(No Model.) 4 Sheets—Sheet 1.

J. F. McELROY.

ELECTRIC HEATER.

No. 586,615. Patented July 20, 1897.

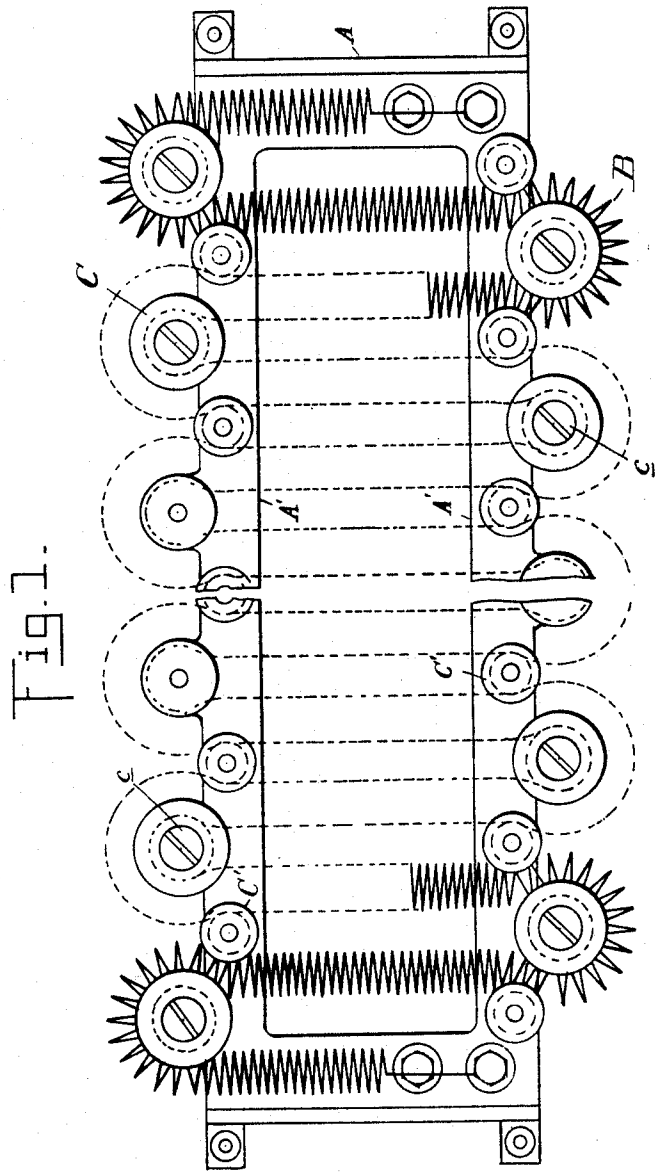

Fig. 1.

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(No Model.) 4 Sheets—Sheet 2.

J. F. McELROY.

ELECTRIC HEATER.

No. 586,615. Patented July 20, 1897.

