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		2,329,766 9/1943	Jacobsen	219/211
		3,079,486 2/1963	Winchell	219/211
[21] Appl. No.	843,710	3,292,628 12/1966	Maxwell et al.	219/211X
[22] Filed	July 22, 1969	3,293,405 12/1966	Costanzo	219/211
[45] Patented	Mar. 9, 1971	3,298,368 1/1967	Charos	219/260
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		3,396,264 8/1968	Murphy et al.	219/211

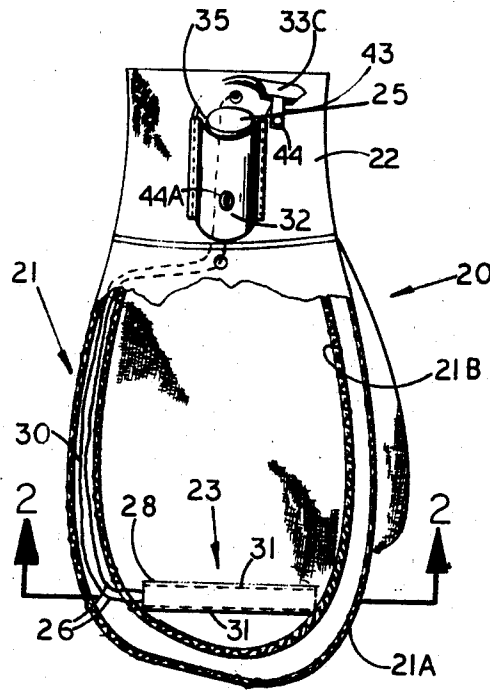
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[54] **SELF CONTAINED LOW VOLTAGE BATTERY OPERATED GLOVE**
2 Claims, 10 Drawing Figs.

- [52] U.S. Cl. 219/211,
128/402, 219/527, 219/529, 2/159
- [51] Int. Cl. H05b 3/36
- [50] Field of Search. 219/211-
-12, 527-9, 549; 312/212; 128/216, 402; 2/159

- [56] **References Cited**
UNITED STATES PATENTS
2,227,781 1/1941 Joy et al. 219/211

ABSTRACT: A self contained low-voltage battery operated glove in which a pocket is located on the back of the wrist portion of the glove for supporting a small low voltage battery directly thereon. A low voltage heater connected in circuit with the battery is located within the glove adjacent the fingertip portion on the palm side.



