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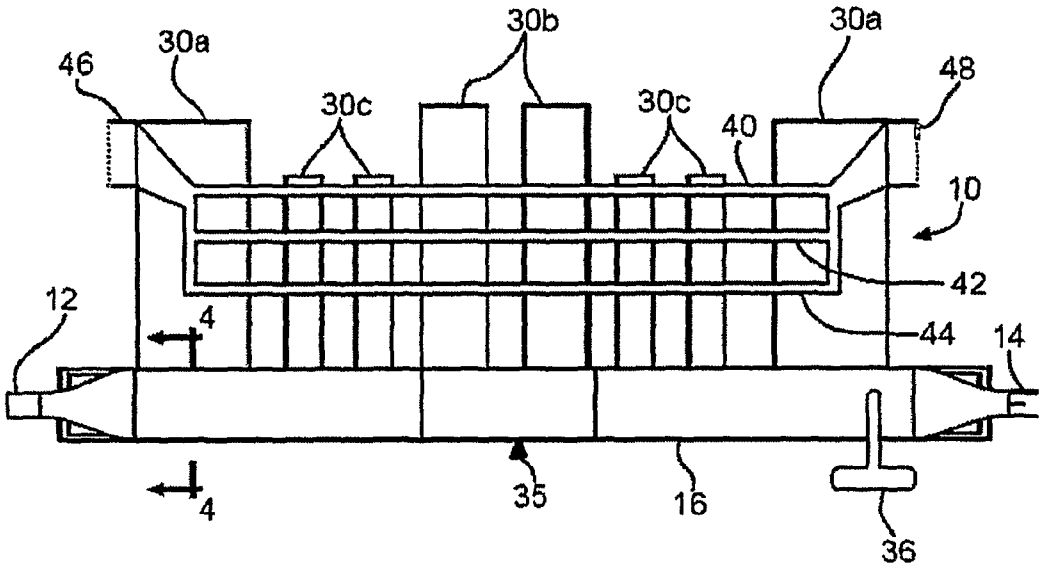
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(54) Title: PERSONAL FLOATATION DEVICE HAVING SELECTIVELY INFLATABLE BLADDERS



(57) Abstract: A personal floatation device includes a housing and a plurality of bladders disposed within the housing. The plurality of bladders are movable between a non- deployed position within the housing and extendable from the housing to a deployed position. A device is provided for selectively filling the bladder with a substance that is buoyant in water and causing the bladder to be moved from the non-deployed position to the deployed position. The bladder filling and deploying mechanism can be a cartridge that contains a supply of a compressed gas.

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TITLE

PERSONAL FLOATATION DEVICE HAVING SELECTIVELY INFLATABLE BLADDERS

BACKGROUND OF THE INVENTION

[0001] This invention relates in general to personal flotation devices, commonly referred to as life vests or life jackets. In particular, this invention relates to an improved structure for such a personal floatation device that includes a belt-like structure containing a plurality of selectively inflatable bladders.

[0002] Personal floatation devices are well known in the art and are adapted to be worn by a user to keep the user afloat in a body of water to prevent drowning. To accomplish this, a typical personal flotation device supports or contains a material that is sufficiently buoyant in water as to keep the user afloat. A wide variety of personal flotation devices are known in the art for performing this general function.

[0003] Although known personal floatation devices have been successfully engineered to address the needs of users when floating in the water, it appears that little attention has been given to the design of such personal floatation devices when they are worn by users out of the water. On the contrary, many personal floatation devices are relatively uncomfortable to wear and significantly restrict the free movement of the arms and torso of the users wearing them. Consequently, many people simply do not wear their personal floatation devices when engaged in water activities until an emergency situation arises. Unfortunately, during such an emergency situation, it may be difficult to quickly locate and don a personal floatation device. Thus, it would be desirable to provide an improved structure for such a personal floatation device that is relatively comfortable to wear when not in use.

