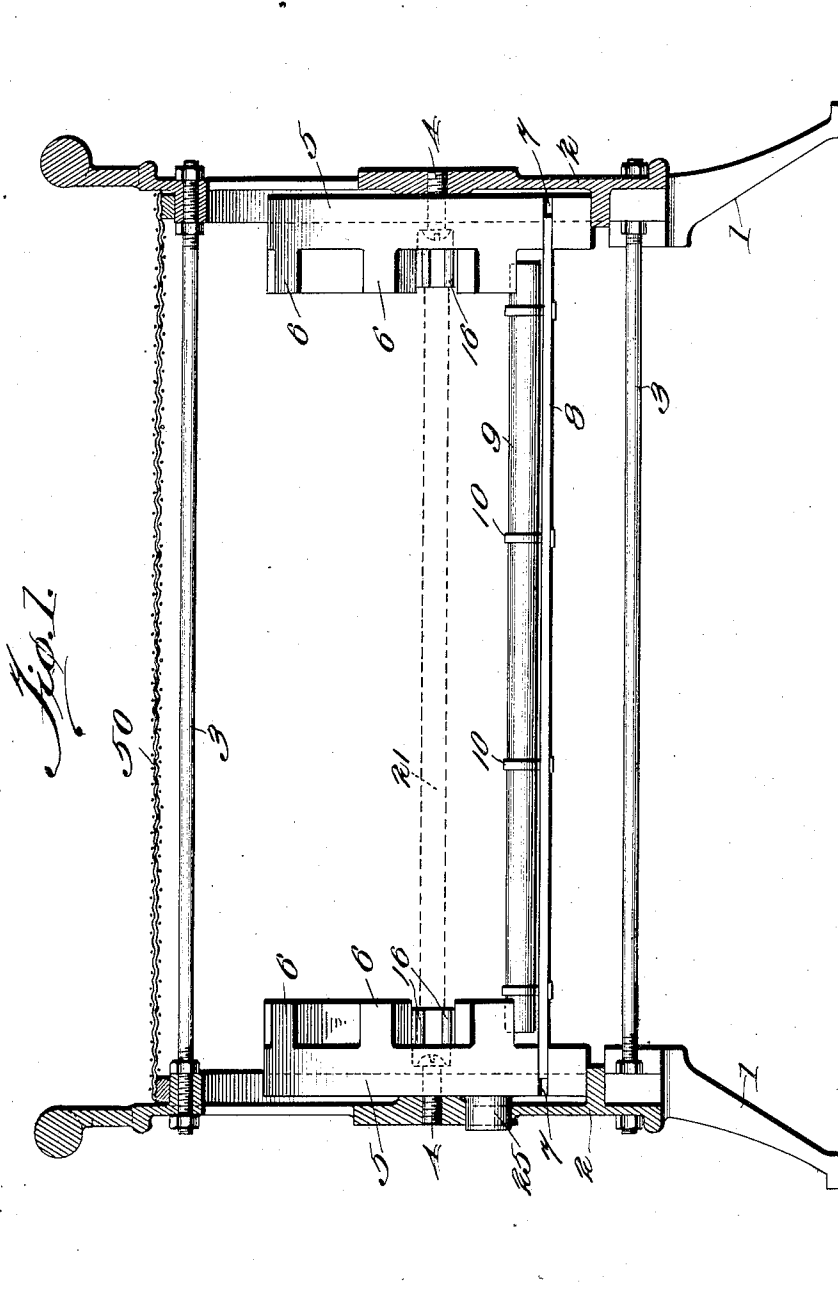


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ELECTRIC HEATER.
APPLICATION FILED FEB. 4, 1910.

1,014,437.

Patented Jan. 9, 1912.

3 SHEETS—SHEET 1.



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3 SHEETS-SHEET 2.

Fig. 2.

