Jan. 20, 1959 L. S. JOHNSON 2,869,151

BUOYANT BELT

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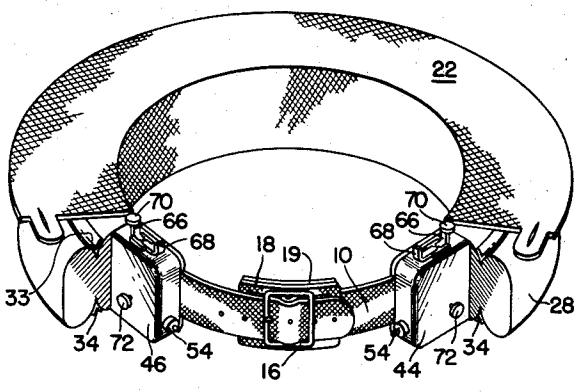

FIG. 1

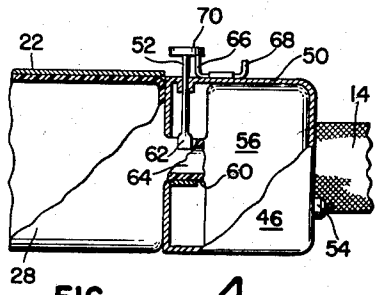

FIG. 4

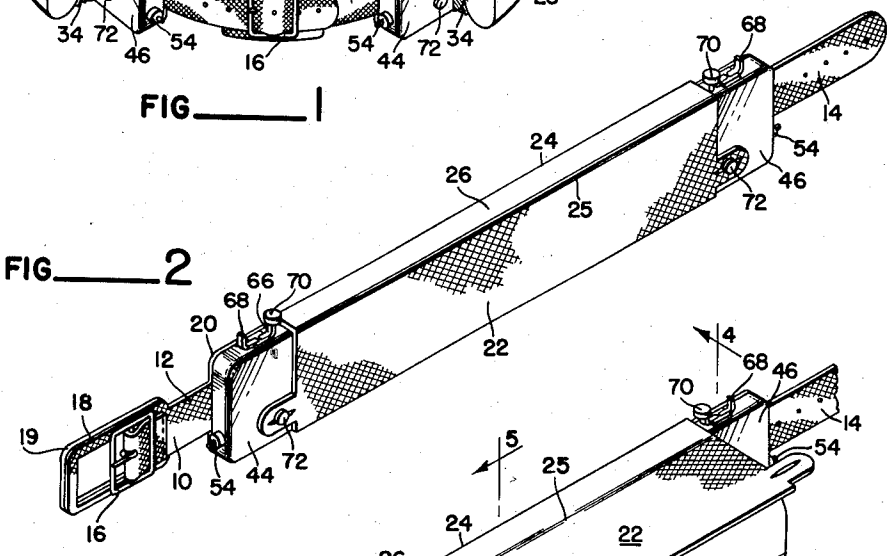

FIG. 2

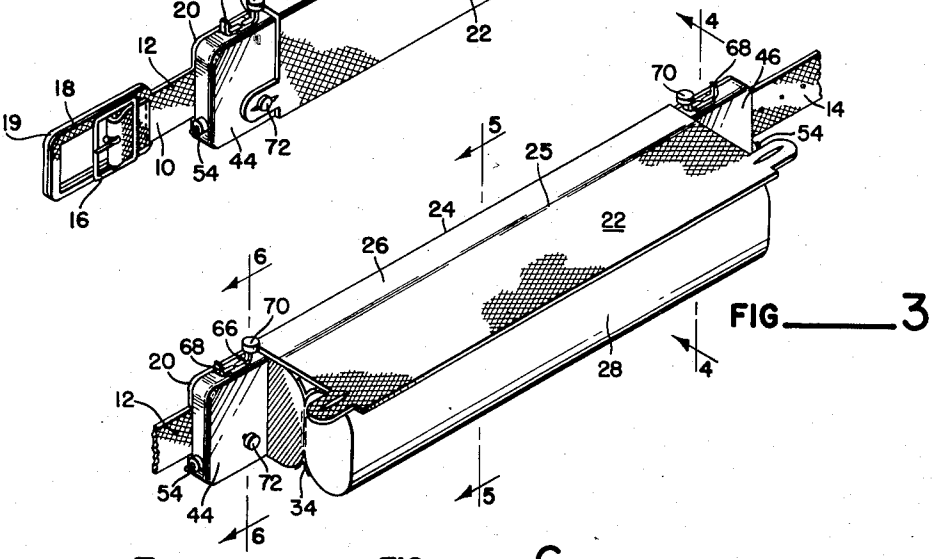

FIG. 3

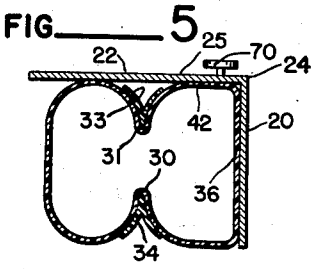

FIG. 5

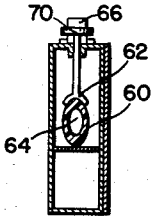

FIG. 6

LYLE S. JOHNSON
INVENTOR.

BY Smith & Tuck

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BUOYANT BELT

Lyle S. Johnson, Seattle, Wash.

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4 Claims. (Cl. 9—17)

This present invention relates to belts intended to be worn by persons when in the water and to provide, self-contained within the belt assembly, two separate containers each charged with air under pressure and each being sufficient to fully inflate the belt during periods of use. As distinct from, for instance, an automobile tire inner tube, this present device has a solid belt assembly which may be properly adjusted to the wearer's waist; and then means are provided in the construction of the buoyant chamber so that, when it is expanded by the compressed air, it does not appreciably reduce the interior diameter of the device and thus pinch the wearer, as so often occurs in devices of this order.

Buoyant devices, which gain their buoyancy by containing air within a rubber-like container, have not been well received by various lifesaving agencies, and particularly the governmental agencies responsible for the inspection and approval of protective and lifesaving devices. The U. S. Coast Guard, for instance, for years insisted that the only safe life preserver was one having blocks of solid cork in a suitable jacket arrangement. This of course was a very bulky and clumsy unit, and this very clumsiness oftentimes was the