No. 737,689. PATENTED SEPT. 1, 1903.

C. WIRT.

ELECTRIC HEATER OR RHEOSTAT.

APPLICATION FILED DEC. 5, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1

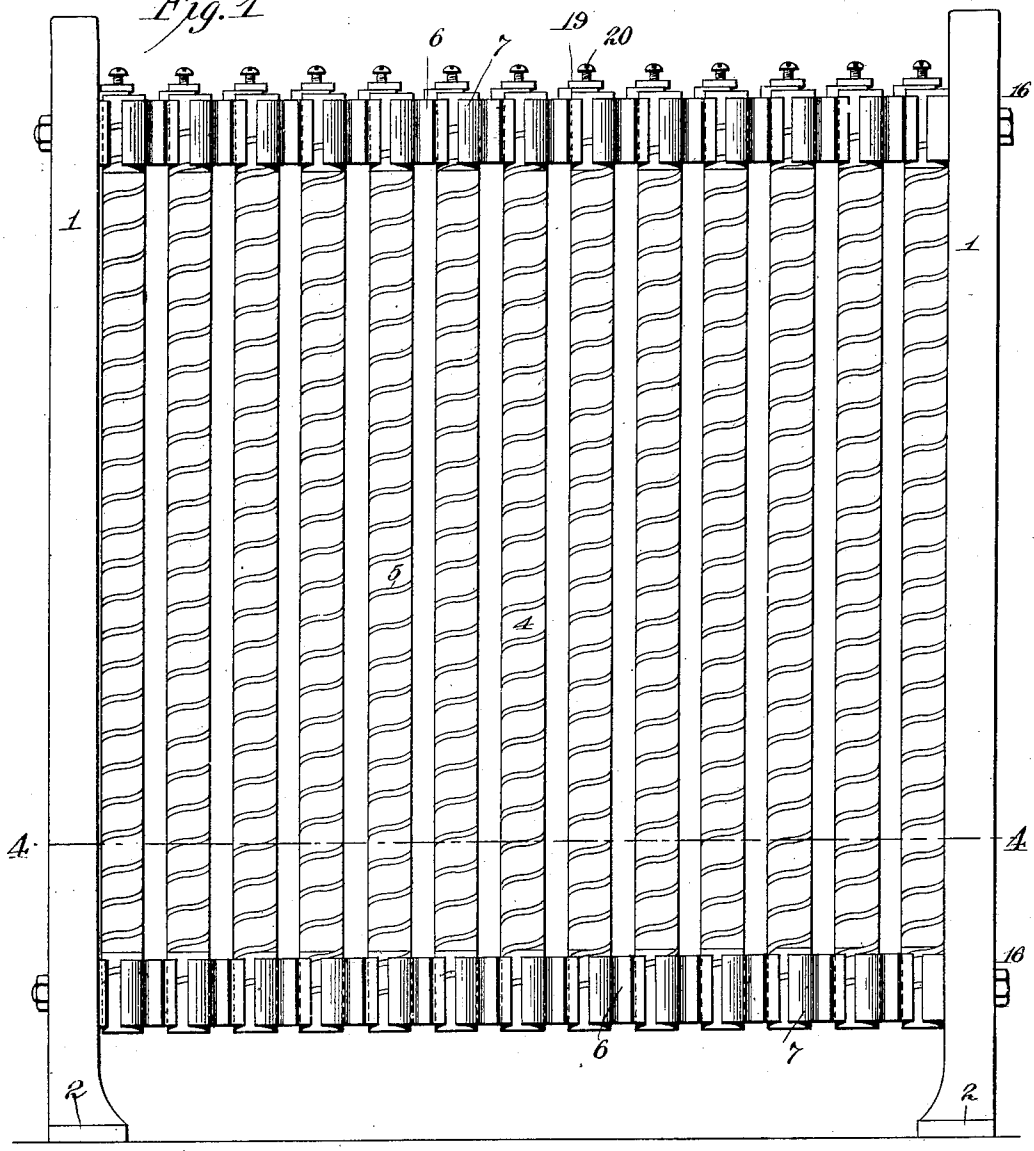
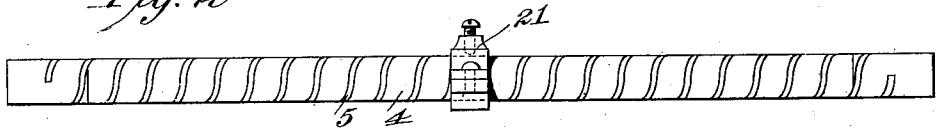


Fig. 2



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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 3

