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F. LOBL

2,401,360

HEATING PAD

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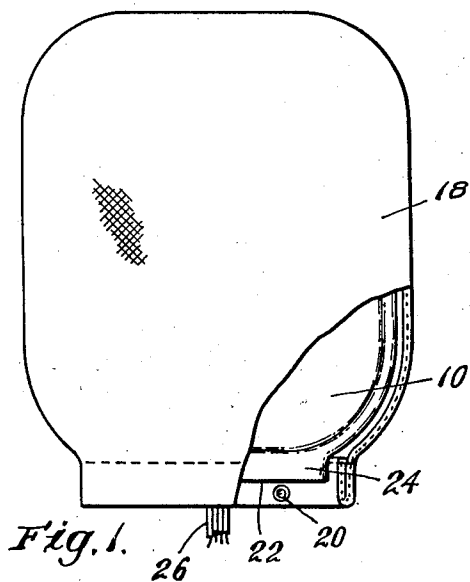


Fig. 1.

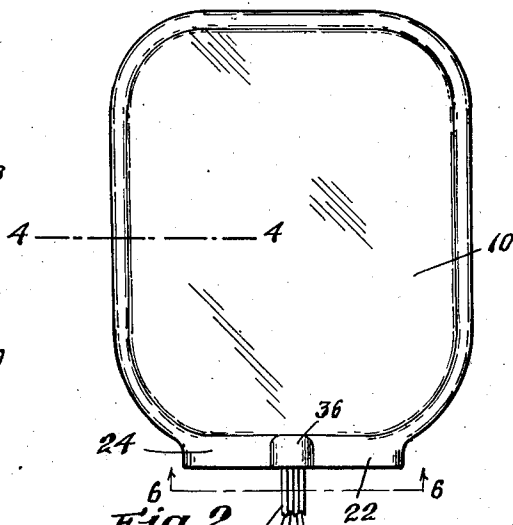


Fig. 2.

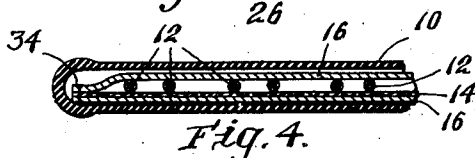


Fig. 4.

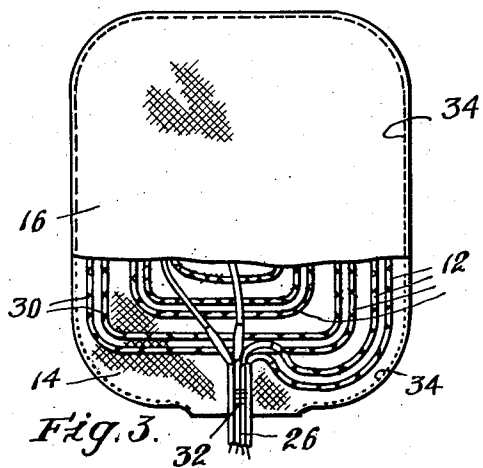


Fig. 3.

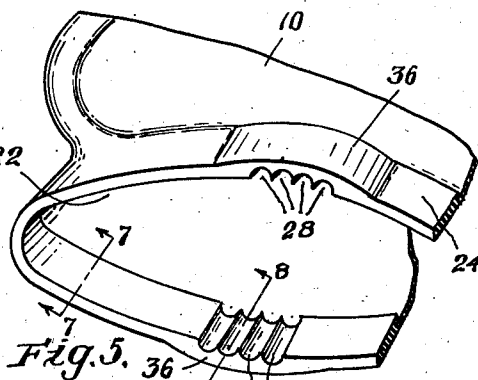


Fig. 5.

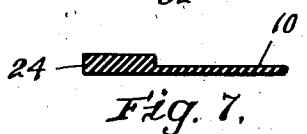


Fig. 7.

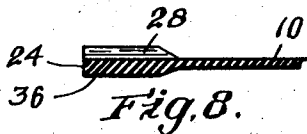


Fig. 8.

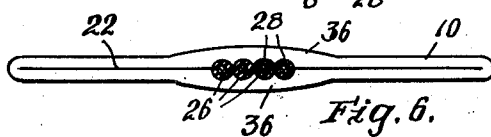


Fig. 6.

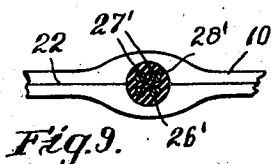


Fig. 9.

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UNITED STATES PATENT OFFICE

2,401,360

HEATING PAD

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5 Claims. (Cl. 219—46)

1

2

This invention relates to improvements in electric heating pads and the like and more particularly to so-called heavy duty heating pads which are designed for service in hospitals and comparable institutions where heating pads may be put to daily use under the severest of service conditions.

