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H. M. WICKER.

ELECTRIC HEATER.

APPLICATION FILED JAN. 26, 1907.

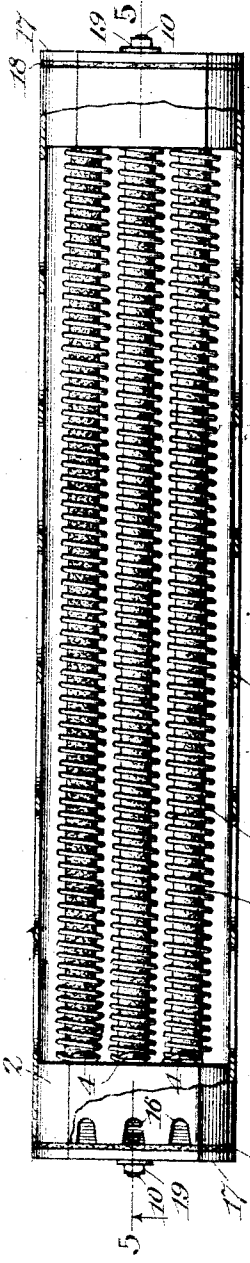


Fig. 1.

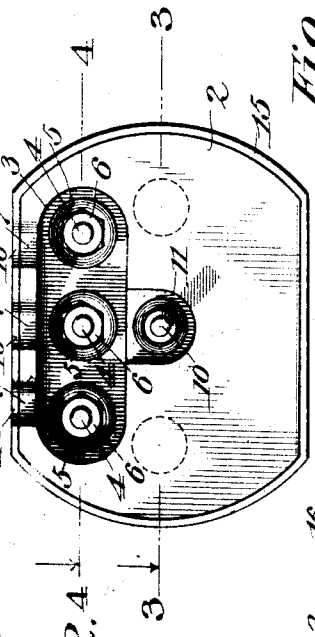


Fig. 2.

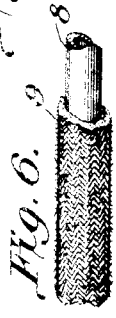


Fig. 6.

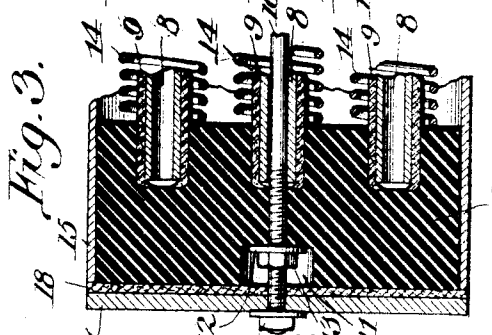


Fig. 3.

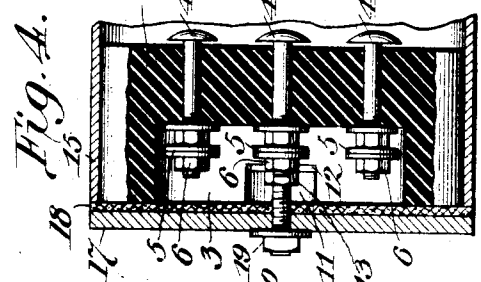


Fig. 4.

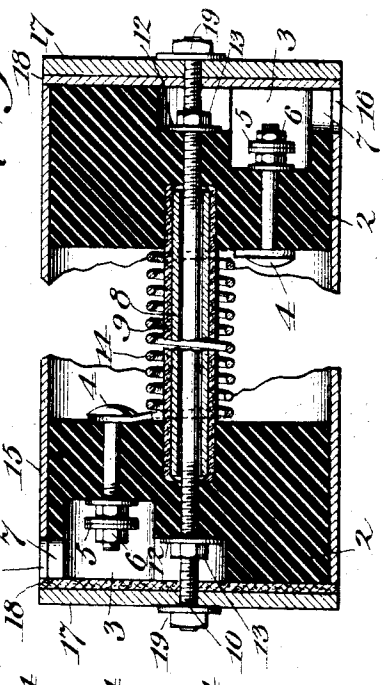


Fig. 5.

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UNITED STATES PATENT OFFICE.

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ELECTRIC HEATER.

No. 871,153. Specification of Letters Patent. Patented Nov. 19, 1907.

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To all whom it may concern:

Be it known that I, HUGH M. WICKER, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented new and useful Improvements in Electric Heaters, of which the following is a specification.

The present invention relates to heaters of that type in which the heating effect is produced by means of electrical currents traversing coils of wire of relatively high resistance, so that during passage of the current the temperature of the coils will be raised to an effective heating point. Heaters of this general type have long been known, and are particularly well adapted for car heating, although their use is obviously not restricted to this, since they may be used wherever a compact, readily controlled, and effective heating device is needed.