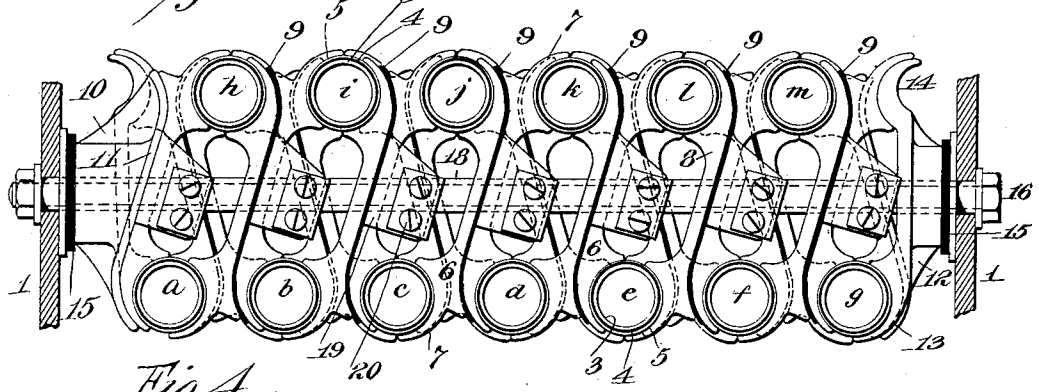


Fig. 4

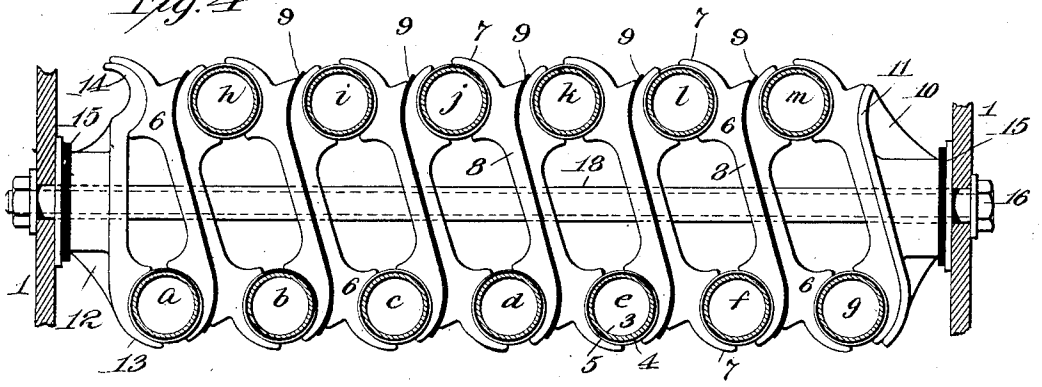


Fig. 5

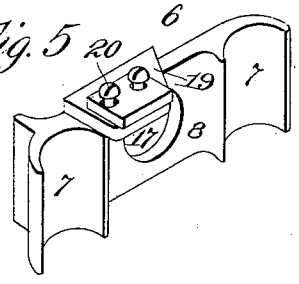
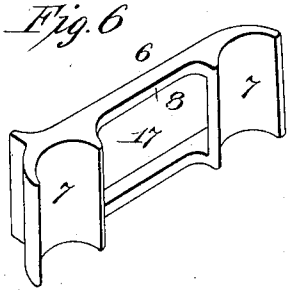


Fig. 6



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No. 737,689. Patented September 1, 1903.

UNITED STATES PATENT OFFICE.

CHARLES WIRT, OF PHILADELPHIA, PENNSYLVANIA.

ELECTRIC HEATER OR RHEOSTAT.

SPECIFICATION forming part of Letters Patent No. 737,689, dated September 1, 1903.

Application filed December 5, 1902. Serial No. 133,983. (No model.)

To all whom it may concern:

Be it known that I, CHARLES WIRT, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a certain new and useful Improvement in Electric Heaters or Rheostats, of which the following is a description.

My invention relates generally to devices employing electrical resistance—such as rheostats and electric heaters—and wherein energy is expended in the form of heat developed either intentionally or incidentally.

My objects are to improve and simplify the construction of these devices, so as to permit of easy and economical manufacture.

My improved rheostat or heater comprises one or more substantially identical units, so that it becomes possible to construct devices of different capacities by merely increasing or diminishing the number of such units. The mechanical construction of the device is such that the resistance units can be readily assembled and operatively connected in any desired number to constitute a strong and serviceable apparatus. At the same time the electrical construction is of the most approved type.

