United States Patent

Johnson

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[54] LOW-VOLTAGE, ELECTRICALLY HEATED SHIRT

[72] Inventor: **Richard L. Johnson,** Easton, Conn.

[73] Assignee: **Timely Products Corporation**

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[51] **Int. Cl.** **H05b 1/00**

[58] **Field of Search** .....219/211, 527–529, 219/538, 549; 2/2.1 A; 128/379, 402

[56] **References Cited**

UNITED STATES PATENTS

3,519,791	7/1970	Basseches et al.	219/211
2,692,326	10/1954	Crowell	219/211

FOREIGN PATENTS OR APPLICATIONS

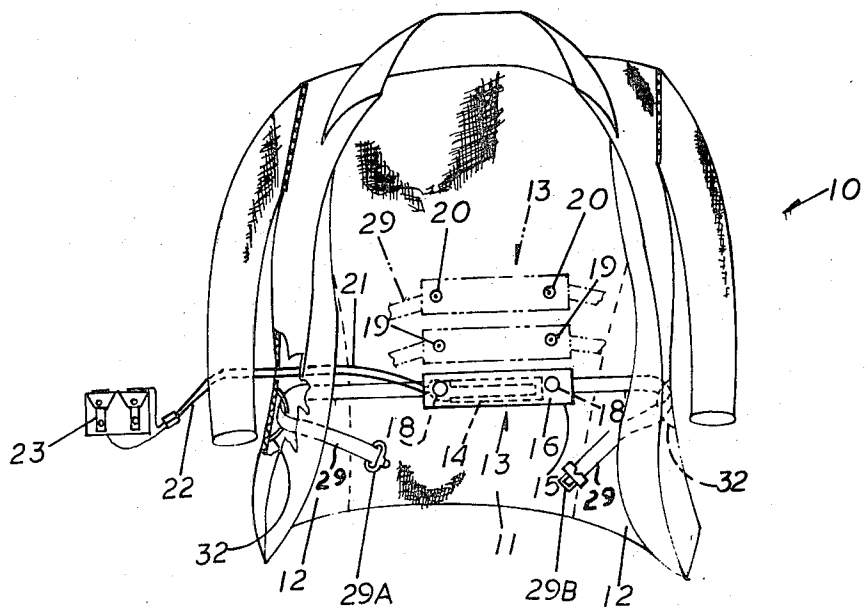
546,812	7/1942	Great Britain	219/211

Primary Examiner—C. L. Albritton
Attorney—Arthur T. Fattibene

[57] **ABSTRACT**

A low-voltage electrically heated shirt adapted to operate on less than six volts. The low-voltage heater assembly for the shirt is constructed so that it can be readily detached from a shirt permitting the shirt to be optionally worn either as a heated shirt or an unheated shirt. The heater assembly may be also detachably fastened to the shirt in any of several adjusted positions. Stretchable bands are operatively connected to the heater assembly to draw the heater assembly close to the body of the wearer when worn as a heated shirt to provide for maximum transmission of heat to the body in any of the adjusted positions.

