April 27, 1954 W. B. DAVIDSON ET AL 2,676,319

GARMENT FOR PROTECTION AGAINST FLASH BURNS

Filed March 10, 1951 2 Sheets-Sheet 1

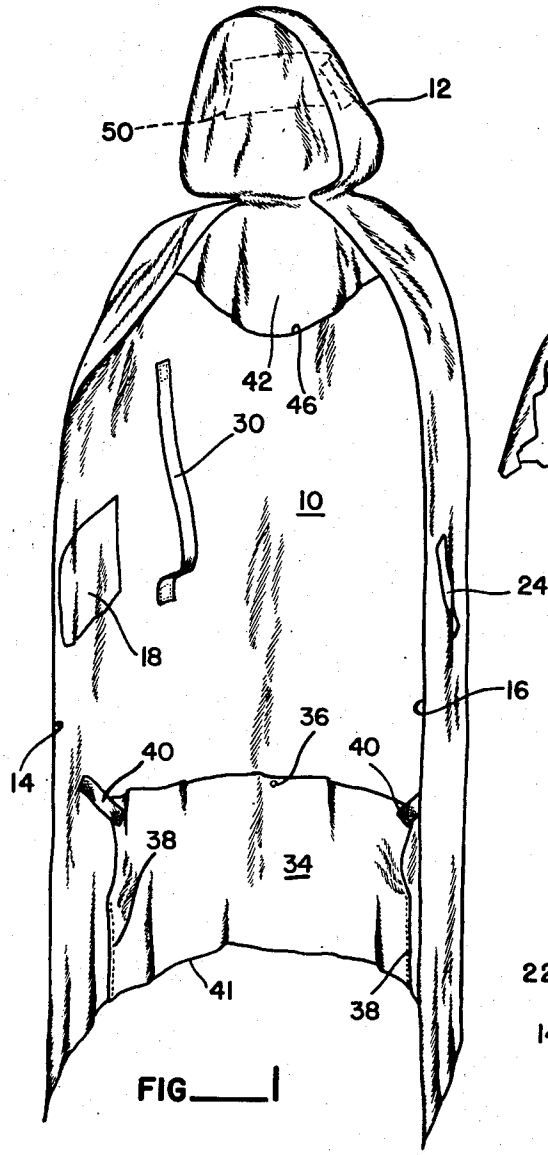
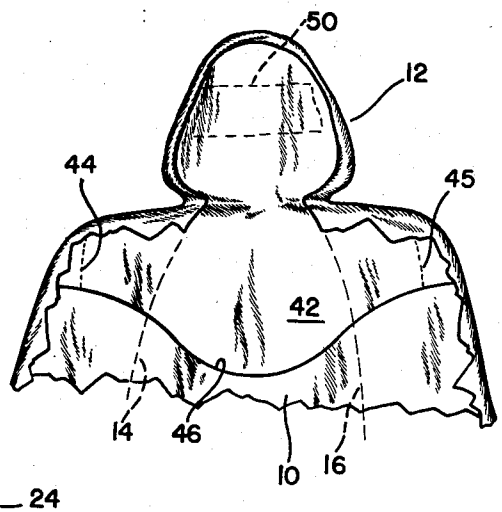


