

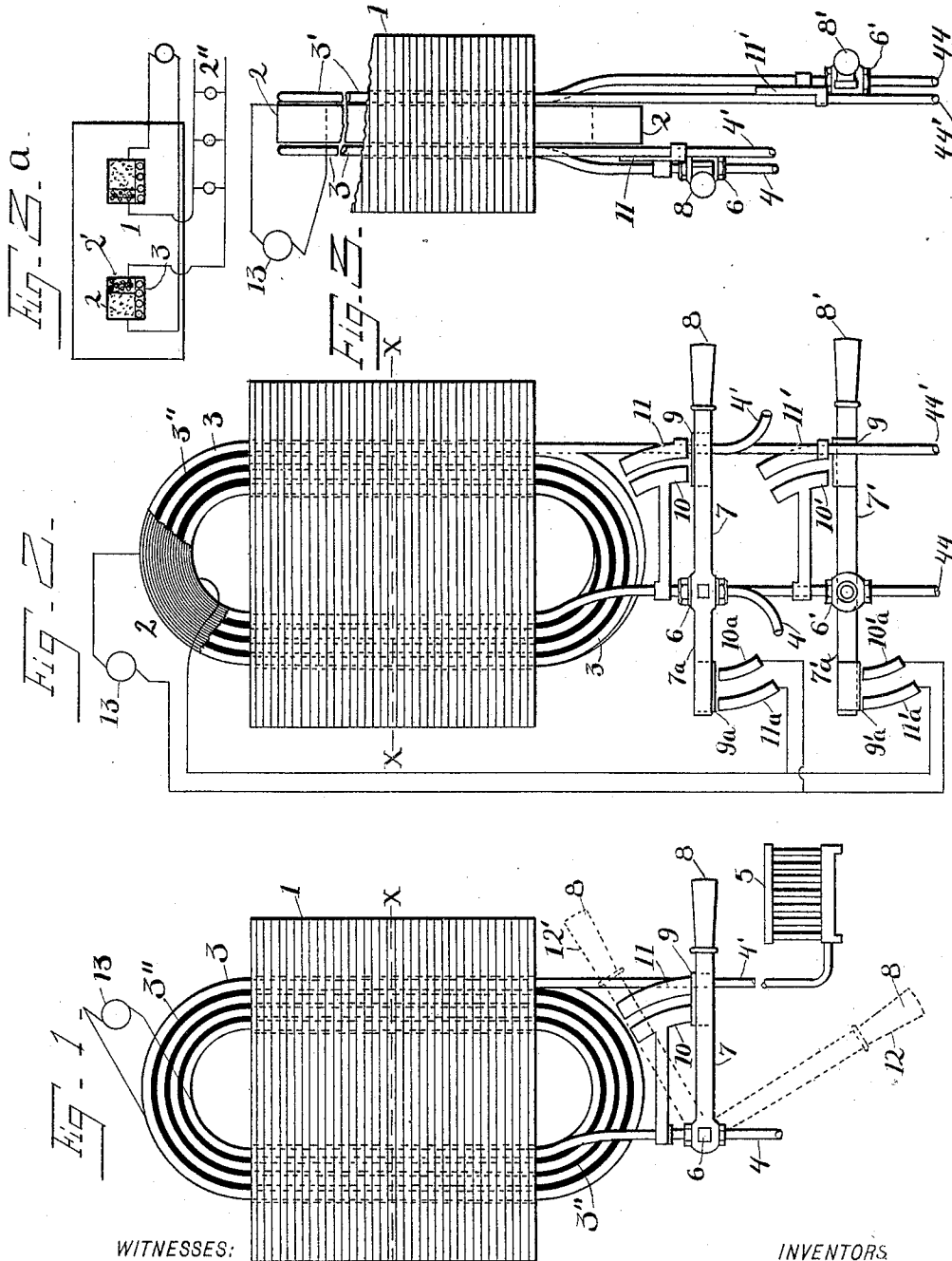
(No Model.)

2 Sheets—Sheet 1.

E. P. WETMORE & C. E. ROEHL.
ELECTRIC HEATER.

No. 570,077.

Patented Oct. 27, 1896.



