

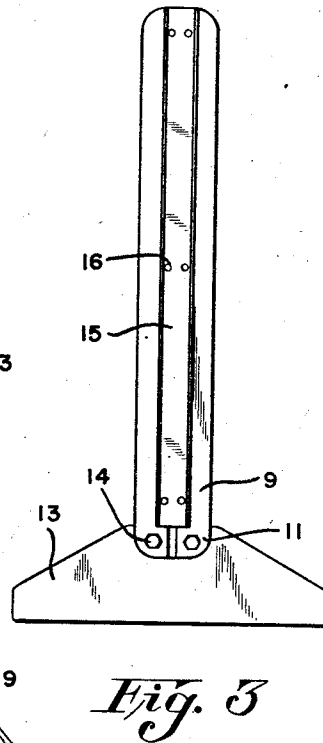
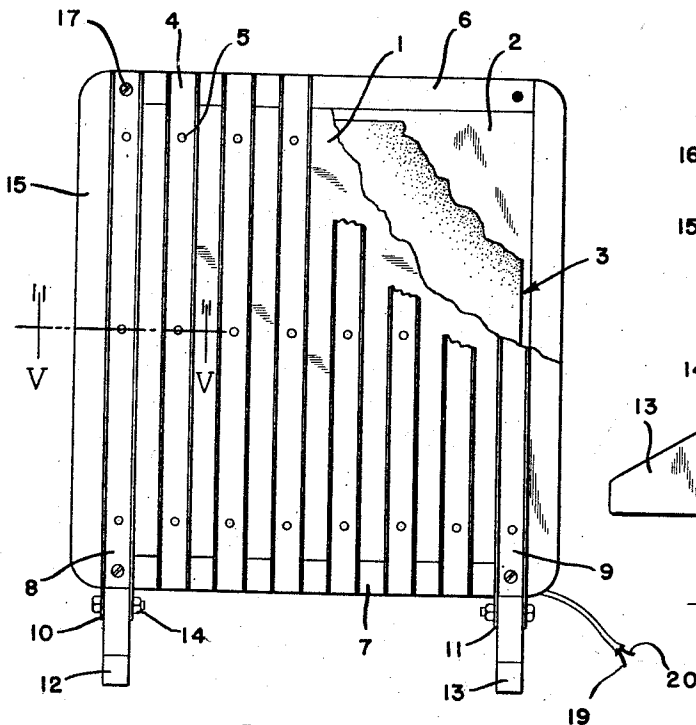
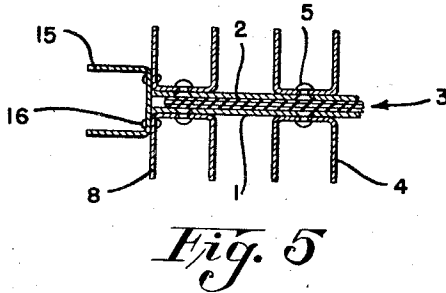
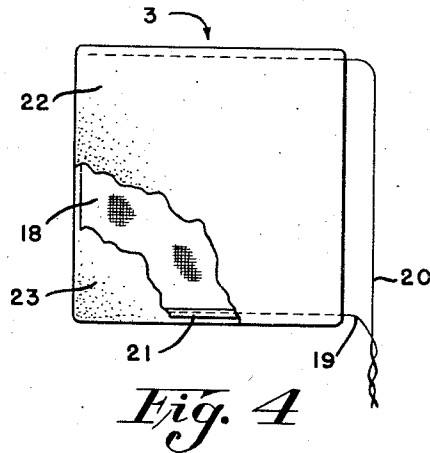
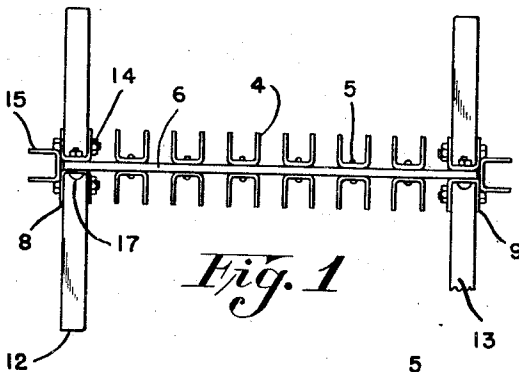
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2,432,400

ELECTRICALLY HEATED RADIATOR

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ELECTRICALLY HEATED RADIATOR

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2 Claims. (Cl. 219—38)

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This invention relates to radiators and in particular it relates to electrically heating means in combination with means for transmitting and dissipating the heat.

