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FLUID CONTAINER FOR INFLATABLE PNEUMATIC DEVICES

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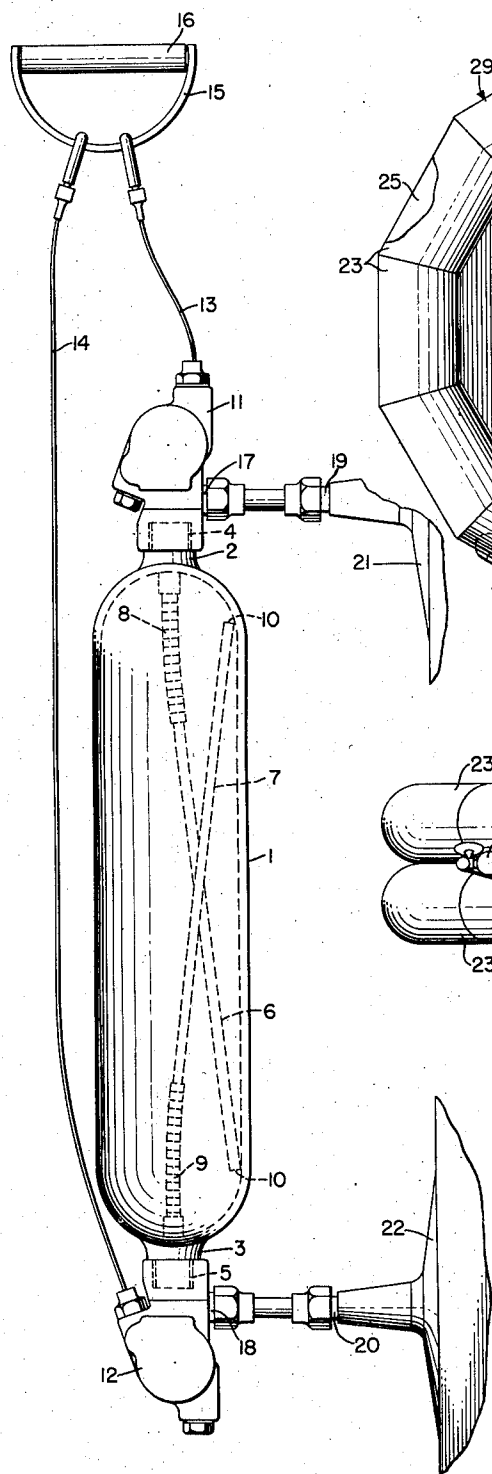
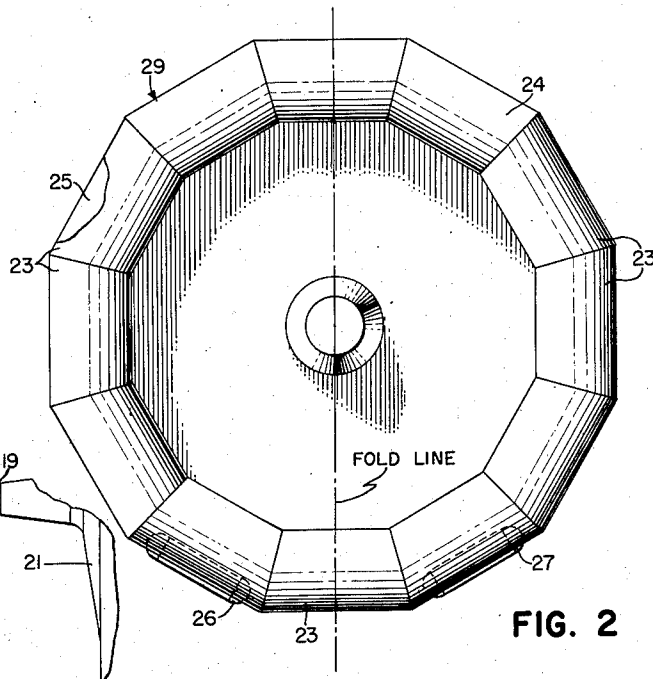


FIG. 2

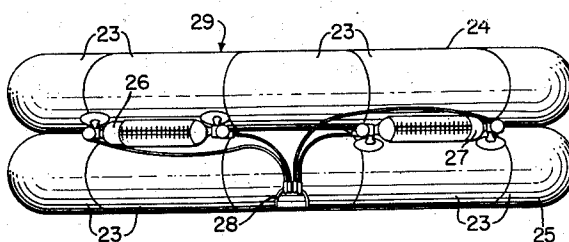


FIG. 3

FIG. 1

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FLUID CONTAINER FOR INFLATABLE PNEUMATIC DEVICES

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2 Claims. (Cl. 222—3)

This invention relates to containers for confining gaseous materials under high pressures and more particularly for containers used in connection with inflatable pneumatic structures such as life rafts, pontoons, landing mats, etc. which require relatively large volumes of the inflating gas at low pressures.

Structures of this type generally are packaged in comparatively small packages which, when needed, are opened easily. In many instances it is desirable that the structures be rapidly inflated in case of emergency such as in a forced landing at sea of an aircraft. Inflation of such structures is accomplished by releasing the contents of a cylinder of comparatively small volume containing a gas such as carbon dioxide under high pressure. When the gas enters the inflatable structure, a large volume of gas at low pressure properly inflates the structure. It is the time interval between the release of the high pressure gas in the cylinder and the complete inflation of the pneumatic structures that is critical, particularly in emergencies. It is therefore an object of this invention to provide a container having gas under high pressure therein from which the gas can be discharged more quickly.

Another object of the invention is to provide a container that may be readily adapted to present uses with only minor structural changes.

A further object of the invention is to provide a much improved container without materially increasing the cost or size of the container.

