

- [54] AQUASTABILIZED SURVIVAL RAFT
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Related U.S. Application Data

- [63] Continuation-in-part of Ser. No. 216,990, Jan. 11, 1972, abandoned.
 [52] U.S. Cl. 9/11 A; 9/1 A; 9/2 A
 [51] Int. Cl. B63c 9/04
 [58] Field of Search 9/1 A, 2 A, 11, 14, 9, 9/4 R, 8; 52/2; 272/1 B; 114/121, 125

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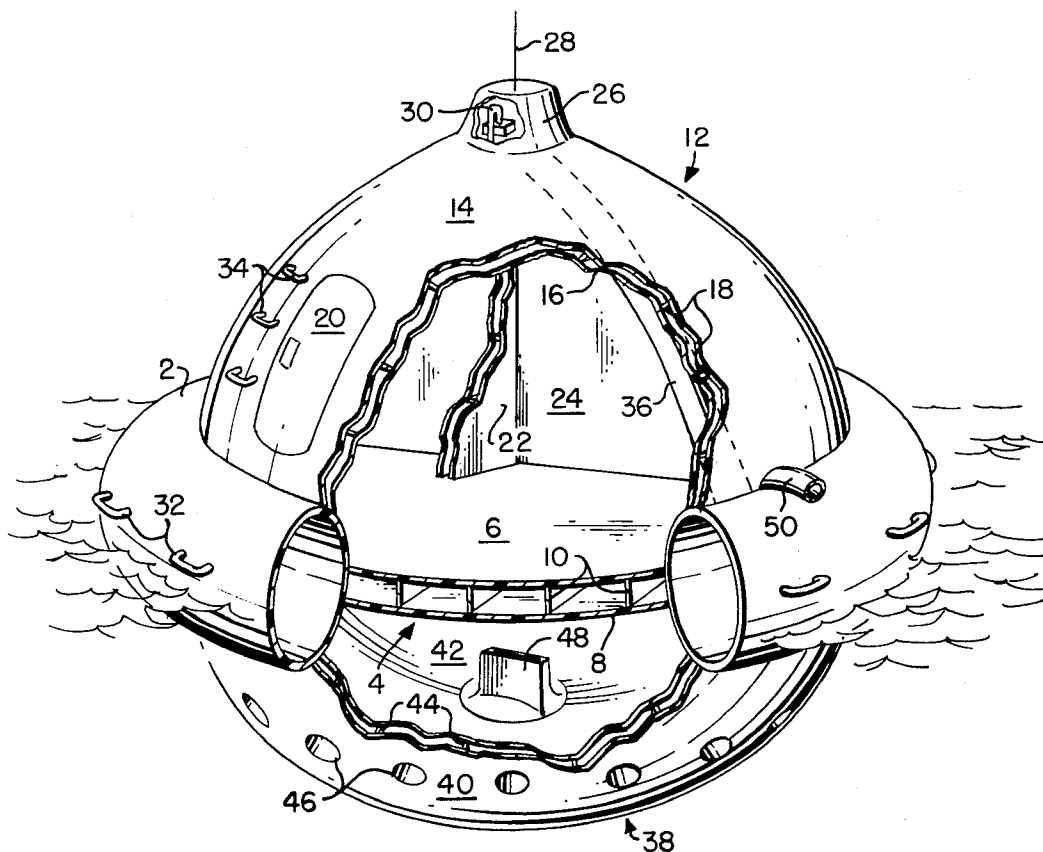
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[57] ABSTRACT

An aquastabilized survival raft comprising a buoyant inflatable structure circumscribing a floor. A stabilizing chamber is attached to the underside of the buoyant structure. The chamber comprises at least one orifice in the lower portion thereof and a plurality of apertures in spaced locations around the upper periphery extending from the interior of the chamber to the atmosphere. When placed upon a body of water, water rapidly fills the stabilizing chamber by entering the orifice and expelling air through the apertures. The water-filled chamber stabilizes the survival raft so as to minimize pitching and rolling in rough water. An inflatable water-tight hemispherical shelter having suitable openings therein is attached to the top of the buoyant structure and when inflated protects survivors against the elements.