WITNESSES:

Harry J. Perkins.
Emma C. Deghise

INVENTORS

Earl P. Wetmore.
Charles E. Roehl,

BY

Edward P. Thompson
ATTORNEY.

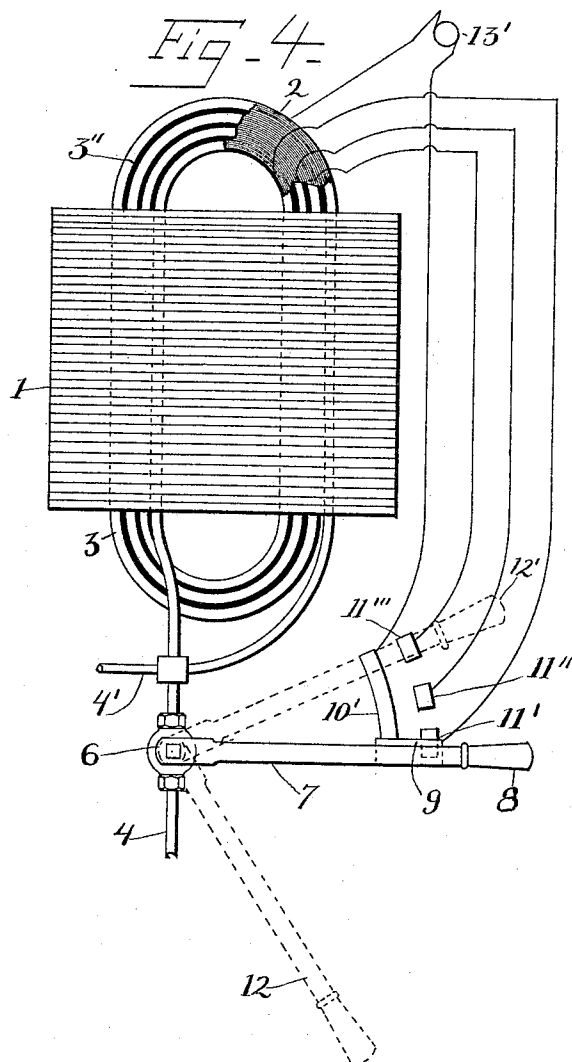
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UNITED STATES PATENT OFFICE.

EARL P. WETMORE AND CHARLES E. ROEHL, OF ST. JOSEPH, MISSOURI.

ELECTRIC HEATER.

SPECIFICATION forming part of Letters Patent No. 570,077, dated October 27, 1896.

Application filed May 1, 1895. Serial No. 547,737. (No model.)

To all whom it may concern:

Be it known that we, EARL P. WETMORE and CHARLES E. ROEHL, citizens of the United States, and residents of St. Joseph, county of Buchanan, and State of Missouri, have invented certain new and useful Improvements in Electric Heaters, of which the following is a specification.

The present invention relates to that class represented by Letters Patent No. 500,272, of June 27, 1893, in which is shown as the leading feature a coil of pipe employed as the secondary conductor of an electric converter and having the successive turns electrically connected to each other for the purpose of closing each convolution upon itself.

The object of the present invention is to provide an electric heater involving the same general principles, as a basis, and additional elements, which are intended to overcome difficulties found in the use of the older device set forth in the above-named patent.

All the details of the invention are set forth in the drawings.

Figure 1 is a front elevation of a simple form of the invention. Portions of the secondary conductor 3, between the radiator 5 and the indicated ends 4 and 4', are represented as broken away in the drawings, but in practice the radiator 5 is connected up as in any steam-heating radiating system. The portions that are broken away may of course be any length and therefore they are not indicated. For example, the radiator may be located on an entirely different floor in a building from that supporting the converter or heater. Fig. 2 is an elevation of an important development with respect to Fig. 1. Fig. 3 is a side elevation of that which is shown in Fig. 2. Fig. 3^a shows a modification of the coils of the converter, of which a cross-section is represented, some circuit connections being also indicated. Fig. 4 is a vertical elevation of a modified manner of regulating the currents.

In all of the figures some of the elements are represented more or less in mere outline or diagram.

