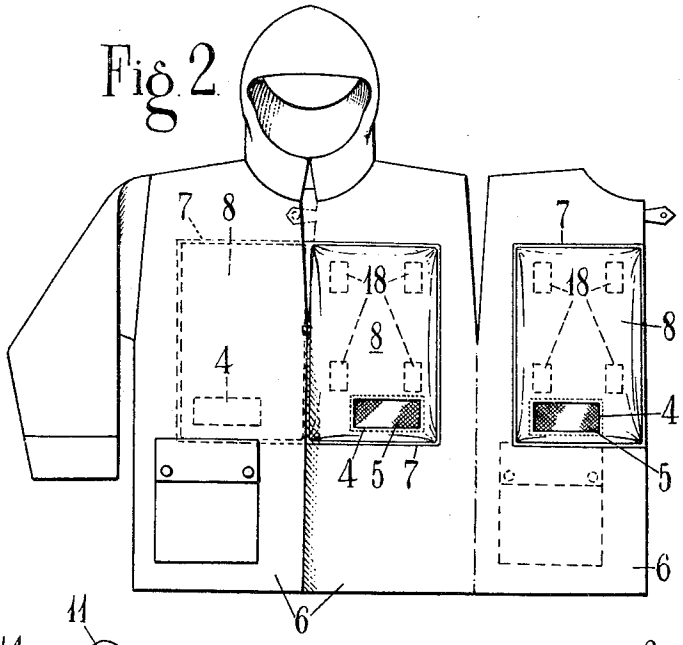
Aug. 7, 1962 M. SHAW 3,047,889

PROVISION OF BUOYANCY FOR GARMENTS AND THE LIKE

Filed April 10, 1959

Fig. 2.



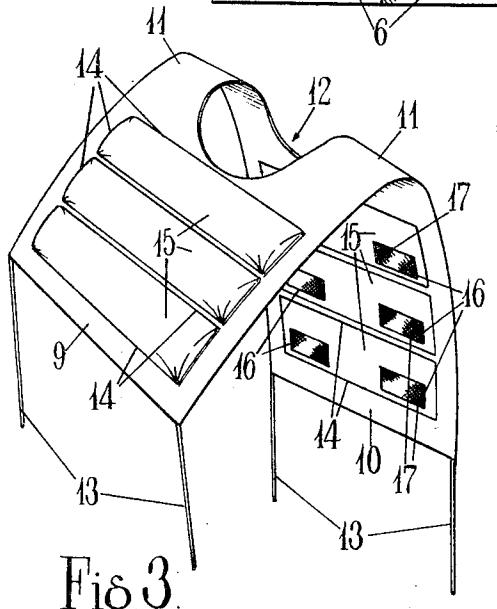


Fig. 3.

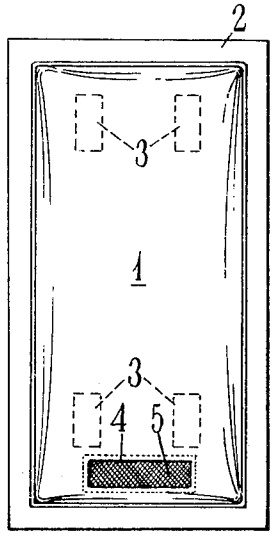


Fig. 1.

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PROVISION OF BUOYANCY FOR GARMENTS AND THE LIKE

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This invention relates to buoyancy compartment constructions for garments or the like. The buoyancy compartment construction, according to the present invention, may comprise an article of compartmented construction adapted to be incorporated into a garment or the like, or a compartmented construction incorporated in a garment or the like during the manufacture of the garment or the like. The term "garment or the like" is intended to include any articles of wearing apparel, to which buoyancy compartments can be suitably applied, such as coats, jackets, waistcoats, swimming costumes, but also includes such articles as life jackets or belts or articles carried on the human body such as packs or rucksacks.

It is an object of the present invention to provide an improved buoyancy compartment construction for garments and the like in which the buoyancy compartment is readily exhausted of entrapped air (e.g. for packing and storage purposes) but which becomes air-tight to prevent the escape of entrapped air as soon as the compartment is immersed in water, even if the immersion is only partial or initially only partial.

It is a further object of the present invention to provide an improved buoyancy compartment construction for garments and the like which is simple and cheap to manufacture.

The invention consists in a buoyancy compartment construction for garments or the like, or adapted to be incorporated in garments comprising a compartment envelope made of waterproof and air-tight material and having one or more openings therein closed by a panel or panels of a textile material (hereinafter referred to as the "wet/dry material") which is air permeable when dry but substantially air-tight when wet.

By this construction, when the article is immersed in water so that the panel or panels are wetted, substantially no air can escape from the compartment envelope, but when the panel or panels are dry any air contained in the compartment envelope can be expressed therefrom through the panel or panels so that the bulk of the article can be reduced to a minimum.