SUMMARY OF THE INVENTION

[0004] This invention relates to an improved structure for a personal floatation device that includes a belt-like structure containing a plurality of selectively inflatable

bladders. When the user is not in the water, the bladders can be rolled up and stored within the personal floatation device as to provide the user with significant maneuverability, near normal air circulation, and a minimum amount of discomfort. When needed for use, however, the bladders can be inflated with a gas or otherwise filled with a buoyant material, either manually or automatically. During such inflation, the bladders are extended from the personal floatation device around the user to provide a personal floatation device that supports the user in a body of water.

[0005] Various objects and advantages of this invention will become apparent to those skilled in the art from the following detailed description of the preferred embodiment, when read in light of the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] Fig. 1 is a side elevational view of a personal floatation device that includes a belt-like structure containing a plurality of selectively inflatable bladders in accordance with this invention.

[0007] Fig. 2 is a sectional view taken along the line 2-2 of Fig. 1 showing one of the plurality of bladders in a deflated and non-deployed position within the personal floatation device.

[0008] Fig. 3 is a side elevational view similar to Fig. 1 showing each of the plurality of bladders in an inflated and deployed position extending from the personal floatation device.

[0009] Fig. 4 is a sectional view taken along the line 4-4 of Fig. 3 showing one of the plurality of bladders in the inflated and deployed position extending from the personal floatation device.

[0010] Fig. 5 is a schematic view of a pneumatic actuating circuit that is contained within the personal floatation device for deploying the plurality of bladders as shown in Figs. 3 and 4.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0011] Referring now to the drawings, there is illustrated a personal floatation device, indicated generally at 10, in accordance with this invention. The illustrated personal floatation device 10 includes a housing that is shaped generally in the form of a belt, being relatively long and narrow in shape. However, the personal floatation device 10 may be formed having any desired shape. The illustrated personal floatation device 10 has first and second fastening devices 12 and 14 provided at opposite ends thereof. The first and second fastening devices 12 and 14 are adapted to selectively cooperate with one another to releasably secure the personal floatation device 10 about a user in the manner of a belt. To accomplish this, the fastening devices 12 and 14 may be embodied as any conventional type of releasable cooperating fasteners that are well known in the art, such as are commonly used on a variety of known personal floatation devices. If desired, the personal floatation device 10 may include a conventional length adjustment structure (not shown) to facilitate use thereof by persons having different body sizes, again as well known in the art.

[0012] The structure of the personal floatation device 10 is more clearly illustrated in Fig. 2. As shown therein, the personal floatation device 10 can be formed from an elongated strip of material that is folded lengthwise along a bottom edge 16 to form a generally U-shaped or V-shaped internal pocket 18. Edges 20 and 22 of the strip of material are releasably secured together to close the upper end of the pocket 18. To accomplish this, one or both of the edges 20 and 22 of the strip of material can be provided with a conventional fastening mechanism 23. The fastening mechanism 23 can, for example, be embodied as a strip of conventional hook and loop material. The personal floatation device 10 can alternatively be formed from multiple pieces of material that are sewn or otherwise secured together.

[0013] Within the pocket 18 of the personal floatation device 10, a plurality of bladders 30 is provided. One of the plurality of bladders 30 is shown in Fig. 2 within the personal floatation device 10 in a deflated and non-deployed position. Preferably, each of the deflated and non-deployed bladders 30 is rolled up or folded within the personal floatation device 10 in such a manner as to facilitate inflation and

deployment in the manner described in detail below. Each of the bladders 30 is sewn or otherwise secured to the personal floatation device 10, such as shown at 32.

[0014] Referring back to Fig. 1, it can be seen that the personal floatation device 10 also includes a device, indicated generally at 35, for selectively inflating and deploying each of the bladders 30. In the illustrated embodiment, this bladder inflating and deploying mechanism 35 includes an actuator 36 for selectively initiating the operation thereof. In the illustrated embodiment, the actuator 36 for the bladder inflating and deploying mechanism 35 is a manually operable pull lever. The illustrated pull lever 36 is provided on the personal floatation device 10 adjacent to one end thereof. As a result, when the personal floatation device 10 is worn by a user, the pull lever 36 is positioned at or near the front of the user for easy accessibility and use. Alternatively, the actuator 36 may be embodied as an automatic sensing device that is responsive to a predetermined condition or plurality of conditions for automatically initiating the operation of the bladder inflating and deploying mechanism 35 without any manual input from the user wearing the personal floatation device 10. For example, the automatic sensing device may any conventional sensor that is responsive to the presence of water or to the presence of a predetermined magnitude of pressure for initiating the operation of the bladder inflating and deploying mechanism 35.