In general the present invention comprises an electrically heating element composed of a plastic material containing electrical conducting particles, and this heating element is arranged in an insulating manner between a pair of spaced metallic panels which are provided with heat dissipating fins. The heating element itself is retained on a fabric base and accordingly it is especially light in weight. Also the metallic panels and fins associated with the heat unit are preferably formed of light gauge aluminum. As a result of this combination it is possible to produce a light weight portable radiator which may be easily moved from place to place and which may be fashioned in an attractive appearance.

By using a heating element formed of a layer of electrically conducting plastic material that has a lower conductivity than metal conductors, it is possible to produce a uniform generation of heat at a moderate temperature over a relatively large area. This makes it possible to avoid a localized heat source in which the temperature is intense, and permits relatively low temperatures to be used over a wide area thus providing a safe radiating means which avoids the use of temperatures that are high enough to cause burns or irritation to an individual who may accidentally contact the radiator.

It is therefore among the objects of my invention to provide a light weight radiator which is heated by electrical means and which is readily portable; to provide such a radiator that operates at relatively low heating temperatures and with a highly uniform distribution and dissipation of the heat; to provide a radiator of the character described which may be fashioned in a convenient size and attractive appearance; and to provide a radiator of the character described which may be manufactured economically and which will function efficiently for the purpose stated.

These and other objects and advantages will appear more fully in the following detailed description when considered in connection with the accompanying drawing, in which:

Fig. 1 is a top plan view of a radiator illustrating one embodiment of my invention;

Fig. 2 is a front elevational view thereof, with parts broken away;

Fig. 3 is an end view of the radiator;

Fig. 4 is a detailed view, partly broken away, of the heating unit of the radiator; and

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Fig. 5 is a transverse view, in section, of a portion of the radiator taken along lines V—V of Fig. 2.

With reference to the drawing I show an embodiment of my invention in the form of a radiator comprising a pair of slightly spaced panels 1 and 2 having positioned between them an electrical heating unit 3. The panels 1 and 2 are formed of sheet metal because of its capability of transmitting heat readily. Preferably these panels are formed of sheet aluminum because of the high heat transmission capability of the aluminum in combination with its lightness in weight. The panels may have a thickness of approximately 16 gauge. For the purpose of increasing the dissipation of heat from the panels 1 and 2 I provide a plurality of fins in the form of channels 4 which are attached to the panels by means of rivets 5. These rivets are countersunk at the inner surface of the panels so that they will not protrude from such inner surfaces into the heating unit 3. Upper and lower frame members 6 and 7 respectively function as spacers for the panels 1 and 2 and also as supports for the heating unit 3. The spacers also serve as structural members for stiffening and strengthening the radiator. The two outermost channel fins 8 and 9 upon each panel 1 and 2 are provided with extensions 10 and 11 at their lower ends for engaging with leg or base members 12 and 13, respectively. Bolts 14 secure these extensions to the base members. A similar fin member 15 is also attached to the radiator at each end thereof for the purpose of adding to the appearance of the radiator and also to serve as additional heat dissipating means. Rivets or other fastening means 16 are used for securing the fins to the outermost channel members 8 or 9. To complete the assembly bolts 17 are utilized to attach the outermost channel fins 8 or 9 with the spacer members 6 and 7.