reason why people did not put the jacket on timely enough to be of practical value in an emergency. During World War II the need for tremendous numbers of lifesaving devices quickly used up the readily available supply of cork bark, and as a result other devices were resorted to and considerable use was made of kapok and other buoyant fibers, synthetic sponges and the like. Quite recently the Coast Guard has finally permitted the use of kapok-filled three-part jacket in lieu of the cork life preserver, and further has permitted the use on small pleasure craft of the buoyant kapok-filled cushions in lieu of life preservers. This no doubt has been the result of the war emergency and somewhat satisfactory use of kapok-filled jackets during the war, and especially the air-filled or sealed tube gas-filled, inflatable devices, one of which was used in great numbers by the Air Corps and Navy fliers, and termed the "Mae West" jacket. The majority of these jackets used a sealed tube capsule as the gas-containing element.

In my present device I endeavor to produce a unit that will meet with governmental acceptance by making it particularly secure and to insure its operability even after long periods of non-use. Further, I provide that my belt can be charged by air, as by an air pump or more currently probably from an automobile service station or the like. This means, of course, that the device can be repeatedly used and it thus becomes a swimming aid, particularly in the instruction of adults who have never swum before and who are so reluctant to get their bodies really sufficiently under water to take advantage of the natural buoyance of their bodies. A belt of this order gives great confidence to a person, and to that end the belt has been arranged with the buoyant area on the sides and back of the wearer, with none in the stomach portion.