[0015] The illustrated bladder inflating and deploying mechanism 35 further includes a bladder filling device 38 that is responsive to operation of the actuator 36 filling each of the bladders 30 with a substance that is buoyant in water. In the illustrated bladder filling device 38 is a cartridge that contains a supply of a compressed gas, such as carbon dioxide gas. However, the bladder filling device 38 may be embodied as any conventional mechanism that is capable of selectively filling each of the bladders 30 with a substance that is buoyant in water. Preferably, the bladder filling device 38 is supported on the outside of the personal floatation device 10 and near the middle thereof. As a result, the bladder filling device 38 will normally be positioned at or near the center of the back of the user where it will not normally impede his or her movements. However, the bladder filling device 38 may be

provided at any desired location on the personal floatation device 10. Alternatively, the bladder filling device 38 may be provided as a stand alone unit that is separate from the personal floatation device 10.

[0016] When it is desired to deploy the plurality of bladders 30 of the personal floatation device 10 for use, the actuator 36 of the bladder inflating and deploying mechanism 35 is initially operated, either by manually pulling the pull lever 36 or automatically as described above. This causes the bladder filling device 38 to fill each of the plurality of bladders 30 with a substance that is buoyant in water. When this occurs, the bladders 30 are inflated and deployed so as to extend from the personal floatation device 10, as shown in Figs. 3 and 4. The bladders 30 can be formed having any desired cross-sectional shape, but are preferably of circular, semi-circular, or oval in cross-sectional shape. Regardless of their specific sizes and shapes, the bladders 30 are adapted to provide a desired amount of buoyancy for a user.

[0017] As shown in Fig. 3, the plurality of bladders 30 may be formed having different sizes. In the illustrated embodiment, the plurality of bladders 30 includes a group (two in the illustrated embodiment) of first bladders 30a, a group (two in the illustrated embodiment) of second bladders 30b, and a group (four in the illustrated embodiment) of third bladders 30c. The first bladders 30a are located at or near the opposite ends of the illustrated personal floatation device 10. Thus, when the personal floatation device 10 is worn by a user, the first bladders 30a are located adjacent to one another at the front of the torso of the user. The second bladders 30b are located adjacent to one another at or near the center of the illustrated personal floatation device 10. Thus, when the personal floatation device 10 is worn by a user, the second bladders 30b are located adjacent to one another at the rear of the torso of the user. A first pair of the third bladders 30a are located between one of the first bladders 30a and the second pair of bladders 30b, and a second pair of the third bladders 30a are located between the other of the first bladders 30a and the second pair of bladders 30b. Thus, when the personal floatation device 10 is worn by a user, the third bladders 30c are located at the opposite sides of the torso of the user.

[0018] Preferably, the first and second bladders 30a and 30b are the largest of the plurality of bladders 30 and, therefore, perform the bulk of the buoyancy function of the personal floatation device 10 when the personal floatation device 10 is worn by a user. The third bladders 30c are preferably relatively short in length in relation to the first and second bladders 30a and 30b so that the third bladders 30c fit comfortably beneath the arms when the personal floatation device 10 is worn by a user. However, as mentioned above, the plurality of bladders 30 can be formed having any shapes and sizes, as well as any desired combination thereof.

[0019] As also shown in Fig. 3, one or more straps (such as the illustrated three straps 40, 42, and 44), may be secured to some or all of the plurality of bladders 30. The straps 40, 42, and 44 are conventional in the art are provided to maintain the plurality of bladders 30 in a desired relative alignment (such as generally parallel to one another, as shown in the illustrated embodiment) and also to urge the plurality of bladders 30 in engagement with the torso of the user. The straps 40, 42, and 44 can be formed from any desired material and may be secured to the plurality of bladders 30 in any desired manner. Alternatively, adjacent ones of the plurality of bladders 30 may be secured directly together to accomplish this.