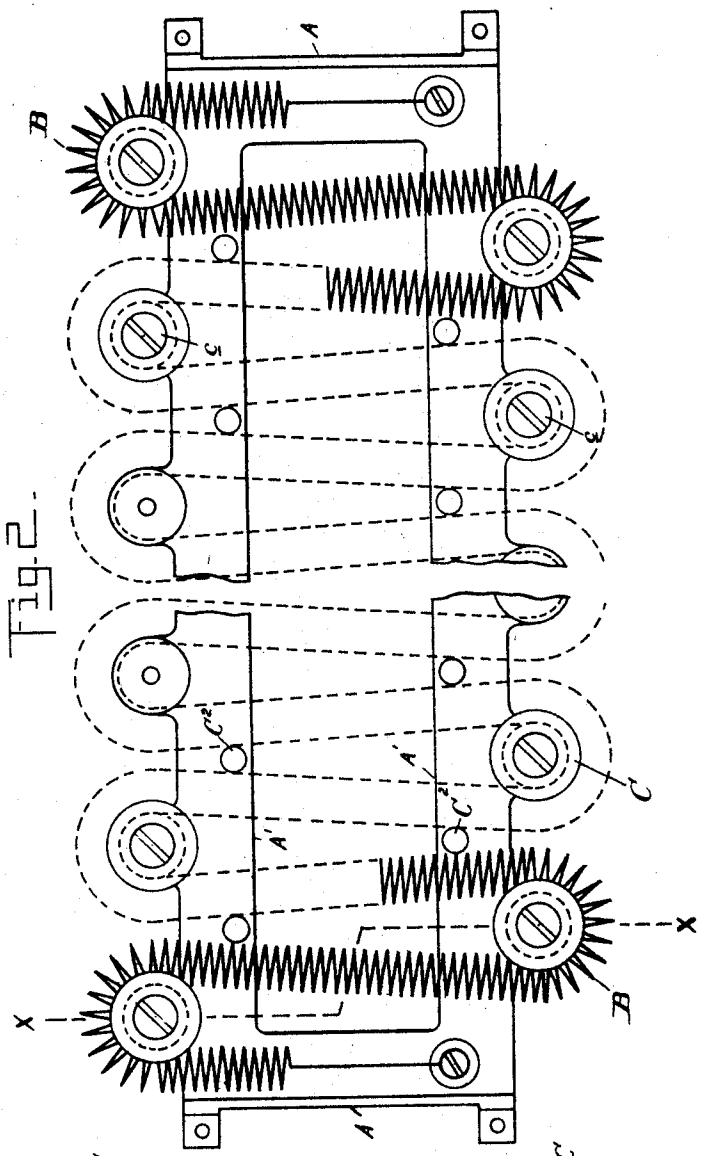

Fig. 2.

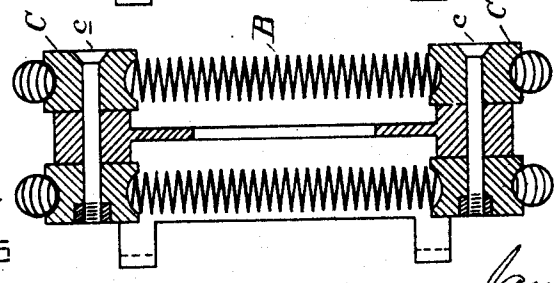

Fig. 4.

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(No Model.) 4 Sheets—Sheet 3.

J. F. McELROY.

ELECTRIC HEATER.

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Fig. 3.