FIG. 1

FIG. 2



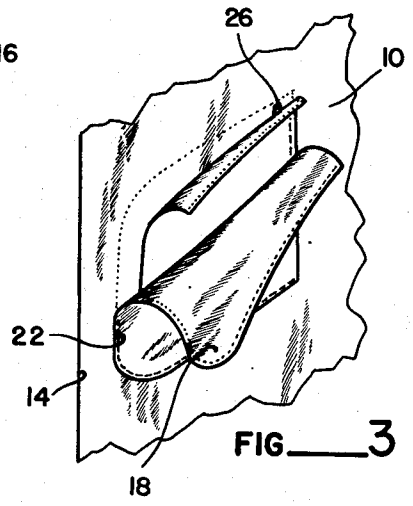


FIG. 3

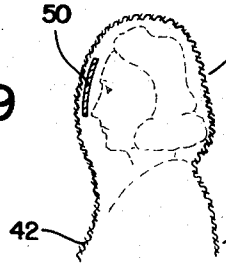


FIG. 9

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FIG. 4

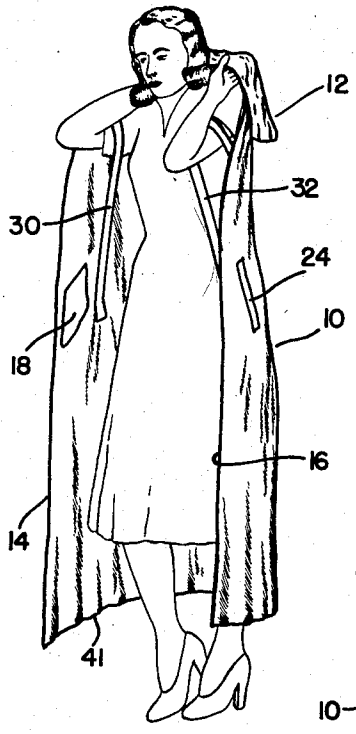


FIG. 5

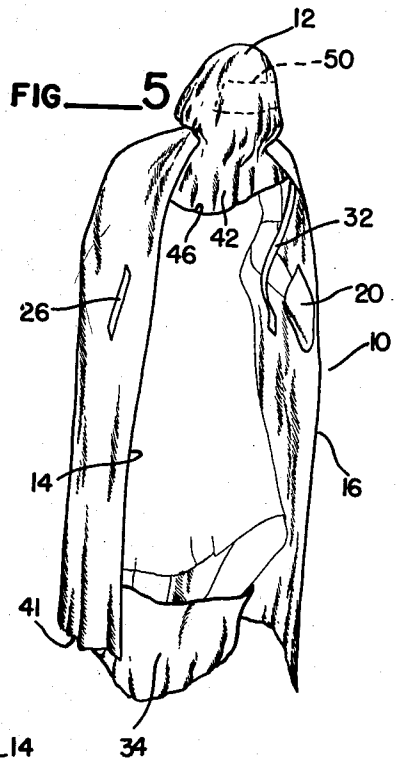


FIG. 6

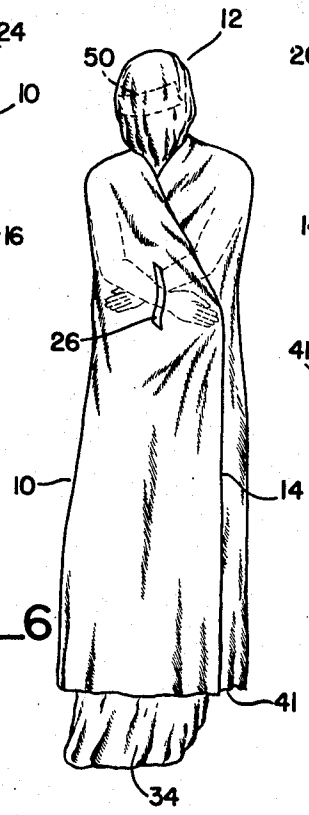


FIG. 8

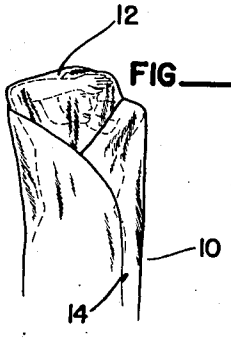
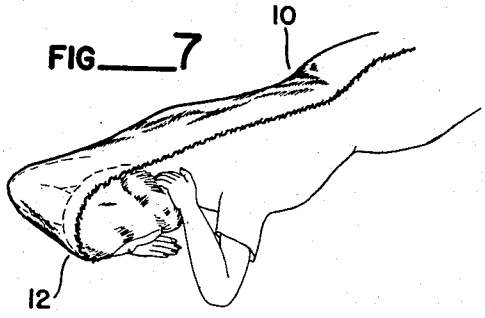


FIG. 7



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GARMENT FOR PROTECTION AGAINST FLASH BURNS

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Application March 10, 1951, Serial No. 214,876

3 Claims. (Cl. 2—1)

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This present garment is provided to give protection for a person against intense sources of heat with particular adaptation to protection against flash burns such as have in the past accompanied the explosion of atomic bombs. The garment is provided of a light-weight, preferably white material which is fireproofed by impregnation and which is designed after the general style of a hooded cloak or cape with especial attention being given to the ease and dispatch with which the garment can be put on and the means whereby the entire body of the wearer can be fully protected by the same when it is being worn.