The principal object of my present invention therefore is to provide a buoyant belt that can be worn quite conveniently in its deflated state, and thus be more generally used, due to the fact that it does not interfere appreciably with normal work or movement.

A further object of my invention is to provide a buoyant belt in which the buoyant chamber is interrupted in the front portion so that it will, when inflated, interfere to the minimum with the normal functioning of the arms and the like, as in swimming or in performing certain operations which might conceivably be required in boat handling and the like just prior to the actual need of the buoyant belt.

A further object of my invention is to provide a buoyant belt which has a movable, slightly extendible containing envelope which is folded and then covered with a protective cover, to the end that any chafing or the like, that might occur during long periods of storage or when being worn for considerable periods, will be taken by the outer cover and thus not impair the efficiency or strength and durability of the air-containing element.

A further object of this present invention is to provide a duplication of air storage compartments where air or gas can be stored under sufficient pressure so that either of the relatively small chambers will supply the buoyant gas needed to fully inflate the belt. There being two of these, one on each end of the unit, there is an adequate reserve for emergency use.

A further object of this invention is to provide a buoyant belt in which many small features are combined in order to make a belt that is sufficiently acceptable to be readily worn by persons who might not otherwise wear lifesaving equipment. Because of the convenience and comfort of the device, it is believed it will provide a ready solution of how to get people to wear protective devices when the immediate need is not readily apparent.

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 a perspective view showing my belt in its inflated condition.

Figure 2 is a perspective view illustrating my belt in its extended, and not inflated, condition.

Figure 3 is a view similar to Figure 2, but showing the inner storage chamber inflated and with the protective covering released.

Figures 4, 5 and 6 are cross-sectional views taken along similarly numbered lines of Figure 3.

Referring more particularly to the disclosure in the drawings, the numeral 10 designates the belt structure generally, upon which my buoyant arrangement is mounted. This belt is preferably made from water-impervious material, but of considerable firmness and weight so that it will give reasonable rigidity and protection to the unit. Each end of the belt, as at 12 and 14, is reduced in width to that of an ordinary wide waist belt, and one end is provided with a plurality of adjusting openings, as is common with many belts, and the other end is provided with a suitable form of buckle as 16. Buckle 16 is preferably backed with a pad member as 18 employing an interior surface of resilient material as sponge rubber 19, so that, when in use and considerable pressure is placed upon the unit, the buckle will not rest uncomfortably on the abdomen. Throughout the larger extent of the belt it is widened out as at 20, to form the backing for my device proper. Formed normally as part of the widened portion 20 of the belt is the cover portion 22. This cover portion is provided with two folding lines, as at 24 and 25, to the end that the belt assembly 10 will, in effect, provide a backing,

a top covering and a front covering for the expansible air chamber.

The buoyant chamber 28 of my device is formed of some suitable flexible material which will be impervious to air or similar gases, and will not deteriorate from long storage during long periods of non-use. There are many synthetic materials that meet these specifications which normally serve just as satisfactorily as the former rubber inflatable tubes, but which are superior to rubber in that they do not deteriorate with age. It is my intention to make use of this type of material, to the end that equipment of this order may be stored or carried in a boat or the like or in an airplane for possibly long periods and never used at all, and yet when a period of use occurs it is essential that it be in good, sound condition.

The preferred cross-section for the air chamber 28 is as indicated in Figure 5 in which, in effect, two oval-shaped units are joined together at their upper and lower points of tangency so as to provide the inwardly directing folds as 30 and 31. These folds are preferably backed with additional material, as at 33 and 34, so as to give a definite line of folding and to reinforce the chamber at this point so that it will not be extended outwardly by the interior pressure of the inflated gas. One side, as 36, of the air chamber is secured as by gluing thereto the extended or widened portion of the belt 20. The covering portion formed of the wide panel 22 and the narrow panel 26 included between the folding lines 24 and 25 will extend outwardly substantially as shown in Figure 5, and to this is secured, as by gluing thereto, the area of contact of the upper chamber between folding lines 24 and 25, as indicated at 42. This tends to give form and to preserve the form of the air chamber. At the same time it protects the chamber from damage while actually in use, because of the relatively heavy protective covering of the top.