[0020] The first bladders 30a that are located near the opposed ends of the personal floatation device 10 may be provided with cooperating securement structures 46 and 48. Like the first and second fastening devices 12 and 14 described above, the cooperating securement structures 46 and 48 are adapted to selectively cooperate with one another to releasably secure the personal floatation device 10 to a user, in the manner of a vest. In the illustrated embodiment, the cooperating securement structures 46 and 48 are two halves of a conventional zipper. However, the cooperating securement structures 46 and 48 may be formed having any desired structure.

[0021] Fig. 5 is a schematic view of a pneumatic actuating circuit that is contained within the personal floatation device 10 for deploying the plurality of bladders 30 as shown in Figs. 3 and 4. The pneumatic actuating circuit includes a plurality of one-way valves 50 are respectively connected between the bladder inflating and deploying

mechanism 35 and each of the individual bladders 30. In the illustrated preferred embodiment, an individual one of the plurality of one-way valves 50 is associated with a respective one of the plurality of bladders 30. Thus, if one of the plurality of bladders 30 leaks or otherwise fails, it is isolated from the other bladders 30, which will remain inflated. If desired, each of the plurality of bladders 30 may be provided with a deflation valve 52. The deflation valves 52 can provide a convenient mechanism for deflating the plurality of bladders 30 following use so that they can be folded back into the personal floatation device 10 for reuse.

[0022] Although not illustrated, it is contemplated that leg straps, a torso strap, or other structures can be provided on the personal floatation device 10 to limit or prevent movement thereof relative to the user.

[0023] In accordance with the provisions of the patent statutes, the principle and mode of operation of this invention have been explained and illustrated in its preferred embodiment. However, it must be understood that this invention may be practiced otherwise than as specifically explained and illustrated without departing from its spirit or scope.

What is claimed is:

1. A personal floatation device comprising:

a housing;

a bladder disposed within the housing in a non-deployed position and extendable from the housing to a deployed position; and

a device for selectively filling the bladder with a substance that is buoyant in water and causing the bladder to be moved from the non-deployed position to the deployed position.

2. The personal floatation device defined in Claim 1 wherein the housing is formed from a strip of material that is folded lengthwise along an edge to form a pocket, and wherein the bladder is disposed within the pocket.

3. The personal floatation device defined in Claim 2 wherein the strip of material includes edges that are releasably secured together to close the pocket.

4. The personal floatation device defined in Claim 1 wherein a plurality of bladders is disposed within the housing in a non-deployed position and extendable from the housing to a deployed position.

5. The personal floatation device defined in Claim 4 further including a strap that is secured to at least some of the plurality of bladders.

6. The personal floatation device defined in Claim 4 further including a plurality of straps that is secured to at least some of the plurality of bladders.

7. The personal floatation device defined in Claim 1 wherein the device for selectively filling the bladder includes an actuator and a bladder inflating and deploying mechanism that is responsive to operation of the actuator for filling the

bladder with a substance that is buoyant in water and causing the bladder to be moved from the non-deployed position to the deployed position.

8. The personal floatation device defined in Claim 7 wherein the actuator is a manually operable pull handle.

9. The personal floatation device defined in Claim 7 wherein the bladder inflating and deploying mechanism is a cartridge that contains a supply of a compressed gas.

10. The personal floatation device defined in Claim 1 further including a one-way valve that is connected between the bladder and the device for selectively filling the bladder.

11. The personal floatation device defined in Claim 1 further including a deflation valve for selectively deflating the bladder.

