

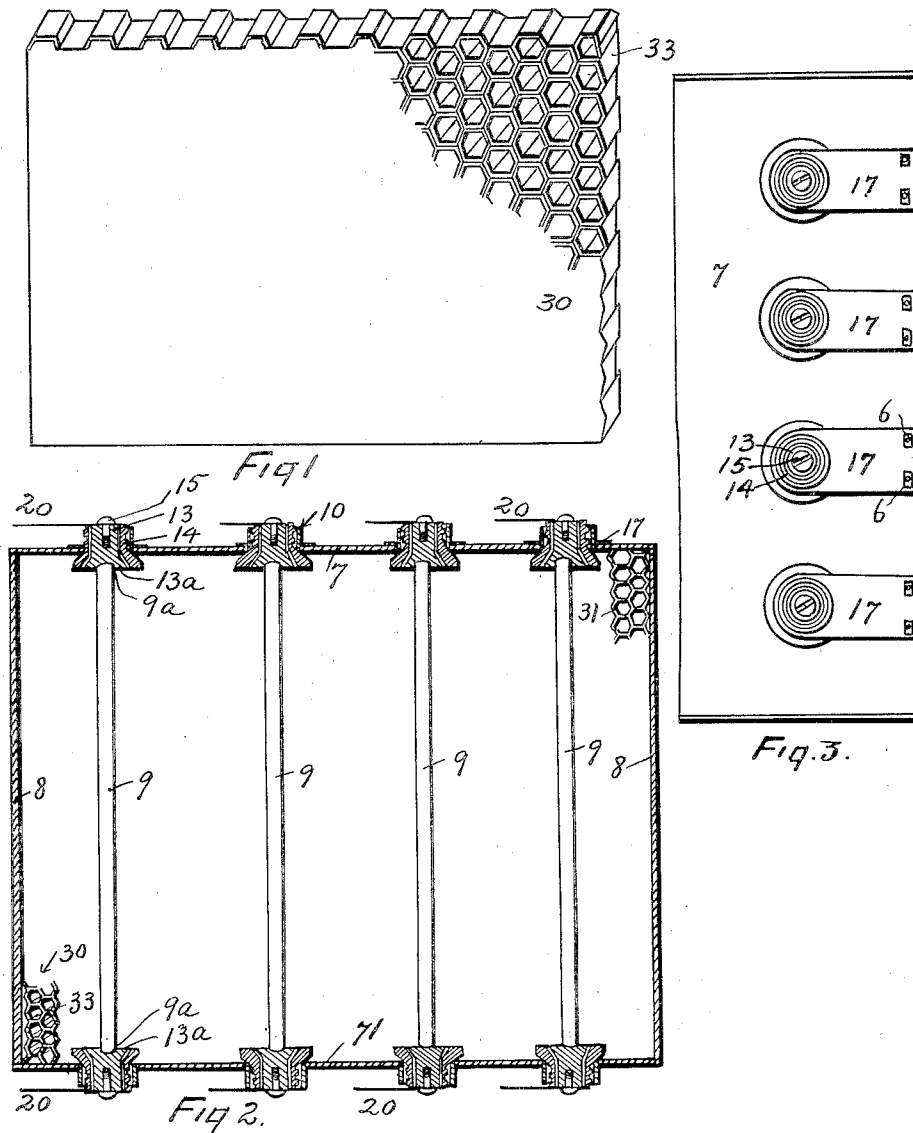
**Feb. 5, 1929.**

**1,701,096**

R. T. BOWLING ET AL  
ELECTRIC AIR HEATING RADIATOR

Filed Jan. 7, 1927

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

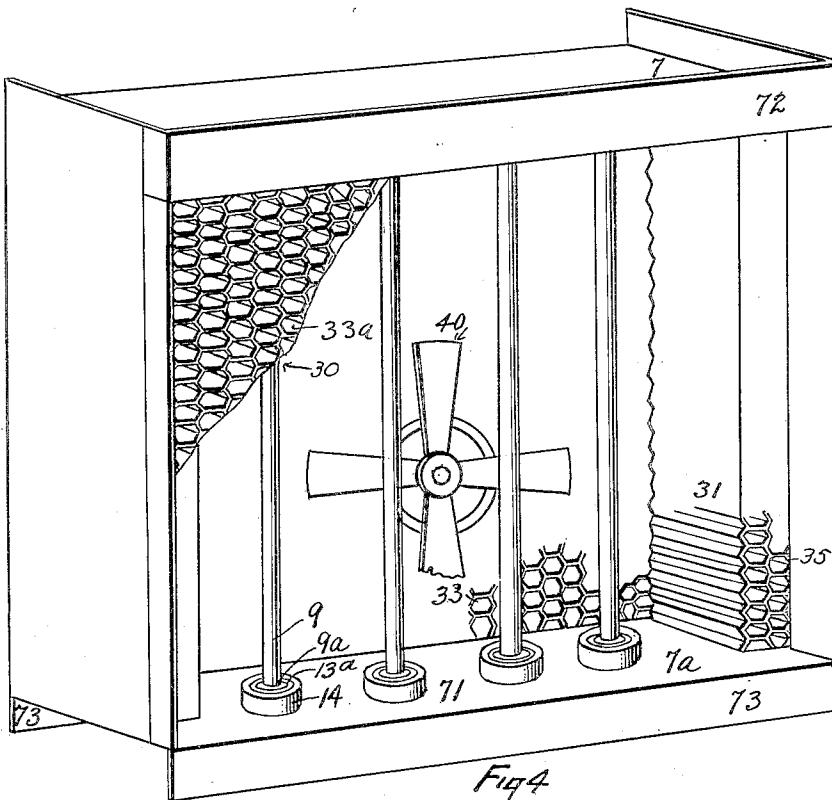


Fig 4

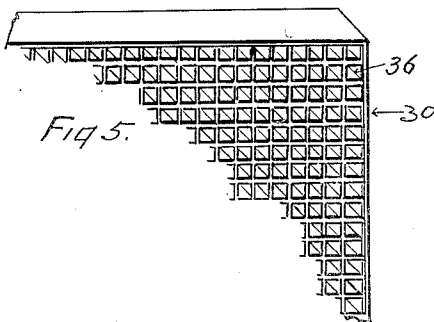


Fig 5.

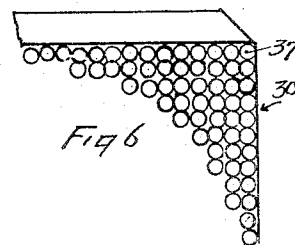


Fig 6

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## UNITED STATES PATENT OFFICE.

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## ELECTRIC AIR-HEATING RADIATOR.

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Our invention relates to a heat radiator, and more specifically to a device for transforming an intense heat generated preferably by electrical energy and within a small area, to a heat of a lower temperature and over a much larger area, within a very short period of time. This and other objects are accomplished by means of the device hereinafter described and illustrated in the accompanying drawing, in which Figure 1 shows a cellular radiator for diffusing the heat. Figure 2 is a sectional view of the frame adapted to contain the device showing the electric heating elements. Fig. 3 is a top view of the device. Fig. 4 is a perspective of the electric heating unit assembly. Figs. 5 and 6 are modified forms of cellular structures.

