

June 11, 1963

J. R. OWEN
BUOYANCY UNITS

3,092,853

Filed Sept. 24, 1958

3 Sheets-Sheet 1

FIG. 1

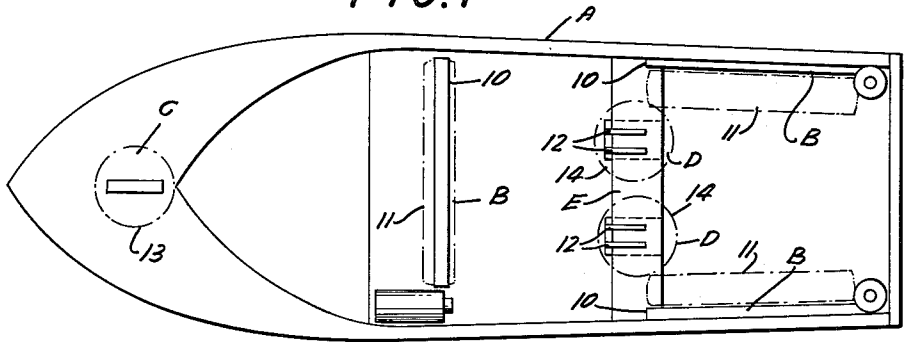


FIG. 2

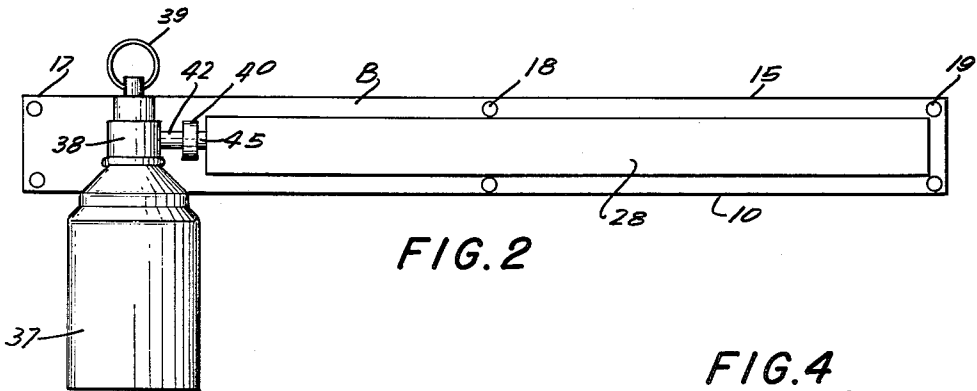


FIG. 3

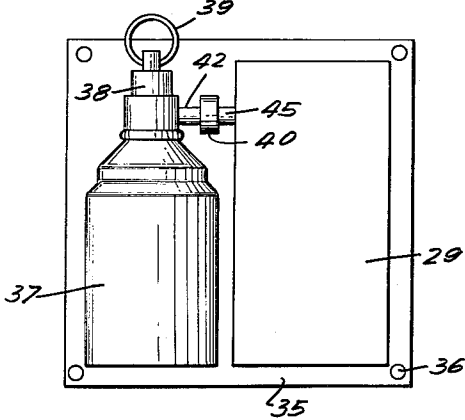
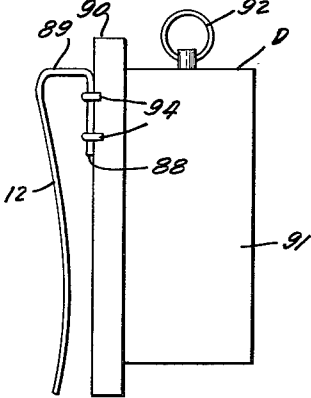


