

1,044,270.

Patented Nov. 12, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

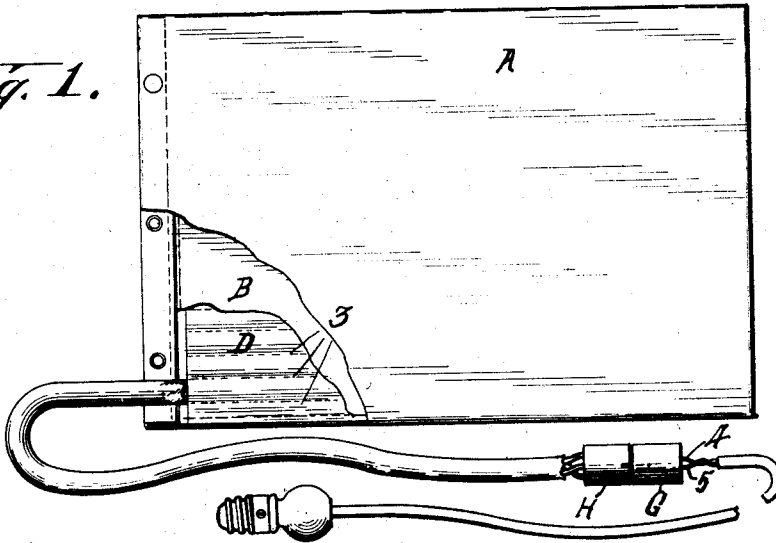


Fig. 2.

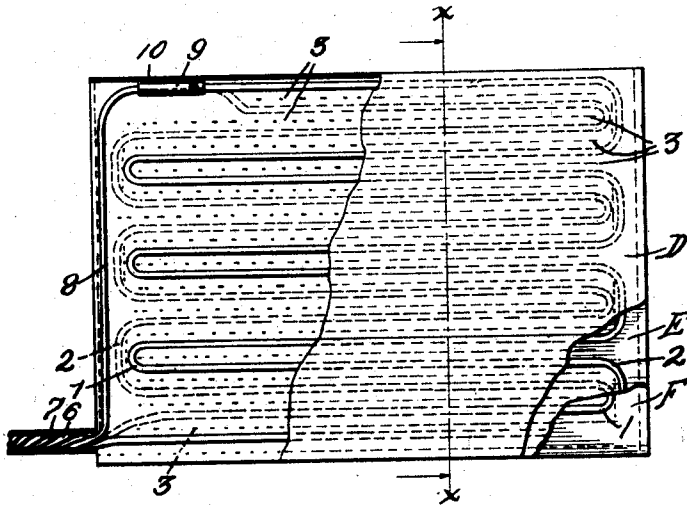
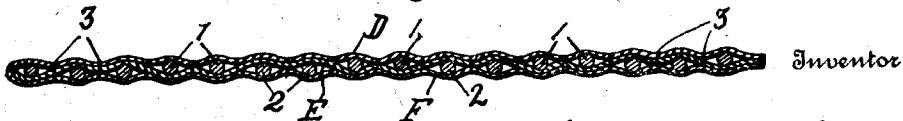


Fig. 3.



Witnesses
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ELECTRICAL HEATING PAD.
APPLICATION FILED FEB. 28, 1910.

1,044,270.

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2 SHEETS-SHEET 2.

Fig. 4.

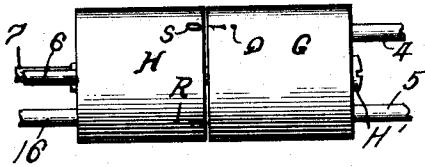


Fig. 5.

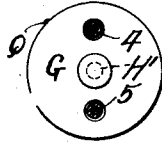


Fig. 6.

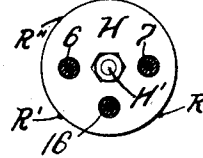


Fig. 7.

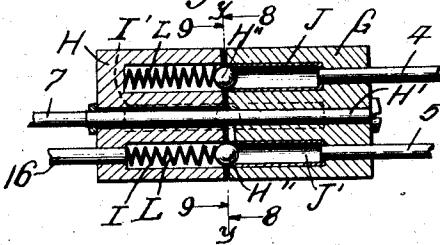


Fig. 8.

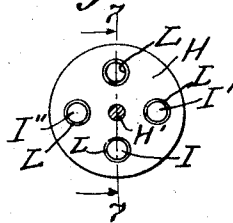


Fig. 9.

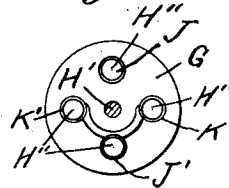


Fig. 10.

