April 24, 1956 V. H. HURT 2,742,654

LIFE SAVING DEVICE

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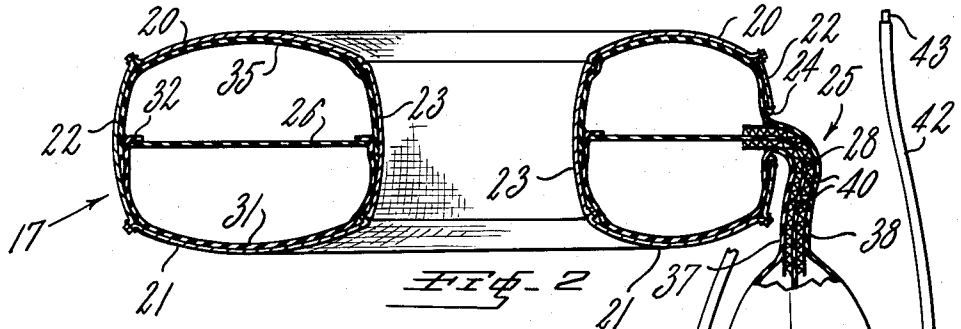


Fig. 2

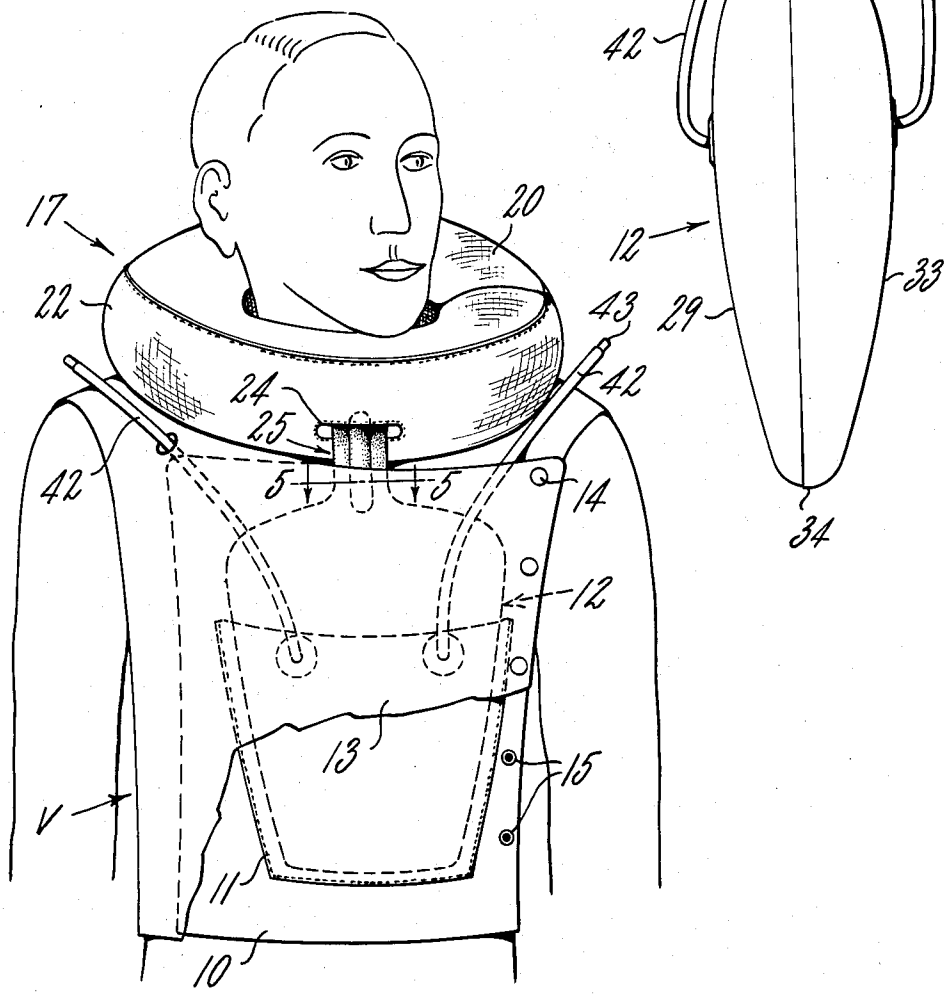


Fig. 1