The invention further consists in a buoyancy compartment construction, according to the preceding paragraph, wherein the compartment may be sub-divided by the formation of bulkheads or the like into a plurality of sub-compartments, each sub-compartment having one or more openings therein closed by a panel or panels of the wet/dry material.

The invention still further consists in a buoyancy compartment construction, according to either of the two preceding paragraphs, wherein the or each opening in the compartment is closed by more than one panel layer of wet/dry material such that should the outermost panel layer become damaged (e.g. torn or cut) the subsequent layer or layers will afford the necessary sealing off of the compartment when wetted.

According to one form of the invention as set forth in any of the three preceding paragraphs, the buoyancy compartment construction is incorporated in a garment as it is made, the compartment walls forming part of the garment itself, the compartment opening, closed by the panels of wet/dry material preferably being located on what is the inside of the garment when worn and also at

or towards the lower margin of the garment as worn. Alternatively the buoyancy compartment construction may comprise a compartment, or compartmented, article adapted to be fitted to, or incorporated in, an already-made garment, and in this form, the article may be of a variety of convenient shapes, e.g. rectangular, oval or specially shaped to fit a specific form of garment.

In the accompanying drawings:

FIGURE 1 is an elevation of a buoyancy compartment, according to the present invention,

FIGURE 2 is a front elevation of an "oilskin" jacket (partially opened up to show the interior), having buoyancy compartments according to the present invention, and

FIGURE 3 is a perspective view of a life jacket having buoyancy compartments according to the present invention.

In carrying the invention into effect according to one mode by way of example, a buoyancy compartment article, see FIGURE 1, comprises a compartment 1 made up of two layers of waterproof and air-tight material, such as plasticized polyvinyl chloride or rubberised cotton, secured e.g. welded or stuck, together along a margin 2 to define the compartment 1. The two layers, within the margin 2, are preferably kept separated by the interposition of blocks 3 of resilient material, such as kapok or foamed plastic.

One of the layers forming the compartment walls is formed with an opening 4, preferably adjacent one side or edge of the compartment, of relatively small area, say 5 inches by 1¼ inches and over this opening is secured, as by stitching or adhesive or both, a panel 5 of textile material (wet/dry material) which is pervious to air when dry but impervious when wet, as described hereafter.

The compartment 1 therefore contains air, which can be expressed by pressure when the panel 5 is dry but when wetted the panel 5 becomes impervious to air so that the compartment becomes completely air-tight.

The compartment article, according to FIGURE 1, can be incorporated in any article in which buoyancy provisions are required. When incorporated in a garment such as a coat, the compartment 1 is disposed so that the opening 4 is adjacent the bottom of the garment so that normally the panel 5 will normally become wetted immediately a wearer becomes immersed in water.

Alternatively the buoyancy compartment construction, according to the present invention, can be incorporated direct into a garment, see FIGURE 2, wherein an "oilskin" jacket has a body portion 6 made of two separate layers of waterproof material, such as plasticised polyvinyl chloride or rubberised cotton. The two layers are secured together as by stitching, adhesion or heat-sealing along lines 7 defining totally enclosed compartments 8, the securing being such that the compartments are air-tight along the lines of securement, so that in the case of stitching it is desirable to reinforce the seam by means of a sealing substance. In a preferred arrangement of such compartments 8 for the "oilskin" jacket, two compartments are provided on the back and two on the front of the jacket, the compartments being square or rectangular, so that in an adult's garment each separate compartment would measure about 8½" x 15".

Each compartment 8 is formed, as described with reference to FIGURE 1, with an opening 4 at or towards its lower margin measuring, say, 5" x 1¾" and into this opening is secured as by stitching or adhesive or both a panel 5 of wet/dry material, as defined hereafter, so that the panel-filled opening 4 comprises, in effect, a valve which, when the panel 5 of wet/dry material, is dry permits the ingress and egress of air to and from the

associated compartment and which, when the panel is wet prevents egress or escape of air from the interior of the compartment.

By the provision of the valve panels 5 of wet/dry material at or towards the bottom of each compartment 8, and by keeping the dimensions (area) of the valve panels 5 small, sealing-off of the compartment rapidly takes place when a wearer is immersed in water and any initial escape of air from the compartments is reduced to a minimum.

If desired a second panel layer of wet/dry material (not shown) may be provided over the opening 4 in each compartment 8 in case the outermost panel becomes damaged. Also each compartment may be provided with more than one opening, but it is still preferred to keep the total area of openings in each compartment to a minimum.

In a similar manner, the invention may be applied to a life jacket (see FIGURE 3), e.g. of the type comprising chest and back portions 9 and 10 separated by shoulder straps 11 between which there is an aperture 12 for the wearer's head, the portions 9 and 10 being connectible together by ties or other fastenings 13. The chest and back portions 9 and 10 are each made up of two layers of waterproof and air-tight material secured together along lines 14 defining a number of compartments 15, for example, three compartments in each portion 9 or 10 each extending across the width of the portion and placed one above the other. Each compartment 15 has one or more openings 16, e.g. four openings of about 1½" x 1¼", spaced along its length, or, as shown, two spaced openings of about 1½" x 3", each opening being filled as described above by a panel 17 of wet/dry material. Thus, in a preferred form, a life jacket has a total of six compartments and a total of sixteen or thirty-two panel-filled openings.

