(No Model.)

R. A. L. SNYDER & A. F. TINNERHOLM.

ELECTRIC HEATER.

No. 590,916. Patented Sept. 28, 1897.

Fig. 1.

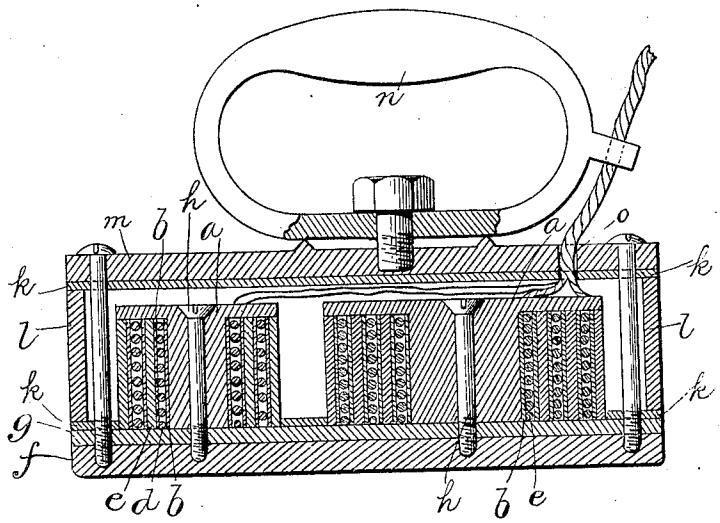


Fig. 2.

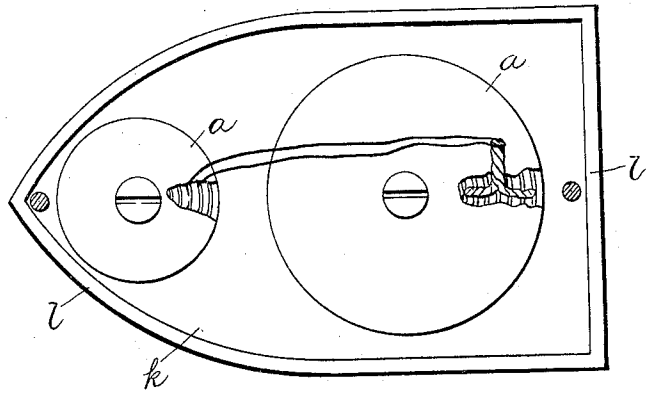
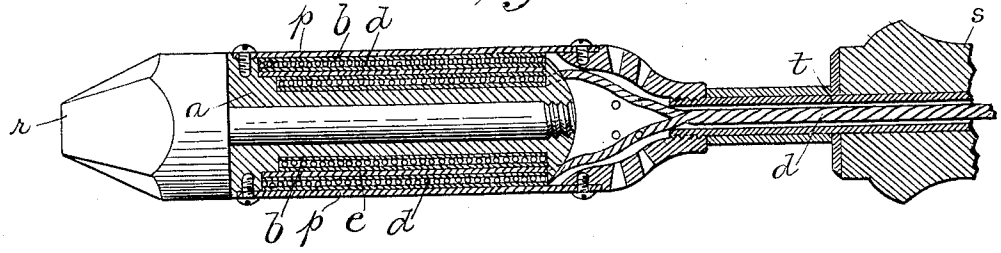


Fig. 3.



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UNITED STATES PATENT OFFICE.

RICHARD A. L. SNYDER, OF PITTSBURG, PENNSYLVANIA, AND AUGUST F. TINNERHOLM, OF DETROIT, MICHIGAN, ASSIGNORS TO THE AMERICAN ELECTRICAL HEATER COMPANY, OF DETROIT, MICHIGAN.

ELECTRIC HEATER.

SPECIFICATION forming part of Letters Patent No. 590,916, dated September 28, 1897.

Application filed December 22, 1896. Serial No. 616,652. (No model.)

To all whom it may concern:

Be it known that we, RICHARD A. L. SNYDER, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, and AUGUST F. TINNERHOLM, residing at Detroit, in the county of Wayne and State of Michigan, citizens of the United States, have invented certain new and useful Improvements in Electric Heaters; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to improvements in electric heating apparatus, with which either an alternating or a direct current of electricity is employed.

In electric heating apparatus of the character to which our invention relates it is of the greatest importance that the heat generated should be quickly transmitted to that part of the apparatus which it is the object to heat and to keep as cool as possible those parts of the apparatus not intended to be heated. We have found by experience that when a heating-coil consists of a considerable number of layers of resistance-wire the middle layers, or layers inside the coil, get very much hotter than the outside layers and the layers nearest the core. This is caused by accumulation of heat, as the heat is not conducted away from the wire as fast as generated, and as a consequence the middle or inner layers often burn out, while the outer layers and layers nearest the core are very little, if any, affected by the heat.