Referring to Fig. 1, the mechanical construction consists of the combination of the core 1, which, of course, is preferably a laminated core having openings for containing

the primary coil, and the secondary coil 3, which is not, as usual in electric converters, a solid conductor, but a hollow conductor, whose ends serve, respectively, for the entrance and exit of liquids or gases which are to be heated. The primary coil 2 of Figs. 2 and 3 is not apparent in Fig. 1, as it is directly behind the secondary coil 3. 4 is preferably the entrance end, and 4' is the exit, which in Fig. 1 is represented as connected to a steam or hot-water radiator 5. The hollow secondary conductor is turned upon itself several times in order to form convolutions electrically insulated from one another by insulations 3". The end 4 is provided with a valve 6. 7 is a circuit-closer. A handle 8 serves to operate the valve 6 and circuit-closer 7, which latter are preferably rigidly connected together. The contact-plate of the circuit-closer is characterized by 9, and the two terminals to be connected by the contact 9 are numbered 10 and 11, the former being connected to the terminal 4 and the latter to the terminal 4' and are arc-shaped around the valve 6 as a center. The valve in the lower position 12 of the handle is closed, so that no liquid or gas can enter the hollow secondary 3. In its full or horizontal position it is open full. In the upper dotted position 12' the valve is only partially closed, and if the valve is turned by moving the handle down more and more from the dotted position it is more and more opened until it gets in the horizontal position shown by full lines. The electric-arc-shaped terminals 10 and 11 extend through the arc passed through by the handle 8 from its horizontal position to its upper dotted position. The operation of the device representing this portion of our invention consists in passing an inducing current, such as an alternating, a pulsating, or an intermittent current, from the generator 13 through the primary coil 2. By well-known principles of induction no current is induced in the secondary coil 3 when the handle 8 is not closing the terminals 10 and 11. In order to get the greatest quantity of liquid or gas in the coil 3 to be heated, and at the same time to heat it, the valve is opened full, whereby the contact 9 at the same time closes the circuit, but in order to get the highest temperature the valve 6 is partially turned off, but the sec-

ondary conductor maintained closed by moving the contact 9 upward more or less toward the dotted position of the handle 12'.

In Figs. 2 and 3 we represent an electric heater which permits two or more sets of coils to be combined into one converter, whereby the amount of iron in the core is greatly economized and whereby the one coil can be used independently of the other, or both may be used simultaneously without interfering with one another. In explaining this construction the description may be greatly condensed by referring to Figs. 1, 2, and 3 in conjunction. The difference over Fig. 1 consists in extending the lever 7, belonging to the valve of the secondary hollow conductor 3 and in adding a similarly-extended lever 7' for a supplementary secondary hollow conductor 3', the ends of which are respectively 44 and 44'. The valve in the secondary conductor 3' is numbered 6' and is operated by the lever 7'. The extended portions of the levers 7 and 7' to the left of valves 6 and 6' are provided, respectively, with circuit-closers 9^a and 9'^a, which operate for closing terminals 10^a and 11^a and 10'^a and 11'^a, which form duplicate terminals of the primary coil 2, so that when the said circuit-closers, one or both, are closed the valves 6 and 6' are correspondingly, one or both, opened more or less, and at the same time the hollow secondary conductors 3 and 3' are, one or both, closed upon themselves.

Referring to Fig. 4, the numerals that are repeated refer to the same elements as in the former figures. The blocks 11', 11'', and 11''' are the terminals of different sections of the primary coil 2. A terminal of the primary coil is connected to the terminal 10', which is arc-shaped and extends, as did the terminal 10, from the full-open position of the valve to the partially closed at the dotted position of the handle 12'. Arranged in the path of the contact 9 and opposite the terminal 10' are the terminals 11', 11'', and 11'''. When the circuit-closer 9 closes the terminals 10' and 11', the current, as indicated by tracing out the circuits, is through the entire primary coil. At the contact 11'' a less portion of the primary coil is included in circuit, and at the dotted position 12' a still less or minimum length of the primary coil is included in circuit, and, therefore, at the lowest position of the handle 8 the greatest amount of liquid can enter for the purpose of being heated, but if the device is used, for example, in connection with heating or warming fluid a less quantity may be entered by raising the handle 8, so that the circuit is closed between the contacts 10' and 11'', and by moving the handle still farther for similar reasons a still less amount of liquid may be heated. It is evident that the terminals 11', 11'', 11''', and 10' could represent the terminals of different sections of the secondary conductor, as well as of the primary.