10 Claims, 3 Drawing Figures



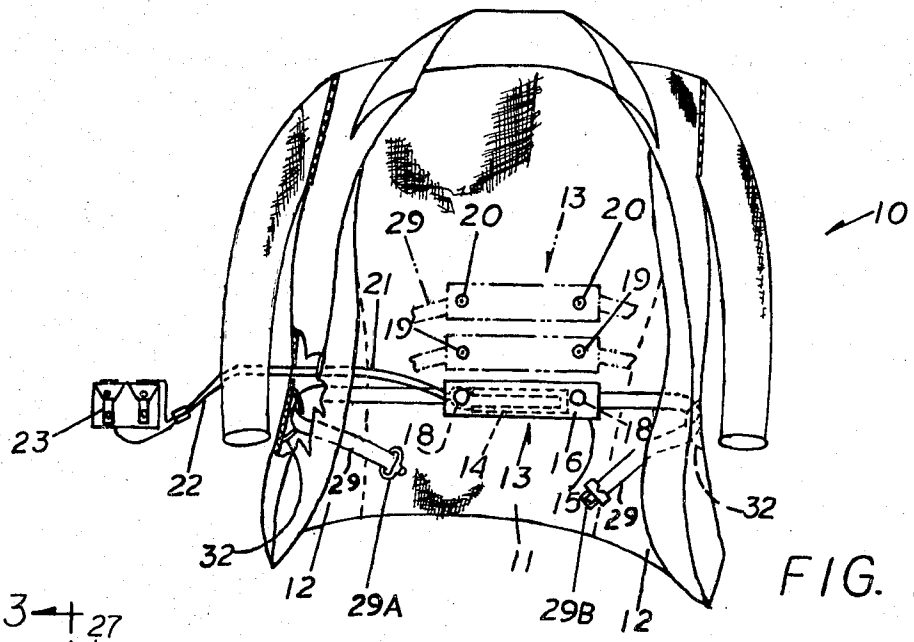


FIG. 1

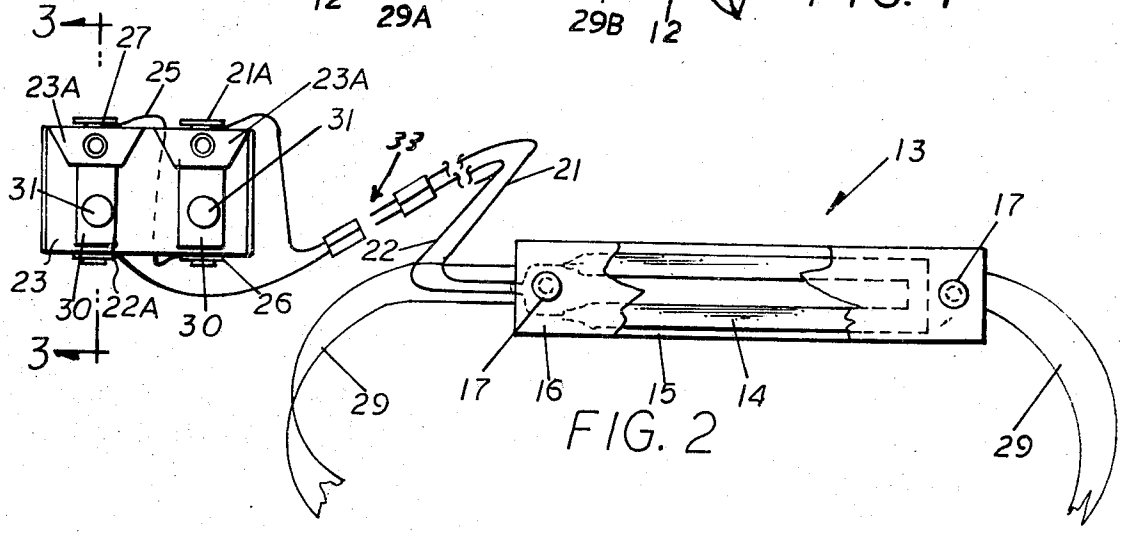


FIG. 2

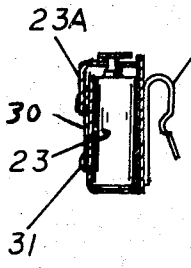


FIG. 3

INVENTOR.
RICHARD L. JOHNSON
BY
Archer F. Fattibene
ATTORNEY

LOW-VOLTAGE, ELECTRICALLY HEATED SHIRT

PROBLEM AND PRIOR ART

In the past the only known heated garments contained electrical heaters which required very high voltages. For this reason such heaters were relatively complex and costly to manufacture. Also the construction of the known garments was such that the heaters were fixedly secured or built into the garment, and consequently the garment could only be worn with the heater attached thereto. Thus the care and cleaning of such heated garments offered considerable difficulty.

Also because such known garments could only be energized by relatively high voltage, the movement of a wearer was generally restricted to the length of cord or conductor wire required for carrying the current to the built-in heaters. Because the heaters utilized in the known electrical garments were relatively massive and complex, the garment so heated tended to be bulky and awkward in appearance and use. The limitations thus built in or inherent in the known heated garment types, as a matter of practice, limited them to very restricted application, as for example, for use as a heated flying suit, therapeutic and/or health suits, and the like, in which the mobility, comfort, dress or fashion were not the prime considerations of the garment.

