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ELECTRIC HEATER

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Fig. 1

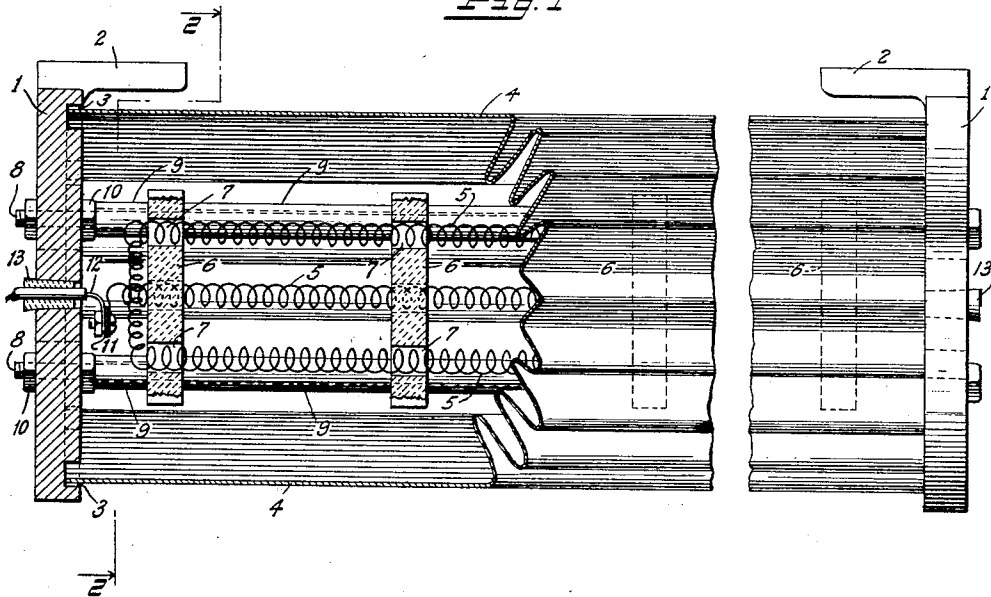
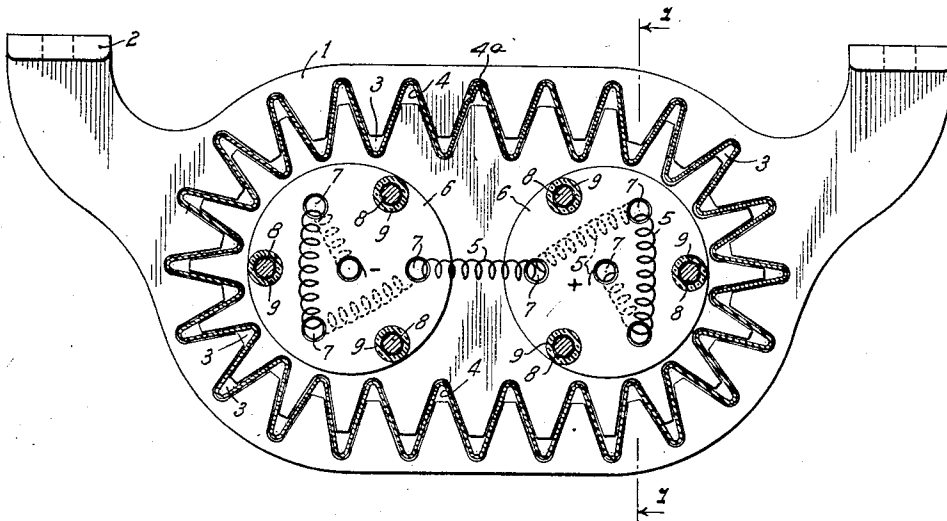


Fig. 2



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ELECTRIC HEATER

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This invention relates to electric heaters generally, but is more specifically designed to produce a heater for railroad cars and for domestic use, by which the intense heat of the small mass of the usual form of resistance element may be evenly dispersed and delivered to the car or room interior from a heated surface many times larger than that of the coil of wire by which said heat is initially generated ordinarily.

To this end the heating coil of resistance wire, or other element translating electrical current into heat, is, in my invention, not exposed directly to the atmosphere of the car or room, but is supported in skeleton form within an air space of relatively considerable volume enclosed by corrugated sheets of metal usually unpolished and therefore having high heat radiating capacity. In this way a large area of heat generating surface of a temperature much lower than that of the heating coil, but higher than that of the room atmosphere, is obtained, with the result that relatively large volumes of air coming into contact with the exterior of the heater may be raised to the desired room temperature and circulated throughout the car or room, thereby heating the same equably by convection, as does a steam or hot water radiator, and without liability of scorching nearby objects, as is often the case with electric heaters using exposed heating coils.

The best form of apparatus at present known to me embodying my invention is illustrated in the accompanying sheet of drawings in which:

Fig. 1 is a side elevation with parts broken away and others shown in section on line 1—1 of Fig. 2, illustrating a form of heater adapted to be attached to the under side of a car seat, and

Fig. 2 is a cross section on line 2—2 of Fig. 1.