In the two examples that have occurred to date where the atomic bomb has been used against cities, a tremendous number of the casualties were produced considerably distant from ground zero which could have been prevented had a suitable shielding garment been available. It now appears that with the knowledge that such bomb explosions may be visited upon our cities, this present garment has been devised to on one hand give maximum protection to the wearer of the same; is so constructed that the wearer can put the garment on quickly and lastly, the garment is so constructed that it admits of very compact packaging so that it would not be burdensome and can thus be carried about under times of stress and would thus be available to serve its intended purpose should such an attack occur.

In the past a very considerable development has occurred along the line of protective or fireproof garments. These have been used for firemen particularly, for fire rescue work and by persons whose work normally expose them at periods to extreme temperatures. The prior art is resplendant with many solutions of this problem. Garments in which the wearer was encased in doublewalled garments, the interstices of which were filled with many compounds and textured materials employed further insulated value. Others have used a double wall structure in which the walls were spaced and water was used for cooling the garment. The general form of garments that has met with most universal application today, however, has been those fabricated from woven asbestos fabric. In this case the garment made of such materials was absolutely fireproof and with proper attention to heat insulation, to shield the wearer, the same has proved very satisfactory and has been employed with great satisfaction, particularly in the rescue work and combating of fires incidental to the wreckage of aeroplanes.

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All of these various solutions which have been observed for this problem, however, have been of a character in which the bulk and stiffness of the garment thus produced made it necessary to spend a very appreciable time dressing in such garments as many of the same required at least one assistant to achieve the dressing. All such garments further are so heavy and bulky as to preclude their being carried about as an emergency garment.

The principal object of this present invention is to provide an emergency garment of very little bulk so arranged that it can be very quickly put on the person, and when on, will fully protect the individual.

A further object of this invention is to provide a lightweight emergency garment so impregnated with fireproofing compound that the garment itself cannot burn and will have high resistance to charring.

A further object of this invention is to provide in an emergency garment a body covering having a reflective outer surface so that but a small portion of the heat to which the person is subjected will pass through the garment.

A further object of this invention is to provide a cloak-like emergency garment having a special hood and foot compartment so arranged that when the cloak is fully wrapped around a person it cannot be disarranged even by winds of very high velocity.

Further objects, advantages and capabilities will be apparent from the description and disclosure in the drawings, or may be comprehended or are inherent in the device.

In the drawings:

Figure 1 is an elevation showing the general features of structure in our protective garment;

Figure 2 is a fragmentary view, in the same sense as Figure 1, with certain parts of the garment broken away to more fully illustrate its construction;

Figure 3 is a fragmentary prospective view in which the inner covering of the pocket has been peeled back to more fully illustrate the strengthening of the pocket;

Figures 4, 5 and 6 illustrate successive steps in putting on our protective garment;

Figure 7 is a perspective view, partly broken away, to illustrate one recommended form of protective position that may be assumed by a person wearing the garment;

Figure 8 is an elevation, partly broken away, to illustrate the manner in which the arms can be placed within the garment for further protection of the person;

Figure 9 is a fragmentary vertical sectional view illustrating the eye protecting pad used in our garment.

Referring more particularly to the disclosure in the drawings, the garment consists essentially of a cape or cloak-like portion 10 and a hood portion 12 which is fixedly secured to the cape 10. For the purpose intended the cape and hood should be made of lightweight, compact, tightly-woven material. It has the basic requirements of producing a garment that is light in weight and which can be folded into the smallest possible bulk, yet it must be wear resistant, and capable of accepting and retaining adequate fireproofing materials. The best choice as at present advised appears to be cotton sheeting such as the muslin or percale material used in bed sheeting. Cotton also has the capacity of not burning readily, such as silk, nor does it melt under heat as do many of the nylon materials. The garment to be most effective should present preferably a white outer surface. Consequently, although there are many fireproofing compounds which may be successfully used, one should be selected that does not change the color of the material. The chlorides of antimony, particularly those referred to as butter of antimony, are water soluble and the material can then be soaked in a solution made up in the proportion of 5 ounces of butter of antimony to 1 gallon of water; and in this manner a very finely divided impregnation can be assured throughout the material. When the material dries, and especially if it is dried under moderate heat, the soluble chlorides will undergo a chemical change and will remain in the cloth as oxyo-chlorides of antimony, which are insoluble in water, and being finally divided, in effect produce a permanent fireproofing of the cotton fabric.

