Feb. 7, 1967 R. BOUCHER 3,302,224

INFLATABLE LIFE SAVING BELT

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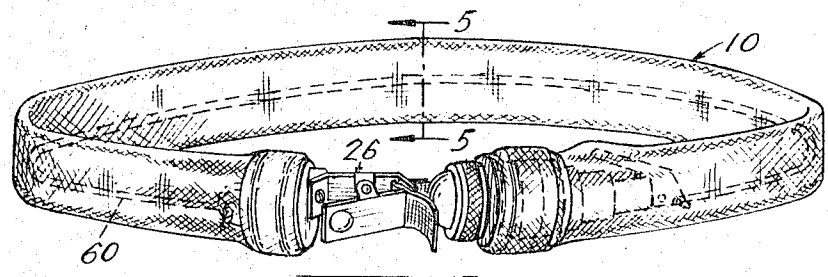


Fig. 1

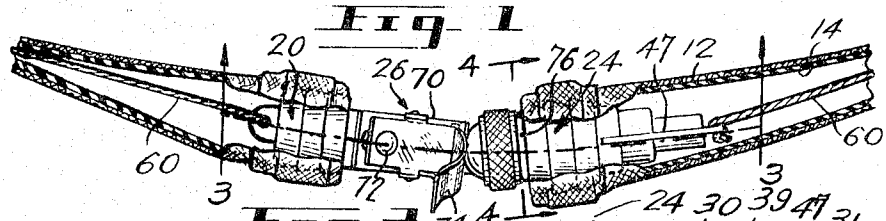


Fig. 2

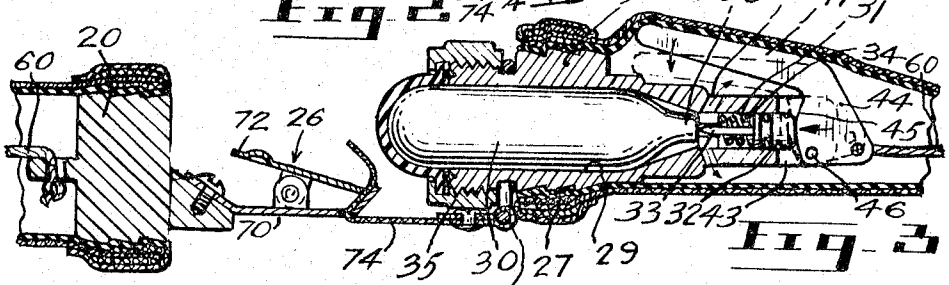


Fig. 3

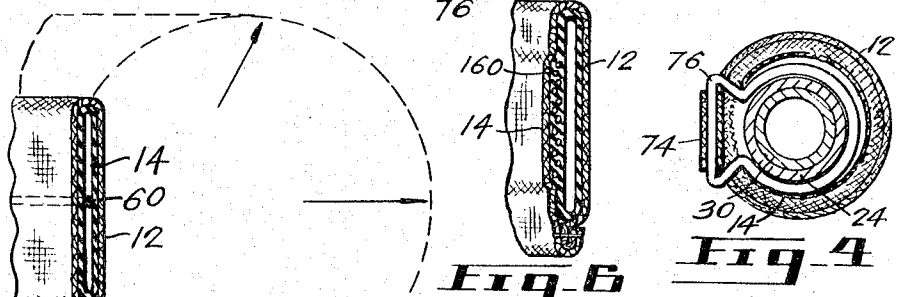


Fig. 4

Fig. 5

Fig. 6

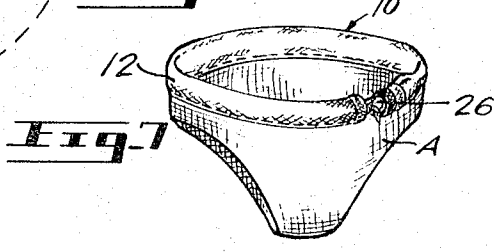


Fig. 7

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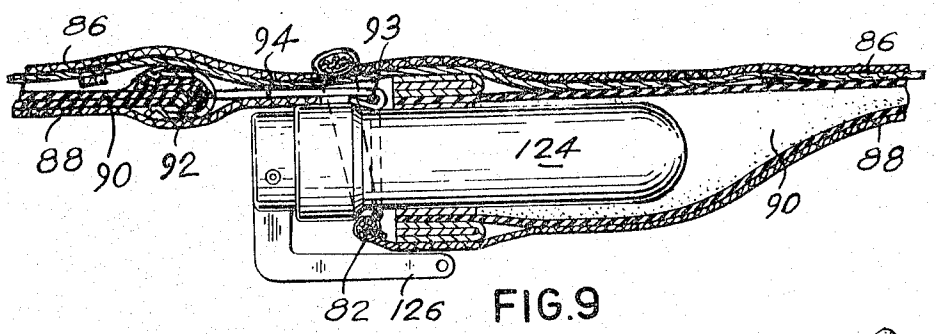


FIG.9

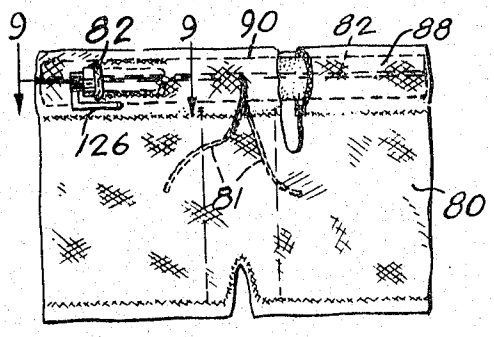


FIG.8

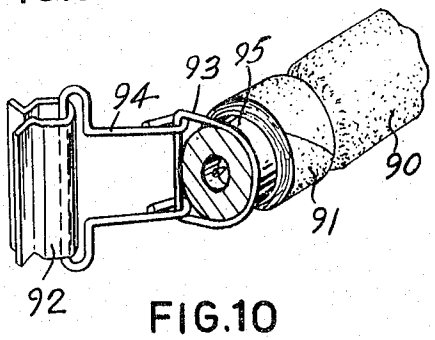


FIG.10

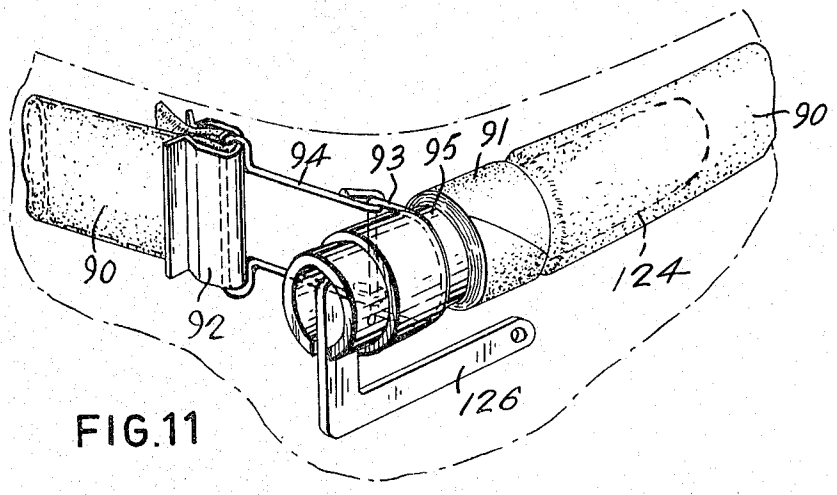


FIG.11

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INFLATABLE LIFE SAVING BELT

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Filed Jan. 19, 1965, Ser. No. 426,617
13 Claims. (Cl. 9—316)

The present invention relates to improvements in life saving equipment and more particularly to an improved construction of an inflatable belt that can be worn separately or incorporated in a garment, for example a swim suit or the like.

While there are many and varied types of inflatable devices for the present general purpose available, most of these are designed so as to fit about the chest, neck, or waist of the person utilizing them with little or no consideration being given to their bulk since they are mainly intended as an accessory to be worn only when people are travelling in a boat or engaged in a sport where there is a possibility of falling into the water. This general bulky construction of the prior art devices of this nature, of course, discourages their use by swimmers particularly if they are not in the novice class.

As a result, it is very rare to find anyone who is an accomplished swimmer wearing any form of safety device and yet a high percentage of accidental drownings occur in this group.