OBJECTS

It is an object of this invention to provide a low-voltage, electrically heated shirt having the appearance and comfort of a conventional shirt which can be optionally worn either as a heated shirt or as an unheated shirt.

Another object of this invention is to provide an improved heated shirt construction in which the heater assembly is rendered readily detachably connected to the shirt so that the entire heater assembly may be removed at the will of the wearer in a simple and expedient manner; thereby facilitating the cleaning, laundering and/or care of the garment.

Another object of this invention is to provide an electrically heated shirt in which the location of the heater may be adjustably positioned on the shirt so that the generated heat may be concentrated on a desired portion of the body of a wearer.

Another object of this invention is to provide an electrically heated shirt having a heater construction which can be energized by one or more very low-voltage batteries which may be carried either on the shirt or adjacent thereto.

Another object of this invention is to provide an electrically heated shirt in which the heater assembly is relatively light in weight, and which when attached to the shirt can be concealed from view so that the shirt has the outward appearance of an ordinary conventional type shirt.

Another object of this invention is to provide an electrical shirt construction in which the heater assembly may be drawn close to the body of the wearer when the shirt is worn as a heated shirt so as to provide for a maximum transmission of heat to the body.

Another object of this invention is to provide an electrically heated shirt which is light in weight, and which can be manufactured in any desired styling.

Another object of this invention is to provide a low-voltage electrically heated shirt which is relatively simple in construction, which can be inexpensively produced, and which is positive in operation.

BRIEF SUMMARY OF THE INVENTION

The foregoing objects, and other features and advantages of this invention are attained by a low-voltage, battery energized, heated shirt comprising a shirt of any suitable conventional construction formed with a heater assembly comprising a relatively thin strip of electrical resistant material sandwiched between strips of heat diffusing material. The heater assembly is constructed so as to be detachably secured to the inside portion of the shirt. Preferably the heat diffusing strips are sized so as to be substantially wider than the width of the electrical resistant strips to define a substantially flat heating assembly.

Wire conductors are electrically connected to the opposed ends of the resistant strip. The other ends of the wire conductors are connected in circuit to a battery source of electrical energy which may be carried in a pouch connected to the shirt or carried by the wearer adjacent the shirt.

The means for detachably securing the heater assembly to the inside surface of the shirt comprises a fastening means connected to the adjacent end portions of the heater assembly, and a plurality of spaced apart sets of complementary fastening means connected to the inside portion of the shirt. The arrangement is such that the fastening means of the heater assembly may be detachably secured to any of the set of complementary fastening means connected to the shirt thereby rendering the heater assembly adjustably and detachably connected to the shirt. Tie means in the form of stretchable bands are connected to the opposed ends of the heater assemblies to permit the wearer to draw the heater assembly close to the body when the shirt is worn as a heated shirt, for maximum transmission of heat to the body. If desired loops may be connected to the inside portion of the shirt to receive the tie means. Suitable buckling or fastening means are secured to the free ends of the stretchable bands by which the ties may be fastened to secure the band about the body of the wearer.

FEATURES

A feature of this invention resides in the provision of an electrically heated shirt which can be readily energized from a low-voltage battery or batteries which can be readily carried either on the shirt, or the body of the wearer.

Another feature of this invention resides in an electrically heated shirt which is relatively light in weight, free of bulk, comfortable, and pleasing in appearance.

Another feature of this invention resides in the provision of a heated shirt having a heater assembly constructed and arranged to be readily detachably connected to the shirt in a simple and expedient manner thereby permitting the heater assembly to be removed at the will of the wearer.

Another feature of this invention resides in the provision wherein the heater assembly may be adjustably positioned to the inside portion of the shirt in a manner which will enable the heater assembly to be positioned close to the body of the wearer for the maximum transmission of heat thereto in any of the adjusted positions.

Another feature of this invention resides in the provision of a heated shirt having all of the freedom of movement and comfort of a conventional shirt.

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

FIG. 1 is an expanded view of a shirt construction embodying the present invention.

