

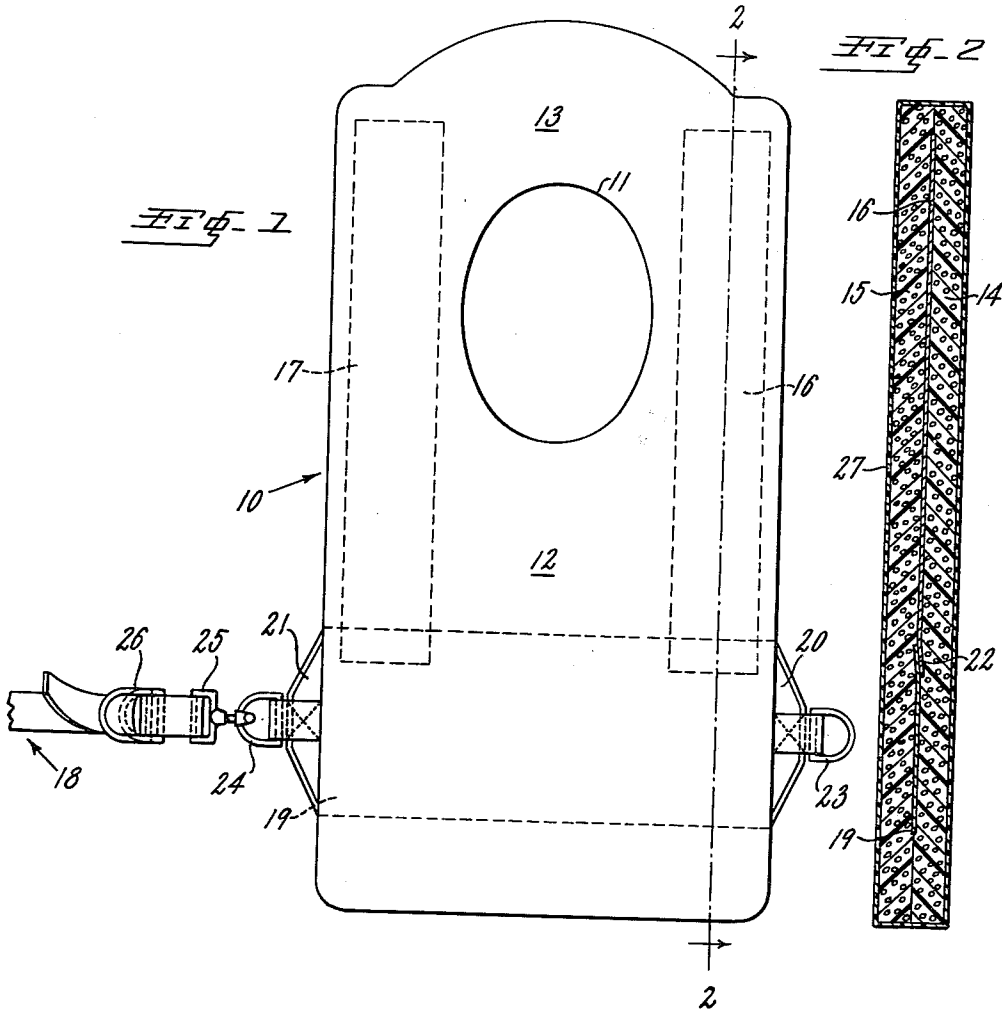
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LIFE VEST

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3,042,947
LIFE VEST

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This invention relates to an improved life vest, and in particular to life vests which are constructed so that they may be quickly donned by the wearer and yet will not become detached from the body when the wearer jumps into water from an elevated position.

Heretofore, it has not been possible to construct a life vest with a waist band as the sole body attaching means without also providing means for adjusting the neck or head opening as the force of impact with the water when jumping from an elevated position would elongate and enlarge the head opening and cause the life vest to pass over the head of the wearer. The vest would thus become useless if the condition of the wearer were such that he or she would not be able to put the life vest on again.

Accordingly, it is an object of this invention to provide such a life vest which will not become detached from the wearer under such conditions.

It is a further object of this invention to provide a life vest which is completely reversible and which has a minimum of body attaching means so that the vest can be quickly donned in an emergency.

Another object of this invention is to provide a life vest which has an extremely simplified construction.