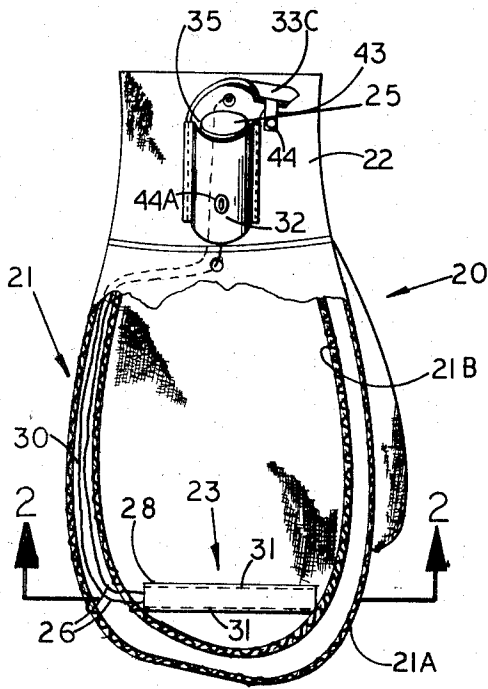


FIG. 1

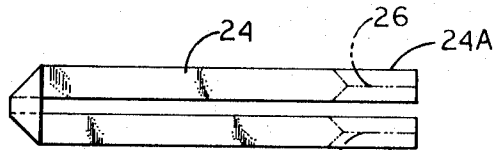


FIG. 3

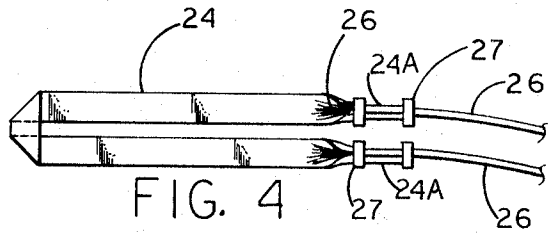


FIG. 4

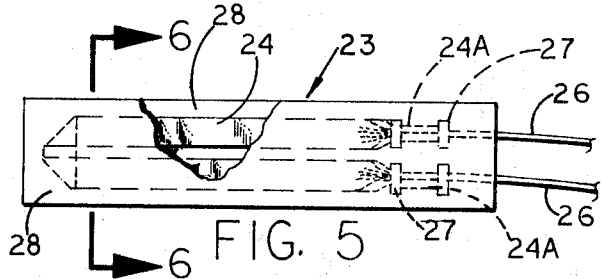


FIG. 5

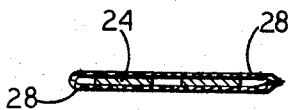
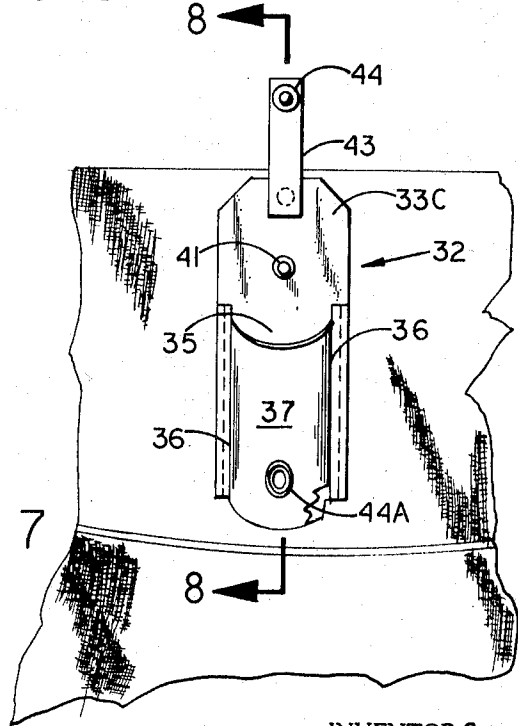


FIG. 6

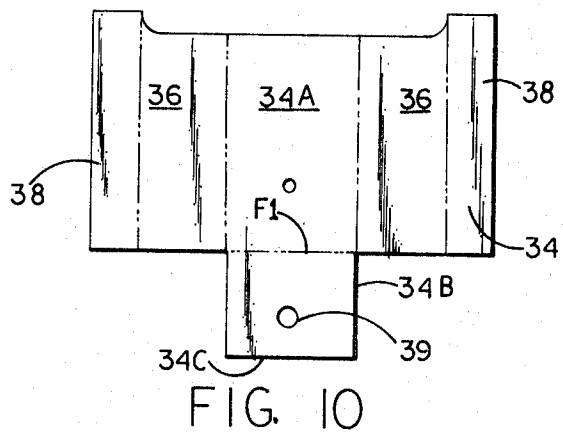
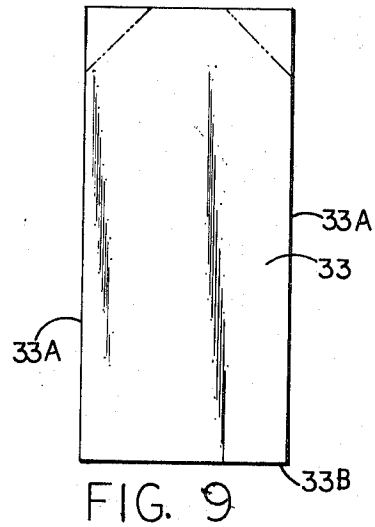
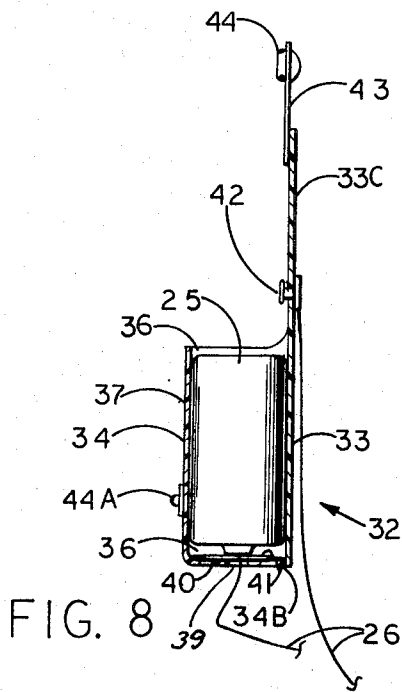
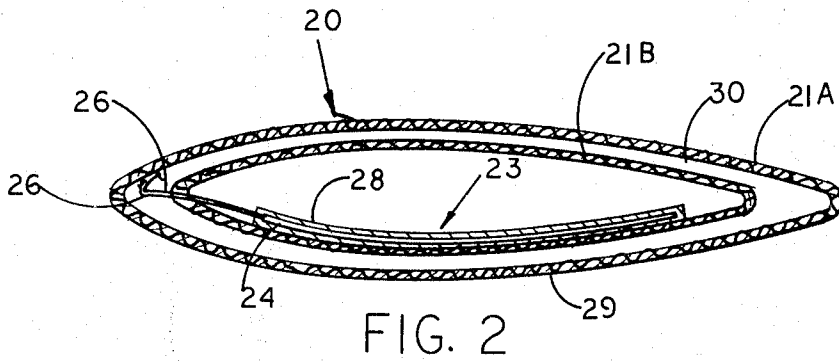
FIG. 7



