(No Model.)

A. S. HATCH.

ELECTRIC HEATER.

No. 515,401. Patented Feb. 27, 1894.

Fig. 1.

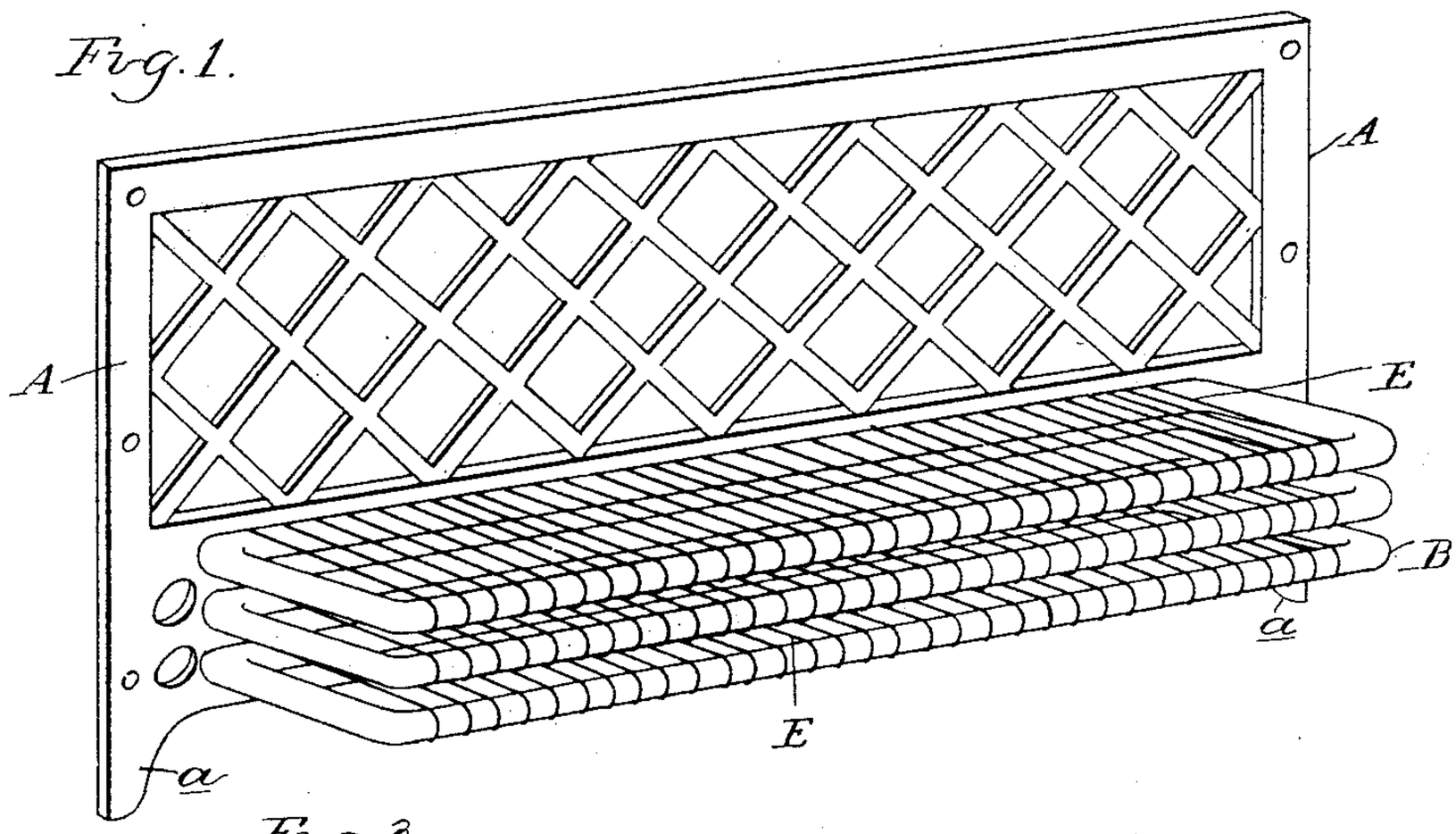


Fig. 3.

