

E. J. ROHNE.
ELECTRICAL HEATING PAD.
APPLICATION FILED FEB. 11, 1920.

1,368,412.

Patented Feb. 15, 1921.

Fig. 3

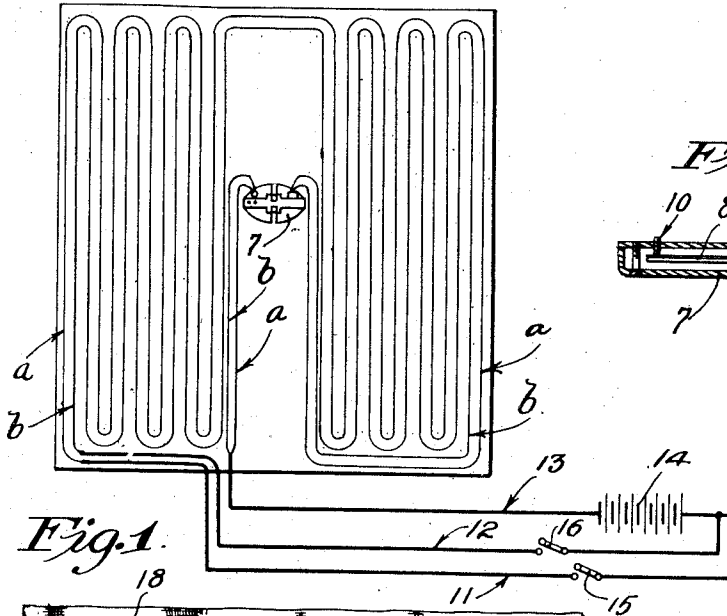


Fig. 1

Fig. 4

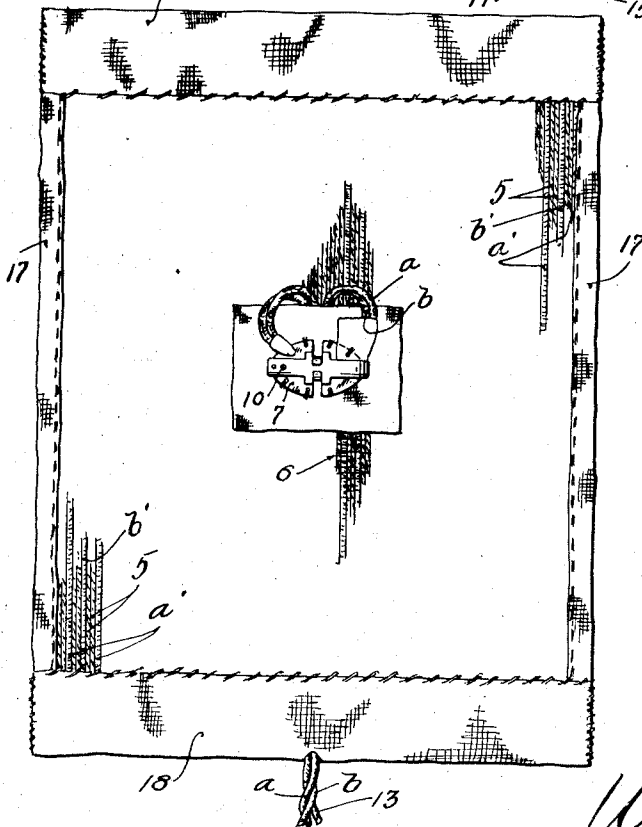
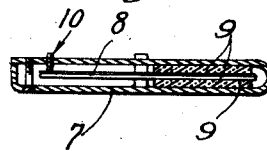
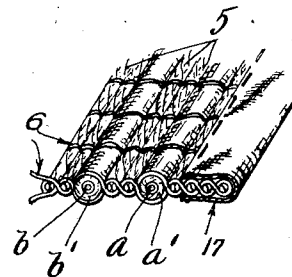


Fig. 2



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ELECTRICAL HEATING-PAD.

1,368,412.

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To all whom it may concern:

Be it known that I, EVEN J. ROHNE, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Electrical Heating-Pads; and I 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.

My invention has for its object to provide an electric heating pad which, in point of efficiency, flexibility and durability, is an improvement on electric pads hitherto constructed, and in which, even under wear, there is no danger of short circuit of wires or heating elements of the pad.