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Fig. 3

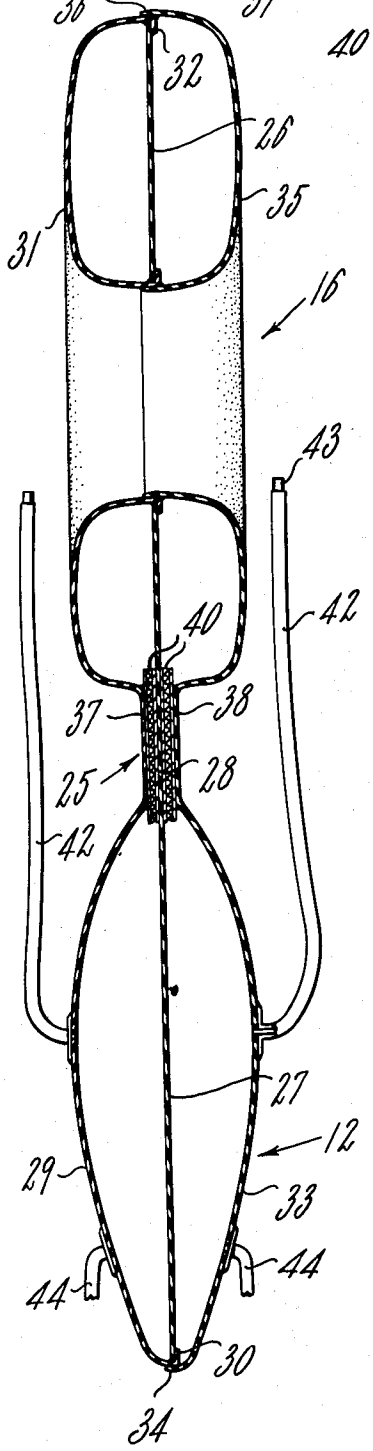


Fig. 5

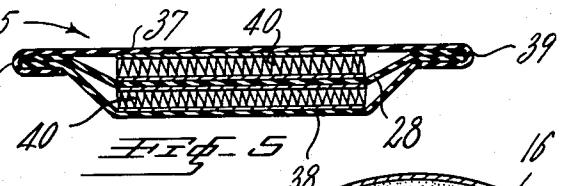


Fig. 4

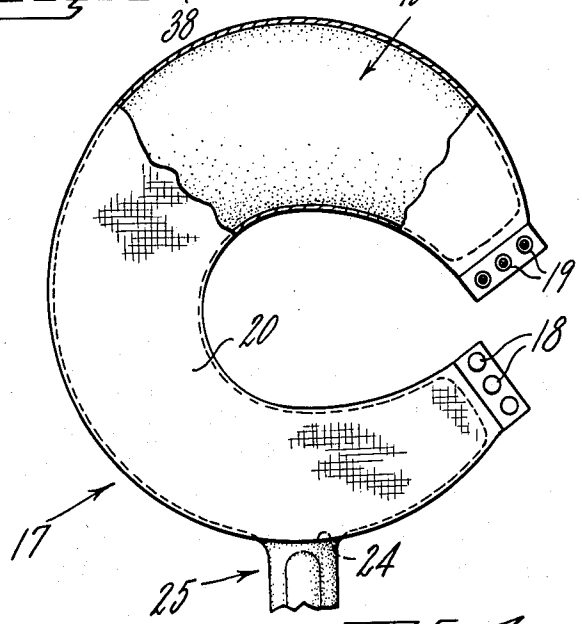
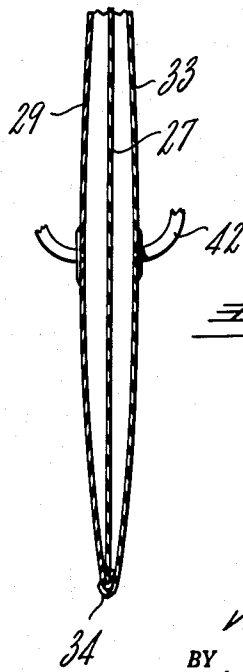