Throughout the drawings like reference characters indicate like parts.

1, 1, represent end plates usually made of cast iron or other metal and having lugs or feet 2, 2, by which they may be attached to the under side of a car seat or other support, or, on which the heater may stand when

placed in reversed position. The inner faces of these plates, when assembled in pairs, are correspondingly grooved as indicated at 3, 3, preferably in the outline of a zigzag loop. 4 is a corrugated sheet of metal, preferably unpolished, which, when bent into a loop, as shown in Fig. 2, conforms to and fits into grooves 3, 3, thus constituting a corrugated element of the completed casing formed by it in cooperation with end plates 1, 1. Preferably the adjacent extremities of the looped corrugated metal sheet 4 are slightly overlapped, as shown at 4^a in Fig. 2.

In the enclosed air space so formed, is supported a coil or coils of resistance wire, one of which is indicated at 5. As shown, the preferred means for supporting said resistance element comprise a plurality of perforated disks 6, 6, usually made of some refractory, electrically non-conducting material, such as porcelain, which disks are strung on rods 8, 8, extending lengthwise of the casing and fastened to end plates 1, 1. This fastening may be conveniently done by means of nuts 10, 10, mounted on screw threaded ends of rods 8, 8, which pass through holes in said plate. Each disk 6, 6, has one or more perforations 7, 7, through it not designed to receive rods 8, 8, but to permit the coil of resistance wire 5 to be threaded through them.

The disks 6, 6, are held apart in spaced relation by short tubes or sleeves 9, 9, of metal which are also strung on rods 8, 8, and distributed between the disks.

Current is supplied to resistance element 5 by suitable lead wires, as 12, clamped to the ends of the coil, as indicated at 11. The lead wire may pass through holes in the end plates 1, 1, as indicated in Fig. 1, and be securely insulated therefrom by means of a tapered bushing 13 of non-conducting material.

Preferably there are two sets of disks 6, 6, in each casing, as shown in Fig. 2, and one coil of resistance wire is threaded back and forth through one set and then across to the other and back and forth through that set, in each case passing through the holes 7, 7. One terminal of the entire coil is connected to a lead wire 12, as shown in Fig. 1, and the

other end of said coil is then connected to a similar lead wire (not shown) at the same end of the casing, as indicated by plus and minus signs in Fig. 2, but any other desired arrangement of circuits could be substituted for that shown.

In operation the resistance element 5 is highly heated by the passage of a suitable current of electricity and the air confined in the casing formed by elements 1, 1, and 4, is effectively heated by radiation, conduction and convection therefrom, but to a lower temperature. The air in turn heats the corrugated metal sheet 4 by convection and the large exterior surface of the latter transmits the heat to the external air. The air so heated circulates about the interior of the car or room and equably warms the same, without the intense heat of the resistance element 5 being permitted to act directly upon any person or object close to the exterior of the heater. In this way I avoid the possibility of a person near the heater on a cold day being scorched on one side or at one point without being warmed at other points, as occurs with heaters using exposed resistance elements. Also, as a relatively large volume of air is warmed to the desired extent, such air will be rapidly generally distributed about the room, instead of having only a small volume of air very highly heated by direct contact with the heating coils and then rising rapidly to the ceiling, leaving other portions of the room relatively cold.

Furthermore a suitable reservoir of heat is provided in the highly heated air trapped within the heater casing, which is not destroyed by sudden blasts of cold air when the car door is opened, and this reservoir of heat immediately becomes active to reheat the car interior as soon as the car door is closed.

Among other advantages of the invention may be mentioned its cheapness of construction, ease of packing and transportation in knock-down position, and readiness of assembling. The end members 1, 1, are cheap castings. Full length sheets of metal from the mill can be corrugated in quantity and thereafter cut in lengths to form the casing element 4. The disks 6 can be cheaply molded of one standard size, and other structural parts cut from commercial tubing and rods.

The insulating disks 6, 6, could be made of other shape, and other profiles of corrugation for the casing element employed, and various other changes made in detail of various elements of the particular construction here shown as an example so long as the general principle and method of operation above described are preserved, and this without departing from the essential novelty of the invention.

Having described my invention, I claim:

1. The combination, in an electric heater, of end plates correspondingly grooved on

their inner faces, a corrugated casing element bent to conform to the outline of said grooves and having its ends nested therein, means for holding said end plates and said casing element in assembled relation, and a resistance element supported in the casing thus formed, but out of electrical contact therewith.

2. A combination such as defined in claim 1 in which the corrugations in the grooves in each plate are adjacent each other and combine to form a closed loop, and in which said corrugated casing element, the ends of which are nested in said grooves, extends along the entire length of the grooves with its adjacent extremities in contact one with the other to form, with said plates, a complete enclosure of relatively considerable volume for said resistance element.

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