In order that the invention may be better understood, attention is directed to the accompanying drawings, forming part of this specification, and in which—

Figure 1 is a side view of a rheostat or heater embodying my present improvements; Fig. 2, a separate detached view of one of the resistance-tubes; Fig. 3, a plan view of Fig. 1, showing the end plates in section; Fig. 4, a section on the line 4 4 of Fig. 1, and Figs. 5 and 6 perspective views of different forms of clamping-plates.

In all of the above views corresponding parts are represented by similar reference characters.

The improved rheostat or heater comprises a pair of end plates or frames 1 1, which may be conveniently provided with lugs 2, by means of which the apparatus may be secured in place to a suitable base or within any desired casing or receptacle. Each resistance unit comprises a metal tube 3, around which a sheet of asbestos paper or other insulating material is wound to form an insulating layer 4. Upon this insulating layer a strip of metallic resistance 5 is spirally coiled, as shown particularly in Fig. 2. Resistance units of this type are well known, and I make no special claim to the same. A number of these resistance units are sustained in position and at the same time electrically connected between the side plates 1 1 by means of clamps 6 6, arranged as shown in the drawings. These clamps, except those which are arranged at the ends and which will be specifically described, are all of the same construction and comprise the curved jaws or sockets 7, which engage the tubular resistance units and the connecting portions 8, the latter being formed on their outer surfaces with compound curves, as shown, in order that the adjoining clamps throughout the apparatus may snugly nest together.

Referring to the several resistance units in one row by the letters a to g, inclusive, and in the other row by the letters h to m, inclusive, it will be noted that at one end the clamps connect the units a and h, b and i, c and j, d and k, e and l, and f and m and that at the other end the clamps connect the units b and h, c and i, d and j, e and k, f and l, and g and m. By interposing sheets of insulation 9 between the several sets or pairs of clamps at each end it will be manifest that all the resistances will be connected in series through the several clamps.

At one side of the apparatus I make use of an abutment 10, having a compound curved face 11, which snugly engages the corresponding face of the adjacent clamp 6, and at the other end I employ an abutment 12, having a socket or jaw 13, corresponding to the jaw 7 and also formed with a knuckle 14 to engage the unoccupied jaw of the extreme end clamp 6. The abutments 10 and 12 are insulated from the side plate 1 by insulating-washers 15, and the whole apparatus is clamped together by tie-bolts 16, passing through the end plates 1 and through openings 17 in the several clamps. Each tie-bolt is provided with an insulating-sleeve 18, surrounding the same to prevent danger of short-circuiting through said bolts. It will be obvious that by merely releasing the tie-bolts the entire apparatus can be taken apart and as readily reassembled and that by varying the number of the

sectional resistances and the connecting-clamps a rheostat or heater of any desired capacity can be secured. It will also be seen that the thickness of insulating material 9 between the several sets of clamps need only be sufficient to resist the difference in electrical potential which exists in the apparatus between said clamps.

When the apparatus is used for a rheostat, the segments of the latter can be connected to the resistance units in any suitable way. For example, one clamp of each set may be provided with a separate or integral lug 19, having screws 20, from which connection may be made with the rheostat-segments, or, if desired, a separate split collar 21 may be secured to any number of the resistance units, (see Fig. 2,) from which a corresponding connection may be made, or both of these arrangements may be employed, as will be understood.

In Figs. 5 and 6 I illustrate different forms of clamps which may be used and which are self-explanatory. The clamp shown in Fig. 6 differs from that illustrated in Fig. 5 in the respects that it is somewhat lighter and is not provided with means for permitting connection with the rheostat-plates or elsewhere.

It will be obvious that by reason of the improvements which I have made I am enabled to construct rheostats and heaters very cheaply which are mechanically and electrically correct and by which devices of different capacities can be readily assembled.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is as follows:

1. Apparatus of the character described, comprising in combination a plurality of resistance units, a plurality of sets of clamps mechanically connecting said units at their ends and mechanically engaged together, and a clamping device for maintaining pressure on all of the clamps, whereby the several sets thereof will be held in mechanical engagement while the several resistance units will be clamped by the several sets, substantially as and for the purposes set forth.

2. Apparatus of the character described, comprising in combination a plurality of resistance units, a plurality of sets of clamps mechanically connecting said units at their ends, the clamps at one end being arranged oppositely to those at the other end, and means for maintaining the clamps and resistance units in mechanical engagement, substantially as and for the purposes set forth.

3. Apparatus of the character described, comprising in combination a plurality of resistance units, a plurality of sets of clamps mechanically and electrically connecting said units at their ends and mechanically engaged together, a clamping device for maintaining pressure on all of the clamps, whereby the several sets thereof will be held in mechanical engagement while the several resistance units will be clamped by the several sets, and insulation between the several sets of clamps for electrically insulating the same, substantially as and for the purposes set forth.