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SELF CONTAINED LOW VOLTAGE BATTERY OPERATED GLOVE

PRIOR ART AND PROBLEMS

Heretofore it was not considered possible for a glove to be electrically heated by a very low voltage source. For this reason the prior known heated glove constructions of the type disclosed in U.S. Pat. Nos. 2,227,781; 2,685,021 and 3,292,628 required the heater elements to be extended over substantially the entire area of the glove body. The resistance of such heaters was so high that they could only be energized by a very high voltage source. For this reason the gloves of known construction could only be satisfactorily energized when plugged into a household source of electricity, e.g. 110 AC. Consequently relatively long conducting cords or wires were needed if the wearer intended on being mobile. Such electrically heated gloves therefore greatly limited the mobility of the wearer and further required a considerable voltage source.

Also the heaters required to heat such gloves necessitated a construction which greatly increased the bulk, thereby rendering such gloves uncomfortable and generally impractical for outdoor use.

Also such gloves were not readily capable of being washed or cleaned. For these reasons the known electrically heated gloves had only limited application.

OBJECT

An object of this invention is to provide a wholly self-contained battery heated glove in which the battery can be directly carried on the glove so that the heated glove can be worn like any standard glove.

Another object is to provide a glove with a heater construction capable of being energized by a battery small enough to be carried on the glove itself.

Another object is to provide an electrically heated glove in which the heater is located only along the fingertip portions on the palm side of the glove.

Another object is to provide a wholly self-contained battery heated glove in which the battery is carried in a specifically constructed pouch connected directly on the back of the wrist portion of the glove.

Another object is to provide a self-contained electrically heated glove in which the battery is connected in circuit to energize the heater only when the flap of the battery pouch is closed.

BRIEF SUMMARY OF THE INVENTION

The foregoing objects and other features of the invention are attained by a glove body having a hand receiving portion and a wrist engaging portion in which a low voltage resistance heater (less than 3 volts) is connected adjacent the fingertip end portion on the inner palm side of the glove. The heater construction comprises a bare strip for electrical resistance material sandwiched between a heat diffusing covering material. The ends of the resistance element are connected by means of suitable conductors to a low voltage battery source, e.g., a 1½ volt battery carried in a battery pouch connected directly to the glove. The location of the battery pouch is centrally located on the back of the wrist portion of the glove.

FEATURES

A feature of this invention resides in the provision of an electrically heated glove which is constructed so that it can be worn either as a conventional glove or as an electrically heated glove in which supplemental heat is provided by a low voltage resistance heater located within the glove which is connected to a low voltage source of electrical energy carried directly on the glove.

Another feature resides in the provision of an electrically heated glove which is relatively simple in construction, relatively inexpensive to construct and which is positive in operation.

Another feature of the invention resides in the provision of a heated glove in which the supplemental heat source is located in the fingertip portion on the inner palm side of the glove.

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

IN THE DRAWINGS

FIG. 1 is a back plan view of a heated glove constructed in accordance with the present invention having portions thereof broken away;

FIG. 2 is a cross-sectional view taken along line 2-2 on FIG. 1;

FIG. 3 is a detail plan view of the resistor element construction;

FIG. 4 is a detail plan view of the resistor element construction similar to that of FIG. 3 but illustrating the connection thereof to the electrical conductors;

FIG. 5 is a detailed plan view of the heater element utilized in the glove construction of FIG. 1;

FIG. 6 is a sectional view taken along line 6-6 on FIG. 5;

FIG. 7 is an enlarged detail of the battery pouch construction utilized on the glove of FIG. 1;

FIG. 8 is a section view taken along line 8-8 on FIG. 7; and

FIGS. 9 and 10 respectively illustrate the detail plan view of the blanks of sheet material from which the battery pouch of FIGS. 7 and 8 is constructed.