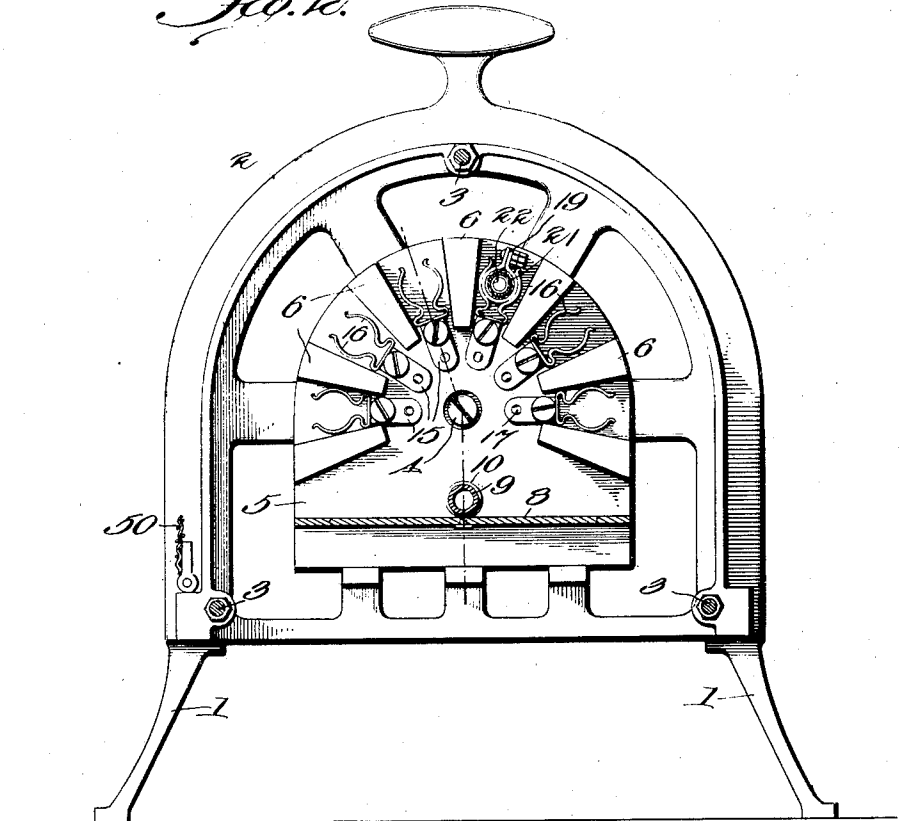


Fig. 3.

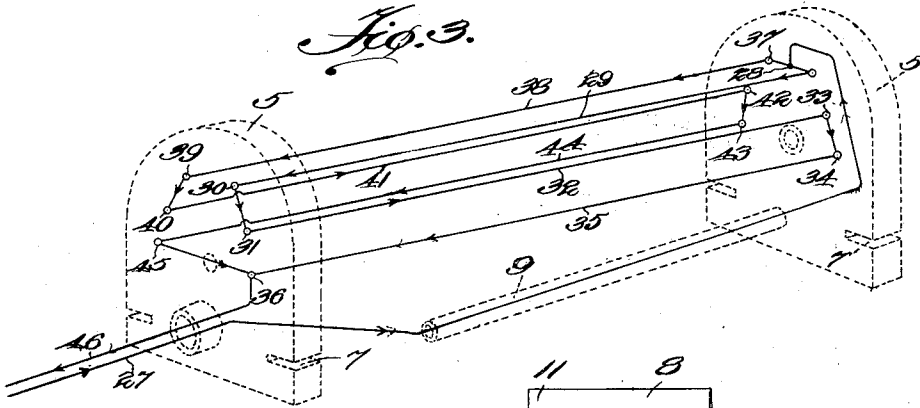
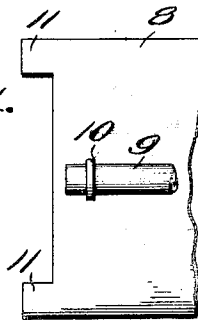


Fig. 4.



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Fig. 5.

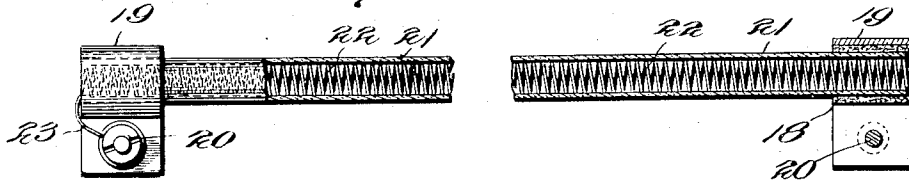


Fig. 6.

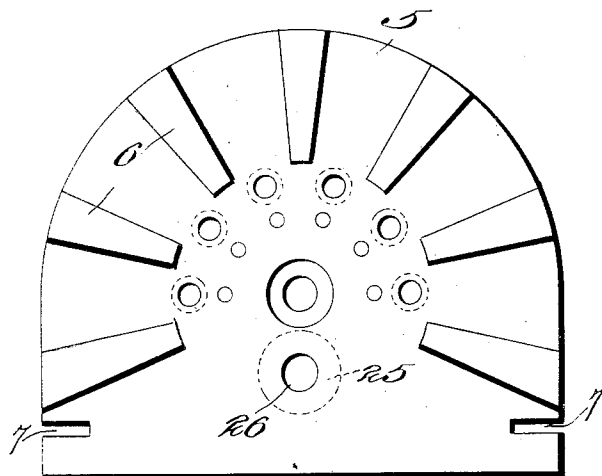


Fig. 7.