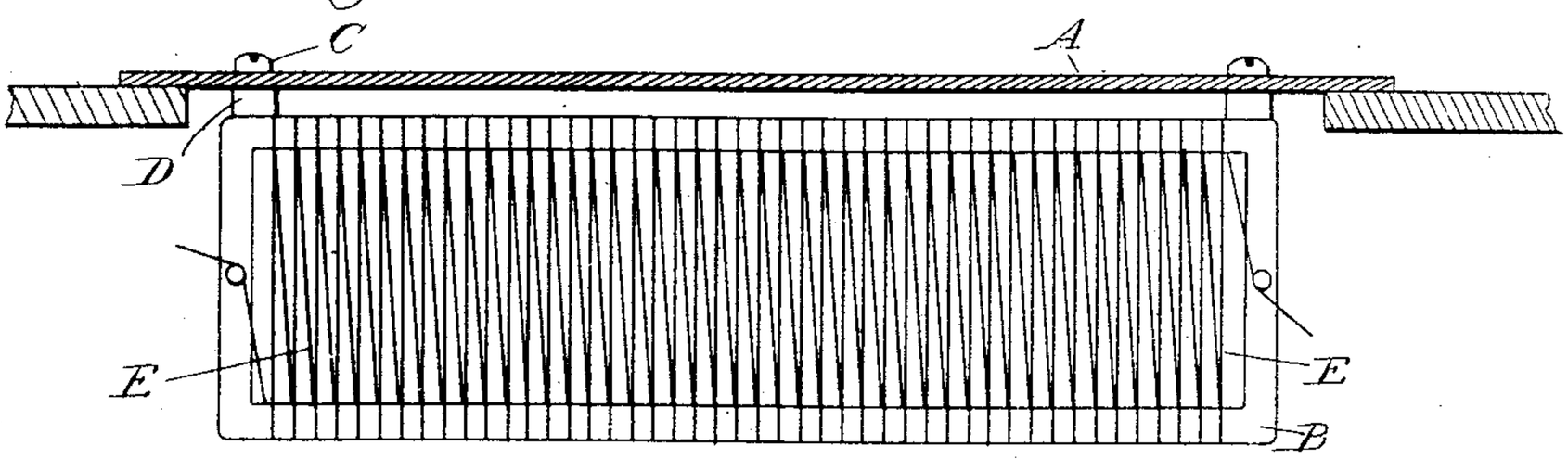
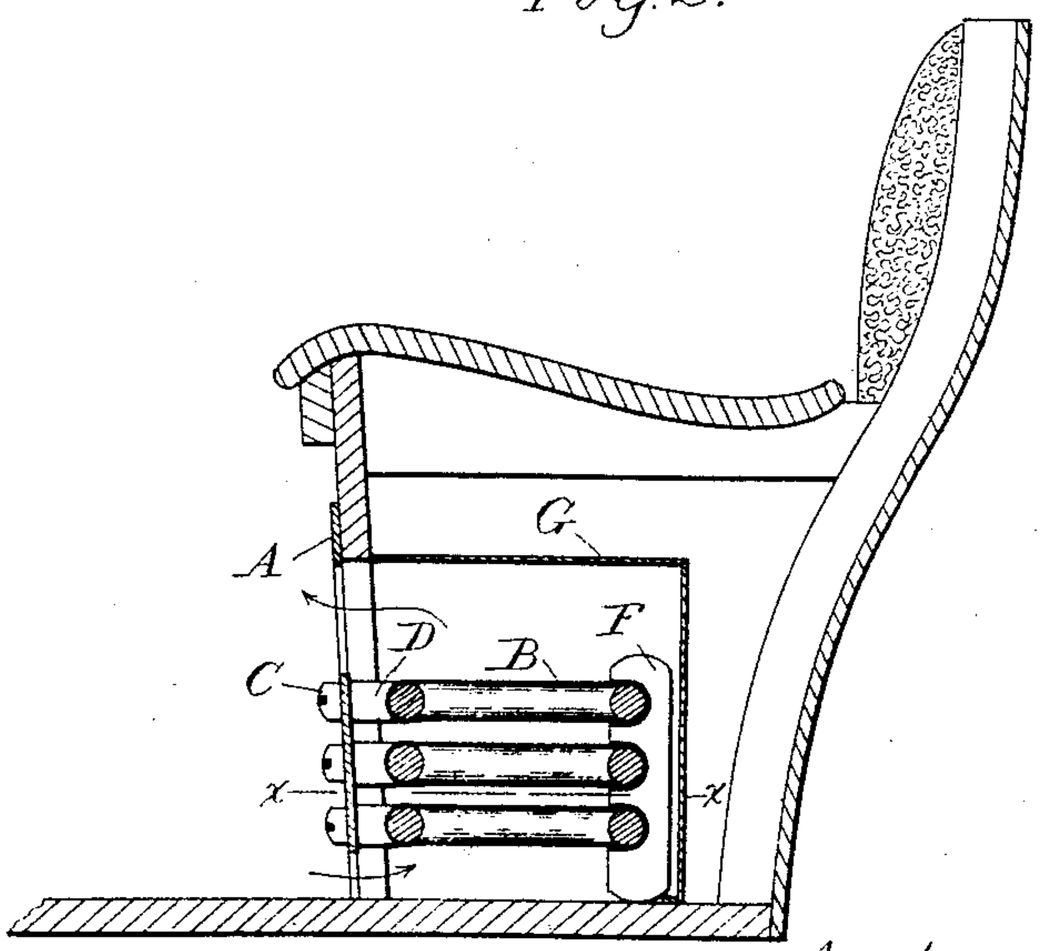


Fig. 2.