Disposed at each end of air chamber 28 are two separate and separately functioning air storage units, as 44 and 46. These units are preferably firm-walled, as it is desirable that they have sufficient rigidity to resist distortion when considerable air pressure is built up within them. These air chambers are of the same belt width as the wide portion of the belt 20 and the same as the belt width of the air chamber 28. The outer wall structure as 50 forms a suitable anchor for the discharge valve assembly 52, the filling valve 54 and also holds without distortion the high pressure portion of the inflatable tube, as is illustrated at 56. Inasmuch as there is need only for relatively low air pressure in the air chamber 28 when the same is extended ready for use, it does not require a very large storage chamber, as 56, to house sufficient air to fill this chamber, provided the pressure is appreciably increased, and to this end wall 50 must be adequate to hold up to preferably about 80 pounds of air, although for most uses 35 or 40 pounds will usually suffice.

The air-filling valve 54 may be very similar to the construction of an automobile or bicycle air valve. This is particularly desirable, in that this is a well developed type of valve with replacements readily available everywhere, and it also fits the various tire pumps and the air-dispensing hose tips at various marine and automobile service stations. The air is contained within chambers 56 at considerable pressure, and some suitable valve must be employed between chambers 56 and chamber 28. Now, it has been found desirable to have chambers 56 formed from the same stock and as a part of the extendible chamber 28, to the end that there will be no connections and the like, which might fail, particularly during storage periods, and for this reason the most logical type of valve is the so-called "Thomas valve" which has been in use for many years and is easily formed from rubber or rubber substitutes.

A suitable means for opening the valve tube 60, which in its closed position is flat with no air passage, is a structure after the showing of Figures 4 and 6, in which a plunger-like arrangement is available for outside manipulation and which extends into the high pressure chamber housing as 44 or 46, with a fork-like end 62 which engages the vertically flattened tube and with pressure can cause it to form an air passageway, as indicated at 65 in Figure 6. Trial has proved this to be a very dependable form of valve arrangement, and the manipulation of the same is relatively simple. It is desirable, however, to provide means so that the valve will not be tripped accidentally, and one convenient means is to provide a slidable safety member as 66, which is shown in the safe position in Figure 4. The device can be grasped by the upturned end 68 and moved to the right, as viewed, and thus free the finger button 70 so that pressure on the same will bring about the condition shown in Figure 6. It is desired to have noted that there are two chambers 56 and that either one of these is adequate to properly inflate chamber 28, and in so doing cover 22 is pulled off the retaining buttons 72.

It is believed that it will be clearly apparent from the above description and the disclosure in the drawings that the invention comprehends a novel construction of buoyant belt.

Having thus disclosed the invention, I claim:

1. A buoyant belt for use in the water, comprising: a waist belt, made of firm material, having a buckle end and a tongue end of waist belt width and an intermediate portion widened out to form a backing for a buoyant chamber; a backing pad for said buckle; a facing for said pad consisting of resilient sheet material; a cover, for a buoyant chamber, formed as a continuation of said widened belt portion and having two longitudinal folding lines; a buoyant chamber formed of gas-impervious flexible sheet material and having a low pressure gas storage chamber of a length in excess of one-half the length of said waist belt and a high pressure gas storage unit at each end of said low pressure chamber, each of which chambers is capable of storing sufficient gas, at high pressure, to effectively inflate the low pressure chamber; said high pressure chambers formed as part of said low pressure chamber and separated therefrom by uni-directional flow valves; means for operating said valves exteriorly of said belt assembly; means normally disposed to prevent accidental opening of said valves; a valved filling opening for each high pressure chamber; said buoyant chamber cover and widened belt portion forming a protective cover for two sides and the top of said chamber when it is deflated and forming a cover for one side and the top when the chamber is inflated; said low pressure chamber being secured to the widened portion of the belt and to the portion of the cover between the two folding lines of said cover; firm-walled pressure confining housings for the high pressure chambers; said low pressure chamber formed with a cross-section conforming substantially to two oval-shaped units joined together on one of the vertical sides of each and with the tangent portions removed; reinforcement for the curved portions of the tangent sides to maintain the twin-oval shape and pre-form the folding lines of the chamber material when it is deflated.