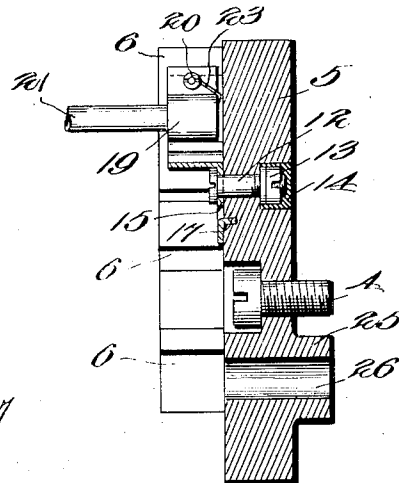
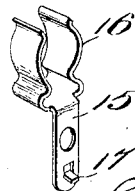


Fig. 8.



(Mr. Map. Small.
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UNITED STATES PATENT OFFICE.

CHARLES ORME BASTIAN, OF LONDON, ENGLAND.

ELECTRIC HEATER.

1,014,437.

Specification of Letters Patent.

Patented Jan. 9, 1912.

Application filed February 4, 1910. Serial No. 542,059.

To all whom it may concern:

Be it known that I, CHARLES ORME BASTIAN, a subject of the King of Great Britain, residing at London, England, have invented certain new and useful Improvements in Electric Heaters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to electric heaters, and has for its object the production of a heater which will consume less current, or will be more efficient for a given out-put of heat, and will be less expensive to manufacture than electric heaters heretofore proposed.

To these ends the invention consists in the novel combinations of parts and details of construction more fully hereinafter disclosed and particularly pointed out in the claims.

Referring to the accompanying drawings forming a part of this specification, in which like numerals refer to like parts in all the views:—Figure 1, is a longitudinal sectional view of a heater made in accordance with this invention; Fig. 2, is a sectional and elevational view of the parts shown in Fig. 1; Fig. 3, is a diagram of the circuits; Fig. 4, is a detail view of the heat deflecting plate; Fig. 5, is a like view of one of the heat resistance elements; Fig. 6, is an elevational view of one of the porcelain insulating plates; Fig. 7, is a sectional view of the same, and Fig. 8, is a perspective view of one of the clamps for holding the resistance elements.

1 represents any suitable base supports; 2 suitable end plates preferably of cast metal carried by the supports 1, and tied together as by the rods 3. To each end plate is preferably secured, as by the screws 4, an insulating head 5 conveniently made of porcelain and having the lugs 6. These terminal heads may be further provided with slots 7, into which fit lugs 11 on a heat deflecting plate 8, preferably made of aluminium, and on this plate may be secured the conductor tube 9, preferably made of porcelain, as by the straps 10.

The insulating porcelain head plates 5 are provided with a number of counter-bored holes, into which fit fastenings 12 preferably provided with nuts 13, which

may be conveniently surrounded with an insulating paste 14, as shown. These fastening screws secure to the porcelain heads clamps 15 provided with resilient jaws 16, between which fit the ends of the resistance elements, as will be readily understood.

In order to more firmly secure the clamps 15 to the porcelain heads 5, they are provided with projecting lugs 17 which fit into corresponding recesses in the porcelain head, as best illustrated in Fig. 7.

In order to protect the resistance element at its ends, and also to provide a readily detachable electrical connection between the same and the jaws 16, the ends of said element are provided with an asbestos or other heat insulating sleeve 18, and around the same passes a metallic clamp 19 having jaws secured together by the screw or other fastening 20, as best illustrated in Figs. 5 and 7. The element itself is composed of a quartz tube 21, in which is located a conductor 22 of nickel or other suitable material and of sufficient resistance to be raised up to or above a red heat when the ordinary current used in the heater is turned on. This conductor is preferably composed of a spirally wound wire, as illustrated, and the ends 23 of said wire preferably pass out of the tube 21 and are secured to the screws 20, as illustrated in Fig. 5. It is evident that if the clamps 19 are snapped in between the jaws 16, an electrical connection will be formed between the wire 22 and the jaws 16, and at the same time the said clamps 19 will be protected from heat generated in the wire 22 by means of the asbestos sleeve 18.