4. Apparatus of the character described, comprising in combination a plurality of resistance units, a plurality of sets of clamps mechanically and electrically connecting said units at their ends, the clamps at one end being arranged oppositely to those at the other end, and means for maintaining the clamps and resistance units in mechanical and electrical engagement, substantially as and for the purposes set forth.

5. Apparatus of the character described, comprising in combination a plurality of resistance units, a plurality of sets of clamps mechanically connecting said units at their ends, and a tie-bolt for maintaining the clamps and resistance units in mechanical engagement, substantially as and for the purposes set forth.

6. Apparatus of the character described, comprising in combination a plurality of resistance units, a plurality of sets of clamps mechanically connecting said units at their ends, the clamps at one end being arranged oppositely to those at the other end, and a tie-bolt for maintaining the clamps and resistance units in mechanical engagement, substantially as and for the purposes set forth.

7. Apparatus of the character described, comprising in combination a plurality of resistance units, a plurality of sets of clamps mechanically and electrically connecting said units at their ends, and a tie-bolt for maintaining the clamps and resistance units in mechanical and electrical engagement, substantially as and for the purposes set forth.

8. Apparatus of the character described, comprising in combination a plurality of resistance units, a plurality of sets of clamps mechanically and electrically connecting said units at their ends, the clamps at one end being arranged oppositely to those at the other end, and a tie-bolt for maintaining the clamps and resistance units in mechanical and electrical engagement, substantially as and for the purposes set forth.

9. In apparatus of the character described, the combination of a plurality of resistance units, a plurality of sets of clamps for mechanically connecting said units at their ends, the clamps of one set nesting with the clamps of the adjacent sets, and means for maintaining the resistance units and clamps in mechanical engagement, substantially as and for the purposes set forth.

10. In apparatus of the character described, the combination of a plurality of resistance units, a plurality of sets of clamps for mechanically connecting said units at their ends, the clamps at one end being oppositely arranged to those at the other end and the clamps of one set nesting with the clamps of the adjacent sets, and means for maintaining the resistance units and clamps in mechanical engagement, substantially as and for the purposes set forth.

11. In apparatus of the character described, the combination of a plurality of resistance units, a plurality of sets of clamps for mechanically and electrically connecting said units at their ends, the clamps of one set nesting with the clamps of the adjacent sets, means for maintaining the resistance units and clamps in mechanical and electrical engagement, and insulating material between the sets of clamps, substantially as and for the purposes set forth.

12. In apparatus of the character described, the combination of a plurality of resistance units, a plurality of sets of clamps for mechanically and electrically connecting said units at their ends, the clamps at one end being oppositely arranged to those at the other end and the clamps of one set nesting with the clamps of the adjacent sets, means for maintaining the resistance units and clamps in mechanical and electrical engagement, and insulating material between the sets of clamps, substantially as and for the purposes set forth.

13. In apparatus of the character described, the combination of a plurality of resistance units, a plurality of sets of clamps for mechanically connecting said units at their ends, the clamps of one set nesting with the clamps of the adjacent sets, and a tie-bolt for maintaining the resistance units and clamps in mechanical engagement, substantially as and for the purposes set forth.

14. In apparatus of the character described, the combination of a plurality of resistance units, a plurality of sets of clamps for mechanically connecting said units at their ends, the clamps at one end being oppositely arranged to those at the other end and the clamps of one set nesting with the clamps of the adjacent sets, and a tie-bolt for maintaining the resistance units and clamps in mechanical engagement, substantially as and for the purposes set forth.

15. In apparatus of the character described, the combination of a plurality of resistance units, a plurality of sets of clamps for mechanically and electrically connecting said units at their ends, the clamps of one set nesting with the clamps of the adjacent sets, tie-bolts for maintaining the resistance units and clamps in mechanical and electrical engagement, and insulating material between the sets of clamps, substantially as and for the purposes set forth.

16. In apparatus of the character described, the combination of a plurality of resistance units, a plurality of sets of clamps for mechanically and electrically connecting said units at their ends, the clamps at one end being oppositely arranged to those at the other end and the clamps of one set nesting with the clamps of the adjacent sets, tie-bolts for maintaining the resistance units and clamps in mechanical and electrical engagement, and insulating material between the sets of clamps, substantially as and for the purposes set forth.

17. In apparatus of the character described, a plurality of spiral resistance units carried by insulating-tubes, and tension-rods for holding said units in mechanical and electrical connection, substantially as and for the purposes set forth.

This specification signed and witnessed this 16th day of October, 1902.

CHARLES WIRT.

Witnesses:
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JNO. ROBT. TAYLOR.