Referring to the drawings there is illustrated in FIG. 1 a heated glove construction 20 embodying the present invention. For purposes of illustration only, the glove 20 is shown in the form of a mitten. However, it will be understood that the present invention can be embodied in any type of glove body.

The illustrated glove 20 therefore comprises glove body 21 arranged to receive the hand of the wearer and a connected wrist portion 22 adapted to circumscribe the wearer's wrist. The glove body is composed of an outer covering 21A and a complementary inner liner 21B which conforms substantially to the shape of the outer glove body. The glove body may be formed of any desired material and made in accordance with any of the known constructions for making gloves.

An auxiliary source of heat is located within the glove body 21 to provide supplemental heat to the wearer. In accordance with this invention the supplemental heat source comprises a heater construction 23 which is capable of being energized by a very low voltage battery carried directly on the glove to provide the wearer of the glove with complete freedom of movement. The arrangement, as will be hereinafter described, is such that the glove 20 may be worn either as a conventional glove or as an electrically heated glove.

Referring to the FIGS. 3, 4, and 5 the heater construction 23 comprises a strip of bare, flat resistor element 24, e.g., a strip of Nichrome or the like which is capable of being energized by a low voltage battery source. A flat strip of Nichrome, approximately 6¼ inches long by .210 inches wide and .002 inches thick has been found satisfactory. However, it will be understood that the foregoing heater specifications are not critical as the dimension of the element may be varied depending on the resistance characteristic desired of a particular resistor element.

In the illustrated embodiment, the resistor element 24 is shaped to define a substantially U-shaped element in which the respective leg portions of the elements are slightly spaced from one another. However, it will be understood that the resistor element may be made straight or formed into any desired shape. As noted in FIG. 3, the free end portions 24A of the resistor element 24 are provided with preformed folds or creases 26 to facilitate the connection thereof to the ends of the associated wire conductor 26-26. The preformed folds or creases 26 can be readily crimped to the ends of conductor 26-26 to form an electrical and mechanical connection therebetween. Positive mechanical connections between the ends 24A of the resistors and the respective conductors 26-26

is attained by suitable clips 27. Thus a positive mechanical bond and electrical connection is assured between the ends 24A of the resistor element 24 and the corresponding ends of the connected wire conductors 26-26 to provide for trouble free operation throughout the life of the heated glove.

Referring to FIGS. 1 and 6, the resistor element 24 is sandwiched between opposed strips of a heat diffusible material which forms a covering for the element 24. The covering or sandwiching strips 28, 28 in addition to functioning as a heat diffuser or conductor, as will be hereinafter described, function to maintain the shape of the resistor and to prohibit the relatively fragile resistor from breaking. Preferably the strips of sandwiching material 28, 28, are coated on one side with a suitable adhesive so that they can be readily secured in back to back relationship to sandwich the heating element therebetween in heat transfer relationship therewith. It will be understood that any suitable material may be utilized as the heat diffusing, sandwiching or covering material for the resistor element. In the illustrated form of the invention the heat diffusion covering or sandwiching material 28-28 comprises an acetate tape coated on one side with a thermal setting adhesive to facilitate the securing of the resistor element thereto. The heat diffusion covering or material 28, 28, may comprise any suitable material which will permit the heat generated by the resistor element to be conducted or radiated therethrough in an amount which will not burn or otherwise harm the wearer. Other suitable covering material may comprise of metallic foil, plastic tape, fabric tape, fiber glass and/or thin asbestos sheets that will permit heat to be conducted and/or radiated therethrough and/or be diffused in an amount which prohibits the formation of excessive hot spots which may otherwise burn or injure the wearer.

As shown in FIG. 1 the heater 24 is preferably secured by sewn seams 31, 31, to the inner surface of the glove liner 21B adjacent the fingertip portion thereof, and preferably on the palm side 29 of the glove 20. The placement of the heater 24 at the fingertip portion of the glove allows rapid warming of the wearer's fingertips where the blood circulation through the hand is generally the poorest and which therefore suffers greatest from the cold during cold weather. Also by positioning the heater 24 on the inner surface of the palm side of the glove, the wearer can bring the fingertips in direct contact with the heater construction 24 by simply closing or clenching the fist thereby providing for maximum heat transfer from the source of heat to the coldest portion of the wearer's hand. In this way maximum utilization of the heat generated can be utilized. The position of the heater 24 in the fingertip portion of the glove on the palm side thereof further permits the wearer to overcome any large heat loss which may be otherwise occasioned when the wearer is utilizing such glove for holding onto a large metal object.

