Feb. 11, 1969 R. J. COSTANZO 3,427,431

SLEEPING BAG AND HEATER THEREFOR

Filed Dec. 13, 1966

FIG. 1

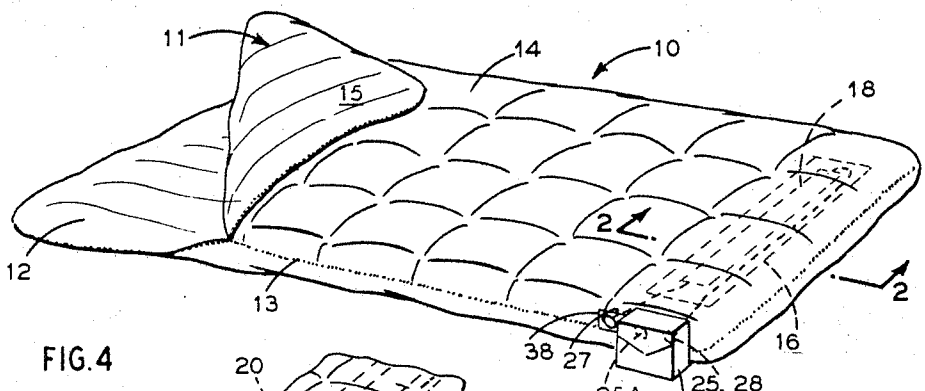
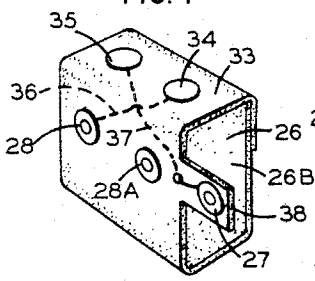


FIG. 4



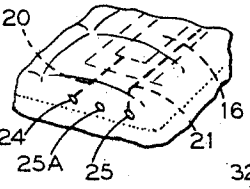


FIG. 6

FIG. 5

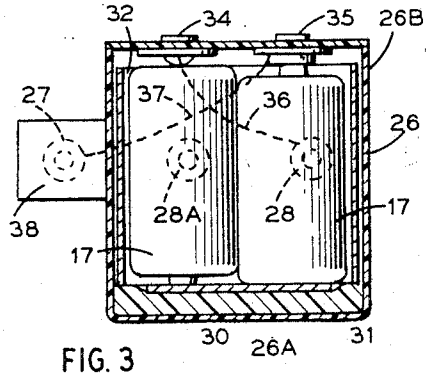
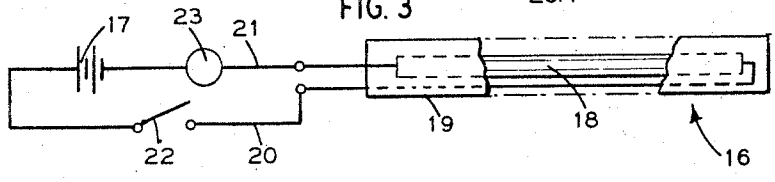


FIG. 3



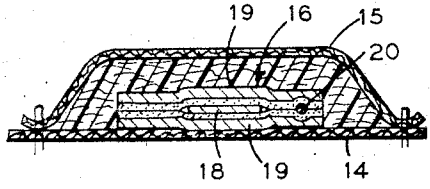


FIG. 2

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SLEEPING BAG AND HEATER THEREFOR

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ABSTRACT OF THE DISCLOSURE

This disclosure is directed to an electrically heated sleeping bag and an improved low-voltage electrical heating means adapted for use therewith. In one form of the disclosure the heating means comprises a resistor element having a radiation surface connected thereto in electrically insulated, heat transferable, relationship to provide for a maximum of heat transfer with a minimum of voltage input to the resistor. A source of low-voltage electrical energy is connected in circuit with the resistor element, the source of energy being carried in a pouch which is constructed so as to be readily detachably connected to the sleeping bag.