When the electric heaters are used in bi-

phase or multiphase current circuits, two or more converters are employed in order to provide a balance between the sides of the system.

In Fig. 3^a is a homogeneous secondary conductor 2' in addition to the hollow secondary conductor and including in its circuit the translating devices 2'', the system accomplishing in one converter but one core and one primary the twofold functions of heating and operating translating devices, as, for example, lamps.

We claim as our invention—

1. An electric heater consisting of the combination of an electric converter having hollow secondary conductors thereon, and means for electrically closing each or all upon themselves, said means being provided with circuit-closers for opening and closing the primary conductor of the said converter.

2. An electric heater consisting of the combination of a converter having a hollow secondary conductor provided with a valve for feeding a liquid or gas into the conductor, and a circuit-closer for opening and closing upon itself that portion of the secondary conductor which passes through the converter.

3. An electric heater, consisting of the combination of an electric converter whose secondary conductor is hollow, a valve within the conductor, electric terminals attached respectively to different portions of the hollow conductor and lying in the path of a given circuit-closer, and a single lever controlling the valve and the circuit-closer.

4. An electric heater consisting of the combination of an electric converter having a hollow secondary conductor thereon, provided with a valve, a circuit-closer for opening and closing said hollow conductor upon itself, and a single manual device attached to the valve and the circuit-closer the elements being so arranged relatively that the valve may be regulated while the said conductor is closed upon itself.

5. An electric heater, consisting of the combination of an electric converter whose secondary conductor is hollow, a valve within the conductor, a first pair of electric terminals attached as to its members respectively to different portions of the hollow conductor, a second pair of electric terminals, electrically connected to a given generator and to the primary conductor of the converter, both pairs of terminals lying respectively in the paths of different circuit-closers, and a single lever attached to said valve and to said circuit-closers.

6. An electric heater, consisting of the combination of an electric converter whose secondary conductor is hollow, a valve within the conductor, a first pair of electric terminals attached as to its members respectively to different portions of the hollow conductor, a second pair of electric terminals, electrically connected to a given generator and to the primary conductor of the converter, both pairs of terminals lying respectively in the

paths of different circuit-closers, and a single lever carrying said circuit-closers and controlling said valve, the said terminals being so constructed that the said circuit-closers

5 will connect them during the regulation of the valve within predetermined limits.

7. An electric heater, consisting of the combination of an electric converter having a hollow secondary conductor, a rotary valve

10 in the conductor, a lever attached to and rotatable with the valve, circuit-closers carried upon respective arms of the lever, and arc-shaped pairs of terminals respectively for the hollow conductor and the primary conductor

15 of the converter, of such length that for different predetermined positions of the valve, they will remain in contact with said circuit-closers.

8. The combination of a radiator, a primary

20 electric coil, a pipe a portion of which passes through the radiator and a portion within inductive action of said primary coil and hollow throughout its length, a valve in the pipe and means for regulating the valve and simulta-

25 neously opening and closing and maintaining

closed electrically, a portion of the pipe upon itself.

9. An electric heater, consisting of the combination of an electric converter whose secondary conductor is hollow throughout its

30 length, a valve within the conductor, electric terminals attached respectively to different portions of the hollow conductor and lying in the path of a given circuit-closer, a single lever controlling the valve and the circuit-

35 closer, and a radiator whose pipes and connecting-pipes form a continuous passage-way with the said hollow conductor for the circulation of fluids, the said lever being so adjusted that the valve is open when the circuit

40 of the hollow conductor is closed.

In testimony that we claim the foregoing as our invention we have signed our names, in presence of two witnesses, this 2d day of April, 1895.

EARL P. WETMORE. [L. S.]
CHARLES E. ROEHL. [L. S.]

Witnesses:

WM. T. VAN BRUNT,
E. C. BORDEN.