

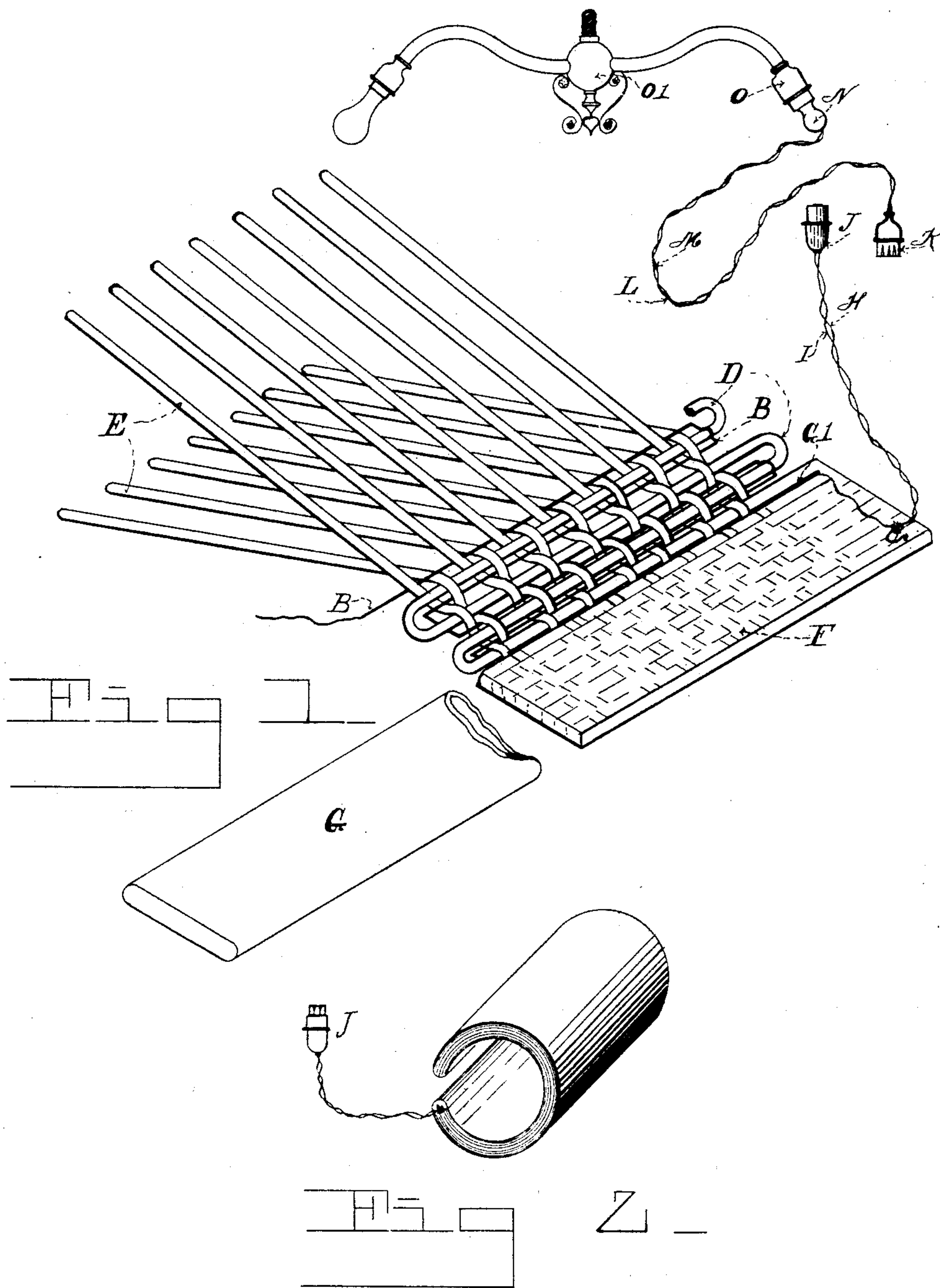
(No Model.)

2 Sheets—Sheet 1.

J. E. MEEK.
ELECTRIC HEATER.

No. 540,398.

Patented June 4, 1895.



Witnesses
Thomas J. Waters
Frank B. Angell

Inventor
John Emory Meek
By his Attorney Phillips Abbott.