My invention provides an efficient and economical electric heating unit, a rugged moisture-proof casing therefore, and employs an improved method and means for hermetically sealing the mouth of the casing after the heating unit has been inserted, including a mechanical positioning of the electrical conductors entering through the mouth and a hermetic seal for the juncture between the conductors and the casing.

It is among the objects of my invention to provide an electric heating pad having a rugged and flexible envelope or casing made of rubber or other suitable moisture-proof material and having a mouth through which a heating unit can be inserted, after which the mouth may be hermetically sealed around the conductor cord, to produce a completely moisture-proof pad.

The invention provides so that the casings or envelopes may be purchased as complete units, each having an open restricted mouth at one end of the envelope through which the heater unit in folded or rolled condition can be inserted and be subsequently spread to flat form within the envelope. The conductor cord extends from the heater unit out through the open mouth and the mouth may be sealed around the conductor cord by a simple and inexpensive press, or by cement to provide a durably strong hermetically sealed heating pad.

Another object is to provide in the mouth of the envelope as it comes from the manufacturer mechanical means for locating the cord and holding it properly positioned during the sealing of the mouth as well as facilitating the attainment of the hermetic seal around the conductor cord.

Still another object is to provide an electric heating pad which safely may be used in hospitals in connection with wet applications, such as poultices and the like.

A feature is to employ multiple conductors and to provide complementary grooves in the envelope at its mouth so that an effective hermetic seal may be made around the conductors without danger of voids in the finished product or spaces requiring a filler in the sealing process.

It is, moreover, my purpose and object generally

to improve electric heating pads and the method of making and assembling them.

In the accompanying drawing:

Fig. 1 is a face view of an electric heating pad embodying features of my invention, a fabric cover being shown enclosing the envelope, with a portion of the fabric cover broken away to the stitch line at one edge;

Fig. 2 is a similar view with the fabric cover removed;

Fig. 3 is a face view of the electric heating unit comprising flexible electric conductors secured in generally coiled arrangement to fabric carrying sheets, a portion of one of the carrying sheets being broken away to reveal the conductors;

Fig. 4 is a cross-sectional view on line 4—4 of Fig. 2, on a larger scale;

Fig. 5 is a perspective view of the mouth end of the envelope or casing;

Fig. 6 is an end elevation of the mouth end of the envelope after being hermetically sealed, the conductors being shown in cross-section;

Figs. 7 and 8 are detail cross-sectional views respectively on lines 7—7 and 8—8 of Fig. 5; and

Fig. 9 is a fragmentary end elevation of the mouth end of an envelope having a modified form of mouth in hermetically sealed relation to a single cross-sectionally round multiple-conductor cord.

Referring to the drawing, a generally flat bag or envelope 10 is adapted to enclose an electric heating unit which, in Figs. 3 and 4, is illustrated as comprising flexible heater coils 12 mounted between two flexible carrier sheets 14, 16 of fabric. In Fig. 1, a cover 18 of fabric or other material which is soft to the touch encloses the envelope 10, being generally of the same contour as the envelope except that it is slightly larger in dimensions so that the envelope with the heater unit therein may be inserted in the fabric enclosure. Snap fasteners 20 at the mouth of the fabric enclosure provide for securing it on the envelope.

The envelope 10 may be a rugged and strong bag made of relatively thick rubber or other moisture-proof material such as a synthetic resin or a suitable plastic. The bag as shown is molded of rubber and has a mouth 22 at one end with a relatively wide thickened lip 24 extending all around the mouth. The envelope 10, if made of rubber, may be made by a rubber goods manufacturer and preferably will be purchased in complete vulcanized condition by the heating pad manufacturer with the mouth left open for in-

section of an electric heating unit by the heating pad manufacturer who conveniently and economically can hermetically seal the unit within the envelope.

To this end, a multiple-conductor ribbon form of cord 26 may be employed and the interior surfaces of opposed mid-portions of the lip 24 of envelope 10 have one or more grooves 28 therein complementary to the contour of one-half of the ribbon cord 26, so that the groove or grooves 28 constitute a locating and positioning means for the cord and ensure a tight engagement of the lips 24 around the cord when the mouth of the envelope 10 is sealed. Fig. 9 shows a single cross-sectionally round conductor cord 26' whose cover encloses and separates the multiple conductors 27'. In this case the mouth of the envelope has the two opposed half-round grooves 28' for receiving and locating the cord.

As in the case of bag 10, the moisture-proof covering of the conductor cord may be of rubber or a synthetic resin or suitable plastic.

Referring now more particularly to Figs. 3 and 4, the heater coils 12 are in the form of a resistance wire wound on an asbestos core and then covered with a layer of asbestos. The resistance wires thus covered conveniently may be arranged in coil form on the fabric carrier sheet 14 and be stitched thereto as at 30 in Fig. 3. As shown, two coils are thus secured on sheet 14 and the opposite ends of each coil are connected to a different one of the conductors of the ribbon cord 26. Also the inner end of the ribbon cord 26 preferably is secured to the fabric sheet 14 as by the stitches 32. Such a simple sheet unit in and of itself constitutes a complete electric heating unit which may be combined satisfactorily with the rubber envelope 10. However, I prefer to employ the second fabric sheet 15 covering the heater coils and stitched as at 34 to sheet 14 around their edges. Such a heating unit is flexible and can be rolled or folded for insertion through the restricted mouth of the rubber casing 10.