FIG. 4



INVENTOR.
JOHN R. OWEN
BY *John R. Owen*
ATTORNEY

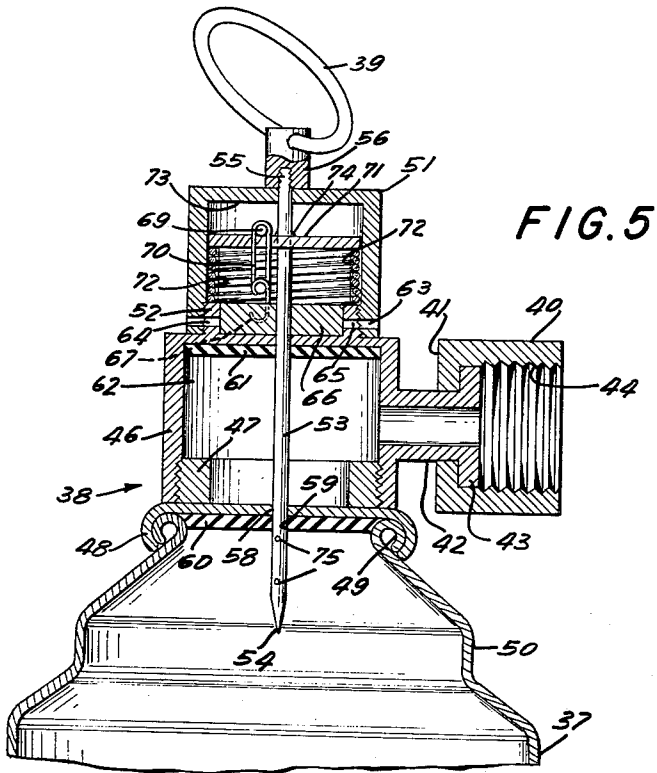
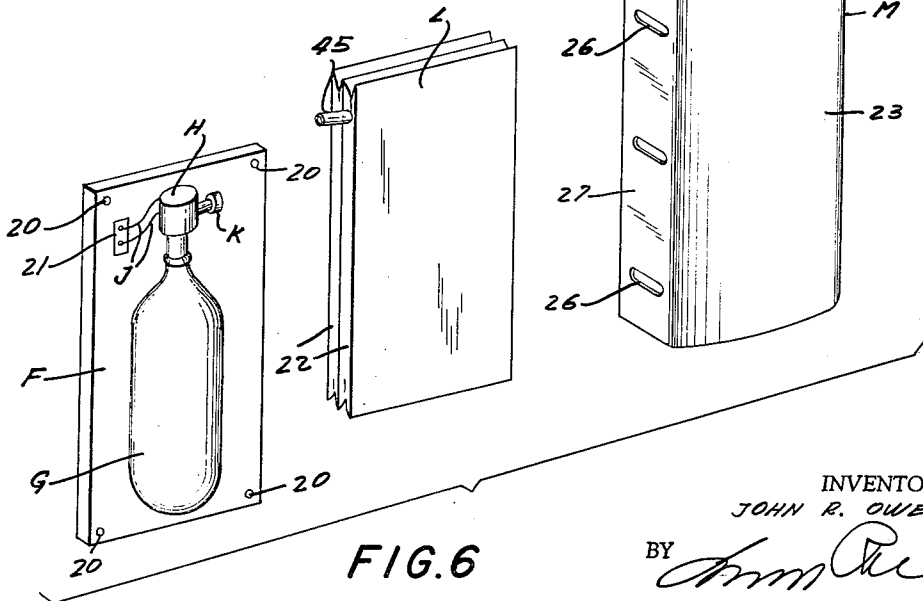
June 11, 1963

J. R. OWEN
BUOYANCY UNITS

3,092,853

Filed Sept. 24, 1958

3 Sheets-Sheet 2



INVENTOR.
JOHN R. OWEN
BY *John R. Owen*
ATTORNEY

J. R. OWEN
BUOYANCY UNITS

3 Sheets-Sheet 3

Filed Sept. 24, 1958

INVENTOR.
JOHN R. OWEN
BY 
ATTORNEY

1

3,092,853

BUOYANCY UNITS

John R. Owen, 115 Howard Terrace, Leonia, N.J.

