W. F. HOFFMANN.

ELECTRICALLY HEATED WARMING PAD.

APPLICATION FILED JULY 2, 1912.

1,096,916. Patented May 19, 1914.

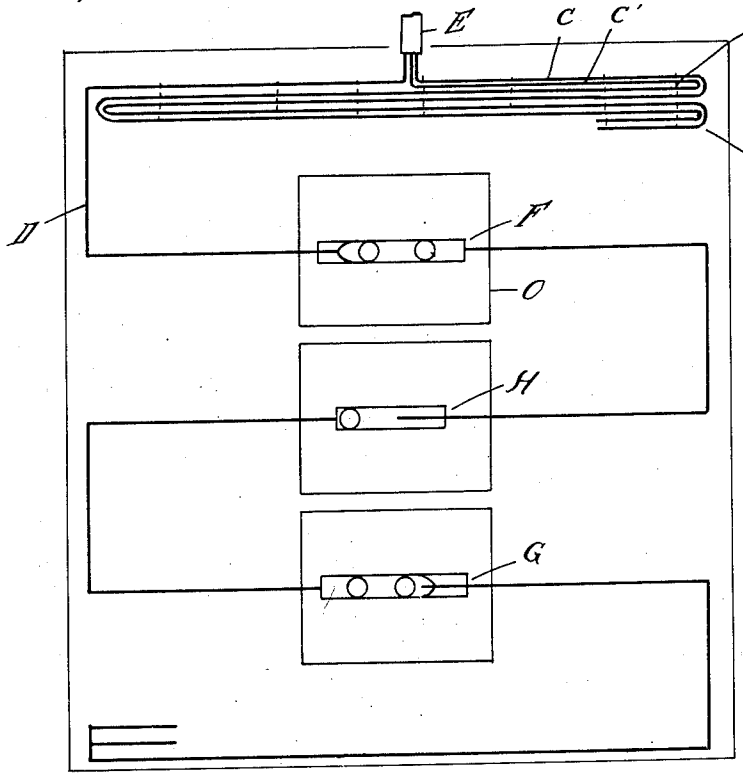


Fig. 1.

Fig. 2.

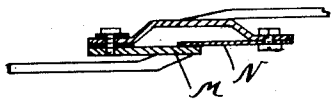


Fig. 3.

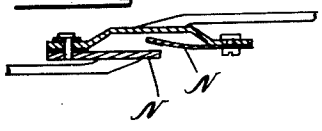


Fig. 4.

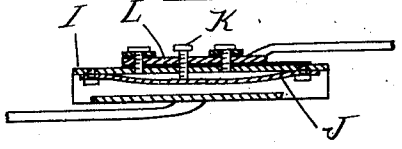
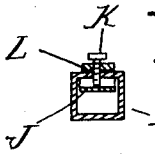


Fig. 5.



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UNITED STATES PATENT OFFICE.

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ELECTRICALLY-HEATED WARMING-PAD.

1,096,916. Specification of Letters Patent. Patented May 19, 1914.

Application filed July 2, 1912. Serial No. 707,231.

To all whom it may concern:

Be it known that I, WILLIAM F. HOFFMANN, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Electrically-Heated Warming-Pads, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to electrically heated warming pads, and has for its particular object the effectual guarding against overheating.

To this end the invention consists in the peculiar construction, arrangement and combination with the pad of a thermostatically operated circuit breaker, and further in the arrangement by which the circuit is normally broken by a thermostat which will again close the circuit upon cooling, while any failure in the operation of this device will result in the permanent opening of the circuit.

In the drawings: Figure 1 is an elevation of the pad. Fig. 2 is a cross section through the automatic cut-out in its normal closed position. Fig. 3 is a similar view showing the open position of the cut-out. Fig. 4 is a section through the thermostatic control. Fig. 5 is a cross section of Fig. 4.