Fig. 11.

Fig. 12.

Fig. 13.

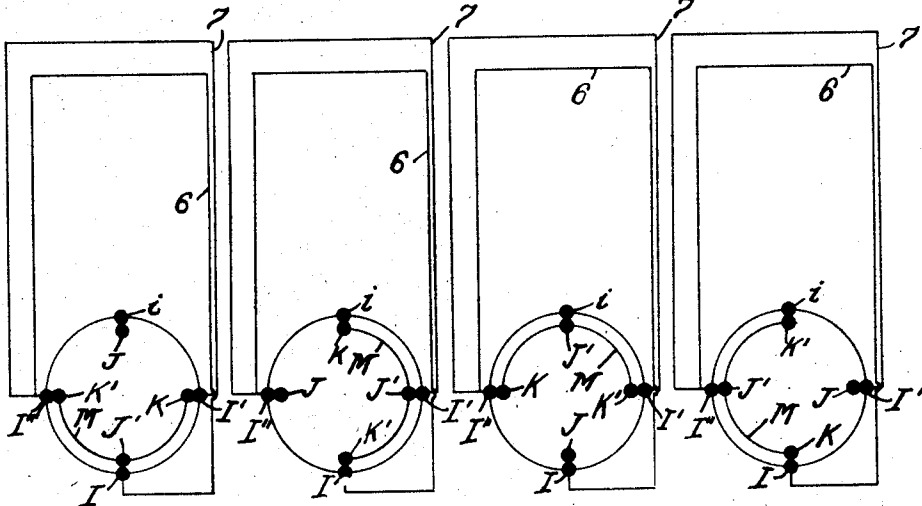


Fig. 14.

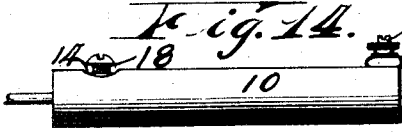
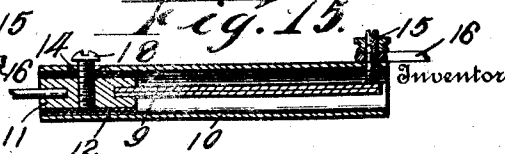


Fig. 15.



Witnesses

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UNITED STATES PATENT OFFICE.

CLARENCE A. SHALER, OF WAUPUN, WISCONSIN.

ELECTRICAL HEATING-PAD.

1,044,270.

Specification of Letters Patent.

Patented Nov. 12, 1912.

Application filed February 26, 1910. Serial No. 546,485.

To all whom it may concern:

Be it known that I, CLARENCE A. SHALER, a citizen of the United States, residing at Waupun, county of Fond du Lac, and State of Wisconsin, have invented new and useful Improvements in Electrical Heating-Pads, of which the following is a specification.

My invention relates to improvements in electrical heating pads.

The objects of my invention are to provide means whereby the heat may be automatically controlled within certain limits established by manual regulation. Also to provide an improved form of pad in which separate heating coils may be insulated from each other, not only by the insulating material covering the several strands of conducting wire but also by sub-divisions or partitions in the pad itself, the pad being divided into compartments. Also to provide improved means for manually regulating the heat of the pad and to provide a pad having greater flexibility than has heretofore been secured in devices of this character, it being my purpose to provide a pad which is sufficiently flexible to be wrapped about any member of the body, such as an arm, leg, or even the finger of a patient.

In the following description, reference is had to the accompanying drawings, in which—

Figure 1 is a plan view of my improved pad with one corner of the outer covering broken away to show the lines of stitching, which connect the interior walls, and with the insulation also broken from the conductors to show their connection with the manual heat regulator. Fig. 2 is a plan view of the pad with the outer covering removed and the inner coverings broken away to show the conducting wires. Fig. 3 is a cross sectional view, drawn on line $x-x$ of Fig. 2. Fig. 4 is an enlarged detail view of the switch or manual regulator. Fig. 5 is a view of the right hand end of the device shown in Fig. 4. Fig. 6 is a view of the left hand end of the same. Fig. 7 is an axial sectional view of the device shown in Fig. 4. Fig. 8 is a sectional view, left hand section, drawn on line $y-y$ of Fig. 7. Fig. 9 is a sectional view on the same line, showing the right hand section. Figs. 10, 11, 12 and 13 are diagrammatic views indicating the various adjustments of the switch members upon each other and their

relation to the electrical circuits. Fig. 14 is a detail view of the thermostat or automatic heat controlling device, and Fig. 15 is an axial sectional view of the same.