In accordance with my invention, the wires which constitute the heating elements of the pad are woven into the fabric of the pad in such way that no one wire crosses the other, but each wire is insulated from the other by the manner in which it is woven into the pad. The wires which constitute the heating elements are bent into parallel manifold form and when woven into the pad they constitute certain of the woof threads of the fabric, and these elements are spaced from each other by certain intermediate non-conducting woof threads or members. The woof threads or strands, including the heating elements, are woven together and into the fabric by transversely extended warp threads which keep the woof threads, including the heating element, always properly spaced though flexibly connected.

For automatically cutting the circuit to prevent the pad from being overheated, I employ a small thermostat; and as an important feature of the invention, this thermostat is not only located at the central or intermediate portion of the pad, but is connected into the intermediate portion of the heating wire or heating element, or elements of the pad, all as will be hereinafter more fully disclosed.

The improved pad is illustrated in the accompanying drawings wherein like characters indicate like parts throughout the several views.

Referring to the drawings:

Figure 1 is a plan view of the pad, the weave of the fabric being shown only in part;

Fig. 2 is a fragmentary perspective partly

in section, illustrating the manner in which the elements of the pad are woven together;

Fig. 3 is a fragmentary plan view illustrating the wires and other electric connections of the pad; and

Fig. 4 is a side elevation of the thermostat removed from the pad.

The pad is preferably a rectangular structure formed substantially as shown in Fig. 1.

The heating elements of the pad, as shown, are two in number, the one being a very fine wire *a* and the other a very fine wire *b*. These two wires, in Fig. 3, are illustrated as if they were straight wires bent into manifold form, but in practice, they will preferably be very finely turned coils, the general directions of which, are indicated diagrammatically in Fig. 3. The said heating wires or elements *a* and *b* may take various forms, but should be insulated wires. They may, for example, be heating elements or wires such as disclosed and claimed in my prior patent Number 1,133,579, of date, March 30, 1915, but in any event they should be provided with insulating jackets, such as would be provided by wrapping the same with asbestos yarn indicated, respectively, at *a'* and *b'* in Fig. 2.

The heating wires *a* and *b*, when bent into manifold parallel formation, as shown in Fig. 3, never cross each other, but are spaced so that they afford, as already stated, certain of the woof threads or members of the fabric, and between the same are placed non-conducting woof threads or cords 5, as shown in Figs. 1 and 2. These woof members *a*, *b* and 5 are tied together and woven into the fabric by transverse warp threads 6, which latter may be spaced substantially as shown in Fig. 2.

The thermostat may be of any suitable form but, as shown, comprises a yoke-like metallic member 7 and a laminated thermally warped blade 8, the latter being rigidly connected to the former, but insulated therefrom by insulating plates 9. The numeral 10 indicates a contact screw working through the top of the metal yoke 7 and with which the free end of the blade 8 will normally engage, but from which the said blade will be disengaged when the temperature of the heating pad exceeds the desired maximum temperature.

This thermostat is located at the central or intermediate portion of the pad and is suitably secured to the fabric by stitching,

or otherwise. At the intermediate portion of the pad, the wires *a* and *b* are cut and separated, and the ends of the long portions of the said wires *a* and *b* are electrically connected to the yoke 7 of the thermostat, while the short ends of the said two wires are electrically connected to the contact screw 10, and from thence, are extended to one edge of the pad.

10. In this improved pad, three electrical leads 11, 12 and 13 are extended to the pad, and these are all connected to the heating elements at one edge of the pad and without being passed over any of the heating elements or extended inward to the thermostat. The lead 11 is connected to one end of wire *a*, the lead 12 is connected to the corresponding end of the wire *b* and the lead 13, which may be treated as a common return lead, is connected to the opposite ends of the two heating wires or elements *a* and *b*. In Fig. 3, the leads 11 and 12 are shown as connected to one side of a battery 14 and the lead 13 to the opposite side of said battery, but in practice, the source of electrical energy will usually be a commercial circuit. The numeral 15 indicates a switch in lead 11 and the numeral 16 indicates a switch in the lead 12. In practice, any suitable switch mechanism may, however, be employed, so far as my invention is concerned. The two switches shown serve to illustrate the heating action of the pad.