The body of cape 10 should be made of generous proportions for the person who is to wear it so that the opposite margins as 14 and 16 can be well overlapped when the garment is put on after the showing of Figure 6. For certain purposes it might be desirable to have some snap fastener arrangement along these margins but actually as a protective garment no such fasteners are needed as it is believed the garment will more properly serve its purpose without any such. On the inside of cape 10 and disposed approximately at waist level are two pockets 18 and 20. These are arranged with their axes substantially horizontal so that the hands can be placed in them and preferably assume the position in Figure 6. This provides the most satisfactory manner of securing the garment in place when in use and thus the pockets should be substantially at the margins 14 and 16. Further, as the pockets will be used hurriedly under considerable emotional stress, special attention is given to reinforcing the pocket end at 22 so there will be no tendency to shove the fingers out through the stitching should the wearer become excited.

As a matter of convenience, slash pocket openings are provided at 24 and 26 so that when the need arises the hand can be passed out through these pockets. Attention is particularly directed however to the fact that the arrangement of overlaps of the covering binding for these pockets should be such that when the garment is used after the showing of Figure 6 there will be no likelihood of exposing the person's arm at the opening.

Arm straps are provided at 30 and 32 which extend substantially from the lower portion of

pockets 18 and 20 well up into the cape. The purpose of these is to make it possible to move the arms throughout considerable latitude particularly when it is desirable to adjust the hood as illustrated in Figure 4 or to assume the positions of Figure 7 or 8. As all such maneuvers will be normally conducted under periods of stress, it is desirable that the garment be relatively positioned on the wearer's shoulders with the minimum opportunity of its being disarranged.

The ground clearance of the cloak should be regulated to the height of the person so as to have a minimum ground clearance compatible with practical use. This clearance, particularly in the case of women, poses a problem in that normally the nylon stockings in prevalent use provide little if any protection. To overcome this a large pocket 34 has been provided in the back portion of the cape, adapted to extend down below the bottom margin 41 of cloak 10, and may have the free margin secured in the upper position by one or more friction or snap fasteners 36. These should preferably be placed only on a medial line with partial stitching as 38.

When the real need occurs for the use of this garment, the feet can be inserted one on each side of the pocket after the showing in Figure 5 and this will complete the body covering after the showing of Figure 6. Resilient means, as the elastic straps 40, allows the outer and upper margin of the pocket to stretch and thus produce a bag that will reach the ground and still protect the front of the wearer's feet and ankles. This is particularly advantageous also when the wearer assumes the reclined position of Figure 7 in that on one hand the pedal extremities are fully enclosed and, secondly, the enclosure being fixedly secured and a part of cloak 10, prevents the lower margins from drawing up over, or being blown off the body and thus exposing the same to the flash heat.

Secured to the upper portion of cape 10 is the protective hood 12. Here again the dimensions must be generous and especially the apron portion 42 which is a downward extension of the face covered portion of the hood. In Figure 2 it will be noted that this apron is fixed to the cape as at 44 and 45 well out beyond the shoulder line. The apron is then carried downwardly as indicated at 46 so as to give an abundance of material to insure that it will always be covered by margins 14 and 16 when the position of Figure 6 is assumed. The generous proportions of the entire hood are essential if the positions of Figures 7 and 8 are to be obtainable. In the front portion of the face covering is an insert piece 50 of considerable weight and of a construction that will give the maximum opacity. It too must be generous in size in order that it may well cover the eyes even though the hood itself is not accurately positioned. In most cases it is felt that due to the lack of time, the urgency of the circumstances, this opaque strip may be the only shield for the eyes and thus protect the wearer from momentary blindness when the flash occurs. A further reason for having apron 42 of generous proportions is that when the garment is in use, with the apron down, visibility of course is entirely cut off by the user; and it is very desirable that sufficient material shall be provided so that the hood and apron can be either rolled up to form a collar, or can be so folded and rolled as to form a hood, which will permit visibility by the user as may be required during periods of

serious alert and which can quickly be brought down over the face for fullest protection.