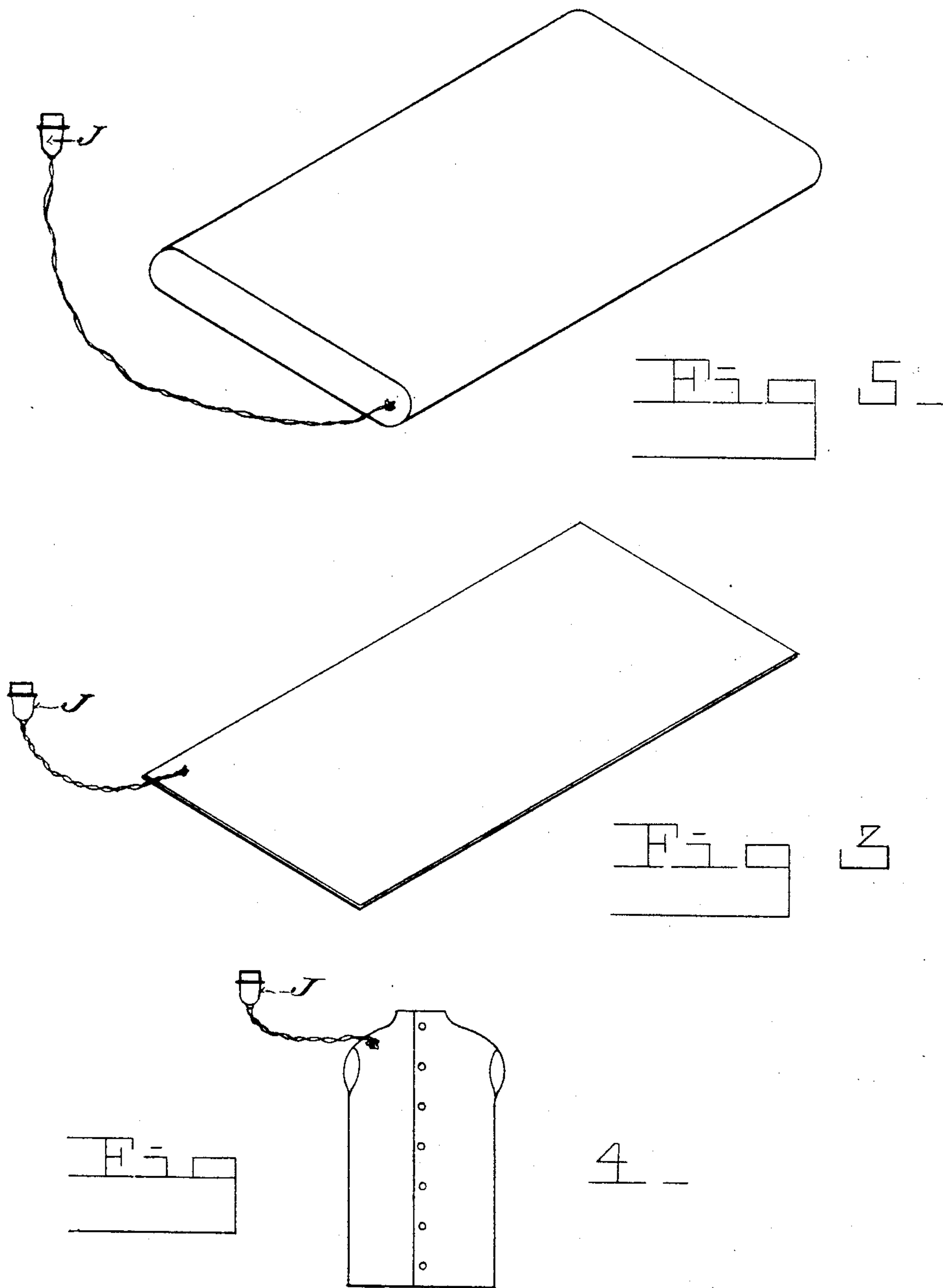
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UNITED STATES PATENT OFFICE.

JOHN EMORY MEEK, OF DENVER, COLORADO, ASSIGNOR TO THE H. W. JOHNS
MANUFACTURING COMPANY, OF NEW YORK, N. Y.

ELECTRIC HEATER.

SPECIFICATION forming part of Letters Patent No. 540,398, dated June 4, 1895.

Application filed February 5, 1894. Serial No. 499,130. (No model.)

To all whom it may concern:

Be it known that I, JOHN EMORY MEEK, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Electric Heaters; and I do 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in electric heaters for applying artificial heat to the human body, and also for the purpose of artificially heating apartments, cars, furniture and similar uses.

It is my object to produce a woven electric heating fabric, which being pliable and soft is applicable to a great variety of uses. I attain this object by weaving an electric conductor (which, however, has the desired resistance) in the form of a wire with threads or yarns of any suitable non-conducting material, preferably asbestos, into a fabric.

Figure 1 represents a perspective view of a piece of my electric heating fabric, showing the preferred arrangement of the conductive and non-conducting threads of which the fabric is made. The right-hand end of this figure shows the fabric as completed, the threads having been compacted together by the operation of the machine, and the left-hand end shows the threads, both warp and woof, and also the conducting-wire, separated from each other and enlarged, the better to illustrate the invention. This figure also shows at one side a sheath or cover for the section of fabric, which is shown as completed. Fig. 2 represents a cushion made of the fabric, curved, showing its flexibility and adaptability to application to a limb of the human body. Fig. 3 represents a perspective view of a blanket, large band, rug, or piece of furniture-covering made of the fabric embodying my invention. Fig. 4 represents a sweating-jacket embodying the invention. Fig. 5 rep-

resents a perspective view of a completed cushion.

