

J. F. MONNOT.
ELECTRIC HEATER.
APPLICATION FILED DEC. 10, 1910.

1,014,662.

Patented Jan. 16, 1912.

Fig. 1.

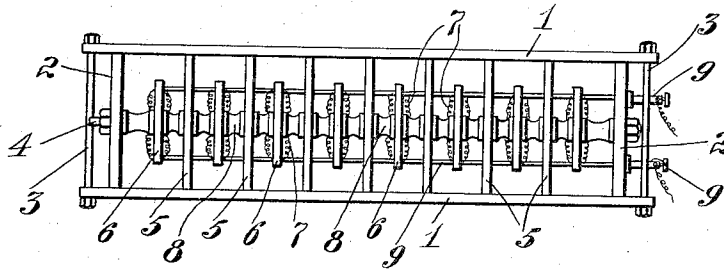


Fig. 2.

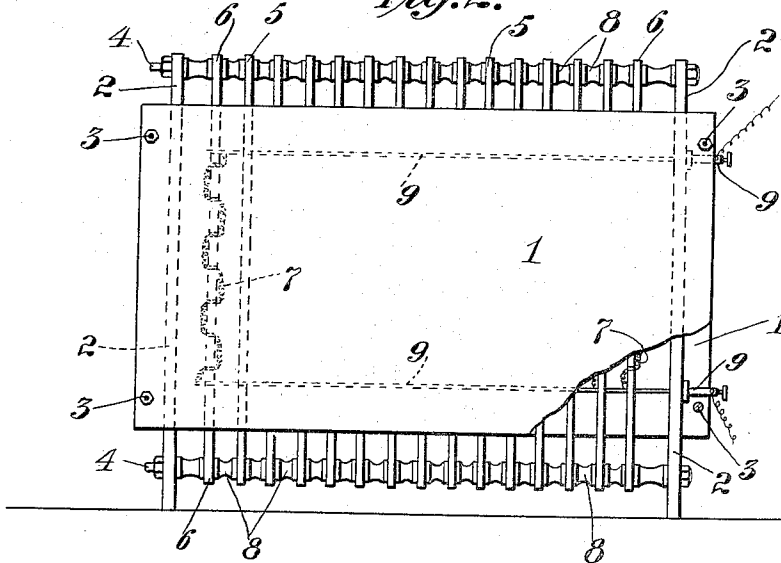
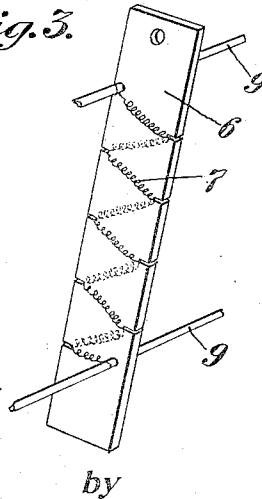


Fig. 3.



Attest:

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UNITED STATES PATENT OFFICE.

JOHN F. MONNOT, OF PARIS, FRANCE.

ELECTRIC HEATER.

1,014,662.

Specification of Letters Patent.

Patented Jan. 16, 1912.

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To all whom it may concern:

Be it known that I, JOHN F. MONNOT, a citizen of the United States, and a resident of Paris, France, have invented a certain new and useful Electric Heater, of which the following is a specification.

My invention relates to electric heaters, and comprises an improved construction particularly adapted for heating air and other gases, and applicable to the warming of rooms, apartments, etc.

When bare resistance coils are employed for heating air and the like, or when incandescent lamp bulbs and the like are similarly employed, there is, in effect, much loss of heat as radiant heat, since from such bare coils or lamps much of the heat generated by the passage of the electric current is emitted as radiant heat, which passes through the surrounding air without raising the temperature of that air materially, and which, in effect, becomes sensible heat only when it impinges upon some solid material not transparent to heat.

In the heater herein described, the heating elements, which may be resistance coils, are located in flues through which the air to be heated passes, the walls of these flues being composed of solid material substantially opaque to heat rays, and which therefore converts the rays of radiant heat into sensible heat, imparting it to the air passing through said flues; said material being also a material of low heat conductivity, in order that the heat generated may be prevented so far as possible, from being radiated outward from the walls, and so that as great a proportion of the heat as possible may be imparted to the air passing through the flues.

The objects of my invention are, to increase the efficiency of electric heaters, and to provide a simple and inexpensive heater which is efficient, durable, simple, and relatively inexpensive.

