SIDNEY Z. MITCHELL.
EARL P. WETMORE.

Witnesses as to signature of Charles E. Roehl:
P. MCL. FORIN,
J. A. FORIN.

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O. F. PAXTON,
C. E. GRAY.

Witnesses as to signature and execution by Earl P. Wetmore:

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