The heating unit 3 is shown in particular in Fig. 4 and consists of a fabric sheet 18 of woven cotton or other textile material. One or both of the surfaces of this sheet is coated with an electrically conducting composition, such, for example, as a rubber compound containing sufficient electrical conducting carbon particles to make the sheet 18 an electrical conductor. The degree of conductivity in the prepared sheet is dependent upon the type of carbon and the carbon content of the compound deposited thereon and is far below that of a metal sheet of the same area. This electrically conducting composition is usually applied in the form of a paint or

paste and one or more applications of the compound may be applied thereon depending upon the temperatures desired.

While reference is made to the fabric 18 as being formed of cotton it is to be understood that other materials such as asbestos may be used, or the conducting compositions may be applied directly to an electrically insulating sheet material. One example of a compound having good electrically conducting properties is as follows:

Rubber -----	100.00
Acetylene carbon black -----	85.00
Zinc oxide -----	15.00
Antioxidant -----	.75
Accelerator -----	2.00
Deodorant -----	.10
Softener -----	7.00
Vulcanizing agent -----	.75

To these ingredients is added a solvent such as 1500 parts of gasoline, and the resulting mixture is applied to the fabric in the form of a cement.

Electrical current for heating the treated fabric 18 is supplied by spaced conducting wires 19 and 20. Those portions of the wires 19 and 20 which extend along the length of opposing margins of the fabric 18 are bare wires and are not insulated so that they will function as conductors throughout the width of the fabric 18. Marginal edge portions 21 of the fabric 18 are turned over the wires to form folds cemented to the fabric sheet. The treated fabric 18 and portion of the conductor wires 19 and 20 are completely insulated by being interposed between a pair of sheets 22 and 23 of insulating material. This insulating material may be of a rubber composition or synthetic rubber or it may be in the form of a plastic composition such as cellulose acetate, or the like. Still further an electrically insulating varnish may be used to serve the purpose effectively.

A heating unit as thus described may be made conveniently to operate upon any given current. Preferably the heating unit is designed to operate on 115 volts which is current used principally for domestic purposes. The electrically conducting plastic composition with which the fabric 18 is treated possesses such conductivity as to represent a wattage of from 150 to 250 for an area of 324 square inches. While other wattage ranges can be used I have found that the above range gives good results and enables efficient operation.

The heating unit 3 is positioned between the panels 1 and 2 so that the panels engage tightly with the surface of the heating element. This serves to accomplish two purposes, in that the panels function to clamp the heating unit in place and also the tight engagement of the panels with the surface of the heating element permits a

quick transmission of heat from the heating unit to the heat dissipating panels.

As thus shown and described it is believed apparent that I have provided a novel radiator combination in which the heating element itself is disposed over a relatively large area and operated to produce a relatively low but uniform amount of heat over this area while permitting a quick transmission and dissipation of the heat throughout the area of the radiator.

While I have shown and described a preferred embodiment of my invention it is to be understood that it is susceptible to those modifications which appear obviously within the spirit of the invention and the scope of the appended claims.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. An electrically heated radiator, comprising a thin broad plastic sheet containing electrical conductive particles and adapted to generate heat uniformly at a moderate temperature throughout a wide area when it is supplied with electrical energy, a pair of thin flat metal sheets of similar area to that of the plastic sheet which is sandwiched between the metal sheets so that the heat of the plastic sheet is efficiently transmitted to the metal sheets, and each metal sheet having secured to its outer face a series of metal ribs that hold the thin metal sheets in contact with the heating sheet and also serve as heat dissipating fins.

2. An electrically heated radiator, comprising a thin broad plastic sheet containing electrical conductive particles and adapted to generate heat uniformly at a moderate temperature throughout a wide area when it is supplied with electrical energy, a thin insulating film covering each face of the heating sheet, a pair of thin flat metal sheets of similar area to that of the plastic sheet which is sandwiched between the metal sheets so that the heat of the plastic sheet is efficiently transmitted to the metal sheets, and each metal sheet having secured to its outer face a series of metal ribs that hold the thin metal sheets in contact with the heating sheet and also serve as heat dissipating fins.

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