FIG. 2 is a detail plan of the heater assembly utilized in the shirt construction of FIG. 1, having portions broken away.

FIG. 3 is a sectional view taken along line 3—3 on FIG. 2.

Referring to the drawings there is shown in FIG. 1 a shirt construction **10** embodying the present invention. The shirt **10** may be made in accordance with any well-known construction to define any particular style shirt. Generally, a conventionally constructed shirt includes a back panel **11** and connected side panels **12** which are adapted to enwrap about the body of a wearer. It will be understood that the shirt **10** may be formed with sleeves or without sleeves depending upon the desired styling.

In the illustrated form of the invention the shirt is shown as a typical open front shirt which may be suitably buttoned in the well-known manner when worn. It will also be understood that the shirt **10**, if desired, may comprise a pull-over or sweater-type shirt.

In accordance with this invention, an improved low-voltage heater assembly **13** is detachably secured to the shirt **10**, as for example, to the back panel portion **11**. As best seen in FIG. 2,

the heater assembly comprises an elongated strip of suitable electrical resistant material **14**, as for example, Nichrome, or the like. Preferably the Nichrome strip **14** is defined as a long narrow, flat strip of resistant material which is formed into a U-shaped configuration. Because the resistor strip is relatively thin in cross section, e.g., a few thousandths of an inch, 0.002–0.004 inch or the like, and of relatively narrow width, e.g., one-eighth to one-fourth of an inch, the resistant material is sandwiched between a pair of heat diffusing strips of material **15** and **16**. It will be understood that the strips of heat diffusing material **15** and **16** may be formed of any suitable material through which the heat generated by the resistant material, when energized, may be conducted or transmitted. For example, the strips of heat diffusing material **15, 16** may comprise of similar or dissimilar strips, for example, acetate tape, fabric tape, metal foil and/or thin plastic tapes which will function to diffuse the heat generated, and to maintain the shape and position of the resistant strip of material **14** sandwiched therebetween.

Preferably, it is desired that the heat diffusing strips **15** and **16** be adhesively backed so that they may be secured in back to back relationship with the strip of electrical resistant material **14**, securely bonded therebetween. Connected to, and adjacent the opposed ends of the heater assembly **13**, is a fastening means **17** by which the heating assembly **13** may be detachably secured to a panel portion of the shirt, e.g., the back panel **11**. As best seen in FIG. **1** a complementary set of fasteners **18, 19** or **20** is suitably secured to the back panel portion of the shirt. In the illustrated form of the invention the heater fasteners **17** and the complementary fasteners **18, 19** or **20** on the panel portion of the shirt may comprise complementary male and female snap-type fasteners of conventional construction. For example, the fasteners **17** on the heater assembly may comprise the male fastener and the set of fasteners **18, 19** or **20** on the shirt the female fasteners.

To render the location of the heater assembly **13** adjustable with respect to the panel portion of the shirt, a plurality of sets of complementary fasteners **18, 19** and **20** are vertically spaced to the panel portion of the shirt. Consequently it will be noted that the heater assembly may be detachably secured to either set of complementary fastening means so that the position of the heater **14** relative to the panel portion of the shirt may be adjusted at the will of the wearer by simply snapping the fastening means **17** of the heater assembly to a corresponding set of complementary fastening means connected to the panel portion of the shirt. The alternate adjusted position of the heater assembly **13** is shown in phantom in FIG. **1**.

Suitable wire conductors **21, 22** are electrically connected to the opposed ends of the resistant material **14** for conducting the current thereto. The other end of the wire conductors **21, 22** is suitably connected to the contacts or contact plates **21A, 22A** carried on a pouch **23** adapted to receive and hold the battery or batteries forming the source of electrical energy for heater **14**. If desired, a plug and socket **33** may be disposed intermediate the length of conductors **21, 22**.

In the illustrated form of the invention the pouch **23** is constructed so as to snugly receive a dry cell or flashlight type of battery or batteries of conventional construction. In the illustrated form, the pouch **23** is sized to receive two, one and one-half volt-type batteries, or the like, disposed in side by side relationship with the wiring of the contacts adapted to engage the electrodes of the battery within the pouch wired in series, as by a connector conducting wire **25** connecting the lower contact **26** of one battery to the upper contact **27** of the other battery.