8 Claims, 7 Drawing Figures



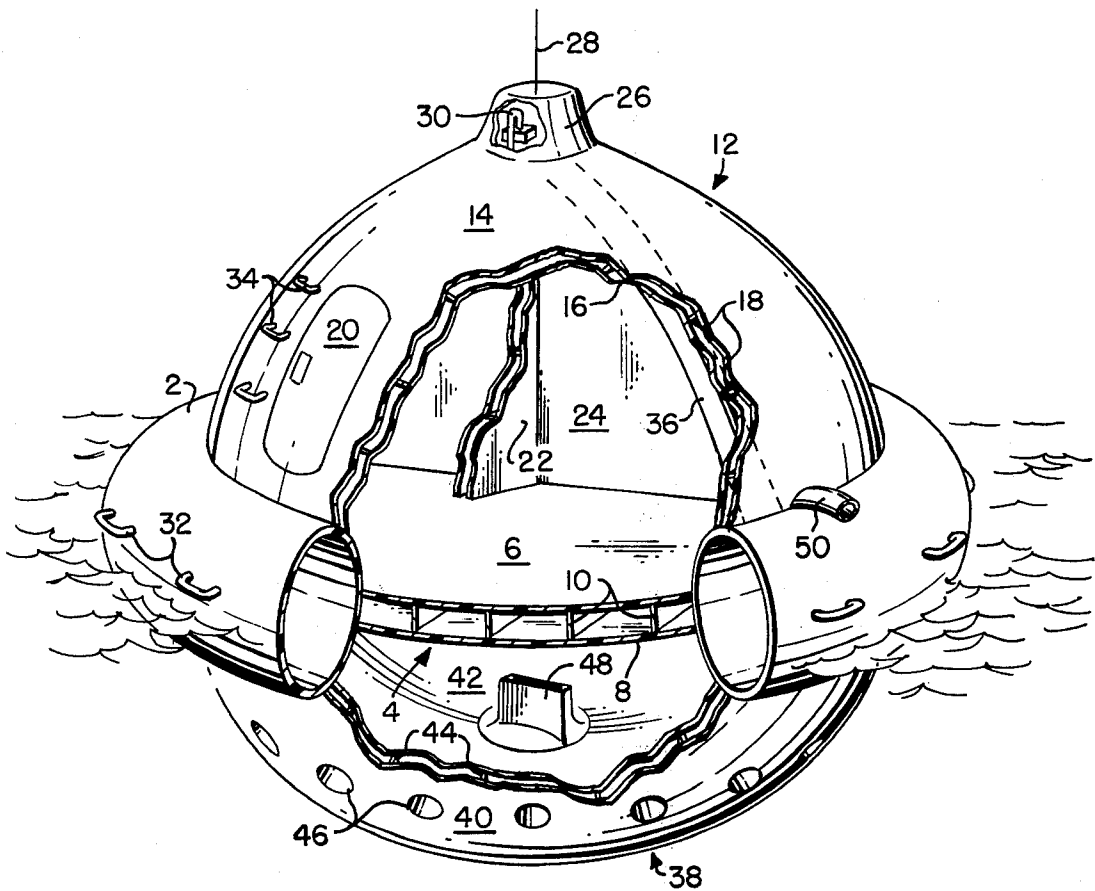


FIG. 1

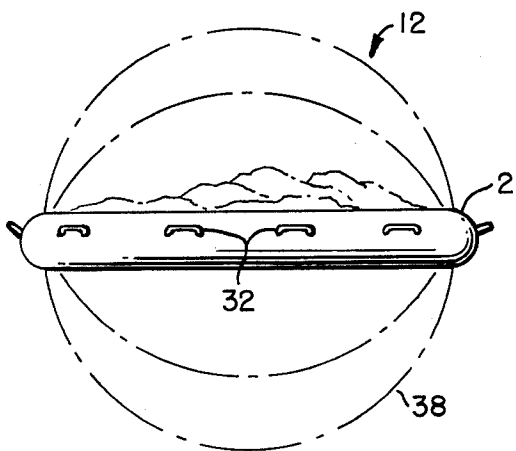


FIG. 2

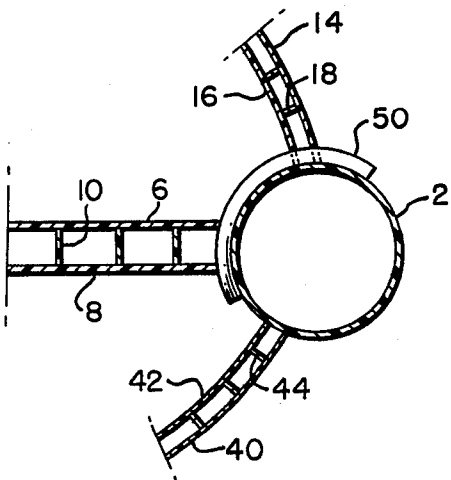


FIG. 3

FIG. 4

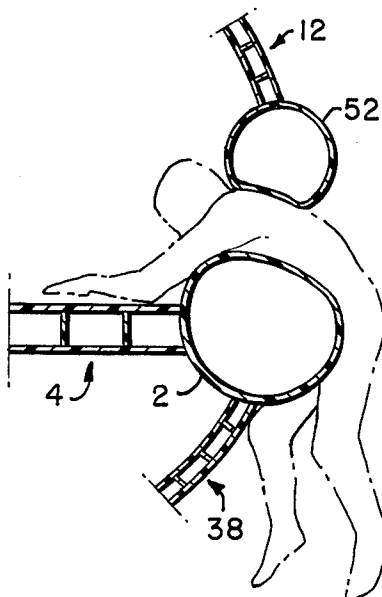
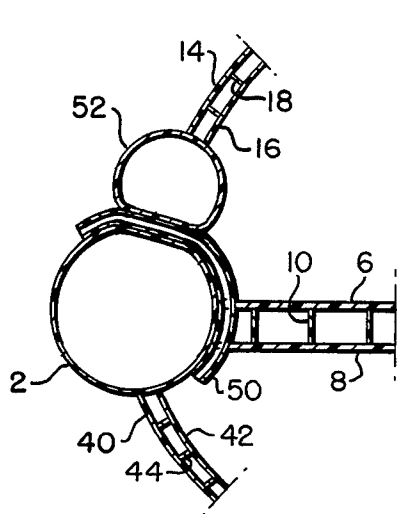


FIG. 5

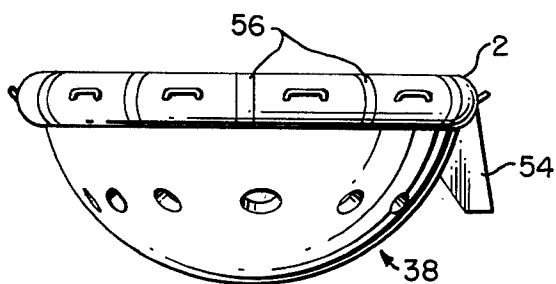


FIG. 6

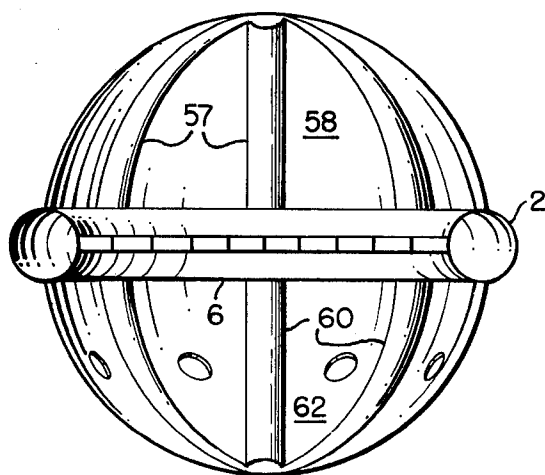


FIG. 7

AQUASTABILIZED SURVIVAL RAFT

This application is a continuation-in-part of U.S. Pat. application Ser. No. 216,990, filed Jan. 11, 1972, now abandoned.

BACKGROUND OF THE INVENTION**FIELD OF THE INVENTION**

The present invention relates to water survival craft and more particularly to an aquastabilized survival raft or other structure which is supported by a body of liquid and requires relative stability.