In the form of heater illustrated, it is preferred to employ six quartz tubes 21, which together with their conductors and connections I will hereinafter designate as resistance elements, and it is preferred to make the clamps 15 of German silver. When six of these elements are employed the circuit through the same is preferably arranged as indicated in Fig. 3. That is to say, one of the head plates 5 is preferably provided with a projection 25, which fits into a hole in the casting 2, and which itself is provided with a passage 26, as best illustrated in Fig. 7. One of the lead wires 27 passes through the hole 26, thence through the conductor tube 9 over to the other plate 5 and to the point 28 where the current divides, part passing by way of the wire 29, 110

which represents a resistance element, thence to the point 30, which represents the clamp holding said element, thence to the point 31, which represents another clamp holding another element, along the wire 32, which represents the wire of another resistance element, to the points 33, 34, along the wire 35, and to the point 36, which represents the extreme end of the third resistance element, which is fed by this portion of the current. From the point 28 in Fig. 3, another portion of the current passes to the point 37, wire 38, point 39, point 40, wire 41, point 42, point 43, wire 44, point 45, and finally joins the other portion of the current at the point 36, whence the wire 46 returns the current to its source.

The porcelain projection 25 and the conductor tube 9 afford ample protection for the conducting wires. This method of wiring is used where the heater is to be operated on a 110 volt circuit. If however the heater is to be used on a 220 volt circuit the conductor tube 9 may be omitted, the wire 27 leads directly to the point 28, and the resistance elements connected in series for with the higher voltage sufficient current will pass to permit of this arrangement of parts. The lugs 6 on the porcelain heads project, say one-half of an inch, from the faces of the heads, and serve to prevent short circuiting of the elements, in the event of a piece of metal or other conductor dropping down on the terminal clamps 19. A wire or other screen 50 preferably surrounds the elements in order to protect the same from mechanical injury.

From the fact that the tubes 21 are made of quartz, which is transparent to radiant heat rays, substantially all of the heat generated in the wires 22 is radiated out into the room, and from the fact that quartz is practically non-oxidizable at a red heat, it may normally be used at such heat without material deterioration. In addition to this, at a red heat, very little oxygen is left in the tube to oxidize the conductor, and I am consequently enabled to use for the resistance element oxidizable metals which, of course, greatly lessens the cost. That is to say, it is well known that an electric heater if run at a temperature above or corresponding to a red heat is much more economical and efficient than if run at a temperature below red heat. It is also well known that practically no metals outside of gold and platinum will stand temperatures corresponding to a red heat in the atmosphere without oxidizing to an injurious extent and that, therefore, at such high temperatures electric heaters which have been heretofore proposed have not been run efficiently except when they employed metals as expensive as gold for their resistance elements. By the simple expedient, however, of inclosing base metals

in a quartz tube and permitting the high temperature to expel the air I am enabled to run said metals at a red heat and still have the same protected from any injurious oxidizing action of the atmosphere, and I therefore secure all of the advantages and the very high efficiency which would accompany the use of platinum spirals.

It is evident that those skilled in the art may vary the arrangement of parts and the details of construction, without departing from the spirit of my invention, and therefore I do not wish to be limited to such features except as may be required by the claims.

What I claim is:—

1. In an electric heater, the combination of insulating head plates; clamping means provided with resilient jaws attached to said plates; a resistance element held by said clamping means and comprising a quartz tube; a conductor in said tube; heat insulating means surrounding the ends of said tube; a clamp with which said conductor is in electrical contact surrounding said insulating means, and suitable supports for said head plates, substantially as described.

2. In an electric heater, the combination of insulating head plates provided with projecting lugs 6; clamping means provided with resilient jaws attached to said plates between said lugs; a resistance element held by said clamping means and comprising a quartz tube; a conductor in said tube; heat insulating means surrounding the ends of said tube; a clamp with which said conductor is in electrical contact surrounding said insulating means; and suitable supports for said head plates, substantially as described.

3. In an electric heater, the combination of suitable supports; castings 2 carried by said supports; insulating head plates provided with protecting lugs carried by said castings; clamps provided with resilient jaws secured to said head plates between said lugs; a heat deflecting plate extending between said head plates; and resistance elements extending between said clamps, substantially as described.

4. In an electric heater, the combination of suitable supports; castings 2 carried by said supports; rods for holding said castings together; insulating head plates provided with protecting lugs carried by said castings; clamps provided with resilient jaws secured to said head plates between said lugs; insulated fastenings for securing said clamps to said head plates; a heat deflecting plate extending between said head plates; a tube adapted to receive the conducting wires carried by said heat deflecting plate; and resistance elements extending between said clamps, substantially as described.

5. In an electric heater, the combination

of an insulating head plate provided with means for securing it to a support and having protecting lugs; a clamp having resilient jaws attached to said head plate between said lugs; and a resistance element comprising a clamp fitting said jaws; a heat protecting sleeve 18 in said last mentioned clamp; a quartz tube in said sleeve; and a coiled conductor in said tube electrically con-

nected with said last mentioned clamp, substantially as described. 10

In witness whereof I have hereunto set my hand this 25th day of January, 1910, in the presence of two witnesses.

CHARLES ORME BASTIAN.

Witnesses:

FREDK. L. RAND,
R. T. WILLIAMS.