Witnesses
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AUSTIN S. HATCH, OF WINDSOR, CANADA, ASSIGNOR OF ONE-HALF TO STEPHEN J. MARTIN, OF DETROIT, MICHIGAN.

ELECTRIC HEATER.

SPECIFICATION forming part of Letters Patent No. 515,401, dated February 27, 1894.

Application filed March 27, 1893. Serial No. 467,790. (No model.)

To all whom it may concern:

Be it known that I, AUSTIN S. HATCH, a citizen of the United States, residing at Windsor, in the county of Essex, Canada, have invented certain new and useful Improvements in Electric Heaters, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention refers more particularly to such class of heaters in which the air is heated directly by contact with heat developing electric conductors and the object of my invention is to construct the heater in a manner to prevent the conductors from burning out by becoming overheated which with the present constructions occurs frequently and forms a serious drawback to the use of such heaters.

My invention embodies an arrangement of the heat developing conductor whereby the surrounding air produces a maximum cooling effect which prevents the conductor from becoming overheated, all as more fully described hereinafter and shown in connection with drawings in which—

Figure 1 is a detached rear perspective view of my heater as constructed for specific use as a car heater. Fig. 2 is a vertical section through the heater as arranged under a car seat. Fig. 3 is a horizontal section on line *x*—*x* in Fig. 2.

A is a face plate substantially of the kind as used for hot air registers.

B are open rectangular frames formed of a heat resisting insulating material, such as porcelain or similar material adapted to form a light open frame.

C are screws or bolts by means of which said frames are secured in horizontal position to the face plate, one above the other with open intervals between them.

D are washers interposed between the face plate and the frames to form an open air space between them. These washers are also preferably of insulating material and they may be made integral with the frames.

E are the heat developing electric conductors, preferably of copper or German silver wire for a continuous current and of iron wire for an alternating current; each frame is wound with a single conductor wound over the frame crosswise and with open intervals between the windings to allow the air to pass freely through it.

The frames may be more or less in number, and the conductors on the frames are connected in circuit with the electric supply as required to produce the best heating effects of the current.

F are additional supports which may be used if the weight of the frames requires it; they are of insulating material and notched as shown to engage the rear portions of the frame and support them collectively from the floor.

G is a sheet metal casing inclosing the frames with an open air space all around.

The heater being thus constructed and arranged it can be readily secured in position in a suitable recess, so that it is entirely concealed. In applying it as a car heater, it is placed most conveniently under a seat (preferably two of such heaters near opposite corners in the car). To this end a panel in the front of the seat may be cut out suitable to secure the face in the opening thus formed.

In operation the cold air is admitted into the heater through the bottom portion of the face plate underneath the frames and becoming heated by contact with the heat developing conductors becomes heated itself and passes upward and out through the upper portions of the face plate. The face plate to this end is preferably made entirely open near the base except that legs *a* are formed on it to stand on, in front of the frames, the face plate is less open so as to compel the heated air currents to rise upwardly.

My construction has the important advantage that the heat developing conductors lie at right angles across the air currents, thus the air around the conductors is constantly renewed by fresh air, whereas in other heaters the conductors are placed in lines coincident with the direction of the air currents and thus the air passing along the conductors becomes soon overheated and loses its cooling effect on the conductors with the consequence that the conductors are likely to become overheated and burn out, that is, lose their heat developing quality.

My heater is also very simple, safe and economical and permits the easy mounting and dismounting.

What I claim as my invention is—

In an electric heater, the combination with a casing of a face plate thereon having an open base and an apertured upper portion, a series of open, rectangular insulated frames arranged one above the other and out of contact, and each connected to the face plate at a point between the open base and apertured upper section, and a heat developing conductor wound spirally around the frames, the respective spirals being out of contact with each other, substantially as described.

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

AUSTIN S. HATCH.

Witnesses:
M. B. O'DOGHERTY,
N. L. LINDOP.