The object of our invention is to overcome this and to provide means of conducting away the heat from all parts of the coil as fast as generated.

Having these objects in view, as well as the production of a very simplified form of apparatus, our invention consists of the features, combination of parts and their construction, all as more fully hereinafter described, and particularly claimed.

Our invention is illustrated in the accompanying drawings, in which—

Figure 1 is a cross-section showing our invention employed in connection with a flat-iron; Fig. 2, a plan view of same, and Fig. 3 a cross-section showing our invention applied to a soldering-iron.

Referring to the drawings, *a* indicates iron cores, each preferably consisting of a single piece of cast-iron; but the cores may be composed of a number of pieces of iron and built up in any suitable manner.

The number and shape of the cores may vary to suit the various styles of appliances to which our invention is adapted.

Immediately surrounding each core and in contact therewith are sheets or pieces *b* of some suitable insulating material, as mica.

d is one of a series of layers of resistance-wire.

e are copper strips or pieces placed between the layers of resistance-wire *d*, but separated from the resistance-wire by the insulating-sheet *b*.

By this construction—namely, a series of layers of resistance-wire, sheets of insulating material, and heat-conducting copper strips built up around the cores in the manner above described—that is to say, immediately surrounding the cores *a* we place a sheet of good insulating material *b*, as mica. On this we wind the first layer of wire *d*. Another sheet of insulating material *b* is then placed over the first layer *d* of the series. Then the good heat-conducting substance, as the copper strips *e*, are introduced. On the top of the strip *e* we add another insulating-sheet *b*, then another layer *d* of the resistance-wire, and so on until the desired amount of wire is wound on the core—we produce a very efficient device.

It will be understood that our invention may be employed with many different styles of heating appliances, but we have thought it only necessary to show and describe in detail its use in connection with a flat-iron and a soldering-iron, and we now first refer to Figs. 1 and 2 of the drawings.

The iron cores *a*, having the resistance-wire wound thereon in the manner above described, together with the heat-conducting strips *e*, rest and are held in the desired position on an iron plate *f*, or, rather, directly on the copper-plated surface *g* of the plate *f*.

The purpose of the copper-plated surface *g* of the plate *f* is to aid in conducting heat from the heating-coils to said plate and to distribute the heat over the entire plate. The cores *a* are fastened to the plate *f* by screws *h* or other suitable means. Care should be taken to have the copper strips *e* make good contact with the part to be heated. *k* is a sheet or mat of asbestos resting on that part of the copper-plated surface *g* of the plate *f* not covered by the cores or spools and their windings. The flat-iron further consists of the side portions *l* and top *m*, provided with a handle *n* and an opening *o* to permit the resistance-wire to pass to the cores *a*. The top *m* on its inner surface is provided with a sheet of asbestos *k*. By thus making the outer casing composed of three parts—namely, the heating-plate *f*, the side portions *l*, and the top *m*—all separated by asbestos or other suitable poor heat-conducting material, we are enabled to keep the upper part of the iron much cooler than if the casing was made from a single piece of metal.

In Fig. 3 we have shown a cross-section of a soldering-iron having an outer casing *p*, made of any suitable shape and material. *r* is the soldering-tip. *s* is a handle provided with a hollow shank *t*, through which the wire *d* passes. The core *a*, the mica sheets *b*, and the copper strips *e* are all in the same relative position as in the figures above described.

Having thus described our invention, what we claim is—

1. In an electric heating apparatus, a metallic part to be heated; a metallic core; layers of resistance-wire arranged on the core and insulated therefrom; a metallic strip, between the said layers of resistance-wire and insulated therefrom, said strip in metallic contact with the part to be heated.

2. In an electric heating apparatus, a metallic plate, to be heated; a metallic core attached thereto; an insulated layer of resistance-wire arranged on the core; a metallic shell in metallic contact with said plate, a layer of insulated resistance-wire arranged on the metallic shell.

3. In an electric heating apparatus, the combination of an outer casing, a heating-coil arranged within said casing; said casing composed of separate parts consisting of the heating-plate, side portions and top; poor heat-conducting material separating the side portions from the heating-plate and poor heat-conducting material separating the side portions and said top, substantially as described.

In testimony whereof we affix our signatures in the presence of two witnesses.

RICHARD A. L. SNYDER.
AUGUST F. TINNERHOLM.

Witnesses to the signature of Snyder:
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