Referring to FIGS. 1, 4 and 5 it will be noted that the wire conductors 26, 26 utilized for conducting electrical energy to the resistor element 24 are extended to the same side of the resistor element 24 due to the specific U-shaped construction of the element. This construction enables the wires 26, 26 to be threaded through the space 30 defined between the outer glove body 21A and its liner 21B to extend along the side of the glove body 21A to a means for supporting a source of electrical energy directly on the glove.

The means for supporting the source of electrical energy, e.g., a battery 25 on the glove 20 comprises a pocket or pouch 32 secured to the wrist portion 22 of the glove on the back side thereof. The pouch 32, as will be herein described is positioned so that the weight of the battery 25 contained therein is rendered practically unnoticeable to the wearer and provides for minimum of interference with other wearing apparel, e.g., the sleeves and cuffs of other garments.

Referring to FIGS. 7 through 10 the pouch 32 is constructed of two blanks 33, 34 of sheet material which are arranged so that when secured together they define a pouch or pocket volume 34 which will snugly receive the low voltage battery 25. The battery 25 for energizing the heater comprises essen-

tially a flashlight type battery having a voltage capacity of approximately one and one-half (1½) volts and which may comprise either a standard dry cell flashlight battery, an alkaline battery, a nickel cadmium battery, or any other battery of like low voltage capacity.

Referring to FIG. 9, the back portion of the pouch is constructed of blank 33 which is generally rectangular in shape with the longer dimension 33A defining the back side of the pouch 32 and associated flap portion 33C. The shorter dimension 33B defines substantially the width of the pouch 32. As shown in FIGS. 7 and 8 the blank 33 defines the back portion of the pocket or pouch volume 35 and a connected flap portion 33C which is adapted to be folded over the open end of the pouch volume 35 to secure within the pocket 35.

The blank 34 of FIG. 10 is sized so as to have a substantially rectangular portion 34A having its longer dimension adapted to be disposed transversely relative to the longer dimension of blank 33. Integrally formed to the rectangular portion of blank 34 is a centrally disposed web portion 34B depending from the lower edge. The rectangular portion 34A of the sheet material 34 of FIG. 10 is sized so as to define integrally formed opposed sidewall portions 36-36 on interconnecting front wall portion 37 of the pocket volume 35.

In the assembled pocket forming position, as seen in FIG. 7, the rectangular portion 34A of the sheet 34 is secured to sheet 33 along the marginal edges 38 thereof so as to define therebetween a pocket volume sized to snugly receive the battery 25. In the illustrated form, the marginal portions 38 of blank 34 are disposed in overlying position with the lower marginal portions of blank 33 whereby the overlying marginal portions are suitably secured together as by sewing, fusing or adhesion to define the pocket construction of FIG. 7. The web portion 34B is folded along foldline F, with the free end 34C being similarly secured to the lower edge of the back portion 36 to form the bottom wall 41 of the pocket. As shown, the web portion 34B defining the bottom wall 41 is provided with an aperture 39 through which one of the wire conductors 26 is adapted to extend. A contact plate 40 of electrically conducting material is located in the bottom of the pouch, and it is electrically connected to the conductor 26 which extends through aperture 39. The contact plate 40 is adapted to make electrical contact with one of the battery electrodes when the battery is connected in circuit to the heater 23.

The upper portion of the blank 33 defines a flap 33C which is adapted to be folded over the end of the battery contained within the pouch or pocket to secure battery 25 therein. As shown, an intermediate portion of the flap 33C is provided with an electrical contact button 42 which is arranged to engage the other electrode or bottom of the battery 25 to complete the electrical circuit to the heater, whenever the flap 33C is closed. Contact button 42 is connected in circuit to the heater by the other conductor 25. It will thus be noted that when flap 33C of the pouch is closed that the electrodes of the battery are connected in electrical contact with the contact plate 41 and the contact button 42 to complete the circuit to the battery. The flap thus functions as a switch means by which the battery is connected into and out of circuit with the resistor elements, i.e., the circuit to the heater is open when the flap is open and the circuit energized when the flap is closed. To positively secure the flap in the closed position, a closing tab 43 is connected to the free end of the flap 33C. Connected to the tab 43 is a suitable fastener 44, e.g., a snap fastener which is arranged to mate with a complementary fastener 44A located on the front portion of the battery pouch 32. To insure positive engagement of the battery with contacts 40 and 42, it is preferred that tab 43 be formed of elastic material so that it is under stress when the flap is closed.