DESCRIPTION OF THE PRIOR ART

Life craft such as lifeboats or life rafts are well-known as useful life-saving devices for the occupants of airplanes traveling over water, persons temporarily located upon structures such as drilling rigs, as well as for occupants of ships traveling through water. Life crafts are employed to prevent drowning or over exposure in the event the airplane must make a forced landing, the ship sinks or people are forced to abandon a rig.

Craft and/or lifeboats that manage to successfully be deployed offer little or no protection to the survivors against the elements. Frequently in rough water lifeboats will overturn or fill with water and capsize. Efforts have been made in the past to minimize this problem by providing an enclosed survival vessel. See, for example, U.S. Pat. Nos. 3,064,282 and 3,259,926. Prior art enclosed survival vessels of these types are cumbersome, heavy, and cannot easily be stored in compact condition. Thus, their use is limited, particularly as they relate to aircraft and smaller surface vessels.

Most watercraft used for lifesaving require some form of stabilizing structure and it is known to use confined water as a stabilizing force. See, for example, U.S. Pat. No. 3,035,286.

BRIEF DESCRIPTION AND OBJECTS OF THE INVENTION

According to the present invention, a chamber forming part of a buoyant platform and extending below the structure readily fills with water through an orifice in its lower surface, expelling air from peripheral apertures. The water filled chamber acts as a stabilizing force for the buoyant platform prohibiting the platform from overturning in rough water. An inflatable shelter may be attached to the top portion of the platform and when inflated, the shelter is dome shaped in configuration and provides protection for survivors against the elements.

It is, therefore, a primary object of the present invention to provide a novel survival raft that is water-stabilized.

It is another primary object of the present invention to provide a novel survival raft that offers survivors protection against the elements.

It is another object of the present invention to provide a stabilizing unit for use upon a buoyant craft which utilizes the supporting fluid as a stabilizing medium and utilizes the flow into and out of the unit to dampen any exteriorly directed force.

Yet another object of the present invention is to provide a fluid circulating system within a stabilizing unit which greatly improves the stability of the unit.

Still a further object of the present invention is to provide a valved opening in the bottom of the stabilizing

unit which permits an influx of water upon the downward movement of the craft and retards outflow upon the upward movement of the craft.

These and other objects and features of the present invention will become more fully apparent from the following description taken in conjunction with the accompanying drawings.

FIG. 1 is a perspective view, partially broken away of a life craft utilizing the inventive stabilizing chamber.

FIG. 2 is an elevational view of an inflatable raft utilizing both the stabilizing chamber and the atmospheric protection chamber.

FIG. 3 is a sectional view through the buoyant outer ring, showing the relationship between the floor and the sidewalls of the chamber of the life raft of FIG. 1.

FIG. 4 is a sectional view through a life raft having a pair of contiguous inflatable members and including a vent pipe extending from the interior of the stabilizing chamber to the atmosphere.

FIG. 5 is a view through a raft similar to that shown in FIG. 4 wherein a space is left between the two inflatable members allowing entry or exit therethrough.

FIG. 6 is an elevational view of a raft utilizing a stabilizing unit, which may well be sold separate from the raft and secured thereto by straps or the like.

FIG. 7 is a sectional view showing an alternate configuration for the stabilizing lower chamber.

DETAILED DESCRIPTION OF THE DRAWINGS

Seen in FIG. 1 the preferred embodiment of an aquastabilized life raft includes an outer buoyant inflatable tube 2, which although shown as circular, could well be of any desired configuration. Spanning distance between the inside walls of the tube 2 is an inflatable floor 4, which for purposes of insulation has an upper surface 6 and a lower surface 8 interconnected by webbs 10. The space between the webbs 10 and surfaces 6 and 8 is designed to be inflated with air or other gaseous substance providing a double-wall insulated supporting surface.

An upwardly extending dome 12 is secured to the peripheral ring 2 and is adapted to be inflated. The dome includes an outer water-proof, fire-proof wall 14 and a flexible inner wall 16, the distance between the two walls being spanned by webbs 18. The entire dome structure is designed to be inflated in a manner similar to the floor 4. A door 20 is provided permitting ingress and egress with respect to the interior of the upper portion, compartmenting walls 22 and 24 may well be provided to assure privacy within the sphere itself. The door 20 may be secured by a zipper or other suitable sealing means.