My improved pad comprises a series of loops of insulated wire which are stitched together to form a flexible fabric, said loops constituting the resistor for generating the heat. If desired all of the loops of this resistor may be included in a single circuit, but preferably there are a plurality of circuits which may be alternatively connected in series or multiple so as to produce different degrees of heat.

For controlling the circuits to prevent a dangerous overheating, I employ a plurality of thermostatic controllers, all being preferably connected in the main circuit so that the operation of any one will open the circuit.

In detail, A are the loops which are secured parallel to each other by rows of cross stitching B.

C and C′ are divided leads for the multiple and D is a common lead for all of the circuits, said leads being all included in a flexible conductor cord E.

F and G are thermostatic circuit breakers and closers, which are of similar construction and which are included in series in the lead D, and H is a thermostatically operated cut-out also in series with circuit breakers F and G in the lead D. The devices F, G and H are preferably arranged parallel to the loops and are distributed at different points in the pad so as to not interfere with its flexibility or to form any objectionable projection. The construction of these devices is also such that they will lie flat against the pad. Thus the controllers F and G illustrated in Figs. 4 and 5 consist of tubular casings I, within each of which is secured a composite metal bar J formed by metals having different co-efficients of expansion. This composite bar forms one terminal of the circuit by a screw K engaging an insulated conductor member L and with its point normally in contact with the member J. The arrangement is such that when the bar J is heated to an abnormally high temperature it will be warped and consequently will separate from the contact screw K, thereby breaking the circuit. As soon, however, as the bar J is cooled it will again make contact and reëstablish the circuit, and thus an automatic circuit breaker and closer is formed.

By reason of the fact that two of the automatic circuit breakers F and G are included in the same circuit, the failure in the operation of one will be overcome by the successful operation of the other, and thus the chances of failure are greatly lessened. Inasmuch, however, as the failure of both devices is a possibility and that this would result in a dangerous condition, I have placed an automatic cut-out H in the circuit, the operation of which is certain.

The cut-out H comprises essentially two terminal members M and N, one of which is normally under tension acting to move it out of contact with the other, as for instance, by making the member out of resilient metal. Normally these two members M and N are secured to each other by a low fusing solder, the melting point of which is such as to be above the normal temperature developed in the pad, but below any temperature that would be dangerous. Furthermore the thermostatic circuit breakers F and G are so set that the circuit will be open normally by one or the other of these devices before a temperature is reached equal

to the fusing point of the solder. Thus under normal conditions the cut-out H will remain inactive and the temperature will be controlled entirely by the devices F and G, but if through any cause these controllers F and G fail to operate the rise in temperature will fuse the solder, permitting the resilient contact member M to separate from the coöperating member N, thereby breaking the circuit.

A pad provided with the controllers as above described has the advantage that it will be normally automatic in its operation, the circuit being opened and closed as required. This avoids the necessity of repair or any adjustment which would require skill or knowledge on the part of the user. On the other hand safety is provided as the control is not dependent upon the automatic circuit openers and closers alone, but where these fail the circuit will be opened before a dangerous condition is reached by a positive and reliable cut-out.

For securing the control devices F, G and H to the pad, small sections of a suitable fabric O are stitched to the loops and the controllers are stitched to this fabric, thereby distributing any mechanical stresses due to the controllers over a large area. The pad may be covered by a suitable bag or case (not shown), which will protect the loops and controllers from injury and also form a soft surface for application.

What I claim as my invention is:

An electrically heated warming pad, comprising a stationary resistor arranged in a series of parallel loops stitched together to form a flexible fabric and including a plurality of circuits, a common lead for all of said circuits extending across said pad, a plurality of thermostatic switches opening and closing said lead and said circuits, said thermostatic switches being arranged parallel to said loops and lying flat against the pad at distributed points in the area thereof, and a positive automatic cut-out also controlling the lead to all of said circuits and operating by externally generated heat and with a temperature above the normal cut-out temperature of said automatic switches.

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

WILLIAM F. HOFFMANN.

Witnesses:

HARRY W. LUYCKX,

GEORGE S. TOWAR.