Fig. 6



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LIFE SAVING DEVICE

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Application February 9, 1953, Serial No. 335,853

5 Claims. (Cl. 9—17)

This invention relates to an inflatable life saving device designed to keep a person afloat in water, and more particularly to such a device employing two or more inflatable bladders for buoyantly supporting a person, and having a relatively flat, specially constructed, tube connection between the bladders so that the inflating gas can pass back and forth between the bladders.

Life saving garments such as jackets and vests have been provided heretofore with two or more buoyant bladders connected by a tube, but the connecting tube has presented difficulties for if it is made highly flexible the walls thereof may be pressed together and choke off the passage of the gas therethrough, and if the tube is made relatively stiff so that the walls will not collapse even if the tube is bent, then the stiffness of this tube may interfere seriously with the comfort of the person wearing the life saving garment. Furthermore it is difficult to attach the ends of such tube to inflatable bladders so that danger of leakage does not exist.

Having in mind the foregoing, the present invention contemplates a life saving device comprising two inflatable bladders disposed a substantial distance apart for use in different portions of a life saving garment, and which bladders are connected by a relatively flat flexible tube the walls of which are prevented from contacting each other and choking off the passage of a gas therethrough by providing in such tube a porous fabric strip that will hold the walls apart even if the tube is bent at a pronounced angle, to thereby permit the inflating gas to flow back and forth between the bladders.

The life saving device of the present invention was designed primarily to form a satisfactory tubular connection between an inflatable bladder designed to be worn in the front portion of a life saving garment, and a second bladder designed to encircle the neck of the wearer so as to keep his head out of the water. In such a construction the tube connecting these bladders is disposed below the chin of the wearer of the garment, where it would be very uncomfortable if formed of a relatively stiff hose. Therefore the present invention contemplates a construction whereby this connection tube between the bladders is given the form of a relatively flat flexible tube that is so constructed that it cannot be pinched in use in such a manner as to choke off the passage of an inflating gas therethrough.

The above and other features of the present invention will be further understood from the following description when read in connection with the accompanying drawings wherein:

Fig. 1 is a front view of the upper portion of a man wearing a life saving vest, equipped with the inflatable bladders that are connected as contemplated by the present invention.

Fig. 2 on a longer scale is a vertical sectional view through the neck encircling bladder and a side view of the bladder which is disposed over the chest of the wearer.

Fig. 3 is a vertical sectional view through the aligned bladders and connecting tube.

Fig. 4 is a top plan view of the fabric casing in which the neck encircling bladder is housed.

Fig. 5 on an enlarged scale is a sectional view taken on the line 5—5 of Fig. 1, and

Fig. 6 is a vertical sectional view through the uninflated bladder that lies over the chest of the wearer.

The life saving device contemplated by the present invention was developed primarily for use in a life saving garment of the type worn by military air pilots when flying at sea, so that if they are forced down in the water they can quickly inflate the bladders to keep them afloat. Such bladders should be carefully constructed so that they are not likely to leak since a human life may depend upon their buoyancy. In order to guard against the danger of a bladder becoming punctured and deflated, each bladder is preferably provided with two separate non-communicating chambers formed by providing a central partition extending lengthwise of the bladder.

The life saving device of the present invention as shown in Fig. 1 is worn in a double breasted vest indicated in its entirety by the letter V. This double breasted vest has the inner front portion **10** which extends across the chest and has sewed to the outer face thereof the pocket **11** adapted to receive the lower inflatable bladder **12**. The outer front portion **13** of the vest overlies the under portion **10** as shown, and the vest is fastened about the body of the wearer by engaging the outer snap fasteners **14** with the inner snap fasteners **15**, or by employing other well known fastening means.