Like parts are identified by the same reference characters throughout the several views.

The pad preferably has an outer covering A of rubber, or rubber cloth, and an inner covering B of linen, cotton or other suitable fabric, which coverings A and B inclose the body of the pad. The body of the pad is composed of non-combustible fabric, such as asbestos cloth or fiber, which offers sufficient resistance to the heat of the coils to cause a distribution of the heat throughout the fabric or body walls D, E and F. An electrical conductor is arranged in a series of loops 1, extending longitudinally of the pad between the walls D and E, and another conductor is similarly arranged with loops 2 between the walls E and F. These conducting wires with loops 1 and 2 are so arranged as to extend substantially parallel to each other from one end of the pad to the other, and are separated by longitudinal lines of stitching 3, which connect the three walls D, E and F with each other, and bind them together between the conducting wires. The several loops in each of the conducting wires are alternately broad and narrow in form, each narrow loop of conducting wire being disposed between one of the open loops of the wire, as best shown in Fig. 2, and each of the narrow loops of the wire being disposed between the open loops of the wire. It will therefore be observed that all of the strands or lengths of the wires 1 and 2 are not only separated from each other by the lines of stitching 3, but that the wires are also separated from each other by the intermediate wall 3, so that it is not necessary to cover the several strands individually with insulation, in order to prevent short circuiting.

Each wire forms a complete circuit through the pad so that said wires may be used either separately or jointly for heating purposes. These two wires, above and below the intermediate wall 3, are extended into a connecting cable, in which they form the strands 6 and 7. Ordinary covered or insulated wire is used, and they are therefore electrically independent. The several loops 1 and 2 are therefore merely continuations of the conducting wires 6 and 7, and

at the other side of the pad they are connected in common with a wire 8, which is electrically connected with a thermostatic bar 9, inclosed within, but insulated from, a casing 10. For my purposes, it is necessary that this thermostat and its casing be small and of light weight, so that its presence in the pad will not interfere with the uses of the latter or cause discomfort when the pad is applied to the person. I therefore mount the thermostatic bar 9 in a plug 11, which is wrapped in mica 12 or other suitable insulating material and inserted in the casing 10. A set screw 18 has threaded bearing in the plug 11 and bears upon the mica opposite an opening 14 in the casing through which the screw extends without contact with the casing. The pressure of the screw upon the wrapping 12 causes the plug to bind upon the other side of the wrapping and holds it and the bar 9 rigidly in position. The bar 9 is normally in contact with a contact screw 15, which has threaded bearing in the casing and is electrically connected with a conductor 16, but when the heat passes a predetermined point, the bar 9 moves away from the contact screw and breaks the circuit.

It will be observed that while the ends of the wires 6 and 7 at one side of the pad are connected in common with the single wire 8, the other ends of the wires 6 and 7 are extended into the cable as separate wires, so that these conductors may be separately energized. The circuits are manually closed by a switch which I have specially devised for this purpose, and which carries connecting contacts in two cylindrical members G and H, connected end to end by an axial bolt H' and adapted for relative rotation upon each other. The main conductors 4 and 5 are connected with the contacts carried by the member G. The separated ends of the wires 6 and 7 and the wire 16 are connected with contacts carried by the member H.

Four contact devices are carried by each of these switch members, and they preferably consist of small metallic tubes socketed in the material composing said members, the ends of said tubes being expanded to receive balls H'', which serve as a conducting medium between the contacts of the respective members, and also operate as anti-friction devices. The body of each member, G and H, is composed of non-conducting material.

The wire 16 is connected with the contact device or tube I, the wire 7 with the tube I' and the wire 6 with the tube I''. The fourth tube i is unconnected, electrically, with the conductors of the heating pad. The main conductor 4 is connected with the tubular contact device J and the conductor 5 with the tube J'. The latter is provided with a

segmental member M electrically connecting it with the tubes K and K' respectively, which thus act in common with the tube J' as terminals for the main conductor 5. Coiled springs L, seated in the tubular contact devices I, I', I'' and i tend to socket the balls forcibly in the expanded ends of the tubes J, J' and K, K' and also serve as an electrical connecting medium with the devices in which they are seated.