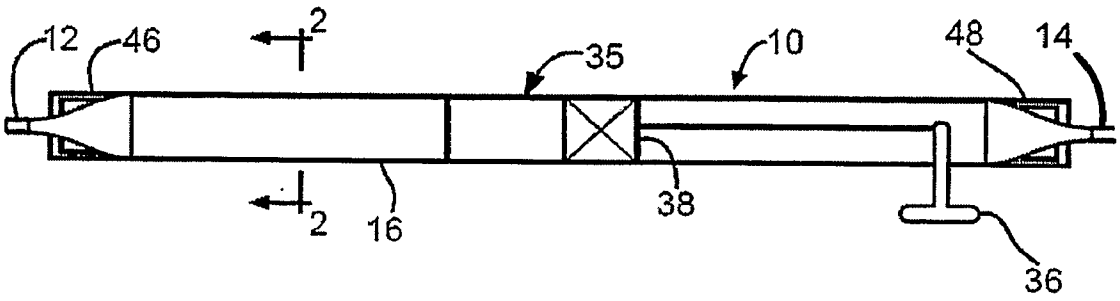


FIG. 1

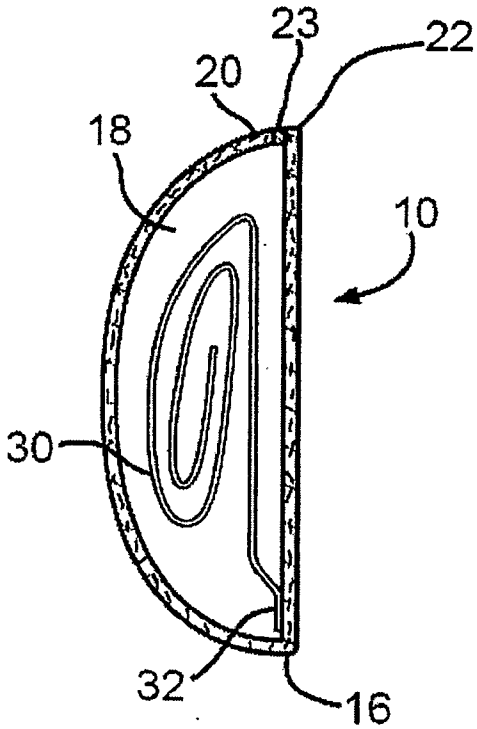


FIG. 2

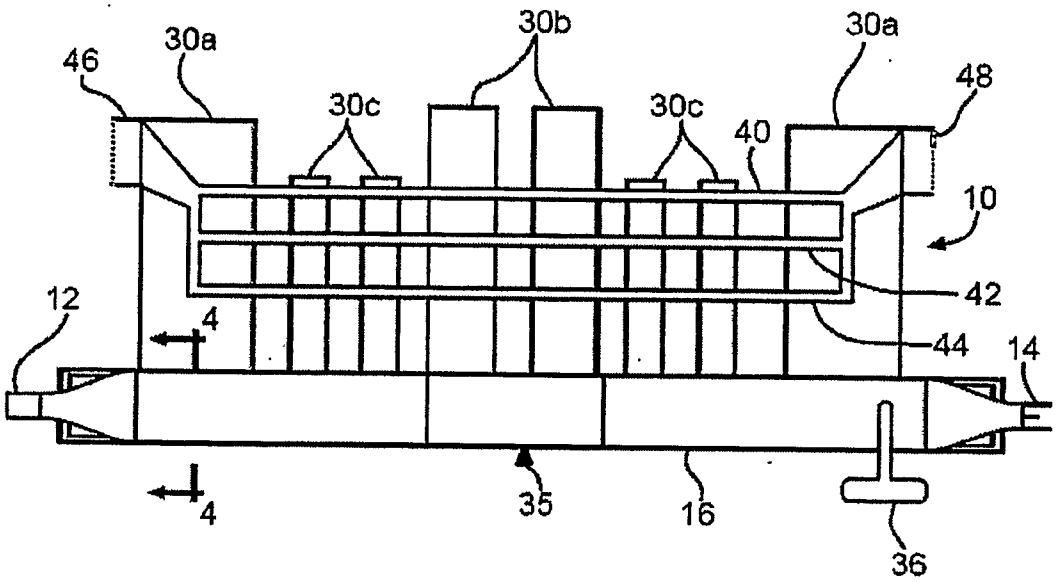

46
30a
30b
30a
48
30c
