R. H. MINNS.

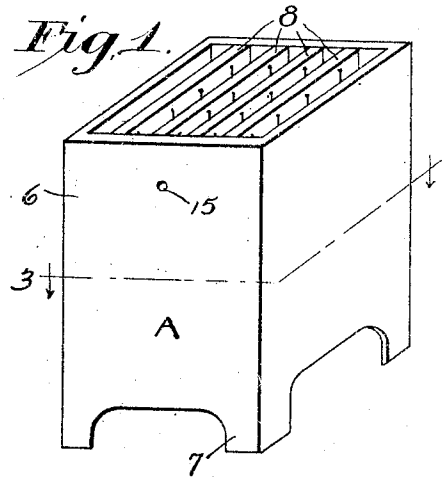
ELECTRIC AIR HEATER.

APPLICATION FILED AUG. 23, 1918.

1,381,579.

Patented June 14, 1921.

Fig. 1.



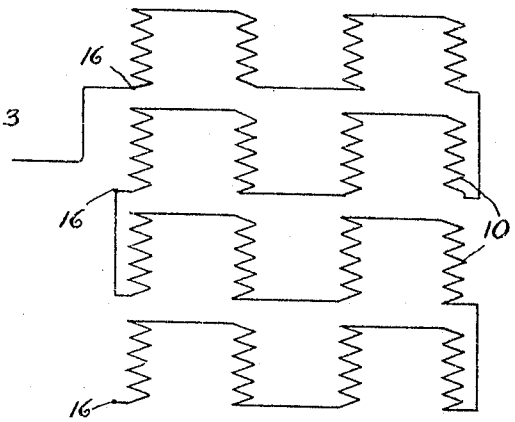


Fig. 2.

Fig. 3.

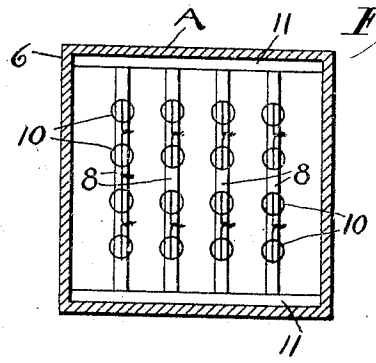
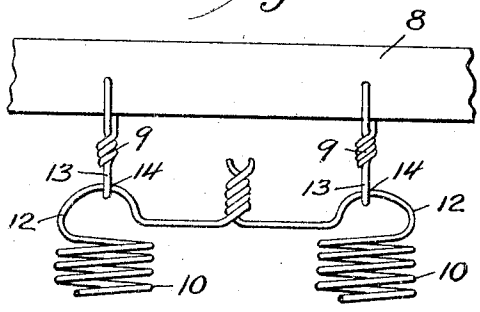


Fig. 5.



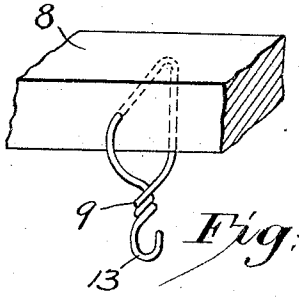


Fig. 4.

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UNITED STATES PATENT OFFICE.

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ELECTRIC AIR-HEATER.

1,381,579. Specification of Letters Patent. Patented June 14, 1921.

Application filed August 23, 1918. Serial No. 251,191.

To all whom it may concern:

Be it known that I, RAYMOND H. MINNS, a citizen of the United States, residing at Bedford Hills, in the county of Westchester, State of New York, have invented certain new and useful Improvements in Electric Air-Heaters, of which the following is a specification, together with the accompanying drawings, in which like numerals represent like parts.

My invention relates to electric air heating devices of the portable type in which the heat is distributed by convection of air directly heated from the electric units.

The invention has for its object, first, to provide a very simple and inexpensive portable device that may be used to warm air in the rooms where a small amount of heat only is needed continually or frequently or where larger amounts are needed in case of emergency, as when other sources of heat such as gas or coal fail, as in very cold weather.

Another object is to provide a heater for small rooms where space being limited, physical contact with such a device is likely to occur, as in a nursery where children are playing about, and it is imperative that such a device be provided as has no outward parts capable of producing burns or electric shock.

Another object is to provide an electric air heating means of such simple parts that any rural mechanic may build it out of materials at hand in localities where fuel is scarce and where wind power or water power is abundant.

Still another object is to provide a means for quickly drying articles of clothing, such as overcoats and rubber boots in localities having a cool moist climate such as along the sea coast.

With these and other objects in view, the invention consists of the novel construction, combination and arrangement of parts hereinafter described and claimed, and illustrated in the accompanying drawings, in which,—

Figure 1 is a perspective view.

Fig. 2 is a diagram of the interior wiring.

Fig. 3 is a sectional view taken on a horizontal plane through broken line 3—3.