Object of the invention

An object of this invention resides in the provision of an electrically heated sleeping bag having a heating element which is constructed and arranged so as to be energized by a very low source of electrical energy.

It is another object of this invention to provide a sleeping bag with an electric heater having self-contained power source which can be readily detachably connected to the sleeping bag.

Another object of this invention is to provide an improved low-voltage electrical heater having a radiation surface connected in heat transfer relationship to the resistor element thereof.

Another object of this invention is to provide an improved electrical heater which is durable in construction, inexpensive to manufacture and positive in operation.

Another object of this invention is to provide an improved heating element capable of transmitting heat over a considerable area with voltage input thereto.

Brief description of the invention

The foregoing objects and other features and advantages of this invention are attained by a sleeping bag defined by an upper portion and a bottom portion which are suitably connected about the peripheral or marginal edge thereof to define a bag-like configuration into which a person may comfortably lie. The sleeping bag is rendered electrically heated by a very low-voltage electric heater imbedded in a portion of the sleeping bag. The electric heater comprises a strip of bare resistor connected in circuit with a low-voltage source of electrical energy, e.g., a battery. A heat radiation surface is connected directly to the bare resistor as to be electrically insulated in heat transfer relationship therewith. In this manner the heat transfer area of the heater is substantially enlarged, thereby enabling maximum heat transfer with a minimum amount of voltage input to the resistor. Connected in circuit with the heater is a battery source of electrical energy. Preferably the battery is carried in a pouch which is adapted to be detachably connected in circuit with the heater from an exterior portion of the sleeping bag. Also a switch means is provided for making and breaking the circuit to the resistor element without effecting removal of the battery pouch. If desired, a circuit breaker is interconnected in series between the source of power and the heater for making and breaking of the circuit in accordance with predetermined temperature conditions.

A feature of this invention resides in an electrically heated sleeping bag which is relatively inexpensive to fabricate and which is positive in operation.

Another feature of this invention is to provide a sleeping bag which can be effectively heated electrically by utilizing a self-contained source of low-voltage electrical energy.

Another feature of this invention resides in the provision wherein the sleeping bag may be optionally utilized either as a conventional sleeping bag and/or as an electrically heated sleeping bag.

Another feature of this invention resides in the provision wherein the source of electrical energy can be readily detachably connected into electrical circuit with an electrical heater of the bag.

Other features and advantages will become more readily apparent when considered in view of the drawings and specification in which:

FIG. 1 is a perspective view of a sleeping bag embodying the present invention.

FIG. 2 is an enlarged detailed sectional view taken along lines 2—2 on FIG. 1.

FIG. 3 is a schematic diagram of the electrical circuit for energizing the heater.

FIG. 4 is a perspective view illustrating the pouch or carrier for the source of electrical energy.

FIG. 5 illustrates a sectional view of the battery pouch of FIG. 4.

FIG. 6 is an enlarged detail of a portion of the sleeping bag.

Referring to the drawings, there is shown in FIG. 1 a sleeping bag **10** comprising essentially of an upper blanket or portion **11** and a lower blanket or portion **12** which may be suitably connected along the peripheral edges thereof as by seam **13** to define a bag-like formation in which one may lie. The respective upper and lower blankets **11** and **12** are preferably similarly constructed. As shown in FIG. 2 the blanket portions comprise an inner and outer lining **14** and **15** respectively. To increase the warmth of the sleeping bag **10**, there is provided an electric heating means **16** which is specifically constructed and arranged so as to be energized by a very low-voltage source **17** of electrical energy, as for example a battery of six volts or less.

As is best seen in FIGS. 2 and 3, the electrical heating means of the invention comprises an elongated bare flat resistor element **18**, as for example Nichrome of a suitable length, positioned between the upper and lower liner portions **14** and **15** of the sleeping bag blanket **11**. While the heating element is illustrated as being interposed in the upper blanket **11** of the sleeping bag, it will be readily appreciated and understood that the heating element may be interposed either in the upper and/or lower heating blanket **11** or **12** of the sleeping bag, as may be desired and/or located along any desired portion thereof.