The construction which I have invented, and which I shall describe in detail hereinafter, has to do more particularly with the manner of building up, assembling, and securing together the heating units of which these systems are usually made up; for, as is well-known, it is customary to assemble any desired or necessary number of these units in any convenient relation to each other, so that one or more of the units of the system may be used as desired, and a highly flexible heating apparatus thereby produced.

In the drawings herewith, in which I have illustrated one embodiment of my invention, I have shown but one of these units, for it will be obvious that they may be built up in any desired relation mechanically or electrically to form a complete system, and in said drawings: Figure 1 is a side view of a heating unit made in accordance with my invention. Fig. 2 is an end view of the porcelain or insulating head of the heater. Fig. 3 is a sectional view on line 3—3 of Fig. 2, looking in the direction of the arrows. Fig. 4 is a sectional view on line 4—4 of Fig. 2, looking in the direction of the arrows. Fig. 5 is a longitudinal sectional view of the unit shown in Fig. 1, taken on line 5—5 of Fig. 1, the heating coils and their supporting elements being broken out for economy of space. Fig. 6 is a detail view of a section of a coil-supporting element.

Referring to the drawings by numerals, like numbers indicating like parts in the several views, 2 indicates the porcelain or insulating heads of the heating unit, the said elements 2 being identical in construction excepting that, as will be seen from an inspection of Fig. 5, they are placed in reversed relation at the opposite ends of the unit. The said porcelain heads 2 are each provided with a countersunk chamber 3, designed to receive the binding posts 4, three of which are shown in the present instance, and as shown comprise headed bolts passing through holes in the blocks 2 and provided at their screw-threaded outer ends with clamping washers and lock nuts to secure the bolts 4 to the porcelain heads, said bolts 4 being further provided with binding washers 5, between which the lead wires will be held by means of binding nuts 6; suitable outlet notches 7 being provided in the outer walls of the chambers 3 through which the lead wires pass.

It has been hereinbefore stated that the end blocks 2 are preferably arranged in reversed relation (see Fig. 5), and this is advantageous for the reason that where the units are placed in superposed series the lead wires, which usually connect the successive coils in series throughout the successive units, may be led in at one side of the unit and pass out at the other side thereof, with a minimum length and compact arrangement of leading-in wires, and this from a practical standpoint is a desirable feature. The said porcelain heads 2 form the supports for the coil-carrying elements of the unit, said coil-carrying elements (three of which are shown in the present case) comprising hollow metal tubes 8 resting in seats in the inner faces of the porcelain heads 2, said tubes 8 being covered with a tight fitting sleeve of fibrous insulating material, this material in the present case being a woven asbestos sleeve 9, which is drawn over and snugly fits the tube 8 from end to end, as will appear from inspection of Fig. 5. This construction of coil-supporting element I deem of especial value in this art, as it gives a very light element, one which may be cheaply made, and one in which insulation and heat radiation are very perfect. Preferably the asbestos sleeve 9 will be woven and it may then be conveniently drawn on over the tubes in making up the elements.

One of the tubes 8 which form the coil-supporting elements, the middle tube in the embodiment of the invention herein shown, is traversed by a tie-rod 10, the screw-threaded ends of which pass through holes

in the porcelain head 2 and lead to a chamber or seat 11 formed in the outer face of the porcelain heads. This seat 11, in the present case being shown as communicating with but of less depth than the chamber 3 for the binding posts. The tie-rod 10 is provided at each end with a spring washer 12 and clamping nut 13, so as to securely lock the parts in place and prevent their jarring loose.

It will be observed that by the use of a single tie-rod 10 traversing one of the series of tubular coil-supporting elements 8, I can bind the whole device or unit firmly together, for the asbestos coated tubes 8 being seated in the seats or sockets formed in the porcelain heads 2, and being of the same length, all will be firmly held when the nuts 13 on the tie-rod 10 are set up in assembling the device. Surrounding these coil-supporting elements 8 are the resistance coils 14, which form the heating medium by reason of the high temperature generated by the passage of the current through them, these resistance coils being wound loosely about the asbestos sleeved tubes 8 and being each connected at the opposite ends of the unit with its binding posts 4, so as to include it in the proper circuit in which it forms one of the series of heating media. The unit thus made up is preferably inclosed within a case 15 of perforated sheet steel, bent to the proper form to fit the unit; this casing, as shown, inclosing entirely the end porcelains 2 and having openings 16 therein coinciding with the openings 7 in the porcelain head 2 so as to accommodate the leading-in wires.