Filed Sept. 24, 1958, Ser. No. 763,126

1 Claim. (Cl. 9—8)

The present invention relates to buoyancy units and it particularly relates to buoyancy units which may be utilized in connection with water craft. It is among the objects of the present invention to provide a simple, inexpensive, compact, readily installed buoyancy unit which may be installed on a boat or ship or accessory thereto, to give increased buoyancy in case of need and to enable flotation thereof in case of accident, damage, storm, or the like.

Another object is to provide a buoyancy system for use with ships, boats, outboard motors and other similar marine equipment which may be readily installed and either manually or automatically actuated to give increased buoyancy or added flotation power in case of need.

Another object is to provide convenient, readily installed, compact, economical buoyancy units which may be mounted in or about the hull of pleasure craft, motor boats, life boats, sail boats, or relatively large ships or vessels which in case of damage due to accident or storm or which because of unseaworthiness require extra buoyancy or flotation power or which have become submerged in water and must be lifted or surfaced for towing or salvage purposes.

Still further objects and advantages will appear in the more detailed description set forth below, it being understood, however, that this more detailed description is given by way of illustration and explanation only and not by way of limitation, since various changes therein may be made by those skilled in the art without departing from the scope and spirit of the present invention.

In accomplishing the above objects, it has been found most satisfactory to provide a mounting or base structure upon which may be placed a compressed gas or air container and an inflatable cell or bag with an internal valve arrangement subject to automatic or manual actuation or both when extra flotation ability or buoyancy is required.

The inflatable bag preferably is in folded or compact condition with a snap-off cover so that inflation thereof will readily remove the cover therefrom and permit free expansion of the bag.

Desirably the compressed gas source or gas generator may produce a pressure of 20 to 40 pounds per square inch with the full inflation being obtained, however, when between one to three pounds per square inch of the gas are maintained in the inflatable bag or cell member.

The buoyancy or inflation effect may vary from 50 pounds for a small unit readily attachable to row boats, canoes or small motor boats up to as much as 10,000 to 12,000 pounds for units which are to be mounted upon large commercial or sea-going vessels or ships.

Desirably the valve arrangement may be provided with a soluble release link which, when immersed in water, will after a predetermined period of time, release the valve and permit the compressed air to inflate the cell or bag, snapping off the protective cover.

The soluble link may be of such a nature that it can be released in a minute or a half hour because of its readily disintegrable characteristics.

On the other hand, the entire soluble link may be made of such construction that it will not be released for 24 to 72 hours where there may be a situation of having the boat submerged to protect it from storm or high water with the inflatable device then being actuated after the storm or high water has passed on.

2

As many of the units as desired may be attached to the hull, or under seats, or even to life rafts or life boats, which are to be subsequently released upon damage or accident. Furthermore various types of floating material or cargo may be provided with such inflatable device, such as carrying automobiles or larger cargo. Outboard motors, various types of containers of material which can be covered and protected against immersion in sea water and the like.

In the preferred form of the invention, the base is provided with a series of openings for connection of bolts, screws or even spring metal clips enabling ready mounting in and about the boat or ship structure.

Desirably a soluble release valve may be readily associated with a manual valve opening device or even with electrical or mechanical arrangements manually or automatically actuated by electrical or mechanical means.

With the foregoing and other objects in view, the invention consists of the novel combination, construction and arrangements of parts as hereinafter more specifically described, and illustrated in the accompanying drawings, wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which fall within the scope of the claim hereunto appended.

In the drawings wherein like reference characters denote corresponding parts throughout the several views:

FIG. 1 is a top plan view showing the boat structure with the buoyancy units mounted thereon.

FIG. 2 is a side elevational view of one type of buoyancy unit upon large scale as compared to FIG. 1.

FIG. 3 is a side elevational view showing an alternate form of buoyancy unit.

FIG. 4 is an end elevational view showing still another form of buoyancy unit.