In reviewing the purposes of a garment of this order, reference is made to National Security Resources Board document No. 130. This document brings out "you are more likely to be hurt by blast and heat than by radiation" and it is brought out that at Nagasaki and Hiroshima nearly one-third of the casualties were caused from the heat flash. These casualties occurred usually in the zone beyond the one-half to two-thirds of a mile radius about ground zero. The percentage of persons killed decreased rapidly with the increase in radius until at two miles from ground zero only two or three out of each one hundred persons were killed or died from the effects of the blast. It therefore appears that a lesson should be taken from these two examples, and, further, the effect of clothing in the protection of burns, which has been well documented and reported, indicates clearly that a well-planned protective garment will greatly increase a person's chance of survival under atomic attack.

A garment of this order should be placed on the body as soon as the first warnings are heard, and when suspicious planes are in a position where they could drop a bomb, the maximum shielding should be sought. Where a great number of workers, however, and persons at leisure are traveling between their homes and places of business, or shopping and the like, there may be a deficiency of material shielding for these persons. Under such conditions the garment should be wrapped fully around the body and the person should lie down on his face, the bottom hem of the garment being held in place by the feet in the pocket provided for them. The opaque eye band should be adjusted so as to give the maximum protection for the eyes. In addition to this, many authorities recommend placing the hand over the nape of the neck as additional protection for the spinal column where it is normally least protected. A person thus has the greatest expectancy of survival without injury, and when taking the precautions noted, should not be blinded by the flash so that all his faculties will be available to assist him in seeking possible further protection, from the pressure blast that can be expected after the initial flash; and by having his full visual faculties, advantage may be taken of more favorable terrain, or he might be able to move away from dangerous objects which might topple over on him.

Document 130 further states that "a little bit of solid material will provide flash protection even close to the explosion and further out the thinnest sort of thing, even cotton cloth, will often do the trick. If you work in the open, always wear full length, loose fitting, light colored clothes in time of emergency." It would therefore appear that this garment as shown and described should be truly a useful one.

There is every indication that a loose-fitting garment of this order will also protect a person from a large amount of radiation especially from contact with radioactive particles which may be drawn against the body or which the body may pick up by brushing by them. While the government document states "when an A-bomb goes off in the air you are more likely to be hurt by the bomb's blast heat wave than by its radioactivity," it is further recommended "be sure to change at least your outer garments and shoes. Outer clothes will automatically serve as a 'trap' for most of the radioactivity you may accidentally pick up. By taking them off you will remove most of the contamination." It is believed that this present garment fully meets this basic requirement.

We claim:

1. An emergency garment to protect an individual from flash burns, comprising: a garment formed of substantially opaque, light-colored, flexible material including a cape portion and a head-covering hood portion extending upwardly from the upper rear portion of said cape portion, said hood portion having an apron downwardly extending from its front adapted to cover the face, neck and upper chest of the user, said apron flaring at its bottom portion to cover the shoulders of the user and having side margins secured to the inner surface of the cape portion, said cape portion having opposed side edges in its front adapted to overlap to cover the front of the user and covering said flared bottom portion of said apron when so lapped; a large foot pocket open on an upper margin disposed at the rear bottom of said cape portion on the inside thereof, said foot pocket normally assuming an upper position by having its upper portion releasably secured to said cape portion in a manner whereby the foot pocket is normally concealed when viewing the cape portion from the outside, and said foot pocket amply accommodating the two feet and lower legs of the user when disposed in a lower position, whereby said garment is adapted to completely cover the user.

2. An emergency garment to protect an individual from flash burns, comprising: a garment formed of substantially opaque, light-colored, flexible material including a cape portion and a head-covering hood portion extending upwardly from the upper rear portion of said cape portion, said hood portion having an apron downwardly extending from its front adapted to cover the face, neck and upper chest of the user, said cape portion having opposed side edges in its front adapted to overlap to cover the front body of the user including the legs to below the knees; a large foot pocket open on an upper margin disposed at the rear bottom of said cape portion on the inside thereof, said foot pocket normally assuming an upper position by having its upper portion releasably secured to said cape portion and said foot pocket amply accommodating the two feet and lower legs of the user when disposed in a lower position while the cape portion, hood portion and apron are covering the remainder of the body of the user.

3. The subject matter of claim 2 in which said upper portion of said foot pocket is secured to said cape portion by means including a pair of elastic bands each having one end secured to an upper corner of said foot pocket and having its other end secured to said cape portion.

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