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W. A. BEMELMAN

3,125,865

COOLING CLOTHING

Filed Jan. 29, 1963

FIG. 1

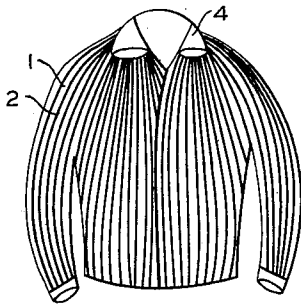


FIG. 2

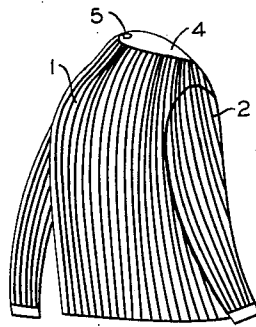


FIG. 3

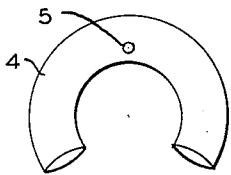


FIG. 4

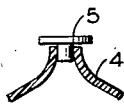


FIG. 5

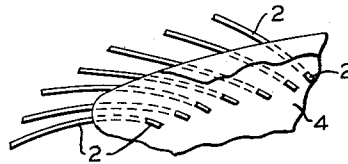


FIG. 6

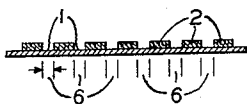
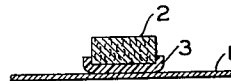


FIG. 7



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3 Claims. (Cl. 62-259)

This invention relates to cooling devices, and more particularly, to garments which are specially adapted to provide cooling for the body of a wearer.

Garments per se and devices adapted to be incorporated into garments have been devised heretofore which utilize the process of evaporation to provide cooling for the body of a wearer. In United States Patent 2,544,381, issued on March 6, 1951 to Isaac Goldmerstein, a multilayer cooling belt is disclosed comprising a layer of waterproof, but highly heat conductive material adapted to be fastened adjacent the body of a wearer, and a layer of absorbent fabric attached to and substantially covering the back of the waterproof layer. An auxiliary container is provided along with the belt for containing a liquid which is used from time to time to wet the absorbent fabric. As the liquid on the fabric evaporates, body heat is drawn through the waterproof layer, thereby providing cooling.

Such a device, although effective for cooling localized regions, has not been found particularly suitable for cooling large areas of the body because the waterproof layer prevents discharge to the atmosphere of accumulated perspiration. Such a condition subjects the wearer to considerable discomfort regardless of the surrounding temperature.

Another device utilizing evaporation to provide body cooling is disclosed in United States Patent 2,010,132, issued on August 6, 1935 to J. C. Bischoff. The apparatus disclosed therein comprises a reservoir having an attached metallic evaporating plate and a distributor for continuously and at a determinable rate applying a volatile liquid contained in the reservoir to a cellulose backing on the plate. While such a device, as was the case with the belt of aforementioned Patent 2,544,381, is suitable for cooling small areas of the body, it is not practicable to cover large areas of the body with a metallic plate.

Accordingly, an object of the present invention is to cool relatively large areas of the human body with a conveniently wearable garment which at the same time permits accumulated perspiration to be exhausted to the atmosphere.

It is another object of the invention to provide a body cooling garment which overcomes the disadvantages resident in prior art type cooling garments.

In accordance with the invention, garments constructed of moisture permeable fabric are provided with capillary fibres attached at spaced intervals over the outer side thereof by means of a waterproof but highly heat conductive substance, for example, moisture resistant glue. All of the capillary fibres terminate in a liquid filled reservoir which constitutes a part of the garment. Liquid from the reservoir is continuously disbursed throughout the fibres by virtue of capillary action, but is prevented by the waterproof substance from seeping through the garment. As the liquid evaporates, body heat is drawn through the waterproof substance, thereby providing cooling. Between adjacent fibres exist bands of the moisture permeable fabric through which body perspiration is permitted to be exhausted to the atmosphere. Accordingly, the invention advantageously provides considerable cooling to large areas of the body, and at the same time garments constructed in accordance therewith exhibit substantially the same properties with respect to perspiration expulsion as do regular clothing.