These and other objects will appear hereinafter as the description of certain preferred embodiments of the invention proceeds, the features, arrangements and combinations being clearly pointed out in the specification and in the claims hereunto appended.

In the drawings:

Fig. 1 is a longitudinal sectional view showing a container constructed in accordance with the invention;

Fig. 2 is a plan view of a pneumatic life raft with the invention mounted thereon; and

Fig. 3 is an elevation of the life raft shown in Fig. 2.

In inflatable rubberized fabric structures, such as life rafts, life vests, pontoons, etc. that are inflated by the contents of a cartridge or cylinder with its contents under high pressure, the gas is usually carbon dioxide. This gas under high pressure is in the form of a liquid and when the valve on the container is opened, the liquid converts to a gas to initially inflate the structure. It is desirable that the compressed gas be released from the cylinder as rapidly as possible for the initial inflation.

Referring to Fig. 1, the container for the inflating medium is shown which comprises a tubular shell 1 formed of high strength metal with similar outlet openings 2 and 3 on the opposite ends of the shell 1. In this particular instance the shell is designed to hold the gas under 900-1000 pounds per square inch. The size of the shell is governed by the capacity of the particular structure that is to be inflated by the contents of the container. As shown, the outlets 2 and 3 are threaded bosses 4 and 5 having an opening therethrough communicating with the

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interior of the shell 1. Siphon tubes 6 and 7 are attached to and in communication with the openings through flexible connectors 8 and 9. As shown, the siphon tubes 6 and 7 are rigid tubes but may be flexible throughout their length. Either of the described siphon tubes permits the open end 10 of the tube to assume a position adjacent the lowermost portion of the container irrespective of the position of the container. When the valves are opened the compressed gas is discharged into the structure in the usual manner. The two siphon tubes provide a direct exit point for the vapor that forms from the liquid as the pressure is released irrespective of the bottle position or the contents level and also for complete exhaustion of the contents. Even though the tubes may be partially filled with liquid when the valve is opened at least a partial conversion to vapor takes place from the surface of the liquid which passes out through the valve to form the well-known "snow." This subsequently sublimates to inflate the structure to the desired pressure.

Attached to the threaded bosses 4 and 5 are release valves 11 and 12 of the conventional type. Valves of this type are available commercially on the open market from various manufacturers such as the Walter Kidde Company and identified as their part Number 870,575. In the particular valve illustrated, a cam mechanism in the valve is operated by cables 13 and 14 to open the valve. Preferably the cables 13 and 14 are attached to a pull ring 15 which is grasped by handle 16 when it is desired to open the valves. The cables 13 and 14 operate the cams in valves 11 and 12 simultaneously to open the valves to permit the confined gas in the shell 1 to pass through the siphon tubes 6 and 7 to the discharge openings 17 and 18 on valves 11 and 12 respectively.

The discharge openings 17 and 18 are connected in the usual manner to the stems 19 and 20 respectively of the valve patches 21 and 22 attached to the inflatable article. The patches 21 and 22 are of well known construction and the method of attaching them both to the discharge openings and inflatable article are well known in the art.

In Figs. 2 and 3, a typical life raft in the inflated condition is shown consisting of twelve gores 23 or sections, each gore having an upper rail 24 and a lower rail 25. The gores 23 of the upper rail 24 are in intercommunication as are the gores 23 of the lower rail 25 but the upper rail 24 and lower rail 25 are separate air chambers. As best seen in Fig. 3, one double headed inflation cylinder 26 is attached to one gore of the upper rail 24 and another cylinder 27 is attached to the one gore of the lower rail 25. A single pull ring 28 is attached to the cables from each of the valves of the cylinders 26 and 27 so that one operation will simultaneously open each of the valves of the cylinders 26 and 27 to cause a rapid inflation of the raft.

In use, the life raft 29 as shown in Figs. 2 and 3 is folded about the fold line seen in Fig. 2 into a small compact package with the pull ring 28 readily accessible. When it is desired to inflate the life raft 29, the packaged raft is tossed out while the pull ring 28 is grasped. This opens the valves on the cylinders 26 and 27 which then inflates the upper rail 24 and lower rail 25 respectively. This inflation time is materially reduced by discharging the compressed gas from the valves on each end of the cylinders 26 and 27 simultaneously.

While certain representative embodiments and details have been shown for the purpose of illustrating the invention, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit or scope of the invention.

Having thus fully described our invention, what we

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claim and desire to secure by Letters Patent of the United States is:

1. A container for confining gaseous material under high pressure comprising a cylindrical shell having outlet openings on the opposite ends thereof, a valve attached to each of said outlet openings, a siphon tube in the interior of the container extending from one outlet opening, the tube being of a length to extend substantially to the opposite end of the container, a flexible connector attaching said siphon tube to said outlet opening, a second siphon tube similarly attached to and extending from the other of said outlet openings, the flexible connector allowing the open end of at least one of said tubes to assume a position adjacent the lowermost portion of the container interior irrespective of the position of the container and means to simultaneously open each valve, said siphon tubes providing simultaneous discharge of the gas through both outlet openings when the valves are opened whereby a rapid discharge of the confined gaseous material in the container is caused.

2. A container for confining gaseous material under high pressure comprising a cylindrical shell having out-

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let openings on the opposite ends thereof, a siphon tube in the interior of the container attached to and extending from one outlet opening, the tubes being of a length to extend substantially to the opposite end of the container, a second siphon tube attached to and extending similarly from the other of said outlet openings, at least a portion of each siphon tube being flexible to permit the open end of at least one of said tubes to assume a position adjacent the lowermost portion of the container interior irrespective of the position of the container, a valve on each outlet opening, and means to simultaneously open each valve to rapidly discharge the confined gaseous material from the container, the gaseous material passing from the interior of the container through the siphon tubes to the outlet openings.

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