30c
40
10
42
12
4
44
14
4
35
16
36

FIG. 3

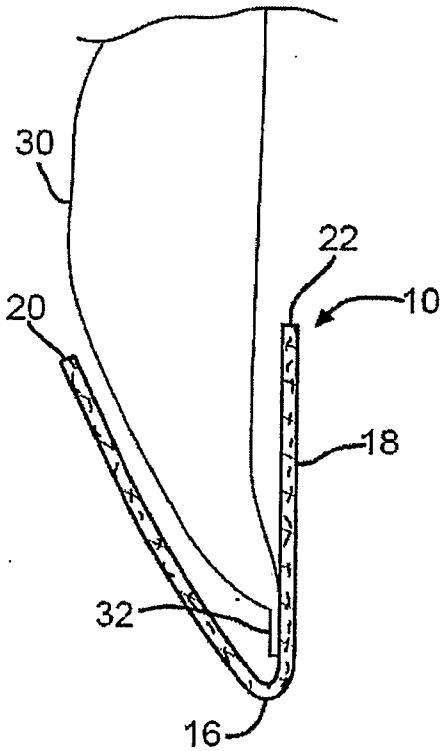

30
22
20
10
18
32
16

FIG. 4

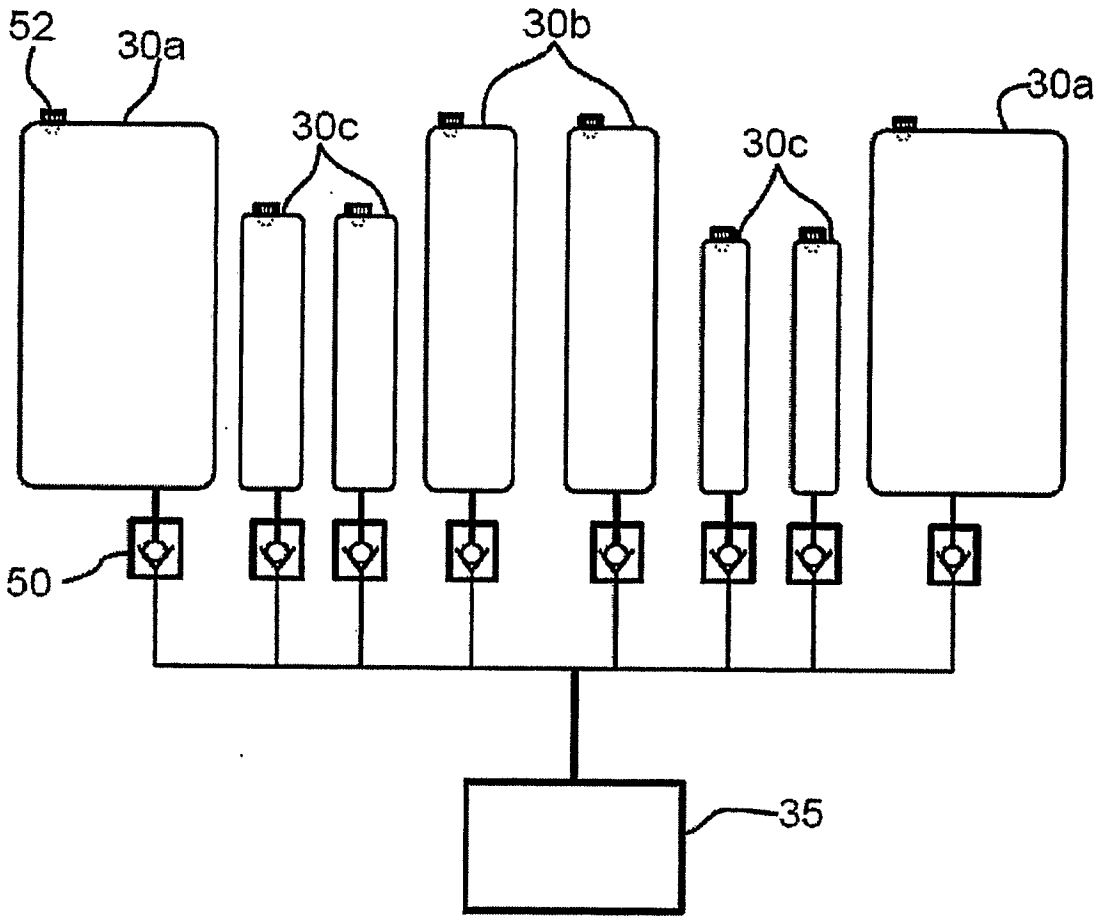


FIG. 5