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VENTILATOR FOR PROTECTIVE GARMENT

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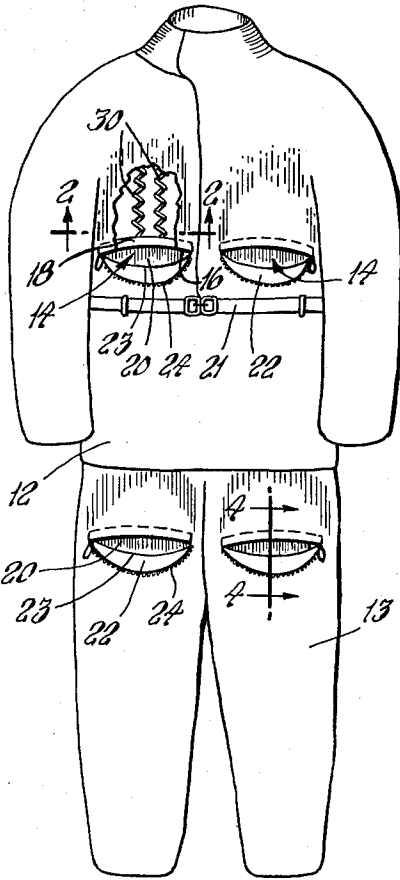


Fig. 1

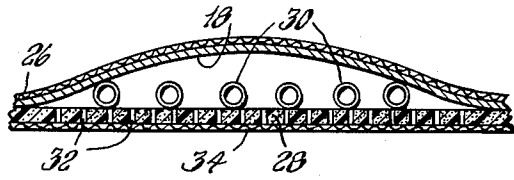


Fig. 2

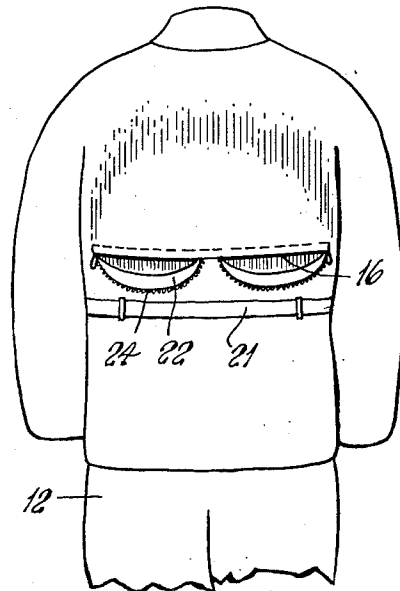


Fig. 3

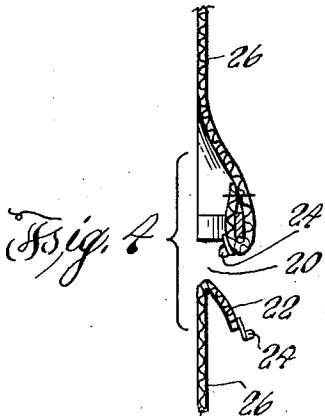


Fig. 4

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1

3,045,243

**VENTILATOR FOR PROTECTIVE GARMENT**

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2 Claims. (Cl. 2-1)

(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

This invention relates to a method and means for controlling the ventilation of a protective garment.

Specific types of garments which protect their wearers against extremes of cold weather such as are found in the polar regions are in use in the military forces. Some of these garments known as the "moisture barrier type" utilize an impermeable outer layer such as a rubber-coated fabric over a middle layer of insulating material and an inner layer of permeable fabric and do not permit the passage of moisture from the body to the atmosphere. Under conditions of physical exertion and/or somewhat moderate environmental temperatures, this can result in extreme discomfort to the wearer from heat and dampness inside the garment. Such discomfort can be overcome by providing means for the circulation of air inside the garment and dissipation of moisture vapor.

The usual methods for circulating air inside the garment and evaporating perspiration are either doffing the garment or opening the normal garment fasteners. In either case, this sudden exposure of large areas of damp undergarments or skin can lead to illness through chilling. Also, opening the garment may interfere with the normal movement of the wearer in the performance of work. A better means of ventilating such garments is therefore desirable.

The objects and advantages of the present invention are accomplished by providing a garment in which there is a slitting of the outer impermeable layer of the garment in at least one, and preferably more, locations in the chest, back and upper thigh regions, and forming an opening by bowing one edge of the slit away from the wearer by means of a curved spacer. If desired, the slit may be made closeable by affixing a slide fastener to its two edges.