In the illustrated form of the invention the battery pouch **23** is provided with a hook means **28** by which the pouch may be supported on the belt of a wearer, e.g., for the belt supporting the wearer's trousers. Alternately the battery pouch **23** may be secured in a pocket formed on the shirt.

The battery pouch **23**, may be formed of suitable material to define enclosing walls for snugly receiving the battery or batteries. A flap **23A** is provided to secure the battery or batteries within the pouch **23**. Preferably the contacts **21A** and **27** are carried on the flap portion to engage the electrode of the battery or batteries respectively only when the flap is closed. As shown in FIGS. **2** and **3** a flap closure may comprise an elastic band **30** having a snap fastener **31** by which it is detachably connected to a complementary fastener carried by the front wall portion of the pouch **23**.

Tie means **29** are connected to the opposed end portions of the heater assembly. In the illustrated form of the invention the tie means comprises a stretchable or elastic band **29—29** connected to each end of the heater assembly to circumscribe the waist portion of a wearer. The free ends of the stretchable bands **29—29** are provided with complementary buckle fastening means **29A, 29B** so that the bands may be secured around the waist of the wearer. The arrangement is such that the stretchable bands **29—29** when buckled about the waist of the wearer will function to draw the heating assembly **13** close to the body of the wearer so as to facilitate the maximum transfer of heat from the assembly **13**, when energized, to the body of the wearer. In this manner the heater assembly **13** is snugly drawn to the body of the wearer, so that maximum utilization of the generated heat is attained.

If desired, a plurality of loops **31** may be provided on the panel portion of the shirt for receiving the stretchable bands **29—29**.

With the construction described the arrangement is such that the entire heater assembly **13** can be readily removed from the shirt **10** so that the shirt may be optionally worn either as a conventional shirt, or with the heater **13** in place as a heated shirt. The ease with which the heater assembly **13** is removed from the shirt further greatly facilitates the care and/or cleaning of the shirt as the shirt can be readily sent to the laundry or dry cleaners without the heating element attached. Also the arrangement is such that the heating element can be adjustably positioned with respect to the panel portion of the shirt so that a wearer may locate and/or direct the heat generated by the heater assembly directly to a desired portion of the body. The arrangement is such that a wearer may snugly draw the heater assembly **13** in close proximity to the body so as to effect the maximum transmission of the heat from the heater assembly to the body.

While the present invention has been illustrated and described with respect to a particular embodiment 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 low-voltage, battery energized, heated shirt comprising:

a back panel and connected side panels,

a heating means including a relatively thin strip of electrically resistant material,

a strip of heat diffusing material connected in back to back relationship to sandwich said resistant strip therebetween in heat transfer relationship,

means for readily detachably connecting said heating means to the inside portion of said back panel to facilitate the removal of the entire heating means from said shirt,

tie means connected to the opposed ends of said heater means for drawing the heating means close to the body of a wearer when said shirt is worn to locate said heater means in close proximity to the body of the wearer for maximum heating effect,

conducting wires operatively connected to said resistant strip for connecting said resistant strip in circuit with a low-voltage battery,

and means defining a support for said battery,

said battery support means including electrical contacts adapted to engage the electrodes of said low-voltage battery and

means for adjustably positioning said heating means on said back panel.

2. The heated shirt as defined in claim 1 wherein said means for detaching said heating means comprises a fastening means connected to opposed portions of said heat diffusing strips and complementary fastening means secured to the back panel of said shirt.

3. A low-voltage, battery energized, heated shirt comprising:

a back panel and connected side panels,

a heating means including a relatively thin strip of electrically resistant material,

a strip of heat diffusing material connected in back to back relationship to sandwich said resistant strip therebetween in heat transfer relationship,

means for readily detachably connecting said heating means to the inside portion of said back panel to facilitate the removal of the entire heating means from said shirt,

tie means connected to the opposed ends of said heater means for drawing the heating means close to the body of a wearer when said shirt is worn to locate said heater means in close proximity to the body of the wearer for maximum heating effect,

conducting wires operatively connected to said resistant strip for connecting said resistant strip in circuit with a low-voltage battery,

and means defining a support for said battery,

said battery support means including electrical contacts adapted to engage the electrodes of said low-voltage battery,

wherein said means for detaching said heating means comprises a fastening means connected to opposed portions of said heat diffusing strip and complementary fastening means secured to the back panel of said shirt,

said adjusting means including a plurality of sets of said complementary fastening means vertically spaced on said back panel.