If desired each compartment 8 in FIGURE 2, or 15 in FIGURE 3, in an article or a garment may be provided with spacing means, as described for FIGURE 1, in its interior for keeping the compartment wall separated so that air is always contained in the compartment, such spacing means need only be provided at spaced locations within each compartment and may comprise blocks 18 of kapok or foamed resilient plastic (not shown in FIGURE 3), in which the relatively smaller compartments 15 can be filled with, for example, kapok.

The wet/dry textile material, referred to above, which is air pervious when dry, but impervious to air when wet may be as follows.

Weave	Oxford.
Ends per inch	232.
Warps count	2/110's Cotton.
Twist singles	27Z.
Twist folded	21S.
Picks per inch	95.
Weft count	2/80's Cotton.
Twist singles	22Z.
Twist folded	18S.
Denting	28.5/8.

The fabric is scoured and desized, to remove the entire wax content of the fibres, in 1% caustic, 0.1% castor oil soap, for 3 hours at 30 lbs. pressure. The fabric is stretched in processing by about 5%, to give a cloth of 4.5 oz. per square yard.

I claim:

1. A flexible buoyancy compartment comprising flexible wall means of waterproof and air-tight material secured to define a casing encompassing sufficient internal volume for buoyant purposes, at least one wall having at least one opening therein of an area that is small in relation to the area of said wall, a flexible panel means secured to said wall and overlying and covering said opening, said panel means comprising textile material possessing the characteristic of being permeable to ambient air when dry so

that air can enter the casing and when wet preventing egress of air and ingress of water so as to entrap the air within the casing, said wall means including opposed walls and at least one spacer body within the casing for preventing adherence of said opposed walls to one another when said casing is folded and in addition preventing complete expulsion of air from within the casing during such folding.

2. A flexible buoyancy compartment as claimed in claim 1 in which said at least one spacer body is a resilient mass which keeps the casing partially distended at all times.

3. A flexible buoyancy compartment as claimed in claim 1 and further including at least one additional spacer body within the casing spaced longitudinally of the first spacer body with reference to the longitudinal axis of the casing and both spacer bodies comprising a resilient mass for keeping the casing partially distended at all times.

4. A flexible buoyancy compartment as claimed in claim 1 in which said flexible panel means comprises two layers of such textile material arranged in superimposed relationship over said opening whereby should the outermost layer become damaged the opening is still effectively covered by the underlying layer.

5. A flexible buoyancy compartment comprising flexible wall means of waterproof and air-tight material secured to define a casing encompassing sufficient internal volume for buoyant purposes, at least one wall having at least one opening therein of an area that is small in relation to the area of said wall, a flexible panel means secured to said wall and overlying and covering said opening, said panel means comprising woven oxford cloth possessing the characteristics of being permeable to ambient air when dry so that air can enter the casing and when wet preventing egress of air and ingress of water so as to entrap the air within the casing, said wall means including opposed walls and at least one spacer body within the casing for preventing adherence of said opposed walls to one another when said casing is folded and in addition preventing complete expulsion of air from within the casing during such folding.

6. A flexible buoyancy compartment as claimed in claim 5 in which said oxford cloth has the following characteristics:

Ends per inch	232.
Warps count	2/110's Cotton.
Twist singles	27Z.
Twist folded	21S.
Picks per inch	95.
Weft count	2/80's Cotton.
Twist singles	22Z.
Twist folded	18S.
Denting	28.5/8.

the fabric being scoured and desized, to remove the entire wax content of the fibres, and stretched in processing by about 5%.

7. A garment adapted to give the wearer buoyancy to enable the wearer to float in water for an extended period of time comprising a body portion covering at least a portion of the wearer's body, at least one flexible buoyancy compartment secured to the body portion and comprising flexible wall means of waterproof and air-tight material secured to define a casing encompassing sufficient internal volume for buoyant purposes, at least one wall having at least one opening therein of an area that is small in relation to the area of said wall, a flexible panel means secured to said wall and overlying and covering said opening, said panel means comprising textile material possessing the characteristics of being permeable to ambient air when dry so that air can enter the casing and when wet preventing egress of air and ingress of water so as to entrap the air within the casing, said wall means including opposed walls and at least one spacer body within the casing for

preventing adherence of said opposed walls to one another when said casing is folded and in addition preventing complete expulsion of air from within the casing during such folding.

8. A garment as claimed in claim 7 in which said one flexible wall having at least one opening therein is directed toward the interior of the body portion when the garment is worn and said at least one opening and the overlying panel means being located adjacent that end of the casing which is lowermost when the garment is worn.

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