With this in mind, the present invention aims to provide an inflatable belt of such a compact and non-bulky design that it can be worn either separately or embodied in a bathing suit construction without encumbering a swimmer in any way and, further, is designed for instant inflation when, and if, necessary.

This is accomplished by providing a flexible tube having at each end a coupling means whereby the tube ends can be adjustably connected to provide a complete ring adapted to snugly fit about the waist with a belt inflating mechanism provided within one of said tube ends. In a preferred form, this basic inflatable belt construction is embodied in the waistband of a pair of swim trunks in such a manner that it acts as a normal belt when not inflated. A triggering control is incorporated in the belt inflating mechanism so that if a swimmer is in difficulty a squeeze of the belt end portion is sufficient to inflate the belt into body supporting condition.

Having thus generally described the nature of the invention, particular reference will be made to the accompanying drawings, showing by way of illustration, preferred embodiments thereof, and in which;

FIGURE 1 is a view in front elevation of an inflatable belt in accordance with the invention as it would appear in connected and uninflated condition.

FIGURE 2 is a top plan view, partially in section of the end portions of the belt construction shown in FIGURE 1, to illustrate in more detail the coupling arrangement, inflating mechanism and a preferred means of attaching a stretch resistant internal member.

FIGURE 3 is an enlarged cross-sectional view of FIGURE 2 along the line 3—3 to more clearly illustrate the internal arrangement of the inflating mechanism and trigger.

FIGURE 4 is a cross-sectional view of FIGURE 2 along the line 4—4.

FIGURE 5 is a cross-sectional view of FIGURE 1 along the line 5—5.

FIGURE 6 is a cross-sectional view corresponding in location to FIGURE 5 to illustrate an alternative embodiment wherein non-elastic elements are attached to and preferably embedded in the tube wall.

FIGURE 7 is a view in perspective elevation of a pair of swim trunks embodying an inflatable belt in accordance with the invention.

FIGURE 8 is a view in perspective elevation of a further construction of swim trunks embodying an alternative construction of an inflatable belt according to the invention.

FIGURE 9 is a cross-sectional view of the swim suit construction of FIGURE 8 along the line 9—9 to illustrate in more detail the arrangement and attachment of the flexible belt.

FIGURE 10 is an enlarged detail view of the coupling ends of the inflatable belt construction shown in FIGURES 8 and 9.

FIGURE 11 is a further enlarged detail view of the coupling ends of the inflatable belt with the belt inflating mechanism.

With particular reference to the drawings, the inflatable belt of the invention as shown generally in FIGURE 1 consists of a main belt body 10 made as a double walled tube having an outer wall 12 of stretchable fabric material and an inner air tight wall 14 of resilient material such as rubber or the like. The tube thus formed is sealed at one end by attachment to a cylindrical fitting 20 bearing a coupling means 26 as will be described in more detail later and at the other end by attachment to a second fitting 24 which supports the other portion of the coupling 26 and also acts as a housing for a cylinder 30 of compressed gas, a firing mechanism and trigger as will be described.

Dealing first of all with the fitting 24, it is to be noted that in the preferred form illustrated, the exterior surface is made as providing a plurality of serrations 27 in order to ensure a secure air tight connection to the tube. The interior of the fitting 24 is shaped to provide a recess 29 adapted to snugly receive the gas cylinder 30 with an axial extension 31 of this recess receiving a triggering piston 32, bearing a perforating needle 33, and a coil spring 34. The opposite end of the fitting 24 is threaded so as to receive a cap assembly 35 retaining the gas cylinder 30 in operative position with the plugged end 30*a* in alignment with the perforating needle 33. The end of the fitting 24 bearing the axial recess 31 is slotted transaxially as indicated at 43 to accommodate a trigger plate 44 having an actuating cam surface 45 with the plate 44 pivotally mounted adjacent the cam surface 45 as indicated at 46. With this arrangement, the spring 34 normally urges the piston 32 against the cam surface 45 so that a handle portion 47 of the plate 44 is in raised position as shown. As the portion of the fitting 24 containing the axial recess 31 is bored transaxially to provide gas exhaust ports 39, pressure on the handle portion 47 causes the cam surface 45 to urge the piston 32 inwardly against the spring 34 so that the needle 33 penetrates the plugged end 30*a* of the cylinder 30 allowing the gas to quickly inflate the interior of the tube 10.