Referring to FIGS. 2 and 3, the heating area of the resistor element **18** is expanded by utilizing a heat radiation surface **19** connected in heat transfer relationship with respect to the resistor element **18**. The heat radiation surface **19** may comprise any suitable metallic sheet material or foil, as for example sheet aluminum or aluminum foil and the like, secured in heat transfer relationship to the resistor element. Accordingly, the back of the metallic foil **19** may be coated with a suitable dielectric adhesive which will effectively electrically insulate the radiation surface **19** from the resistor element while at the same time secure the radiation surface **19** into good thermal conductivity with the resistor element **18**. As best seen in FIG. 2, a resistor element **18** is sandwiched between an upper and lower sheet of metallic foil **19, 19** which sheets **19—19** are disposed in back-to-

back relationship. Accordingly, it will be noted that the radiation surface **19**—**19** provides an expanded heating surface connected in thermal heat transfer relationship with the resistor element **18**. If desired, the radiation surface or metallic foil **19** may be also electrically insulated from the resistor material by anodizing the back surface of the foil which is adapted to contact the resistor element **18**.

The resistor element **18** is suitably connected in circuit with the power source **17** by electrical wires or conductors **20** and **21**. A suitably switching means **22** is interposed in the circuit for making and breaking the circuit to the resistor element **18**. Also, if desired, a circuit breaker **23** may be disposed in series between the source of electrical energy **17** and the heating means **16** which will automatically make or break the circuit according to temperature generated by the heater **16**.

As best seen in FIG. 1, the free ends of the conductors **20**, **21** are electrically connected to a terminal or contacts **24** and **25** comprising, e.g., a male snap fastener.

The construction of the heater **16** is such that it can be effectively energized for considerable periods of time by a source of very low-voltage electrical energy, such as battery **17**. Referring to FIG. 5, two low-voltage batteries are connected in series to generate the voltage requirement for energizing the heater **16**. Small alkaline-type batteries have proven to be most satisfactory. A pouch **26** is provided for detachably connecting the batteries **17** to the heating blanket. By rendering the source of electrical energy **17** detachably connected to the sleeping bag **10**, the sleeping bag **10** can be then optionally utilized either as a conventional sleeping bag or as an electrically heated sleeping bag.

To detachably connect the source of electrical power to the sleeping bag, the pouch **26** is provided with snap fasteners **27**, **28**, **28A** which connect and disconnect with complementary male snap fasteners **24**, **25**, **25A**.

Referring to FIGS. 4 and 5, it will be noted that the pouch **26** comprises a bottom wall **26A** having connected thereto a circumscribing upright wall **26B** to define a substantially rectangular open end pouch. The pouch **26** may be formed of any suitable material, such as plastic or the like. As shown in FIG. 5, a plate contact **30** is resiliently supported on the bottom wall **26A** of the pouch by a layer of resilient material **31** such as foam rubber, sponge, or the like. An envelope **32** formed of relatively rigid material, as for example paperboard, hardboard, or the like, is disposed within the pouch **26** to add rigidity thereto and to shape the same. Connected to the back wall of the pouch formed integrally therewith is a flap **33** which is adapted to define the closure for the open end of the pouch **26**. A pair of contact buttons **34**, **35** are connected to a portion of the flap to effect engagement with the respective electrodes of the batteries **17** when the flap **33** is closed. On the back of the pouch are provided a pair of complementary female snap fasteners **28**, **28A** which are adapted to mate with the male fasteners **25** and **25A** connected to the bag **10** to support the pouch on the bag **10**. One of the snap fasteners **28** on the back of the pouch **26** is suitably wired by conductor **36** to one of the contacts **34** on the flap portion **33** of the pouch. The other contact bottom **35** on the flap portion **33** of the pouch is suitably wired by conductor **37** to a contact fastener **27** carried on a tab **38** extending laterally of the pouch. Accordingly, it will be noted that the pouch **26** is provided with three snap fasteners **27**, **28**, **28A**, of which two define the electrical terminals **27**, **28** which are adapted to mate with the complementary terminal fasteners **24** and **25** on the sleeping blanket. Accordingly, with the construction described, it will therefore be apparent that the contact fastener **24** and contact fastener **27** carried on tab **38** function as an on-off switch for the heater means **16** of the sleeping bag.