The operation of the manually actuated switch is as follows: Normally, the contact device J is in registry with the dead contact i in switch member H, no heating circuit being then established. By a one-quarter relative turn of member G, to bring contact J into registry with contact I'', an electrical connection with both of the wires 6 and 7 is established through the conductor 16, the thermostat, and the conductor 8. The circuit will then be completed, through both wires 6 and 7, for the contacts K' and J' (connected by segment M) will be in registry with contacts I and I' with which the other ends of these wires are separately and respectively connected, thus placing these wires in circuit with main conductor 5. (Fig. 11). Another quarter turn of member G relatively to member H brings contact J into registry with contact I and through it with conductor 6. (Fig. 12). The other end of conductor 6 then connects through the thermostat conductor 16 and contact I'' with contact K, thus completing the circuit of conductor 6, segment M and contact J' to main conductor 5. (Fig. 13). Another quarter turn of the switch members brings contact J into registry with contact I' and conductor 7, thus completing the circuit through the thermostat, wire 16, contacts I'' and J', to main conductor 5. (Fig. 13).

The member G is provided with a projection Q on its outer surface and the member H is provided with projections R, R' and R''. There is but one projection R and when the projection Q is axially aligned therewith, the circuit of the heating conductor 7 will be closed as above explained. There are two projections R' and when the projection Q is aligned with these, the circuit of heating conductor 6 will be closed. There are three projections R'' with which the conductor Q may be aligned, whereupon the circuit of both conductors 6 and 7 will be closed. The neutral position is midway between the projection R and the three projections R'', and this may be indicated by a depression or recess in the member H at S, but it is not necessary to indicate this position, since it will be understood that it is one step beyond the projection R and the several steps in the adjustment of the switch can be felt by the user, owing to the jar caused by the balls in snapping into the sockets of the member G under the tension

of the springs in the sockets of member H. By having the projections R, R' and R'' differ in number, the user can readily ascertain which of the conducting wires are included in the circuit, the fact of accurate registry being ascertained by the shock of the balls seating in the sockets and also by the fact that a greater resistance is then afforded to further rotation. The user may, therefore, accurately determine the adjustment of the heater, whether the room be in darkness or light.

It will therefore be seen that I am able to regulate the heat of my improved pad by either closing a separate circuit through the wires 6 (or 7), or by closing circuits simultaneously through both wires. The wires 6 and 7 may be of different size or conductivity, thus imparting different degrees of heat to the pad when used separately.

I attach great importance to the use of two sets of heating coils within the pad, and the arrangement of these coils in such a manner that the wires do not cross and are kept electrically independent, not only by ordinary insulation, but by the intermediate or partition layer E. Owing to the fact that these pads are folded in various directions about the body and limbs of a patient, it is necessary that short circuits and the crossing of wires be wholly prevented. By separating the coils and providing a separate pocket for each turn of each coil, I attain these objects without materially increasing the cost of construction over that of the ordinary pads in which only a single set of pockets is provided.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is—

1. An electrically heated flexible pad, comprising a set of sheets of fabric stitched together along parallel lines and comprising outer and intermediate layers, heating conductors disposed between the intermediate and outer layers and separated from each other by the intermediate layer, said conductors being disposed in loops having parallel strands separated by said lines of stitching; feeding conductors, and a manually controlled switch for electrically connecting and disconnecting the heating conductors with the feeding conductors.

2. An electrically heated flexible pad, com-

prising a set of sheets of fabric stitched together along parallel lines and comprising outer and intermediate layers, heating conductors disposed between the intermediate and outer layers and separated from each other by the intermediate layer, said conductors being disposed in loops having parallel strands separated by said lines of stitching; feeding conductors, and a manually controlled switch for electrically connecting and disconnecting the heating conductors with the feeding conductors, together with a thermostatic circuit breaker also controlling the circuits through the heating conductors.

3. An electrically heated flexible pad, comprising a set of sheets of fabric stitched together along parallel lines and comprising outer and intermediate layers, heating conductors disposed between the intermediate and outer layers and separated from each other by the intermediate layer, said conductors being disposed in loops having parallel strands separated by said lines of stitching; feeding conductors, and a manually controlled switch for electrically connecting and disconnecting the heating conductors from the feeding conductors, together with a thermostatic circuit breaker also controlling the circuits through the heating conductors, said thermostatic circuit breaker being longitudinally disposed between two of said lines of stitching.

4. An electrically heated flexible pad, comprising a set of sheets of fabric, comprising outer and intermediate layers, heating conductors located respectively above and below the intermediate sheet, and arranged in alternate broad and narrow loops and with the narrow loops of each conductor interposed between the sides of the broad loops of the other, but on the opposite side of the intermediate sheet, means for connecting each of said loops with a source of electrical energy, and lines of stitching connecting the sheets with each other between the strands of the several loops.

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

CLARENCE A. SHALER.

Witnesses:

ALVIN J. BRONSON,
LOUIS SCHULTZ.