

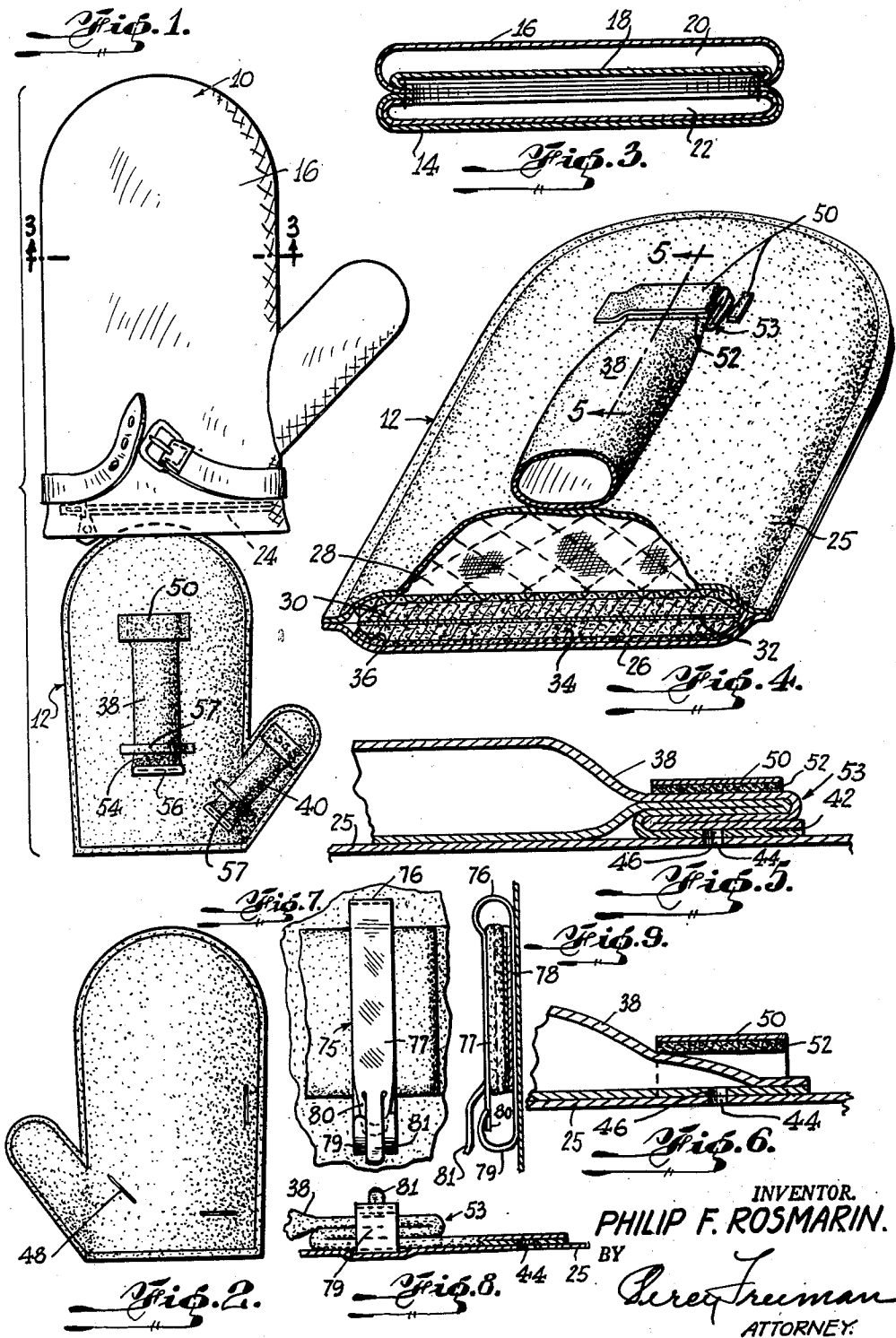
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REPLACEABLE FLEXIBLE HEATING INTERLINING UNIT

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REPLACEABLE FLEXIBLE HEATING
INTERLINING UNIT

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7 Claims. (Cl. 126—204)

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This invention relates to replaceable flexible heating interlining units for garments.