The combining of heater unit and moisture-proof envelope may be easily and economically accomplished with the aid of a simple vulcanizing press, in the case of a rubber envelope, or a suitable cement may be employed to effect the seal. By merely folding the heater unit lengthwise upon itself, it may be passed through the mouth 22 and be spread flat after it is within the envelope, with the conductor cord 26 extending out through the mouth. The cord may be arranged in the grooves 28 of lip 24 which correctly position it and retain it while the opposed portions of the lip are brought together and vulcanized or cemented to effect a hermetic seal. Also the complementary grooves 28 facilitate a tight embracing of the cord so that the vulcanizing or cementing leaves no voids through which moisture might enter to the interior of the envelope. If desired the lip wall may be thickened exteriorly as at 26 to compensate for the diminished thickness of material due to the grooves 28.

It will be obvious from the foregoing description that a highly serviceable and durable hermetically sealed electric heating pad may be economically produced by the ordinary heating pad manufacturer without the expensive and complicated equipment necessary to mold and form raw rubber and to subsequently vulcanize it.

The heating pads of the invention have important advantages over conventional heating pads which are not effectively proof against mois-

ture, especially under the demanding conditions encountered in hospitals and the like. By molding my protective envelope of rubber or molding or otherwise forming it of some other suitable moisture-proof material, and hermetically sealing its mouth after the heating unit is within it, I ensure a durably effective and efficient moisture-proof heating pad which can serve and satisfy the most rigid and strenuous requirements.

I claim as my invention:

1. An electric heating pad comprising a heating unit including a conductor cord, an envelope of moisture-proof material pre-formed so that it has only a single opening therein, said heating unit being insertible through said single opening to a position interiorly of the envelope wherein the walls of the envelope restrain the unit against any substantial movement in any direction relative to the envelope, the said cord of the heating unit extending out through said single opening in the envelope, and means sealing said single opening with the heating unit in its said restrained position within the envelope and with the walls of said sealed single opening sealed around said outwardly extending cord.

2. An electric heating pad comprising a heating unit including a conductor cord having a moisture-impervious exterior surface, an envelope of moisture-proof material pre-formed so that it has only a single opening therein, said heating unit being insertible through said single opening to a position interiorly of the envelope wherein the walls of the envelope restrain the unit against any substantial movement in any direction relative to the envelope, the said cord of the heating unit extending out through said single opening in the envelope, and means sealing said single opening with the heating unit in its said restrained position within the envelope and with the walls of said sealed single opening sealed to said moisture impervious exterior surface of the cord all around a portion of the cord which has extent in said sealed single opening.

3. An electric heating pad comprising a heating unit including a conductor cord, an envelope of moisture-proof material pre-formed so that it has only a single opening therein, said heating unit comprising electrical resistance conductors secured on a fabric sheet, and two thicker sheets between which said fabric sheet with the resistance conductors thereon is arranged and secured thereby to provide bulk and stability to the unit, said unit being insertible through said single opening in the envelope to a position interiorly of the envelope wherein, because of its said bulk and stability, the walls of the envelope restrain the unit against any substantial movement in any direction relative to the envelope, the said cord of the heating unit extending out through said single opening in the envelope, and means sealing said single opening with the heating unit in its said restrained position within the envelope and with the walls of said sealed single opening sealed around said outwardly extending cord.

4. An electric heating pad comprising a heating unit including a conductor cord, an envelope of moisture-proof material pre-formed so that it has only a single opening therein, said heating unit being insertible through said single opening to a position interiorly of the envelope wherein the walls of the envelope restrain the unit against any substantial movement in any direction relative to the envelope, the said cord of the heating unit extending out through said single opening in the envelope, means on opposite walls of said

5

single opening for engaging around said cord thereby to position the cord at a predetermined location in said opening, and means sealing said single opening with the heating unit in its said restrained position within the envelope and with said cord-engaging means sealed around said outwardly extending cord.

5. An electric heating pad comprising a molded pre-formed and pre-vulcanized rubber envelope having only a single opening therein, a heating unit insertible through said single opening into the interior of the envelope, said unit having a conductor cord connected thereto for extending

6

out through said single opening, and having means on the unit for stabilizing it against edge-wise collapse within the envelope and for providing bulk whereby the unit approximately fills the interior space within the envelope so that the unit is restrained by the envelope walls against movement in any direction relative to the envelope, and means sealing said single opening with the heating unit in the envelope and with the walls of said sealed single opening sealed around said outwardly extending cord.

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