From the foregoing description it will be apparent that the glove may be worn either as a conventional glove or as a heated glove when a battery is secured within the battery pouch and connected in electrical circuit with the heater. The arrangement of the pouch 32 on the back of the wrist portion of the glove renders its presence substantially negligible and

free from interference from other articles of clothing which may be worn by the wearer. Also the heater construction 23 is such that it can be readily secured to the glove body as by sewing along opposed seams 31, and it further constructed and arranged so as to avoid the formation of any hot spots which could otherwise burn or render the use thereof uncomfortable to the wearer. If the glove body is made of a fabric material the entire assembly of glove and heater can be rendered readily washable inasmuch as the heater element is suitably secured or sandwiched between back to back sheets of a heat diffusing material which will provide the necessary support for the very thin gauge resistor element. Also the heat diffusion or conducting material sandwiching the heater element provides an adequate support for the resistor element while at the same time permitting the heat to be generated thereby to be diffused and maintained at a temperature which is warm and comfortable for the wearer. The blanks 33 and 34 from which the pouch is constructed while may be readily formed of suitable sheet material are preferably formed of sheet plastic material which permits the blanks to be secured in assembled form by seams that are fused or formed by heat seals.

While the instant invention has been 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.

We claim:

1. A low voltage battery operated heating glove comprising:
 - a glove body having a hand receiving portion and a connected wrist portion;
 - a liner complementing said glove body disposed within said glove body;
 - a heater means disposed in said liner adjacent the fingertip end thereof;
 - said heater means including a flat strip of electrical resistant material which is reversely bent to define a U-shaped element;
 - a strip of heat diffusing material adhesively secured in back to back relationship for sandwiching said heater element therebetween;
 - a sewn seam securing the longitudinal edges of said strip of heat diffusing material to said liner adjacent the fingertip end thereof;
 - said heater means being secured to palm side of liner;
 - means for supporting a low voltage battery directly on the backside of said wrist portion;
 - said latter means including first and second blank of sheet material formed to define a pocket for receiving a battery;
 - said first blank being substantially rectangular to define a back portion and connected flap portion;
 - said second blank defining the opposed side portions; front portion and bottom portion of said pocket;
 - said opposed side portions having marginal portions adapted to overly the complementary marginal portions of said first blank;
 - opposed electrical contacts connected to said pocket for en-

- gaging the electrodes of a battery adapted to be supported in said pocket only when said flap is closed;
 - said opposed contacts including a conducting plate disposed on the bottom of said pocket;
 - a contact button connected to said flap for engaging the electrode of the battery for electrical contact when the closed position of the flap only;
 - means for securing said flap in the closed position;
 - electrical conductors connecting each of said contacts in circuit with said resistant material; and
 - said electrical conductors extending from the contacts to the heater being threaded between the liner and the outer glove body.
2. A low-voltage self-contained battery operated heating glove comprising:
 - a glove body including an outer covering and liner;
 - said glove body having a hand receiving portion and a connected wrist engaging portion;
 - said liner complementing said outer covering so as to be disposed within said outer covering;
 - a heater means disposed on said liner adjacent the fingertip portion thereof only;
 - said heater means including a bare strip of elongated electrical resistant material;
 - a strip of heat diffusing material having a width greater than the width of said bare strip of resistant material;
 - said heat diffusing strip being adhesively secured in back to back relationship for sandwiching said bare strip of resistant material therebetween in direct heat transfer relationship to define a heater assembly;
 - a sewn seam securing the longitudinal edges of said heat diffusing strip to said liner adjacent the fingertip portion thereof;
 - means for supporting a low-voltage battery directly on said glove body;
 - said latter support means including a first and second blank portion of sheet material to define a pocket for receiving a battery;
 - said first blank portion being shaped to define a back portion and a connected flap portion;
 - said second blank portion defining the opposed side portions; connected front portion and bottom portion of said pocket;
 - said opposed side portions having marginal portions adapted to overly complementary marginal portions of said first blank portion;
 - opposed electrical contacts connected to said pocket for engaging the electrodes of a battery adapted to be supported in said pocket only when said flap is closed;
 - said opposed contacts including a contact plate disposed on the bottom of said pocket;
 - a contact plate connected to said flap for engaging the electrode of the battery in the closed position of the flap only;
 - means for maintaining said flap in the closed position; and
 - electrical conductor means for series connecting said resistant material in circuit with said contact plates.

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