An object of this invention is to provide means to ventilate protective garments of the moisture-barrier type.

Another object is to extend the temperature latitude within which moisture-barrier-type protective garments can be utilized.

A further object is to provide controlled ventilation of moisture-barrier-type protective garments.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. 1 is a perspective view of the front of a protective garment employing the invention, the protective garment consisting of a jacket and trouser combination;

FIG. 2 is a cross-section of the jacket taken through the line 2-2 of FIG. 1;

FIG. 3 is a perspective view of the jacket as seen from the rear; and

FIG. 4 is a cross-sectional view taken along the lines 4-4 through one of the knee openings in FIG. 1.

FIG. 1 shows the front of a jacket 12 and trousers 13 of the type employed in some cold weather protective garments. Two slits 14 have been made in the jacket 12

2

approximately at the level of the wearer's solar plexus and two more in the trousers in the upper thigh region. The upper edge of each slit forms a lip 16 which is bowed out by means of a curved spacer 18 (see FIG. 2) of rigid material such as steel. This forms a permanent opening 20 extending into the chest region of the jacket. To close this opening 20 whenever it is desirable to do so, a flap 22 (shown larger than it actually is) may be affixed to the lower edge 23 of the slit 14 and complementary halves of a slide fastener 24 may be sewn to the other edge of the flap 22 and to the upper lip 16 of the slit. A cross-sectional view of a slit area is shown in FIG. 4.

In order to permit the air at the opening 20 of the slit 14 to circulate up to the upper chest region, a spacer is placed between the outer impermeable layer 26 and the insulating layer 28 of the garment. This spacer may, for example, consist of coils 30 of spring steel extended lengthwise from the slit opening 20 into the upper chest region, the coils placed so that their axes are parallel to the plane of the insulating layer 28. The coils 30 are preferably affixed to the insulating layer 28, for example, by being sewn thereon. Another type of spacer which is excellent for this purpose consists of a sheet of corrugated mesh material made of strands of polyethylene-Saran, the material being commercially available under the designation of "Trilok." (This material consists of vinylidene chloride and vinyl chloride copolymer in the ratio of 85 to 15 percent, respectively, by weight.)

The outer layer 26 of the garment is an impermeable fabric such as rubberized cotton, the insulating layer 28 is a material such as unicellular foam (polyvinyl chloride) containing perforations 32 which act as air holes, and the inner layer 34 is an air permeable fabric such as canvas. These layers are illustrated in FIG. 2 which is a cross-section taken through the jacket 12 just above the upper edge of a slit 14.

Similar slits may be positioned in the rear of the jacket as indicated in FIG. 3 where a single slide fastener 24, tacked in the middle to the upper edge 16, is employed.

It should be noted that, in the general case, the curved spacer 18 and the coil spacers 30 may be combined into a single spacer functioning to keep the slit 14 open and to keep the outer layer 26 apart from the insulating layer 28. Various constructions are possible for this single spacer, one example comprising a rigid or semi-rigid perforated base supporting a series of curved spacers similar to the curved spacer 18 in shape but flattening out more and more as the distance from the slit 14 increases. The base is affixed to the insulating layer 28 and the lip of the slit 14 is affixed to the first, or largest, curved spacer.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

We claim:

1. In a protective garment of the type having an air-impermeable outer layer and an air-permeable inner layer, said outer layer formed with a slit having upper and lower edges, ventilation means comprising the upper and lower edges of said slit in said outer layer, a curved member of substantial rigidity located between said inner and outer layers adjacent to said slit, the convex side of said curved member being placed in contact with, and bowing out, the upper edge of said slit so that it stands away from the plane of said lower edge to form a permanent opening, and spacer means between said outer and inner layers extending over a small area adjacent to said slit.

2. In a protective garment of the type having an air-impermeable outer layer and an air-permeable inner layer,

3

said outer layer formed with a slit having upper and lower edges, controllable ventilation means comprising the upper and lower edges of said slit in said outer layer, a curved member of substantial rigidity located between said inner and outer layers adjacent to said slit, the convex side of said curved member being placed in contact with, and bowing out, the upper edge of said slit so that it stands away from the plane of said lower edge to form a permanent opening, spacer means between said outer and inner layers extending over a small area adjacent to said slit, a flap affixed to the lower edge of said slit, and fastening means affixed to the free edge of said flap and to said upper edge of said slit so that the flap may be used to shut off said opening whenever desired.

5

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4

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