I will now proceed to describe my invention with reference to the accompanying drawings, which illustrate one form of heater embodying my invention.

In said drawings:—Figure 1 shows a top view of the heater, Fig. 2 a side view thereof, and Fig. 3 shows a detail perspective view of one of the heating elements.

In the drawings, numerals 1 designate side plates and numerals 2 end plates, together inclosing a space within which the heating

elements, hereinafter described, are located; the end plates being extended down below the side plates, to form feet. These end and side plates may be of any suitable material, but are preferably of a refractory insulating material, such as slate or asbestos board. Bolts 3 hold the side plates together, and bolts 4 the end plates. The space so inclosed by the side and end plates is divided into compartments or flues by transverse partitions, 5, also of refractory insulating material; said partitions being strung upon the bolts 4, and being held in place thereby. In the several compartments or flues so formed the heating elements are located; said elements consisting, in the construction shown, of slabs 6 of suitable refractory material which is also a non-conductor, such as slate, asbestos board, etc., and of resistance coils 7 wound on said slabs 6. The slabs 6 and partitions 5 are spaced apart by means of spacing bushings 8, preferably of porcelain or like material, strung on the bolts 4. Bus-bars 9 extend longitudinally of the structure, passing through holes in the partitions and slabs 6, and adapted at the ends for connection to supply wires; the several resistance conductors 7 being connected to these bus-bars, and so being connected in multiple.

In the particular construction of heating elements shown, the slabs 6 are notched at intervals, at the sides, and the resistance coils are composed of resistance wire, wound helically, and then wound about these slabs. In so winding the resistance coils on the slabs, the workman straightens out one or more of the coils, opposite the edges of the slabs, fitting the part so straightened out into the said notches; whereby the coils are secured in place on the slabs.

In the action of this heater, the air within the various compartments or flues is heated by contact with the coils 7 themselves, and also by contact with the walls of the compartments and by heat reflected from these walls; for the walls become highly heated, through intercepting radiant heat emitted from the coils 7 and transforming it into sensible heat, and then become very efficient means for heating the air within said compartments; which air, as so heated, of course rises, being replaced by other air which is heated in like manner. Since the materials named for the construction of the walls of the flues are of low heat conduc-

tivity, it will be apparent that very little heat will be radiated from these walls themselves, nearly all of the heat generated being imparted to the air passing through the flues. Tests have shown that the heater so constructed has much higher heating efficiency than the same coils would have if not inclosed in compartments.

What I claim is:

1. An electric heater comprising in combination a structure comprising flues, the walls of which are composed of material substantially opaque to radiant heat rays and of low heat conductivity, and electric heating elements within such compartments.
2. An electric heater comprising in combination a structure comprising flues, the walls of which are composed of material substantially opaque to radiant heat rays and of low heat conductivity, and electric heating elements within such compartments, and comprising electric resistance coils mounted upon a base of non-conducting material.
3. An electric heater comprising in combination side plates and end plates, and partitions dividing the space inclosed by said side and end plates into a plurality of flues, means for holding the side plates and end plates together, and for holding the partitions in place, said side and end plates and partitions being of material substantially opaque to radiant heat rays and of low heat conductivity, and electric heating elements within the several flues so formed.
4. An electric heater comprising in combination side plates and end plates secured together, partitions dividing the space in-

closed by said side and end plates into a plurality of flues, through bolts upon which such partitions are mounted, heating elements also mounted on said through bolts, and means for spacing the partitions and heating elements apart.

5. A heating element for an electric heater, comprising a base of non-conducting refractory material, and a helically wound resistance conductor wrapped about said base.

6. A heating element for an electric heater comprising a base of non-conducting refractory material, notched at intervals, and a resistance conductor wrapped about said base and comprising straight sections located within the said notches and helically wound sections intermediate such straight sections.

7. An electric heater comprising, in combination, side plates and end plates secured together, and together forming an inclosure, partitions within said inclosure dividing the interior thereof into a plurality of flues, through bolts extending from one end plate to the other through said partitions, and supported by said end plates and in turn supporting said partitions, heating elements located within the several flues and also mounted upon said through bolts, and means for spacing the partitions and heating elements apart.

In testimony whereof I affix my signature, in the presence of two witnesses.

JOHN F. MONNOT.

Witnesses:

H. M. MARBLE,
D. A. DAVIES.