The foregoing and other objects, features and advan-

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tages of the invention will be more thoroughly understood by reference to the following detailed description of an illustrative embodiment of the invention in conjunction with the accompanying drawing in which:

5 FIG. 1 is a frontal view of a blouse-type garment constructed in accordance with the principles of the invention;

FIG. 2 is a combined side-rear view of the blouse shown in FIG. 1;

10 FIG. 3 shows a reservoir for containing the liquid coolant which wets the capillary fibers;

15 FIG. 4 is a sectional view of the intake opening of the reservoir;

FIG. 5 is a fragmentary view of the reservoir showing the manner in which the capillary fibers terminate;

20 FIG. 6 is a cross-sectional view of the fabric of the blouse indicating the general manner in which the capillary fibers are disposed thereon; and

25 FIG. 7 is an exploded cross-sectional view showing the manner in which a single capillary fiber is secured to the fabric of the blouse.

Throughout the drawing identical elements which are shown in more than one figure are designated by the same reference numeral.

30 With reference to FIGS. 1 and 2 of the drawing, the invention is shown embodied in a blouse-type garment which is constructed principally of an underlying fabric 1 which is permeable to moisture. Secured vertically to the outer surface of fabric 1 are a plurality of capillary fibers 2 which are disposed at spaced intervals to each other and collectively surround the entire blouse. As shown in FIG. 7, the fibers 2 are individually bonded to fabric 1 by a substance 3 which is preferably a water resistant but highly heat conductive glue that will not be affected by temperatures normally encountered by a wearer. For purposes of illustration, but not limitation, it has been found that the thermoplastic glue known as polyacrylate manufactured by N. V. Gebr. Struyck, Zutphen, Holland, and the glue known as copolymer of polyvinylacetate manufactured by N. V. Saba-Dinxperloo, Holland, are satisfactory bonding substances for this purpose. Accordingly, as seen from the sectional view of FIG. 6, moisture permeable fabric 1 is exposed to the atmosphere in bands 6 which are situated vertically intermediate fibers 2. The blouse is completed by a liquid containing reservoir 4 which is preferably located on an upper portion of the blouse, for example, around the collar. As shown in FIGS. 3 and 4 the reservoir includes an intake opening for a liquid with a removable plug. It will be observed from FIG. 5 that the capillary fibers 2 all terminate inside of reservoir 4.

35 As a result of capillary action, aided by gravity, the liquid in reservoir 4, which may be ordinary water, is continuously absorbed and distributed throughout fibers 2. Because of the water resistant substance 3, however, the liquid will not come into contact with fabric 1. As the liquid in fibers 2 evaporates, the requisite heat will, in part, be drawn from the wearer through substance 3 so as to provide cooling. It will be observed that any perspiration from the wearer is permitted to be exhausted to the atmosphere through bands 6 of the fabric 1 in the same manner as ordinary clothing.

40 In all cases it is to be understood the particular embodiment of the invention described herein is merely illustrative, and numerous other adaptations and modifications may be devised without departing from the true spirit and scope of the invention.

What is claimed is:

70 1. A cooling device comprising a garment, said garment being constructed of a moisture permeable fabric, a reservoir affixed to said garment, and a plurality of spaced capillary fibers terminating in said reservoir and

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distributed over an outer surface of said garment, said fibers being individually bonded to said fabric by a water resistant and highly heat conductive substance.

2. A cooling device comprising a garment constructed of a moisture permeable fabric, a reservoir affixed to said garment, and a plurality of spaced capillary fibers terminating in said reservoir and distributed over an outer surface of said fabric, said fibers being individually bonded to said surface by water resistant and highly heat conductive substance, whereby bands of exposed moisture permeable fabric are present intermediate said spaced fibers.

3. A cooling device comprising a blouse-type garment having a layer of moisture permeable fabric, a reservoir affixed to the collar region of said garment, a plurality of spaced capillary fibers terminating in said reservoir, said

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fibers extending vertically downward from said reservoir and in aggregate completely surrounding said garment, said fibers being individually bonded to said fabric by a water resistant and highly heat conductive glue, whereby vertical bands of said fabric are exposed intermediate said fibers.

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