

[54] **COOLING MEANS FOR WORKMEN**

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150/2.2, 2.3, 2.4

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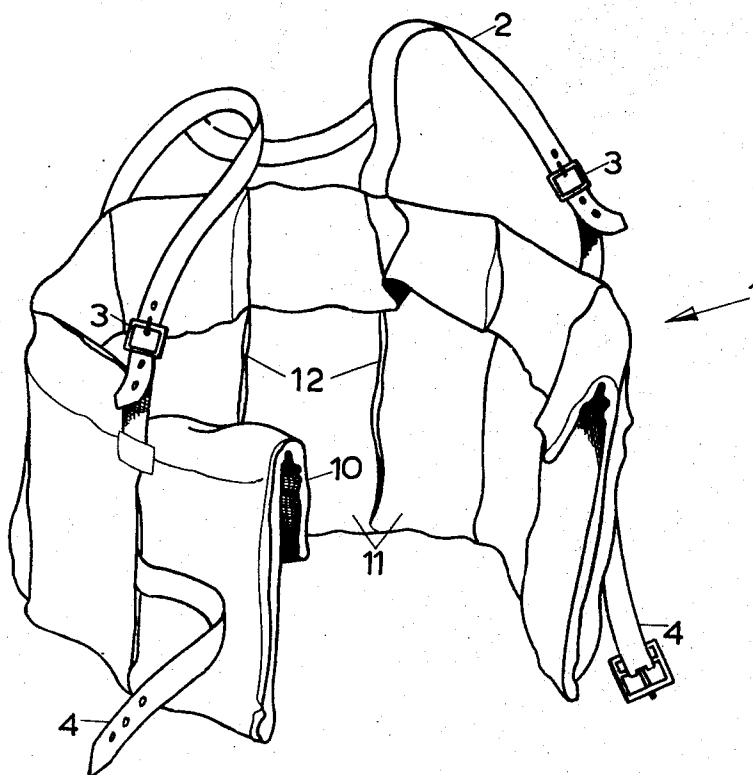
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[57] **ABSTRACT**

An article adapted to be releasably fixed around a human torso, the article having pockets formed therein between inner and outer layers of heat insulating material to receive solid, volatile, expendable refrigerant, means being provided for directing gases liberated by sublimation of the said refrigerant from within each pocket to the exterior of the article on the side thereof containing the inner insulating material and consequently to the body of the wearer.

7 Claims, 2 Drawing Figures



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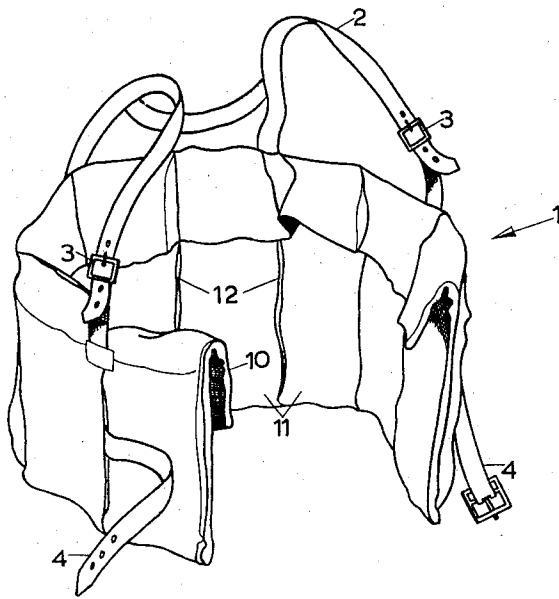


FIG. 1

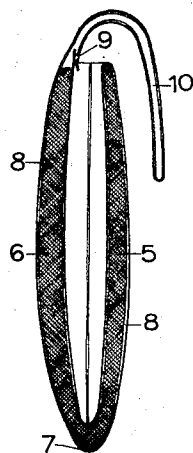


FIG. 2

COOLING MEANS FOR WORKMEN

This invention relates to cooling means for workmen working in hot environments, for example, miners or stokers.

In order to improve the physiological conditions and consequently the work output of miners, it has been proposed to supply miners with cooling jackets. One such jacket had bags formed integrally therewith in which water was contained. A disadvantage of this type of jacket is it would have to be cooled in a refrigerator prior to use to freeze the water. Also, the said pockets would have to be completely watertight to prevent leakage. Further, for adequate cooling a heavy fixed mass is borne by the wearer.

It is the object of this invention to provide a cooling jacket or other article of clothing which has advantages over those presently known.

According to this invention there is provided an article adapted to be releasably fixed around a human torso, the article having pockets formed therein between inner and outer layers of heat insulating material to receive solid, volatile refrigerant, means being provided for directing gases liberated by sublimation of the said refrigerant from within each pocket to the side thereof containing the inner insulating material.