The ends of the porcelain heads 2 are covered, and the seats 3 and 11 inclosed by means of end plates 17 preferably of cast iron, in order that the same may be readily adapted to be cast as a name-plate, these end plates 17 being preferably lined with asbestos 18, as shown, and each having a central hole through which passes the end of the tie-rod 10, a clamping nut and washer 19 being provided so that the end plates may be secured in place and held by the same element (tie-rod 10) that binds the whole unit together.

I find that the porcelain heads 2 which I have devised, having the flat surfaces at either side thereof, are of value from a practical standpoint, in that they give a unit which may be mounted in a very stable manner upon a support; and with these flat surfaces resting upon each other it is an easy matter to assemble or build up a strong superposed stable series of these units and bind the whole together to form a heating system. Furthermore, by chambering the porcelains in the manner shown and providing the cut-out notches 7 for the lead wires, a convenient construction is provided and one in which the binding posts, tie-rods, leads, etc. may be easily manipulated, the whole of the unit being completely inclosed within a protecting metal casing in such a manner that there are no projecting porcelain parts to be chipped or fractured in handling, and this I deem of considerable importance; for it is obvious that without this outer casing of iron completely inclosing the porcelain heads it would be necessary to make these heads of much greater thickness, to enable them to withstand the handling to which they are subjected in service. Another feature which is of great value is that the construction permits of the use of a single tie-rod to bind all of the elements of the unit, including the casing, together, this being due in part to the fact that I have adopted a tubular coil-supporting element, through which the tie-rod passes. Additionally the tubular coil-supporting element has the advantage of being light; it, with its fibrous sleeve of insulating material is complete in itself, and it forms a perfect support for the coil; for it not only insulates the coil, but it deadens all noise of the rattling of the coils against their supports. Furthermore, the tubular coil-supporting element lends itself very readily to the assembling of the parts of the unit, for it will be obvious that the coils may be threaded upon these tubular supporting elements, the porcelain heads placed upon the ends of the tubes and then the tie-rod may be passed through its containing tube and the binding nuts at the ends of the tie-rod set up.

While I have shown a particular embodiment of my invention and that the best known to me, it will be understood that various changes within the skill of the mechanician may be made without departing from the spirit of the invention, and I do not; therefore, limit myself to any of the details shown and described except in so far as I am limited by the terms of the appended claims and the prior art to which this invention belongs.

Having disclosed my invention, I claim:

1. A heating unit for electric heaters, comprising insulating heads, coil-supporting elements, the ends of which enter sockets in said heads, coils mounted on said supports, a housing for said unit, end-plates for said housing, and a tie-rod traversing one of the said coil-supporting elements and extending through said end-plates and serving to bind all of the elements of the unit together.

2. A heating unit for electric heaters comprising insulating heads having sockets in their opposed inner faces and reversely placed chambers in their outer faces, composite coil-supporting elements of metal tubes and asbestos sleeves having their ends entered in said sockets, coils mounted on said supporting elements, binding posts

mounted in said insulating heads on opposite sides of said coils with their outer ends entering said chambers, and a tie-rod traversing one of said coil-supporting elements and serving to bind the heads, tubes, and coils together.

3. A heating unit for electric heaters comprising insulating heads, binding posts mounted in said heads, coil-supporting elements connecting said heads, coils mounted on said supporting elements, a housing extended from end to end of and completely inclosing the unit, end plates for said housing, and a tie-rod traversing the structure from end to end and serving to bind the end plates, housing, heads, and coil supporting elements together.

4. A heating unit for electric heaters comprising insulating heads having open chambers in their outer faces provided with leading-in notches, binding posts entering said chambers, coil-supporting elements entering sockets in the inner opposed faces of said heads, coils mounted on said elements, an inclosing housing having coincident leading-in notches extending from end to end of said unit, end plates having an insulating lining closing said chambered heads, and a tie-rod traversing the structure and serving to bind the end plates, housing, insulating heads, and coil-supporting elements together.

5. A heating unit for electric heaters comprising insulating heads having open chambers in their outer faces provided with leading-in notches, binding posts entering said chambers, tubular coil-supporting elements entering sockets in the inner opposed faces of said heads, coils mounted on said elements, an inclosing housing having coincident leading-in notches extending from end to end of said unit, end plates having an insulating lining closing said chambered heads, and a tie-rod traversing one of the tubular coil-supporting elements and serving to bind the end plates, housing, insulating heads, and coil-supporting elements together.

6. A heating unit for electric heaters having insulating and coil-carrying heads provided on their opposite sides with parallel flat surfaces, to permit building up the units in a stable series.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

HUGH M. WICKER.

Witnesses:
ROBERT A. BESHLIAN,
CHESTER G. PAIGE.