As the preferred material forming the double walls of the tube 10 are resilient and while the fabric outer wall 12 restricts the diameter, it is also necessary to restrict the circumferential expansion of the tube and this is accomplished in the preferred construction illustrated by a non-elastic cable or cord 60 which is secured between the respective inner ends of the fittings 20 and 24, see FIGURE 2 for example. A similar effect can be obtained, as shown as an alternative construction in FIGURE 6, by embodying a plurality of non-resilient strands 160 in the inner wall of the rubber inner lining 14. In this case, the inner circumference of the belt 10 would not be changed by inflation, the expansion being restricted to the remaining portions of the belt without effecting the desired snug fit. This would also apply if the inner walls were made of a non-resilient air tight material.

The coupling 26 in the construction illustrated consists of a first portion 70 secured to the fitting 20 as shown and which includes a pivotally mounted buckle portion 72. The other half of the coupling 26 consists of a flexible tongue member 74 which is mounted on a ring portion 76 fitting on the fitting 24 and being held in place by the cap 35 as shown in FIGURES 4 and 5. The tongue member 74 being flexible is threaded between the buckle portions 70, 72 pulling against the buckle portion 72 when the belt is under tension locking the coupling 26 in place.

With reference to FIGURE 7 showing a preferred embodiment of the inflatable belt of the invention with a pair of swimming trunks A, it will be noted that the outer wall 12 of the tube 10 is seamed directly to the body of the trunks so that the belt in collapsed condition gives the general appearance of a heavier seam or belt as is usual, the coupling 26 acting as a belt buckle. It will also be understood that the belt of the invention could be similarly embodied in ladies swim-suits or other clothing which might be worn for nautical sports.

While the coupling 26 illustrated is capable of adjustment with respect to varying sizes, it will be understood that other buckle arrangements embodying adjustable means could be readily utilized with the basic inflatable belt construction of the invention.

In the alternative construction shown in FIGURES 8 through 11 the swim suit B is provided with an upper inflatable belt receiving portion of tubular form having inner walls 86 and outer walls 88 which are made so as to serve as the outer wall of the tube assembly and for this purpose the fabric is such that again it is capable of greater expansion in the diametrical direction of the inflatable tube than in the circumferential direction. In order to provide the circumferential restriction, a cord or belt 81 is provided which passes around the interior of the fabric tube to an opening in the inner wall 86 so that the ends protrude and are tied in the usual way when the garment is worn to keep the trunks firmly in place and also acting to keep the internal circumference of the inflatable belt within the desired limits.

The cord or tape 81 is held in position about midway of the height of the fabric tube by tabs or loops attached to the inner wall 86. The belt construction shown in FIGURES 8 to 11 has the inflatable inner tube 90 with the upper fabric tube forming part of the swim suit B as was the case with the swim suit A but with the trigger 126 for the firing mechanism positioned outside. The mounting of the firing mechanism 124 to the tube is preferably as follow: a layer of pressure sensitive tape is applied to the body of the firing mechanism, the open end of the tube 90 is pulled over the layer of tape and further layers of pressure sensitive tape 91 applied over the tube end and the end of the firing mechanism. A gap of approximately ¼" is left between the neck of the firing mechanism and the ring of tube and tape 91 to provide a space for a wire ring 95 and to provide a means for locating and attaching the inflatable tube assembly 90 within the garment as will be described later.

The other end of the tube 90 is sealed and coupled to the firing mechanism end as shown in FIGURES 10 and 11. The end of the tube is sealed (flat) and inserted into the end of a metal clip 94 and folded over as shown. A holding clamp 92 is then inserted over this assembly and squeezed tight on same forming a permanent air tight joint. The assembly thus formed is inserted in the swim suit fabric tube through an extensible slot 82 and the ends of the inflatable tube connected by connecting the wire clip 94 to the ring 95 by connectors 93.

The inflatable tube is anchored to the swim suit by attachment of the firing mechanism 124 by a string or tape attached to the inner wall 86 and wound about the firing mechanism 124 adjacent at the gap where the ring 95 is located and tied at that point.

While the construction shown in FIGURES 8 through 11 does not have the tongue and buckle arrangement of the earlier described construction, it will be obvious that the arrangement shown can be stretched, as is usual with a swim suit, for putting on and then adjusted for a firm secure fit by the cord 81.