In extremely cold climates and at very high altitudes, warm clothing is insufficient in itself to keep the body warm. At best, warm clothing merely retains the body heat and prevents it from escaping and it serves as a barrier between the body and the cold air surrounding the body. It has been found that heat-producing means are required, in addition to warm clothing, to keep the body reasonably and comfortably warm. This is particularly true of men in the armed services since their ability to conduct active warfare depends in large measure upon their ability to maintain their body temperature at relatively comfortable levels. An army cannot march on frozen feet, and gun triggers cannot be pulled by frozen fingers.

It is accordingly the principal object of this invention to provide portable heating means which may be carried by or inserted into the clothing so as to produce such heat as may be necessary to maintain the body at a reasonably comfortable temperature. The heat-producing means constituting the present invention may be provided in the form of a padded interlining unit which may be applied to various parts of the body. For example, it is well known that the body extremities are most susceptible to frostbite, and heating units in accordance with the present invention may be inserted into mittens or gloves and similarly into leggings, etc., in order to prevent the freezing of the limbs. Similar units may be applied to other parts of the body and they may be made in varying sizes so as to cover varying areas of the body. For purposes of illustration, the present invention will be described solely in terms of its application to a mitten.

In the preferred form of this invention, the heat producing means comprises a sealed envelope containing padding and a heat-producing chemical composition. The heat-producing composition is normally inactive and it may be activated by applying to it a suitable liquid. This liquid is contained in one or more small containers mounted on the sealed envelope. Communication between said containers and the chemical composition is provided, but means is also provided for preventing such communication until it is desired to activate the chemical composition and thereby to produce heat. Activation of the chemical composition may require a continuous flow of oxygen and this may be provided by simply incorporating suitable open-

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ings into the envelope to allow the air to enter.

The preferred form of this invention above described is shown in the accompanying drawing, in which:

Fig. 1 is an exploded view showing a mitten and a mitten-shaped heating unit made in accordance with this invention, which is adapted to be inserted into the mitten.

Fig. 2 is another view of the mitten-shaped heating unit showing the side which is opposite the side shown in Fig. 1.

Fig. 3 is an enlarged cross-section through the mitten, taken on the line 3—3 of Fig. 1.

Fig. 4 is an enlarged perspective view, in section, showing the construction of the mitten-shaped heating unit.

Fig. 5 is an enlarged fragmentary section on the line 5—5 of Fig. 4, showing the communication and closure means between the unit proper and the container of activating liquid.

Fig. 6 is a similar view showing how the liquid container communicates with the unit.

Figures 7 to 9 illustrate another closure means comprising a spring clip means, Figure 7 being a plan view thereof and Figures 8 and 9 showing two side views thereof normal to Figure 7 and to one another.

Mitten 10 shown in Fig. 1 of the drawing is intended to accommodate the mitten-shaped heating unit 12. The mitten has a palm portion 14 and a portion 16 which extends across the back of the hand. A partition 18 is provided in the mitten to separate it into an upper compartment 20 which is intended to accommodate the heating unit 12, and a lower compartment 22 which is intended to accommodate the hand. A slide fastener 24 constitutes a closure for upper compartment 20 to retain the heating unit. In all other respects mitten 10 may be of conventional construction.

The construction of heating unit 12 is best shown in Figs. 4 and 5. It will there be seen that the heating unit includes a waterproof envelope consisting of an upper covering sheet 25 and a lower covering sheet 26 which may be integral with each other or attached to each other and sealed along their respective edges. These two sheets which together constitute the envelope of the heating unit may be made of any suitable material such as nylon cloth coated with neoprene rubber and united in any suitable manner as by cementing or sewing, etc. along their respective edges. In this particular application of the invention, it will be noted that the envelope consists of a hand portion including the thumb, in the manner shown in Fig. 1.