2. A buoyant belt for use in the water, comprising: a waist belt, made of firm material, having a buckle end and a tongue end of waist belt width and an intermediate portion widened out to form a backing for a buoyant chamber; a cover, for a buoyant chamber, formed as a continuation of said widened belt portion and having two longitudinal folding lines; a buoyant chamber formed of air-impervious flexible sheet material and having a low pressure air storage chamber of a length in excess of one-half the length of said waist belt and a high pressure air storage unit at each end of said low pressure chamber, each of which chambers is capable of storing sufficient air, at high pressure, to effectively inflate the low pressure

chamber; manually operated valve means connecting said high pressure chambers to said low pressure chamber; means normally disposed to prevent accidental opening of said valves; a valved filling opening for each high pressure chamber; said buoyant chamber cover and widened belt portion forming a partial protective cover for said chamber when it is deflated and inflated; said low pressure chamber being secured to the widened portion of the belt and to the portion of the cover between the two folding lines of said cover; pressure-confining housings for the high pressure chambers; said low pressure chamber formed with a cross-section of substantially twin-oval shape; reinforcement for the curved portions of the tangent sides to maintain the twin-oval shape and pre-form the folding lines of the chamber when it is deflated.

3. A buoyant belt for use in the water, comprising: a waist belt, made of firm material, forming the support for a buoyant chamber; a cover, for a low pressure buoyant chamber; a buoyant chamber formed of air-impervious flexible sheet material and having a low pressure air storage chamber having a length in excess of one-half the length of said waist belt and a high pressure air storage unit at each end of said low pressure chamber, each of which chambers is of a size capable of storing sufficient air, at high pressure, to effectively inflate the low pressure chamber; said high pressure chambers formed as part of said low pressure chamber and separated therefrom by uni-directional flow valves; means for operating said valves exteriorly of said belt assembly; a filling valve for each high pressure chamber; said buoyant chamber cover joining said buoyant chamber to said belt and forming a protective cover for two sides and the top of said chamber when it is deflated and forming a cover for one side and the top when the chamber is inflated; pressure-confining housings for the high pressure chambers; and reinforcement for the curved portions of the low pressure chamber adapted to pre-form the folding lines of the chamber when it is deflated.

4. A buoyant belt for use in the water, comprising: a waist belt, made of firm material, having a buckle end and a tongue end of waist belt width and an intermediate portion widened out to form a backing for a buoyant chamber; a buoyant chamber formed of gas-impervious flexible sheet material and having a low pressure gas storage chamber having a length not in excess of two-thirds of the length of said waist belt; a high pressure gas storage unit at each end of said low pressure chamber, each of which chambers is capable of storing sufficient gas at high pressure to effectively inflate the low pressure chamber; means connecting said high pressure chambers to said low pressure chamber; said high pressure chambers formed as part of said low pressure chamber and separated therefrom by a uni-directional flow valve; means for operating said valves; a valved filling opening for each high pressure chamber; said buoyant chamber cover and widened belt portion forming a protective cover for two sides and the top of said chamber when it is deflated and forming a cover for one side and the top when the chamber is inflated; said low pressure chamber formed with a cross-section conforming substantially to two oval-shaped units joined together on one of the vertical sides of each; reinforcement for the curved portions of the joined sides to maintain the two-oval shape and pre-form the folding lines of the chamber when it is deflated.

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