In use, the belt of either form is quickly and easily inflated by squeezing the garment portion surrounding the trigger handle or the exposed trigger handle releasing the compressed gas from the cylinder as previously described. The belt when inflated extends only to a predetermined diameter, controlled by the outer flexible fabric wall, and a predetermined circumference, controlled by the inner non-elastic member or members, to keep the user afloat for an unlimited amount of time. As will be obvious by reference to the preceding description and accompanying drawings, the belt can be used any number of times simply by replacing the exhausted compressed gas cylinder by a new one.

I claim:

1. An inflatable life saving belt adapted to fit about the waist or upper body comprising in combination an elongated multiple walled tube having an inner wall of airtight resilient material and at least one outer wall of a stretchable fabric material, an airtight sealing means at each end of said tube and coupling means for interconnecting said tube ends to form a body-encircling belt disposed adjacent said tube end sealing means, means less extensible than said resilient wall for restricting the circumferential expansion of said wall when inflated, and an inflating mechanism mounted within said tube adjacent one end including a cylinder of compressed gas and means for controllably releasing said gas to the interior of said tube.

2. An inflatable life saving belt adapted to fit about the waist or upper body comprising in combination an elongated multiple walled tube having an inner wall of airtight resilient material and at least one outer wall of a stretchable fabric material, an airtight sealing means at each end of said tube and coupling means for interconnecting said tube ends to form a body-encircling belt disposed adjacent said tube end sealing means, at least one strand of non-stretchable material of predetermined length extending through the interior of said tube and being connected at each end to said tube sealing means to constitute a means of limiting the circumference of said tube when inflated, and an inflating mechanism mounted within said tube adjacent one end including a cylider of compressed gas and means for controllably releasing said gas to the interior of said tube.

3. An inflatable life saving belt as claimed in claim 1, wherein said double walled tube assembly is embodied as an integral part of a swimming garment.

4. An inflatable life saving belt as claimed in claim 1, wherein a plurality of strands of non-stretchable material are connected to a portion of said inner resilient wall to restrict longitudinal extension of said wall portion.

5. An inflatable life saving belt as claimed in claim 1, wherein a plurality of strands of non-stretchable material are embedded in a portion of said inner resilient wall to restrict longitudinal extension of said wall portion.

6. An inflatable life saving belt as claimed in claim 1, wherein said tube sealing means closing the end of said tube containing said inflating mechanism comprises a cylindrical fitting having an internal body recess housing said compressed gas cylinder and means for controllably releasing said gas to the interior of said cylinder, said latter means including a gas releasing trigger adapted for actuation by pressure applied to the exterior of said belt.

7. An inflatable life saving belt as claimed in claim 1, wherein said tube end coupling means comprises a buckle connected to one of said tube sealing means and a flexible tongue connected to the other of said tube sealing means whereby the body-encircling circumference of said belt may be varied.

8. An inflatable life saving belt as claimed in claim 6

wherein said gas releasing trigger is located within said outer wall.

9. An inflatable life saving belt as claimed in claim 6 wherein said gas releasing trigger is located exteriorly of said outer wall.

10. An inflatable life saving belt as claimed in claim 3 wherein the outer wall of said double walled tube is a integral upper portion of a pair of swimming trunks and said garment portion is made of a fabric having greater stretchability in a direction transverse to said inner tube diameter than in the direction of the axis of said inner tube.

11. An inflatable life saving belt as claimed in claim 2 wherein said strand of non-stretchable material constitutes a waist encircling drawstring forming part of said swimming suit construction.

12. An inflatable life saving belt adapted to fit about the waist or upper body comprising in combination an elongated double walled tube having at each end a coupling means for connecting said ends to form a body-encircling belt, and a mechanism for controlled inflation of said belt mounted within one of said double walled tube ends,

wherein the inner one of said double walls is made of airtight resilient material, and the outer one of said double walls is made of stretchable fabric material, and

wherein at least one non-resilient element of predetermined length extends between said tube ends to constitute a means of limiting the circumferential expansion of said belt when inflated.

13. An inflatable life saving belt as claimed in claim 12, wherein said double walled tube is embodied as an integral component of a swimming garment.

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