The upper bladder **16** designed to encircle the neck of the wearer of the life saving garment is adapted to be housed in a fabric casing **17**, which is best shown in Figs. 1 and 4. This casing is sewed to the vest V at the top of the shoulder of the vest. The bladder enclosing casing **17** is preferably given the C-shape construction shown in Fig. 4 and this casing is secured in encircling relation about the neck of the wearer by engaging the top snap fasteners **18** with the underlying snap fasteners **19**, as will be apparent from Fig. 4. This fabric casing may be formed by sewing to a C-shaped top fabric **20** and C-shaped bottom fabric **21** the vertically disposed outer fabric wall **22** and vertically disposed inner fabric wall **23**. The outer fabric **22** has formed in the front portion thereof, as shown in Fig. 1 a large buttonhole **24** through which the top bladder **16** and flexible tube **25** that connects the upper bladder **16** to the lower bladder **12** may pass. The arrangement is such that when the bladders are deflated the upper bladder **16** may be pushed through this buttonhole **24** and then worked around inside of the C-shaped fabric housing **17** to lie therein as shown in Fig. 4.

The upper and lower bladders and flexible connecting tube are preferably formed of integral rubber sheets in a manner to be described to reduce the danger of leakage, and the lower bladder **12**, upper bladder **16** and connecting tube **25** are preferably divided longitudinally by a central partition, so that if one chamber of either bladder should be punctured the other chamber will remain inflated to supply the buoyancy required to keep the wearer of the life saving garment afloat. A simple and practical manner of constructing the parts just mentioned is well illustrated in Fig. 3 of the drawing, wherein there is shown a central sheet or partition, which as one continuous sheet forms a central partition **26** for the upper bladder **16**, partition **27** for the lower bladder **12**, and a partition **28** for the connecting tube **25**. To the marginal edge portion of the lower partition **27** is secured one outer wall **29** of the lower bladder **12**, this is accomplished by bending the outer marginal edges of the wall **29** around the partition **27** and bonding these edges to the partition as indicated by **30**. One outer wall **31** of the upper bladder **16** is similarly secured to the par-

tition **26** as indicated at **32**. The other outer wall **33** of the lower bladder **12** is secured in overlapping relation about the wall **29** as indicated by **34**, and the second other outer wall **35** of the bladder **16** is similarly secured to the wall **31** as indicated at **36**. The outer walls **29** and **31** are connected by an integral neck **37**, and the outer walls **33** and **35** are connected by an integral neck **38**. The side marginal edges of these neck portions are folded one over the other as indicated by **39** in Fig. 5 to form an air tight tube.

In order to prevent the flat tubular connection **25** from being pinched so that the walls contact and shut off the flow of air or gas therethrough, an air pervious strip **40** is adhesively secured in this tube at one side of the partition **28**, and a similar fabric **40** is secured in this tube at the other side of the partition **28** as shown in Fig. 5. The fabric strip **40** may be variously constructed but in order to provide the desired porosity it is preferably formed as a two-ply pile fabric having pile connecting yarns extending between the top and bottom fabric in a well known manner. This will serve to hold the side walls of the tube out of contact with each other and permit inflating air or gas to pass longitudinally through these fabric strips, as will be apparent from Fig. 5. Furthermore if the fabric faces of the two-ply pile fabric **40** are adhered to the adjacent walls **28, 37** or **28, 38** this will limit the amount these walls can separate when the tube is inflated.

Each chamber of the lower bladder **12** has leading therefrom an inflating tube **42** provided for oral inflation of the connected bladder chambers lying to one side of the central partition, and each tube has secured to its outer end a mouthpiece **43** which contains a one way valve. These oral inflating tubes **42** are provided so that a person wearing the vest when floating in water may blow air into either chamber to increase the pressure therein. In order to inflate quickly all chambers of the life saving device, each chamber of the bladder **12** preferably has connected thereto by means of a pipe **44** a quick inflating device, not shown, but of well known construction such for example as a CO_2 holder.