Similar letters of reference indicate similar parts throughout the several figures.

In Fig. 1, all the elements necessary to make a complete electric heater are illustrated.

The conductor B is woven with threads of any suitable non-conductive material, preferably asbestos threads, and is preferably woven with woof threads D, because if so, the non-conducting threads, especially if made of asbestos, will be several times the diameter of the wire conductor, and consequently, the non-conducting material, being more or less soft and compressible, the conductor will be partially, if not wholly embedded therein, especially when these woof threads are crowded into place by the operation of the loom, and thus the conductor will be insulated in addition to the insulation supplied by the warp threads. The conductor may, however, be woven with the warp threads, but if so, the fabric does not cut up into pieces as readily as when the conductor is woven with the woof thread. When woven with the woof thread, the wire lies in straight lines, at right angles to the warp threads, although insulated from each other, as shown in Fig. 1, thus making a fabric and an electric heater, in which the wire is woven with asbestos, or other non-conducting threads in the warp or in the woof, but preferably with the woof threads, thereby forming with them, the filling of the fabric, and when so made, it may be cut transversely into pieces, each piece containing a continuous conductor or wire. Consequently each piece so cut from the fabric is an electric heater in itself, and all that is necessary to make it operative is to connect the terminal wires of an electric circuit to the wire ends exposed by cutting the fabric.

In weaving, the warp threads may be placed in fine combs, so that they almost touch one another, and when the woof threads are compressed, the wire will be embedded between and in them, at the center of the fabric and will be insulated from each other. At the edges of the fabric, the wire passes around

the warp threads as usual to form a selvage. Thus the wire is continuous. Two shuttles are employed, one carrying the non-conductive wool thread and the other the conducting

5 wire.

I prefer to cover the fabric when completed with one or more thicknesses of suitable material, G, such as flannel, felt, plush or such other material as may be preferred, and when
10 the product is intended for use as a heating pad for hospital or other therapeutic use, I prefer to apply an exterior coating of rubber, because if these heaters be used in cases of infectious disease, or in surgical operations,
15 it is desirable that they be adapted to subsequent cleansing and purification by suitable solutions.

If, as shown in Fig. 1, the completed fabric F, be cut across along the line G', where the
20 interwoven part commences, there will be an unbroken conductor in it, and it will only be necessary to connect the exposed ends of the conducting wire to the terminal conductors H and I. These conductors are connected to
25 a plug J and are preferably brought through the covering of the fabric together, so as to form one cord, as shown. They should be long enough to enable a cushion, blanket, pad or garment to be applied to any part of a patient
30 lying in bed, without carrying the switch under the coverings, so that the heat can be regulated without uncovering the patient. The socket K, which with the said plug forms a switch, is connected to a number of feet of
35 conductors L and M, which also are attached to a plug N, adapted to couple to a socket O of a chandelier or bracket O', or any other suitable source of current. In case a current is not available, a battery may be used.

40 This electric heating fabric is relatively soft and is quite pliable and can be made into blankets, pads, sheets, sweaters, cushions, mattresses, furniture coverings, and clothing, and

patients can be kept under its influence for any desired time; Also invalid chairs, car
45 seats, bed mattresses, blankets, &c., may be suitably heated, either for the use of invalids and those in delicate health, or for general use in vehicles, such as railroad cars, and the like.

It is obvious that the ordinary incandescent
50 lighting systems will furnish the current very suitably, for use in connection with my invention.

Having described my invention, I claim as new, and desire to secure by Letters Patent,
55 the following:

1. In an electric heater, an electric resistance fabric, consisting of a current bearing wire, woven with non-conductive threads into
60 cloth, preferably asbestos threads, said non-conductive threads, preferably forming the warp threads of said cloth or fabric, and having said current bearing wire continuous and woven as a part of the fabric or cloth, and
65 preferably as or with the wool threads of the cloth, and adapted to form a selvage on the fabric, whereby the fabric may be cut parallel with said wool threads into pieces of
70 suitable size for use as cushions, pads, blankets, garments and for other heating purposes, each piece, so cut from the fabric being in itself a complete electric heater, when
75 connected in circuit, as and for the purposes set forth.

2. A heating conductor interlaced with the
75 threads of a flexible non-conducting and non-combustible fabric, for the purposes set forth.

3. A heating conductor interlaced with the
80 threads of a flexible, non-conducting fabric, for the purposes set forth.

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

JOHN EMORY MEEK.

Witnesses:

THOMAS J. WATERS,
FRANK B. ANGELL.