According to the present invention, the life vest is made up of at least two laminated layers of cellular elastomeric material having a head opening and a waist band for attaching the vest to the body of the wearer. At least one strip of relatively inextensible material is positioned between the cellular layers on each side of the head opening so that the strips extend over the shoulders. The strips are adhered to the cellular material so as to restrict the elongation of the head opening in the direction of the force which results from impact with the water.

The invention, its objects and advantages are further described in reference to the accompanying drawings, wherein:

FIG. 1 is a plan view of a life vest constructed according to the instant invention; and

FIG. 2 is a sectional view taken on the line 2—2 of FIG. 1.

As shown in FIG. 1, the life vest 10 has a generally rectangular shape with a head or neck opening 11 positioned in approximately the center of the uppermost half thereof. The head opening 11 separates front portion 12 and back portion 13 which extend over the chest and back of the head respectively of the wearer. The opening 11 has the configuration of an ellipse and is of such a size in a relaxed state as to accommodate the neck of the wearer while being smaller than the head of the wearer. A typical life vest will measure about 26 inches in length and about 14 inches in width with the major axis of the head opening measuring 8 inches and the minor axis measuring 6 inches. In order to place the head through the opening 11, the wearer will exert a force primarily along the minor axis of the head opening to elongate the opening mainly in that direction. The elongation is made possible by employing an elastomeric material for the body of the life vest.

As shown in FIG. 2, the vest is made from a laminate of two layers 14, 15 of cellular elastomeric material. A typical life vest will employ a two-layer laminate measuring about 2 3/4 inches in total thickness. Any cellular elastomeric material can be employed in the practice of this invention, such as cellular natural rubber, synthetic

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rubbers or extensible plastics. However, it is preferred to employ a light-weight closed cell, cellular material composed essentially of a vulcanized, gas-expanded homogeneous blend of a thermoplastic vinyl resin, a high boiling organic liquid plasticizer for the vinyl resin, and a rubbery butadiene-acrylonitrile copolymer. This material is substantially entirely of the closed-cell type, as shown by the very low absorption of water when submerged therein for prolonged periods of time. Such a material is disclosed in U.S. Patent 2,570,182, issued October 9, 1951, to Daly et al. This material also contains a chemical blowing agent and vulcanizing ingredients which are consumed in the process of making the product. The preferred method of manufacturing this material is disclosed in U.S. Patent No. 2,901,774, issued September 1, 1959, to Pooley. A typical formulation is as follows, wherein the proportions are by weight:

Compound:	Parts
"Vinylite VYNW" (copolymer of 95% vinyl chloride and 5% vinyl acetate)-----	140
Diocetyl phthalate (plasticizer)-----	40
Antimony oxide-----	20
"Unicel ND" (dinitrosopenta-methylene-tetramine)-----	36
Coumarone-indene resin-----	10
2,5-di-tertiary butyl meta-cresol-----	10
Titanium dioxide-----	20
Calcium silicate-----	10
Zinc oxide-----	6
Calcium stearate-----	6
Barium-cadmium laurate-----	12
Stearic acid-----	2
Salicylic acid-----	2
Benzothiazyl disulfide-----	1
Sulfur-----	4
"Paracril C" (rubbery butadiene-acrylonitrile copolymer, about 35% acrylonitrile)-----	100
"Butyl Eight" (dibutyl ammonium dibutyl dithiocarbamate)-----	2
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As the material employed for the layers 14, 15 is flexible as well as being extensible, the laminate forming the body of the life vest is made flat without curvature so that the vest is completely reversible. It should be clear that more than two flat sheets can be employed in making the laminated body of the life vest if desired.

A strip of relatively inextensible, flexible material is provided on each side of the head opening 11 to restrict the elongation of the opening in the direction of its major axis. The pair of strips 16, 17 are positioned parallel to the major axis of the head opening and extend from the back portion 13 to the front portion 12 over the shoulder area of the life vest. More than one restricting strip may be used on each side of the head opening if desired, especially if the body of the vest is made of more than two layers or sheets of cellular material. The restricting strips may be formed of any inextensible, flexible material such as fabric or metal wires. However, it is preferred to employ a nylon fabric of the type disclosed in U.S. Patent 2,619,705, issued December 2, 1952, to Foster. It is also preferred to coat the nylon fabric with a vinyl resin so as to improve the adhesion of the strips to the flat sheets of the laminated body of the vest. As shown in the drawings, the strips 16, 17 are positioned between the layers of cellular material and adhered thereto with a suitable cement, which is preferably waterproof. The same cement can be used to adhere the layers 14, 15 together where there is no intervening fabric. In a typical life vest, the strips 16, 17 will be about 17 inches long and about 2 3/4 inches in width and will come within 5/8 of an inch from the head opening 11. It has been found that if the life vest is con-

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structed without such elongation restricting strips, the vest will be forced over the head of a wearer jumping from an elevation of ten feet due to the force of impact with the water. On the other hand, the addition of the restricting strips to the same life vest allowed the wearer to jump from elevations of at least 20 feet without having the vest forced over the head by the force of impact.