The life saving garment shown in the drawing is normally worn with the bladders **12** and **17** uninflated, so that they will take up a minimum amount of space and will not interfere unduly with the freedom of movement of the aviator wearing the suit. Since the connecting tube **25** is positioned below the chin of the wearer of the garment, as shown in Fig. 1, it is important that this tube be highly flexible so that it will not interfere unduly with the movement of the wearer's head. When this life saving garment is being worn and the bladders are inflated the tube **25** is bent at substantially a right angle as will be apparent from Fig. 2, but the strips of air pervious fabrics **40** in this tube will hold the walls of the tube spaced apart so that the inflating gas can pass freely from one bladder to the other to equalize the pressure in the bladders. The inflating tube, as above stated, is formed integrally with the bladders **12** and **16** to make the present construction highly leak proof, and this tube has the wall that lies next to the wearer made flatter than the other wall as shown in Fig. 5.

While it is preferred to employ the pervious fabrics **40** to hold the tube walls out of contact with each other, other forms of spacing means such as ribs extending longitudinally within each tube, or spaced nodules formed on an inner wall of each tube may be employed.

The inflating device of the present invention may be formed of rubber or of plastic material such as vinyl resin. When made of rubber the unvulcanized rubber sheets are secured together as shown in Figs. 3 and 6, and the device is then vulcanized. The construction shown and described while simple, is strong and durable and should give good service and the provision whereby a flat connected tube can be used between the bladders without danger of the same being pinched to such an extent as to stop the flow of gas therethrough is very important.

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

1. A life saving device, comprising two inflatable bladders disposed a substantial distance apart to buoyantly support a person in water and each bladder being separated by a longitudinal partition into two non-communicating chambers, a relatively flat flexible tube connecting said bladders and divided longitudinally so that one longitudinal passage of the tube connects one chamber of one bladder with a chamber of the other bladder and the other longitudinal passage connects the remaining chambers, and a porous fabric strip secured in each tube passage to hold such passages open so that an inflating gas can flow back and forth through each passage between the respective chambers they connect.

2. A life saving device, comprising an inflatable bladder shaped to encircle a person's neck, a second bladder shaped to cover a person's chest and having means for securing it in place over his chest, a relatively flat flexible tube connecting said bladders and adapted to bend at approximately a right angle between the bladders, and a porous fabric strip secured in said tube throughout its length to hold the tube walls from contacting each other in the bent portion thereof so that an inflating gas can flow between the bladders.

3. A life saving device, comprising an inflatable bladder shaped to encircle a person's neck, a second bladder shaped to cover a person's chest and having means for securing it in place over his chest, a flexible tube connecting said bladders and integral therewith, a central partition extending longitudinally of both bladders and of said tube to form two non-communicating chambers in each bladder and two longitudinal passages through the tube, and a porous fabric strip in each passage to hold the passages open so that an inflating gas can flow between the bladder chambers connected by said passages.

4. A life saving device, comprising two inflatable bladders connected by a relatively small tube and formed of a central partition sheet extending longitudinally of the two bladders and of said tube and having secured over each face thereon an integral outer sheet so that these two outer sheets form both bladders and the tube, each bladder being divided by said partition into two non-communicating chambers, and a porous fabric strip secured in the tube at each side of the partition to hold the walls apart so that an inflating gas can flow from the chamber of one bladder to a chamber of the other bladder.

5. A life saving device, comprising an inflatable bladder shaped to encircle a person's neck, a second bladder integral with said neck encircling bladder and shaped to cover a person's chest, means for securing said second bladder in place over a person's chest, a relatively small flexible tube connecting said bladders and integral therewith, a central partition extending longitudinally of both bladders and of said tube to form two non-communicating chambers in each bladder and two non-communicating longitudinal passages through the tube, and spacing means secured to an inner wall of said tube to hold the tube walls apart so that an inflating gas can flow back and forth in the tube between the bladders.

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