As shown in said drawing we have provided a frame preferably formed of sheet metal, having sides 8, top 7 and bottom 71, and which is constructed without front or back closures. A flange 72 is on the top of the frame and a flange 73 extends downward therefrom. These flanges strengthen the frame and improve its appearance. Within the frame are one or more electric heating elements 9 which are preferably constructed of electric resistance material so that they will become hot when a current of electricity is passed therethrough. For ease in installing the elements there has been inserted within holes in the top and bottom of the frame pairs of bushings 14 constructed of porcelain or other nonconducting material. Within these bushings are inserted terminals 13. Aluminum terminals are preferable but terminals constructed of other conducting material may be used. The portion of the terminals on the inside of the frame are cup shaped 13<sup>a</sup> so that when an element in the form of a stick or rod is inserted, the ends 9<sup>a</sup> of said elements will be engaged in the cup. The outside ends of the terminals are provided with means 15 for attaching electric wires 20 thereto. The combined porcelain bushings and terminals 10 placed in the upper part of the frame 8 are adapted to slide loosely within the box or frame 8, and for the purpose of holding the terminals tightly against the ends of the elements, we have provided for each element a leaf spring 17 which is constructed so that it engages the porcelain bushing at one end and is at-

tached to the top of the box at the other end. The spring 17 is positioned so that its tension end is downward, thus pushing the combined porcelain and terminal 10 against the end of the element 9. A special advantage in this construction is that the spring which functions to hold the electric element in position is not necessarily used to transmit the current of electricity therethrough, as the electric wires 20 are connected directly to the terminals. This feature will be subject of a co-pending application.

It will be noted that by passing a current of electricity through the elements heat of a high temperature can be produced. For the purpose of transforming this intense heat for use at a lower temperature, and greater volume or for diffusing the heat over a larger area, we have surrounded the elements thus heated with a cellular construction 30 similar to well known automobile radiators. Each individual cell 35 of the cellular structure 30 consists of a tube the cross section of which may be hexagonal as shown in Fig. 4, square 36 as shown in Fig. 5, round 37 as shown in Fig. 6, or any other desirable shape, and the assembled cells may be a plurality of individual tubes grouped together with their axes parallel, or the assembly may be made as one unit with transverse holes therethrough or formed of sheet metal pressed, and positioned together to resemble the cellular structures shown in the drawing. In our invention we have placed a block 31 of the cells on the inside of each side of the frame and the front and the back are enclosed with blocks of the cellular structure designated as 33 and 33<sup>a</sup>. These blocks of cells should be arranged so that the longitudinal diameters of the tubes are all parallel. This form of radiator functions to receive the heat from the elements and to distribute or diffuse the heat over the face of the radiator, and when the air is forced therethrough it emerges from the cellular structure at a much lower temperature than when it first leaves the heating elements, and diffuses through a larger volume of air and instead of a high temperature reflected or emerging from a small area, as is the case without the cellular structure shown, a warm air is radiated from a larger surface.

To make the device more effective an electric fan 40 can be positioned to blow a cur-

rent of air through a set of cells 33, past the heating units, and from thence through discharging cells 33<sup>a</sup>.

As the metal of which the radiator cells is constructed is preferably a heat conductor, the heat is readily absorbed by the thin metal forming the cells and is diffused over the entire radiator surface, and the current of air passing through the cells carries the heat thus distributed so that a larger volume of air is uniformly heated more quickly than if the same volume of air were blown directly upon the heating elements without the interposition of the cellular structure.

Having described our invention we claim:

1. A heat diffusing device consisting of a cellular structure made of heat conducting material, the cells being constructed with open ends so that the air can circulate there-  
through, a chamber formed within said cellular structure, and heating means within said chamber, the said cells being positioned so that the open ends thereof are adjacent to the heating means.

2. A heat diffusing device consisting of a cellular structure having the cells open at

the ends and arranged so that air can readily pass through said cells, a chamber formed within the structure, heating elements within the chamber, and means for forcing a current of air into the chamber and through the cells of the cellular structure and through the chamber.

3. A heat diffusing device consisting of a structure of open cells arranged so that the air can readily pass therethrough, a space between portions of the structure, adapted for heating elements positioned within said space, and means for forcing a draft of air through the cellular structure and past the heating elements.

4. A heat diffusing device consisting of heat producing elements and a cellular structure composed of a plurality of tubes arranged with their diameters parallel, the cellular structure being positioned a spaced distance from the heater and with the open face of the cellular structure adjacent to the heating element.

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