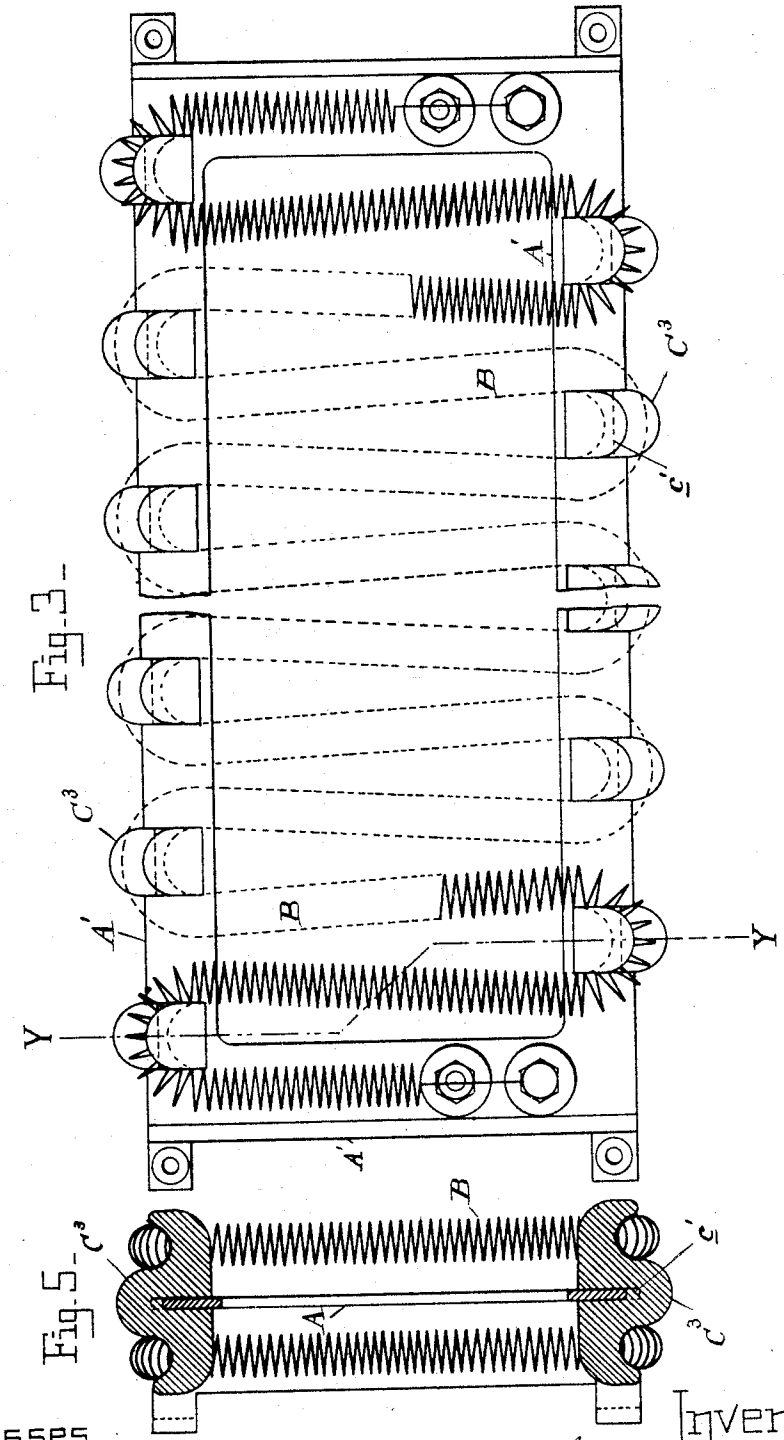

Fig. 5.

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(No Model.) 4 Sheets—Sheet 4.

J. F. McELROY.

ELECTRIC HEATER.

No. 586,615. Patented July 20, 1897.

Fig. 7

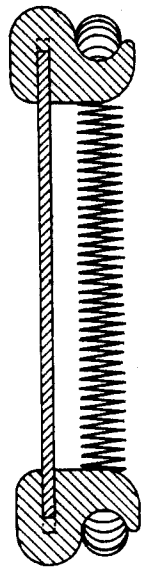
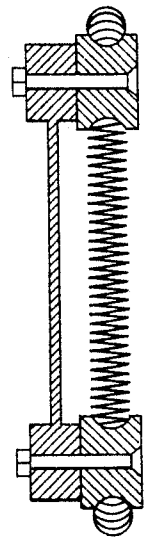


Fig. 6



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UNITED STATES PATENT OFFICE.

JAMES F. McELROY, OF ALBANY, NEW YORK, ASSIGNOR TO THE CONSOLIDATED CAR-HEATING COMPANY, OF SAME PLACE.

ELECTRIC HEATER.

SPECIFICATION forming part of Letters Patent No. 586,615, dated July 20, 1897.

Application filed August 14, 1895. Serial No. 559,231. (No model.)

To all whom it may concern:

Be it known that I, JAMES F. McELROY, a citizen of the United States, residing in the city and county of Albany, State of New York, have invented a new and useful Improvement in Electric Heaters, of which the following is a specification.

My invention relates to electric heaters, and has for its object the construction of a heater which shall be simple, cheap to build, effective as to the amount of heating-surface, and readily permit the detachment and attachment of the heating-coil without disturbing any essential portions of the supporting-points of the heater. The difficulty with most heaters has been in the inability to get a sufficient amount of heating-surface within the space that was allowable—for instance, in a street-car—and the arrangement I propose is designed to overcome in a large measure that difficulty and I obtain the results hereinbefore specified.

In the drawings, Figures 1 and 2 are elevations of the face of the heater with slight variations. Fig. 3 is an elevation of a modification, but contains the same principle of construction. Figs. 4 and 5 are cross-sections of modifications of Figs. 2 and 3, having resistance-coils on both sides of the frame. Figs. 6 and 7 are cross-sections along the lines X X and Y Y on Figs. 2 and 3, respectively.