The pad formed as described, is preferably bound at its sides by binding strips 17, and at its top and bottom by binding strips 18 made of light canvas or any other suitable flexible material.

The wire *a* is preferably of a finer and longer wire than the wire *b*, or otherwise formed or arranged, so that it will have greater resistance, and hence, will produce less heat than the wire *b*. Hence, when switch 15 is closed, and switch 16 opened, the pad will be given its lowest heat; when switch 16 is closed and switch 15 is open, the pad will be given an increased or medium heat; and when both switches 15 and 16 are closed, both heating wires *a* and *b* will be brought into action and the pad will be given its greatest heat. Normally, of course, the circuit through the heating elements will be closed through the rheostat, but when this excessive or undesirable high temperature is reached, blade 8 will move out of contact with screw 10 and the circuit through both heating elements will be simultaneously broken and will be maintained open until the temperature of the pad cools down and the blade 8 again makes contact with screw 10.

In the above arrangement, it will be noted that the short ends of wires *a* and *b* will transmit current when either of the switches 15 or 16 is closed and also when both

switches are closed. Thus ample conducting capacity is obtained when the two circuits are closed without requiring the lead 13 or any of the lead wires to be extended to the thermostat. The lead wires are relatively stiff hard wires and if extended to the intermediate portion of the pad for connection to the thermostat, would stiffen the pad, and moreover, under usage, would be likely to be broken by bending or to become loose and short circuit the heating element. The arrangement described, however, leaves the pad of uniform flexibility throughout. Another objection to bringing one of the leads into the thermostat at the central portion of the pad would be that in case of exposure of any portion of the pad by wear, the user of the pad will get a very severe shock from the full current from the line. When these leads are brought only to one edge of the pad, they may be well covered and protected, and moreover, as stated, are not nearly so likely to be broken or their insulation worn off by the usage of the pad.

In practice, the pad described and illustrated in the drawings will be provided with a flexible jacket or covering of fabric or cloth such, for example, as eiderdown, but, of course, other flexible material may be used.

What I claim is:

1. An electrical heating pad in the form of a woven fabric having a plurality of heating wires disposed in a parallel manifold arrangement, a plurality of separating insulating strands of material all woven into the fabric as elements thereof, a pair of electrical leads connected to said heating wires at one edge of the pad, and a thermostat connected in the intermediate portions of the several heating wires of the pad, and itself located at the intermediate portion of the pad, and a third electrical lead connected to the central portion of said edge of the pad, the said thermostat being relatively nearer to one than to the other of the ends of said heating wires.

2. An electrical heating pad in the form of a woven fabric having a plurality of heating wires disposed in a parallel manifold arrangement, a plurality of separating insulating strands between the adjacent sections of wire and all woven into the fabric as elements thereof, electrical leads connected to said heating wires at one edge of the pad, and switch mechanism whereby either of said heating wires may be independently connected in circuit, or the several heating wires may be simultaneously connected in circuit, the said several wires, when connected in circuit, being in multiple.

3. A heating pad comprising a layer of material having a pair of covered insulated wires woven therein as woof threads, a plurality of insulating strands of material be-

tween adjacent portions of the wire also woven into the material as woof threads, a series of warp threads extending across all of said woof threads, and an exterior covering for said pad, the ends of the wires all emerging from said pad at one edge thereof and near the central portion of said edge.

4. A flexible electric heating pad having two wire heating elements bent into manifold form, a thermostat located in the intermediate portion of the pad and electrically connected into both of said wire heating elements relatively near to one end of each of the same, a common lead connected to the ends of the short portions of the two heating wires, independent leads connected to the ends of the other portions of the two heating wires, the wires being so disposed in relation to each other and to said thermostat

that the wires do not overlap or cross each other at any place.

5. A flexible electric heating pad having two wire heating elements bent into manifold form, a thermostat located in the intermediate portion of the pad and electrically connected to said heating elements, electrical leads entering said pad and connected to said heating elements and to said thermostat, said leads and heating elements being so arranged that there is no crossing of wires in the pad.

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

EVEN J. ROHNE.

Witnesses:

BERNICE G. BAUMANN,
HARRY D. KILGORE.