FIG. 5 is a transverse sectional view in large scale as compared to FIGS. 2 and 4, showing a combined manual and soluble link release for a buoyancy unit.

FIG. 6 is a separated view showing an alternate form of assembly with the buoyancy envelope, the pop-off cover and the combined compressed air container and electric valve separated from each other.

FIG. 7 is a top plan view of an alternate form of valve release.

FIG. 8 is a transverse vertical sectional view upon the line 8—8 of FIG. 7.

FIG. 9 is a transverse sectional view upon the line 9—9 of FIG. 8.

Referring to FIG. 1, there are shown three buoyancy units B of the type illustrated in FIG. 2, one buoyancy unit of the type shown in FIG. 3, and two buoyancy units D of the type shown in FIG. 4.

The buoyancy units B have their base structures 10 mounted on to the vessel and the dot and dash lines 11 indicate the position of the inflated envelope when extra buoyancy is necessary.

The unit C is shown as mounted under the forward deck of the boat A with the dot and dash lines 13 indicating the expanded position of the buoyancy unit.

The buoyancy units D are shown mounted under the cross bench E by spring clips 12 with the dot and dash circles 14 indicating the suspension position of the inflatable envelopes.

Referring to FIG. 2, the base structures 10 are shown provided with a metal plate 15 having the openings 17, 18 and 19 through which screws or bolts are extended to mount the base structures 10 upon the hull or substructure of a boat or vessel.

The general assembly of a buoyancy unit of different type than that shown in FIG. 2 is illustrated in FIG. 6.

The base structure F carries the compressed air or gas

container G having the electric solenoid valve H with the electric wire connection J.

The connection K extends to the inflatable envelope L which is normally received in the pop-off cover M which protects it when not in use.

The base F has the corner openings 20 to receive mounting screws and it also has the electric connection plate 21 with the wire J extending to the solenoid valve H.

The inflatable envelope L has the wide bellows 22 to enable expansion to the dot and dash line positions as indicated at 11, 13 and 14 in FIG. 1.

The pop-off cover M has a reinforced base protecting face 23 with the side flaps 25 and 27 respectively slotted at 24 and 26. The slots 24 and 26 are for ventilating purposes and for ready admission of water.

The assembly as shown in FIG. 6 is of different type than that shown in FIGS. 2 to 4 but it has the general construction of a typical assembly having a base F, a compressed gas container G, a manually or automatically actuated valve H, a connection K to the inflatable bag or envelope L and the pop-off cover M.

These figures generally are characteristic of all of the various alternate forms of pop-off covers which are utilized in the present application.

Referring specifically to FIG. 2, there is shown a pop-off cover 28 which covers an envelope of generally the same structure as indicated at L in FIG. 6.

The compressed air or gas container or gas generator container 37 has a valve structure 38 with a manual release 39.

This same type of container 37 with valve 38 and manual release 39 is shown in FIG. 3 mounted upon the base 35 having the corner openings 36 to receive bolts or screws.

The pop-off cover is indicated at 29 and it will enclose an inflatable unit such as indicated at L in FIG. 6.

In both FIGS. 2 and 3 there is shown a connection 40 from the valve to the inlet 45 leading to the inflatable envelope enclosed in the covers 28 and 29.

A typical valve construction such as indicated at 38 is shown in detailed construction in FIG. 5.

Referring to FIG. 5, there is shown a container 37 having the reduced diameter top portion 50, having a top bead 49 which receives the cover plate 48.

The cover plate 48 carries the upwardly projecting threaded nipple 47 which is threaded into the bottom of the box 46. The plate 48 may be rolled on with the threaded nipple 47 being welded or soldered to the plate 48.

The box 46 carries the downwardly projecting tubular connection 42 having the flange 43 which receives the flange 41 of the coupling nut 40.

The coupling nut 40 is designed to screw on to the connection 45 into an inflatable envelope such as indicated at L in FIG. 6.