Inside the envelope and immediately below the upper covering member 25 is a sheet or layer 28 of porous cloth, such as muslin. Below the muslin cloth is a bat or layer 30 of cotton wadding or wool or other suitable material. Below the cotton wadding is a layer 32 of a chemical composition, hereinafter more fully described, which evolves heat when properly activated. Below the chemical layer is a second bat 34 of suitable material such as wool or cotton wadding. Underneath the latter bat is a sheet or layer 36 of metallic cloth or wire mesh or any other similar material, although strangely enough a layer of newspaper will function substantially as well as the metallic cloth or wire mesh. Aluminum coated fabric and aluminum cloth have been found satisfactory for this purpose. The five layers or plies mentioned, namely 28, 30, 32, 34 and 36 are quilted together as shown for convenience in handling and to insure maintenance of uniform distribution of the dry chemicals. It will, of course, be seen that the last-mentioned layer 36 rests upon the lower covering member 26 of the envelope.

The chemical composition which constitutes layer 32 may be conventional in formula and any suitable heat-producing compound may be used for the purposes of this invention. It is, of course, essential that the production of heat be long sustained and that the temperature produced be adequate, but not excessive. Naturally, variations in the formula and quantity of the material used and other conditions which will shortly be described will be productive of greater or lesser quantities of heat over longer or shorter periods of time. Illustrative of the chemical formulae which have been found suitable for the purposes of this invention are the following:

Example I

Chemical Substance:	Parts by weight
Aluminum powder.....	30
Sodium nitrate.....	20
Calcium hydroxide.....	10
Soda ash.....	10
Inert filler.....	30

Example II

Chemical Substance:	Parts by weight
Sodium chlorate.....	5-18
Aluminum powder.....	5-18
Copper sulphate.....	2-18
Talcum powder.....	7-18

It will be noted that two collapsible tubular containers 38 and 40, respectively, are attached to the envelope of the heating unit and more particularly to its upper covering member 25. These tubular containers are intended to contain a suitable activating liquid such as water or a water-alcohol solution for activating the chemical composition constituting layer 36.

Since the construction of the two tubular containers is identical, it will suffice to describe only one, namely, tubular container 38 shown in Figs. 4, 5, and 6.

Tubular container 38 is closed at its forward end 42. This may be done in any suitable way as by sewing or cementing, etc. It will, of course, be understood that tubular container 38 may be made of the same material as the envelope of the heat-producing unit, and it may be secured to the top covering member 25 thereof in any suitable manner. The application of heat or cement are two possible methods of attaching the tubular container to the envelope. Also if desirable, the

envelope and containers may be made or molded as a single integral unit. Holes 44 are formed in the upper covering member 25 of the envelope and registering holes 46 are formed in the tubular container 38. When the tubular container is in the position which it is shown to occupy in Fig. 6, communication may be had between the inside of said tubular container and the inside of the envelope through holes 44 and 46.

The liquid in the collapsible tubular containers will trickle through the registering holes 44-46, or it may be forced through by squeezing the tubular container, and it will be absorbed by the several layers of cloth and padding which the envelope contains. When the moisture encounters the chemical composition sandwiched between the layers, heat is produced. The number and size of holes 44 and 46 will determine the rate of flow of the liquid from the tubular container to the envelope and the rapidity with which heat will be produced. Other variables are, of course, the nature of the chemical composition itself and the porosity of the padding which surrounds the chemical composition.

Another important factor is the availability of oxygen as one of the elements in the heating reaction above mentioned. To secure a desired supply of oxygen, slits 48 are formed in the lower covering member 26 of the envelope and these slits are just large enough to allow sufficient air to enter the envelope and to allow such gases as may be produced by the heating reaction to escape from the envelope.

Fig. 5 shows how the activating liquid may be prevented from prematurely entering the envelope. It will be noted that the forward end of the tubular container may be folded over upon itself one or more times and its folds are inserted under a strip or band 50 which is fastened at both ends to the upper covering member 25 of the envelope. This band tends to secure the folds, and it will be understood that when the tubular container is folded in such manner, the passage of liquid to the envelope will be prevented. It may be found desirable to apply a certain amount of pressure to the folds in order to prevent the leakage of liquid therethrough, and this may be done by inserting a piece of cardboard 52 or the like between said band 50 and the folds 53 of the tubular container.

Obviously, other valve means may be used to seal off the liquid from the envelope until heat is needed.