The life vest is attached to the body of the wearer by a waist band 18. The waist band 18, which is preferably made of nylon webbing, is attached to the body of the vest by employing a flexible attaching strip 19. The attaching strip 19 extends across the front portion 12 of the vest 10 parallel to the minor axis of the opening 11. In a typical life vest, the attaching band or strip 19 will have a vertical width of about 6 inches and will extend about one inch on either side of the vest body to form tabs 20, 21 having bound edges. The attaching strip 19 is positioned and adhered between the sheets of cellular material in the same manner as restricting strips 16 and 17 and, for the sake of convenience, may be formed of the same material. It is preferred to have the attaching strip 19 attached to the restricting strips 16, 17, as by the overlap joint shown in FIG. 2 at 22. If desired, the elongation restricting strips 16, 17 and the attaching strip 19 may be formed from a single piece of fabric. A pair of D rings 23, 24 are sewn with nylon thread to the tabs 20, 21. Of course, the D rings 23, 24 could be attached by other means, such as riveting. The waist band 18 has a snap 25 with adjustable D rings 26 at each end thereof (only one end being shown in the drawings) to enable the user to adjust the vest by pulling on either end of the band. The single waist band allows the life vest to be put on from either side. If desired, a protective coating 27 may be applied to the outer surface of the cellular laminated vest body. Preferably, this coating is composed of a plasticized vinyl resin applied to the assembled cellular laminate by a dipping operation. A suitable color, such as International Orange, is imparted to the coating 27 by employing an appropriate pigment in the resin.

While the preferred form of this invention has been described herein, it will be understood that changes in the details thereof may be made without departing from the spirit of this invention, and it is intended to cover all those changes which come within the scope of the appended claims.

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

1. A life vest comprising at least two layers of cellular elastomeric material having a head opening extending therethrough, at least one strip of relatively inextensible, flexible material on each side of said head opening extend-

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ing over the shoulders, said strips being positioned between said layers of cellular material and adhered thereto so as to restrict the elongation of the head opening, and a waist band for attaching the vest to the body of the wearer.

2. A life vest comprising at least two generally rectangular flat sheets of cellular elastomeric material having an opening therein through which the head of the wearer is adapted to extend forming front and back portions adapted to extend over the chest and back of the head respectively of the wearer, at least one strip of relatively inextensible fabric on each side of said opening extending from said back portion to said front portion over the shoulder area, said strips being positioned between said cellular sheets and adhered thereto so as to restrict the elongation of said opening, and a waist band as the sole body attaching means.

3. A life vest comprising two generally rectangular flat laminated sheets of cellular elastomeric material having an elliptical head opening extending therethrough, said head opening in a relaxed state being of a size smaller than the wearer's head, a strip of relatively inextensible fabric on each side of said opening extending over the shoulders and parallel to the major axis of said opening, said strips being positioned between said cellular sheets and being adhered thereto so as to restrict the elongation of said opening along the major axis, and a waist band as the sole body attaching means.

4. A life vest as defined in claim 3 wherein the waist band is attached to the laminated sheets by means of an attaching strip extending parallel to the minor axis of the head opening, said attaching strip being positioned between and adhered to said cellular sheets with the end portions thereof extending beyond the laminated sheets for attachment to said waist band.

5. A life vest as defined in claim 4 wherein said elongation restricting strips and said attaching strip are formed from a single piece of fabric.

6. A life vest as defined in claim 4 wherein the elongation restricting strips are joined to said attaching strip by means of an overlap joint.

7. A life vest as defined in claim 3 wherein a protective coating is applied to the outer surface of the laminated sheets.

8. A life vest as defined in claim 3 wherein the cellular elastomeric material is composed of a thermoplastic vinyl resin, a high-boiling organic liquid as a plasticizer therefor, and a rubbery butadieneacrylonitrile copolymer and the strips are composed of a nylon fabric.

No references cited.