The top of the box 46 receives the upwardly extending nipple 64 which is threaded into the top box 51.

The threaded connection is indicated at 52 between the upper box 51 and the upwardly projecting nipple 64 from the lower box.

The lower portion of the upper box 51 and the upwardly extending nipple 64 respectively have through passageways 63 and 65 to permit passage of sea water or other liquid into the upper chamber 51 through the porous block 66 when the buoyancy unit is immersed.

The central valve unit consists of a tubular member 53 having a descending pin 54.

The upper end of the tube 53 is threaded at 55 to receive the block or cylinder 56 which in turn receives the manual actuator ring 39.

Normally the tube 53 is held down in a position shown with both openings 75 below the sealing gasket or disk 60 which tightly hugs the periphery of the tube 53 preventing escape of gas.

The disk 60 may be made of a composition impreg-

nated with a flexible or soft mastic composition which will hold between 20 to 40 pounds per square inch of pressure.

The top of the chamber or box 46 also receives a similar sealing disk 61 which will seal the upper portion of the tube 53.

The plate 71 which is permanently mounted by soldering or sealing 74 to the tube 53 holds the spring 72 down and in compressed condition against the top of the nipple 64.

A soluble link 70 extends between the studs 68 and 69 and is anchored at 67 in the block 66.

This soluble link 70 may be of such composition that it will be released upon contact with water after 15 to 30 seconds, or after 15 to 30 minutes, or after 24 to 72 hours, depending upon the result to be achieved.

When the link 70 disintegrates upon contact with water, the spring 72 will be released forcing the plate 71 against the top 73 of the box 51 moving the tube 53 upwardly so that the openings 75 are on opposite sides of the sealing disk 60.

This will permit gas flow under pressure slowly from the tank or container 37 into the inflatable envelope causing it to expand and fill up with one or two pounds' pressure to give the desired buoyancy effect.

Furthermore, the link 70 may be made of such construction that a manual pull of 5 to 10 pounds on the ring 39 will break it, also permitting release of the spring 72 and movement of the plate 71 to the top 73 of the chamber 51, with expansion of the spring 72.

The rate of release of the gas from the container 37 will be regulated by the size of the opening 75 and the size of the tube 53.

In the clip-on embodiment of FIG. 4, there is shown a base 90 with the clip-on spring element 12 having the bent portions 89 and the mounting portions 88 held on to the base 90 by the clips 94.

The container 91 may be of rectangular structure and it may contain the manual actuating device 92 with a valve of the same type of construction as shown in FIG. 5.

This clip-on construction as shown in FIG. 1 may be conveniently mounted at any desirable place in or about the hull, seat or superstructure of a boat or vessel.

In the alternate form of valve, FIG. 7, there is shown a body 113 having the threaded connection 120 to the compressed gas container and an outlet connection 121 to an inflatable envelope.

Both connections 120 and 121 are threaded and their axes are positioned at right angles to each other.

On the outside of the body 113 there are positioned screws 110 which extend through the slots 112 in the soluble links 111. Only one of the links need be soluble with the other link having non-soluble character, but in the preferred form both links are soluble.

The links 111 latch on to the recesses 115 in the cross bar 116.

The cross bar 116 extends through the tubular head 117 of the rod 118 which slides through the bearing nut 129 threaded into the recess 130.

The valve head 119 is designed to cut off the port 131 at the end of the threaded socket 121.

The end of the symmetrical valve member 119 has a laminated fiber seal indicated diagrammatically at 130.

When the soluble links 111 are subject to attack by water and disintegrate, or when they are broken by lifting pressure under the bar 116, the pressure from the vessel applied through the threaded socket 120 and the outlet port 132 will press the valve 119 away from the port 131 and permit escape of gas from the vessel and from the socket 120 into the socket 121 and permit inflation of the envelope to give buoyancy.

A pressure relief valve is indicated at the right of FIG. 9.