In the drawings similar letters refer to similar parts.

In the drawings, A represents the framework, which is suitably supported when in place, and which is preferably constructed of metal bars A′ A′ of sufficient strength. Upon the upper and lower members of the frame are located insulating-spools C C, upon pivots *c c*, as shown in Figs. 1, 2, and 4; but without departing from the principle of the invention I may use insulating-blocks of other forms, which are or may be non-rotatably attached to the frame A, as hereinafter described. The insulating-spools C C are grooved on their peripheries slightly, as shown, and carry a spring-coil of wire resistance B B, the ends of which are suitably connected to bring it within the influence of an electric current, which heats it in passing.

It will be observed that the coils of the spring-wound wire only touch the insulators at one point in each coil and that the turning of the convolution separates the coils radially, thus preventing contacts and short-circuiting, also that a great deal of elasticity and varying tension can be secured, which equalizes throughout the whole convolution of the heating resistance.

In order to prevent lateral vibration and possible short-circuiting of the up-and-down convolutions, there may be placed at suitable points between such convolutions insulating-blocks C′ C′, which are also attached to the framework and thus keep the convolutions in place under the most severe usage.

In Figs. 2 and 4 I have shown a slight modification in form of the same principle, in that the insulating-spools are relatively larger, which gives a greater radius of the turns of the convolutions of the resistance, and in order not to separate them and thus reduce the heating capacity for the same space they are arranged as shown in Fig. 2, and to prevent short-circuiting by vibration similar insulating-plugs C^2 C^2 are inserted in zigzag relations. In all cases, however, the intermediate insulating-plugs C′ C′ and C^2 C^2 will only be required when short-circuiting by vibration is to be feared, and it is obvious that in many cases they might be omitted.

In Figs. 3 and 5 I show a modification in which the supporting-insulators are blocks C^3 C^3, preferably inserted in slots *c′ c′*, formed in the supporting-frame, which in turn is embraced by slots in the blocks C^3. These blocks are substantially held in place by the tension of the coiled resistance. This form is very cheap to construct and readily assembled without special tools or machinery.

Figs. 4 and 5 show cross-sections of a double heater with supporting-insulators on opposite sides of the frame, thus doubling its heating capacity. It is obvious that the two sides may be connected in series or in multiple, or a number of such heaters can by appropriate switches be optionally connected up with both sides of all in series or the opposite sides in multiple series, if desired.

Having thus described my invention, what I claim as new is—

1. In an electric heater the combination of

a supporting-frame, insulated supports arranged thereon at its upper and lower edges, a continuous coil of wire wound between said supports top to bottom and from end to end of said supporting-frame, and insulating-blocks located and rigidly supported between said coils and between the supporting-points therefor, for the purpose specified and substantially as described.

2. A supporting-frame for an electrical heater carrying thereon at its upper and lower edges insulating blocks or saddles, a continuous coil arranged in zigzag fashion about said insulating-blocks in such manner that said coils converge from top to bottom and bottom to top respectively as indicated, substantially as described.

3. A supporting-frame for an electric heater carrying thereon at its upper and lower edges insulating blocks or saddles, a continuous coil arranged in zigzag fashion about said insulating-blocks in such manner that said coils converge from top to bottom and bottom to top respectively as indicated, and insulating-blocks located between the straight portions of said coils, substantially as described.

4. A supporting-frame for an electrical heater carrying thereon at its upper and lower edges insulating blocks or saddles, a continuous coil arranged in zigzag fashion about said insulating-blocks in such manner that said coils converge from top to bottom and bottom to top respectively as indicated and insulating-blocks located between the straight portions of said coils, said insulating-blocks located between the straight portions of said coils in zigzag fashion being near the point of convergence of adjacent coils, substantially as described.

5. In an electrical heater the combination of a supporting-frame with slots located at its upper and lower edges, blocks adapted to be located within said slots and carrying thereon insulating-saddles and a coil extending alternately from the upper and lower saddles respectively and from end to end of said heater whereby said saddles are maintained in position by the tension in said coils, substantially as described.

JAMES F. McELROY.

Witnesses:
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