Further features of the invention provide for the pockets to be situated adjacent one another along the length of the article, for said means to be a flap adapted to be folded over the upper, open ends of the pockets to overlie the inner insulating material for a portion of its height and for the outer layer of insulating material to have a higher thermal insulation than the inner one.

An alternative feature of the invention provides for said means to be embodied in the inner layer of insulating material by virtue of it being permeable.

One embodiment of the invention is described below by way of example, reference being made to the accompanying drawings in which:

FIG. 1 is an isometric view of an article according to the invention; and

FIG. 2 is a sectional elevation taken through a pocket formed in the article.

In this embodiment of the invention the article is formed as a broad flexible belt 1. To enable it to be carried by a person at chest height, the belt is provided with a shoulder harness 2 having means for adjustment thereof, such as at 3. Straps 4 provide means for adjustably fastening the belt around the person's chest.

The belt 1 comprises an inner layer 5 and an outer layer 6 of heat-insulating material. The layers 5 and 6 are preferably formed from a single mat of insulating material folded about its longitudinal center line, as indicated by numeral 7 in FIG. 2. Both major surfaces of the said single mat forming the layers 5 and 6 are covered by a thin sheet 8 of impervious material. The sheet 8 is preferably a single sheet, shown in FIG. 2 to commence from the upper end of the outer layer 6 on the inner side thereof as at 9 and extending around the inner and outer surfaces of the layers 5 and 6 until it reaches the upper end of the outer layer 6 on the outer side thereof. From here the sheet 8 is extended a distance and returned to the point 9 where it is joined or stitched, thereby forming a flap 10.

Alternatively, the layer 5 may be of impervious material with a separate flap joined onto the outer layer.

Pockets 11 are formed adjacent one another along the length of the belt 1 by joining or stitching the layers 5 and 6 together in vertical fashion and at spaced intervals, as indicated by numeral 12. The upper end of each pocket thus remains open with the flap 10 being adapted to be folded over these ends to overlie the inner layer 5 of the belt for a part of its height. In a preferred form of the invention the outer layer 6 will be made to have a higher thermal insulation than the inner layer 5.

In use, pellets, blocks or rods (not shown) of solid carbon dioxide, commonly known as "dry ice", are placed in each pocket 11 and the belt 1 is strapped around a person's chest. Latent heat of sublimation will be withdrawn mainly from the wearer's body, causing cooling thereof.

Also, gases liberated by sublimation of the dry ice will be directed from the interior of each pocket 11 onto the wearer's body, due to the orientation of the flap 10 with respect to the upper, open ends of the pockets. These gases will cause cooling of the wearer's body in two ways. Firstly, sensible heating of the gases will result due to heat transfer between the wearer's body and the gases. Secondly, convection of the gases on the skin will result in further cooling in that the gases, being dry, will assist in evaporation of any perspiration produced by the wearer.

Another method of directing the gases liberated onto the wearer's body would be to make the inner layer 5 of permeable material to enable the gases to pass there-through.

As a result of the differences in insulating characteristics of the inner and outer layers, a minimum heat transfer is obtained between environment and the refrigerant and a controlled heat transfer between the wearer and the refrigerant.

It will be appreciated that the straps 4 provide means for regulating the cooling rate of the wearer's body. Thus, by loosening the belt, the cooling rate will be lessened due to the lesser contact of the belt and of the gases with the wearer's body. The straps may also be tightened periodically to compensate for the shrinking of the dry ice due to sublimation.

It is considered that effective cooling of a person's body in the region around his chest will substantially decrease fatigue induced by environmental heat.

A further advantage of the use of expendable refrigerant is a progressive reduction in the load borne by the wearer.

What I claim as new and desire to secure by Letters Patent is:

1. An article adapted to be releasably fixed around a human torso, said article comprising:

an inner layer of heat insulating material covered by an outer layer of heat insulating material, said layers forming pockets for receiving solid, volatile, expendable refrigerant material, adjustable straps attached to said pockets for fitting the article around a human torso and thereby regulating the cooling effect of the article;

and means for directing gases liberated by sublimation of the refrigerant material from within each pocket to the exterior of each pocket on the side of each pocket adapted to face the human torso.

2. An article as claimed in claim 1 in which the layers of insulating material are impervious material.

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3. An article as claimed in claim 1 in which the layers of insulating material are porous and covered with impervious material.

4. An article as claimed in claim 1 in which the inner layer has lower insulation properties than the outer layer.

5. An article as claimed in claim 1 in which the said layers of insulating material are formed from a single mat folded substantially about its longitudinal center line, the pockets being formed adjacent one another along the length of the article by the layers being joined

together at spaced intervals in directions transverse to the said center line.

6. An article as claimed in claim 1 in which each pocket is open at one end thereof with the said means comprising a flap joined to the outer layer and adapted to be folded over the open end of each pocket to overlie the inner layer for a portion of its height.

7. An article as claimed in claim 1 in which the said means is embodied in the inner layer by virtue of it being permeable.

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