This pressure relief valve has a safety passageway

5

133 which is normally closed by a conical valve member 125, pressed on to the side 134 by the spring 127.

The spring 127 is held in position in the socket 126 by the screw block 128.

The pressure relief valve allows extensive pressure to be expended when the pressure inside the envelope seats two pounds per square inch.

If the pressure is too high, as might be likely to unduly distend the envelope, the valve 125 will be unsealed against the spring 127 permitting compressed gas to escape until the pressure has been reduced sufficiently to permit re-seating of the valve 125 under the effect of the spring 127.

The electrical connection of FIG. 6 may also be utilized in addition to or in combination with the valve structure of FIG. 5 and of FIGS. 7 to 9.

The gas generator or compressed gas container may release compressed air or carbon dioxide into the expandable or reinforced fabric bags.

The various units may be used in different sizes with the lifts extending from 50 pounds up to 10,000 to 12,000 pounds.

In connection with the buoyancy units of the present invention, the units may displace water in damaged ship compartments or they may cause flotation a predetermined period after immersion.

The units may also be placed in sunken hulls for salvage purposes.

The electrical valve release of FIG. 6 may also be actuated by breakage of a soluble link, of combinations of a soluble link and electrical link may be employed in connection with sea water which has conducting power.

As a general rule, small pleasure craft require 50 to 100 pound units, while large cruiser-type craft require 2,000 pound units.

Large vessels and cargo vessels will require 11,500 pound units.

The device of FIGS. 7 to 9 is particularly adapted to large vessel use where pressures up to 100 pounds per inch may be necessary to inflate the envelope.

In case of submerged vessels where there is raising of the vessel with decrease of water pressure to prevent undue expansion or bursting of the envelope, a release valve may be provided to release the air from the envelope so that there will only be a differential of two pounds between the outside water pressure and the inside envelope pressure. Normally the excess pressure in the bag

6

or envelope will open the valve permitting the envelope or bag to dump without bursting the bag.

The unit with 50 pounds lift may have a base size of 2½ inches by 36 inches by ½ inch as shown in FIG. 2.

As shown in FIG. 6, which is a unit designed for 11,500 pound lift, the base size may be 10 inches by 28 inches by 10 inches in the form of the unexpanded unit.

While there has been herein described a preferred form of the invention, it should be understood that the same may be altered in details and in relative arrangement of parts within the scope of the appended claim.

Having now particularly described and ascertained the nature of the invention, and in what manner the same is to be performed, what is claimed is:

In a buoyancy unit of the type mounted permanently in a pleasure boat and having a base mounted on the interior of a boat, a compressed gas container mounted on the base, a connecting conduit and an inflatable envelope connected to the conduit; the combination therewith of a manually and automatically operated valve connected to and connecting the container and the conduit having a vertical axis, a cylindrical stepped housing with a lower larger gas conduit chamber and an upper smaller actuating chamber having a coil spring actuator and a water dissolvable link, a sealing closure at the bottom of said lower larger gas conduit chamber, an outlet to the conduit at the side of the gas conduit chamber and a pin for opening the closure extending vertically axially through said housing and through both ends of the housing, the lower end penetrating through the closure and the upper end projecting above the housing and carrying a manual actuator at its upper end, said spring biasing the pin upwardly away from the membrane and said link holding the pin down against the spring bias.

References Cited in the file of this patent

UNITED STATES PATENTS

1,474,725	McLeod	Nov. 20, 1923
2,279,705	Dayhuff	Apr. 14, 1942
2,506,884	Myers	May 9, 1950
2,775,951	Billmeyer	Jan. 1, 1957
2,857,078	Wolfert	Oct. 21, 1958
2,894,658	Spidy	July 14, 1959
2,904,217	Gruney	Sept. 15, 1959
2,924,192	Salvage	Feb. 9, 1960

FOREIGN PATENTS

775,678	Great Britain	May 29, 1957
---------	---------------	--------------