Fig. 4 is a perspective view of one of the hooks supporting the heating element.

Fig. 5 is a side elevation of a portion of one of the bars supporting part of the winding by means of two of the hooks.

My improved air heater comprises generally a heating chamber which being open at top and bottom is designed to act as a chimney in the production of a current of air; a heating element placed in this chamber and designed by its large heating surface to communicate its heat rapidly and at a comparatively low temperature to the current of air passing through and around it; and means for supporting or suspending the said heating element in place.

Referring now to the drawings, A is the heating chamber, consisting of a wooden box without top or bottom and resting on legs 7 formed by cutting away the lower edges of the box as shown to permit the inflow of air to the chamber. At top and bottom on two opposite sides of the box are the cleats 11 which support the coil bars 8 against the tension of the wire coil heating units 10. The said coils 10 are suspended from the coil bars by means of the coil hooks 9. Both coil hooks 9 and coils 10 are constructed from bare wire, preferably that kind and grade known as galvanized steel fence or telephone wire.

The wire at each end of each coil is extended in the form of a semicircular loop 12 by bending up at right angles the final half turn. The loop 13 of the coil hook 9 is also circular in form and its plane being at right angles to the plane of the loop 12, it will be seen that coil 10 rests on hook 9 at what is approximately a single point of contact 14. This exceedingly small surface of contact greatly retards the conduction of heat from the heating element 10 to the support bars 8, making possible the use of combustible material such as wood for the bars 8, thus securing at once lightness, good electrical insulating qualities and low cost.

The coils 10 are wound with adjacent turns touching but when placed in position in the heating chamber each coil is extended axially 25% or more of its original length. By this means there is introduced into the coil a tension sufficient to hold the coil securely in place on the hooks 9 and to prevent adjacent coils from springing into contact with each other, as by their own weight or inertia when the heater is accidentally overturned. This extension of the coils also separates the adjacent turns, sufficiently to

prevent short circuits occurring between them and facilitates the circulation of air on the inside of the coil.

The coils may be arranged all in series for the higher voltages or in multiple groups for the lower voltages, sufficient wire always being used to limit the current to a value where the heat developed will not be sufficient to soften the wire and so cause it to lose its tension.

Electric current is supplied to the heating element by any suitable means, as for example, by a two conductor insulated flexible cord passing through a hole 15 in one side of the heating chamber, electrical connection being made to the heating element by meshing the bared ends of the conductors with the end turns of the terminal coils as at 16 in Fig. 2.

From the foregoing it will be seen that I have provided an electric air heater simply constructed of standard materials at low cost to manufacture and having a wide range of adaptability.

By providing a means for obtaining warm air by the cleanest and most efficient method known, without the high first cost due to the use of expensive special materials, I believe I have made a distinct step forward in the electric art.

What I claim and desire to secure by Letters Patent, is:—

1. An electric air heating device of the class described, comprising a body part composed of combustible, non-conducting material, said body part being open at the top and bottom and provided with an air heating chamber therein, a plurality of supports mounted transversely of the top and bottom portions of said body part, said supports being composed of combustible, non-conducting material, a plurality of wire coils mounted in said chamber, and means connected with said supports for supporting said coils in said chamber.

2. An electric air heating device of the class described comprising a body part open at the top and bottom and provided with an air heating chamber, an electric heating element, a plurality of transverse strips of combustible and non-conducting material mounted in said body part, and a plurality of hook-shaped supporting members composed of wire connected with said strips and adapted to support said heating element within said chamber.

3. In an electric air heating device, the combination with a heating device open at the top and bottom to permit of the free passage of air therethrough, of a heating element consisting of one or more coils of bare wire, and supports for said heating element consisting of a plurality of members formed from bare wire and arranged in such manner as to contact with the bare wire of said heating element at a limited number of small contact surfaces.

4. An electric heating apparatus comprising a hollow body open at the top and bottom to permit of the passage of air therethrough, said body being composed of fibrous material and provided at the top and bottom portions thereof with transverse strips of wood, a heating element consisting of a plurality of units, each of which are composed of helix of stiff wire, said units being spaced one from the other and placed in electrical connection with each other, and a plurality of wire hooks mounted in connection with said strips and adapted to support said heating element or the separate units thereof within said body.

5. An electric air heating apparatus of the class described, comprising a body composed of fibrous material and provided with a chamber which opens upwardly and downwardly therethrough, a plurality of wood strips mounted in the top and bottom portions of said body and within said chamber, a plurality of heating units mounted in said chamber between said strips, said units being composed of helix of stiff wire electrically connected one with the other, and a plurality of wire members mounted in connection with said strips and adapted to support said heating units in connection therewith.

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

RAYMOND H. MINNS

Witnesses:

JOHN D. KEYES,

E. I. RICK.