One such valve or closure means which has been found extremely satisfactory is illustrated in Figs. 7, 8 and 9. In this modification, a spring clip 75 is used to clamp together the folds 53 of the tubular container 38. The clip 75 includes a bar 78 which is bent upon itself forming a bight 76 and continuing as a resilient bar 77 having a nose 80 which may be entered under the hooked locking end 79 of the bar 78. To facilitate the operation of the resilient bar 77 there is extended from said bar a manipulating thumb piece 81 which may be used for depressing the bar 77 out of the notch in the hooked end 79. The application of the clip 75 to the folds of the container 38 is readily apparent.

When it is desired to start the reaction between the liquid and the chemical composition, all that need be done is to pull the tubular container outwardly to its unfolded position as shown in Fig. 6, or remove clip 75 of Figs. 7, 8 and 9. The liquid is now free to enter the envelope through registering holes 44 and 46. It may here be stated

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that the liquid may be inserted into the tubular container after its forward end is folded over and sealed off in the manner above described. This may be done by simply inserting the liquid through the back end 54 of the tubular container and then sealing the back end in any suitable manner as for example by means of clips or staples 56, or cement. Retaining loops 57 may be provided into which the free end of the collapsible tube may be inserted to insure against free movement of the tube.

The foregoing is illustrative of a preferred form of this invention, and it will be clearly understood that this preferred form may be modified and other forms may be provided within the broad spirit of the invention and the broad scope of the claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A heat producing flexible interlining for articles of clothing comprising an envelope, padding in said envelope, a heating compound enclosed within said padding, a collapsible tube having a part of one of its walls secured contiguously to one of the walls of said envelope, said contiguous walls having permanently registering holes extending therethrough to provide communication between said tube and said envelope, means for closing said passageway, an activating liquid in said collapsible tube, said activating liquid being absorbed by the padding to react with the heating compound to produce heat when the closing means is removed from the passageway allowing passage of the liquid from the tube into the envelope, said envelope having small openings therethrough to provide communication between the inside thereof and the atmosphere whereby to enable atmospheric air to enter said envelope and to supply oxygen to the extent that it may be required for the reaction between said heating compound and said liquid.

2. A heat-producing flexible interlining in accordance with claim 1, wherein the collapsible tube is folded over upon itself where it joins the first envelope to close off the passageway between the tube and envelope, a band being provided on the first envelope to engage the folds of the tube near its root to prevent unfolding thereof and thereby to prevent opening of the passageway.

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3. A heat-producing flexible interlining in accordance with claim 1, wherein the envelope and the tube are made of neoprene-coated nylon fabric.

4. A heat-producing flexible interlining in accordance with claim 1, wherein the heating compound is provided in the form of a layer quilted between two absorbent paddings.

5. A heat-producing flexible interlining in accordance with claim 1, wherein the heating compound is provided in the form of a layer sandwiched between two absorbent paddings.

6. A heat-producing flexible interlining in accordance with claim 1, wherein the heating compound is provided in the form of a layer sandwiched between two absorbent paddings, a sheet of muslin fabric being disposed in covering relation to one of the paddings and a sheet of metallized cloth being disposed in covering relation to the other padding.

7. A heat-producing flexible interlining in accordance with claim 1, wherein the heating compound is provided in the form of a layer sandwiched between two absorbent paddings, a sheet of muslin fabric being disposed in covering relation to one of the paddings and a sheet of metallized cloth being disposed in covering relation to the other padding, and wherein all of the several layers contained within the envelope are quilted together.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
858,848	Allison	July 2, 1907
1,502,744	Perrault	July 29, 1924
1,659,185	Baker	Feb. 14, 1928
1,714,741	Urquhart	May 28, 1929
1,970,081	Eisendrath	Aug. 14, 1934
2,157,169	Foster	May 9, 1939
2,371,521	Heywood et al.	Mar. 13, 1945
2,429,973	Alexander	Nov. 4, 1947
2,465,117	Pierson et al.	Mar. 22, 1949
2,541,736	Alexander	Feb. 13, 1951
2,573,791	Howells	Nov. 6, 1951

FOREIGN PATENTS

Number	Country	Date
161,501	Germany	June 30, 1905