4. In combination,

a shirt,

a low-voltage heater means,

said heater means including a relatively thin electrical resistant strip, and

a sheet of heat-diffusing material forming a covering for said resistant strip,

said sheet of material having a width substantially greater than the width of said strip,

means for detachably connecting said heating means to the inside portion of said shirt to facilitate the removal of the entire heater from said shirt, and

tie means connected to opposed ends of said heater means for drawing said heater means close to the body of a wearer for maximum heating effect; and

means for adjustably positioning said heater means on the inside portion of said shirt.

5. The invention as defined in claim 4 wherein said detachable connecting means includes complementary male and female fastener members;

one of said complementary fastener members being connected to said sheet of heat diffusing material,

and the other complementary fastener member being connected to the inside portion of said shirt.

6. The invention as defined in claim 5 and including a plurality of sets of said other complementary fastener members connected to the inside portion of said shirt.

7. In combination,

a shirt,

a low-voltage heater means,

said heater means including a relatively thin electrical resistant strip, and

a sheet of heat-diffusing material forming a covering for said resistant strip,

said sheet of material having a width substantially greater then the width of said strip,

means for detachably connecting said heating means to the inside portion of said shirt to facilitate the removal of the entire heater from said shirt, and

tie means connected to opposed ends of said heater means for drawing said heater means close to the body of a wearer for maximum heating effect,

wherein said detachable connecting means includes a complementary male and female fastener member,

one of said complementary fastener members being connected to said sheet of heat-diffusing material,

and the other complementary fastener member being connected to the inside portion of said shirt,

a plurality of sets of said other complementary fastener members connected to the inside portion of said shirt,

and including loop forming means connected to the inside portion of said shirt for receiving said tie means.

8. The invention as defined in claim 4 wherein said tie means includes a stretchable band.

9. A low-voltage, battery energized heated shirt comprising a back panel and connected side panels adapted to encompass the body of a wearer,

a heater assembly including a relatively thin flat strip of an electrically resistant material, and

a strip of heat-diffusing material connected in back-to-back relationship to sandwich said resistant material therebetween in heat transfer relationship,

said heat-diffusing strip being substantially wider than the width of said resistant strip,

wire conductors electrically connected to the opposed ends of said resistant material,

a pouch adapted to receive a low-voltage battery,

said pouch including opposed contacts for connecting with the electrodes of a battery received within said pouch,

means connected to said pouch for supporting said pouch on the belt of a wearer,

said wire conductors having their other ends electrically connected to said contacts,

means for readily detachably connecting said heater assembly to the inside surface of said back panel,

said detachable means including a fastening means connected to adjacent end portions of said heater assembly,

and a plurality of spaced-apart sets of complementary fastening means connected to the inside portion of said back panel whereby the fastening means of said heating assembly may be detachably connected to one of said sets of complementary fastening means to adjustably secure said heater assembly to said back panel,

tie means connected to the opposed ends of said heater assembly,

said tie means being adapted to encircle the body of the wearer,

said tie means including a stretchable band for drawing said heater assembly close to the body of the wearer when said shirt is worn for maximum heating effect,

means defining loops connected to the inside of said shirt to receive said tie means,

and buckle means connected to the free ends of said stretchable bands to detachably secure said band about the body of a wearer.

10. An electrically heated article of manufacture comprising:

a garment,

a low-voltage heater means including an electrically resistant material, and

a means forming a support for said electrically resistant material,

means for detachably connecting said heating means to the inside portion of said garment to facilitate the removal of the entire heater means from said garment,

means for vertically adjusting said heater means to the inside portion of said garment, and

tie means connected to opposed ends of said heater means for drawing said heater means in close proximity to the body of a wearer for maximum heating effect.

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