In operation, the pouch **26** is detachably secured to the

sleeping bag by engagement of complementary fasteners **25**, **25A**, and **28**, **28A** whereby the heater **16** will not be energized until complementary contact fasteners **24** and **27** have been closed or fastened. Thus, the occupant of the bag can effect control over the electrical heater **16** merely by snapping or unsnapping the complementary contacts **24** and **27** without effecting complete detachment of the pouch and batteries therein from the bag.

While the instant invention has been described with respect to several embodiments thereof, it will be readily appreciated and understood that variations and modifications may be made without departing from the spirit or scope of the invention.

What is claimed is:

1. A sleeping bag comprising
an upper portion and a lower portion,
means for connecting said upper and lower portions about the peripheral edges thereof to define a bag-like form opened at one end and sized to receive the body of a person,
and means for electrically heating said bag,
said latter means comprising a flat bare electrical resistor element to impart heat to said bag,
means for radiating the heat generated by said resistor element,
said radiating means including a sheet of heat-conducting material connected to the opposed flat sides of said resistor element in direct heat transfer relationship to sandwich said resistor element therebetween,
means for adhesively securing said heat conducting sheets in back-to-back relationship to sandwich said resistor therebetween,
said heat conducting sheets each having a surface area greater than the surface area of the resistor element sandwiches therebetween to define an expanded surface area,
a low voltage battery defining the source of electrical energy connected in circuit with said resistor element,
and means for detachably connecting said battery into electrical circuit with said resistor.

2. The invention as defined in claim **1** including:
a pair of electrical conductors connected in circuit with the resistor,
a pair of snap fasteners connected to the free end of said conductors to define a terminal therefor,
and said means for detachably connecting said energy source including a pouch for supporting a battery therein,
a bottom contact located on the bottom of said pouch,
means for resiliently supporting said bottom contact,
a flap connected to said pouch to form a closure therefor,
a contact connected to said flap to make electrical contact with the electrode of the battery,
a pair of complementary snap fasteners contacts connected to said pouch for detachably connecting said pouch to the terminal contacts of said conductors to effect the circuit between the battery and the resistor,
and a circuit breaker connected in series with said resistor.

3. An electrical heater construction comprising,
a substantially flat bare electrical resistor element consisting of a relatively long narrow strip of electrical resistant material,
a radiation means including a thin sheet of heat conducting material connected to the opposed flat surfaces of said resistance element to sandwich said element therebetween,
said heat conducting sheets being connected in direct heat transfer relationship to said element,
means for adhesively securing said heat conducting sheets in back-to-back relationship to sandwich said resistance element therebetween,
said heat conducting sheets each having a surface area

greater than that of the flat surfaces of said resistance element,

a source of low voltage electrical energy for energizing said resistance element,

said source of electrical energy including a every low voltage battery,

means for supporting and connecting said battery into electric circuit with said resistance element,

and said latter means including a length of insulated conducting wire for electrically connecting said low voltage battery in circuit with said resistance element.

4. The invention as defined in claim **3** wherein said radiation means includes a sheet of metallic foil disposed in back-to-back relationship to sandwich therebetween said electrical resistance element in direct heat transfer relationship thereto.

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U.S. Cl. X.R.

219—211, 528, 544; 5—343, 347