An upwardly extending portion 26 is secured to the top part of the upper dome portion 12 and includes an antenna 28 and suitable snorkle means 30 assuring that the occupants will have sufficient air even in the event of heavy seas.

Further to be seen in this view, a plurality of handles 32 are provided around the periphery of the buoyant tube and handles 34 extend up the outer surface adjacent the door allowing entry and exit with greater ease. For the safety of the occupants of the upper sphere, inflatable stiffening ribs 35 may well be provided on the interior of the upper sphere thus assuring that the upper sphere will remain in an upwardly projecting configuration even in the event of seas falling upon the top of the raft.

Extending downwardly from the bottom portion of the supporting ring 2 is a dome configuration doublewalled stabilizing unit 38 having an outer wall 40 and inner wall 42, and a plurality of webbing members 44. The space between the webbing members 44 and the walls 40 and 42 adapted to be inflated providing additional stiffening for the structure.

A plurality of apertures 46 extend through the side walls of the downwardly extending dome 38 and a central valve 48 is provided in the bottom thereof. The openings 46 allow ready inflow and outflow of liquid within the dome for stabilizing purposes as described hereinafter. The valve 48 which extends through the lowermost point of the dome may well be weighted to pull the dome downwardly. The valve 48 is designed to allow ready inflow of water during downward movement of the raft but to restrict outward flow of the water during upward movement of the raft.

As described hereinafter, a tube 50 is mounted to the ring and has one end within the lower chamber and one end exposed to the atmosphere above the normal water level. The need for this ring will be described in detail hereinafter.

In FIG. 2 the various stages of the embodiment shown in FIG. 1 during inflation of both the upper and lower domes is illustrated. It is to be understood that although the preferred embodiment includes a chamber which is self inflatable, if desired, the lower chamber may be moved to its extended position by means of a weighted lower valve such as 48, as seen in FIG. 1. Gravity then would displace the chamber to its outwardmost position. As will be described with respect to FIG. 7, both the upper and lower chambers may be supported by inflatable stiffening ribs and a single wall provided therebetween.

FIG. 3 depicts the relative configuration of the floor, the upper and lower dome of the preferred embodiment, as well as vent 50, which as can be readily seen, extends from the interior portion of the lower chamber to the atmosphere. The vent 50 allows the influx to or escape of air from the lower chamber to compensate for the movement of water without placing undue stress upon the floor of the structure. The vents 50 also permit the rapid original inflow of water to cause stabilization. Vents 50 may be of any configuration or placement which permits the desired venting.

As seen in FIG. 4, a second embodiment of the basic life raft can be seen wherein similar numbers are used to denote the similar elements. An additional inflated ring 52 is shown generally overlying the basic supporting ring 2. It can be seen that the vent 50 could then extend between the two rings. Rings 2 and 52 would be secured at various positions with the general resiliency of the inflated rings being utilized to keep them in close contact throughout the major portion of the contiguous surface.

As seen in FIG. 5, the utilization of the two rings as described with respect to FIG. 4 permits the ingress and egress of occupants between the rings. The individual merely forces the rings apart at the place where they are not secured and passes between the rings. This embodiment eliminates the possibility of the jammed zipper about a door 20 such as is shown in FIG. 1.

As described hereinabove, the life raft has been primarily directed to a manufactured unit wherein the floor, the upper dome and lower dome are sealingly interconnected with the bouyant struture. It is recog-

nized, however, that the stabilizing unit may well be attached to an existing raft, which as seen in FIG. 6 would involve the use of connecting ropes, straps 52 or the like which would transfer the stress as generated during the stabilizing motion to a large portion of the raft itself, thereby eliminating the possibility of structural failure. Further to be seen in this view is a rudder 54 which is an optional feature, but may well be desirable for utilizing currents or the like.

FIG. 7 depicts another embodiment of the life raft wherein the general tubular configuration is shown and a double-walled, insulated floor 6 is incorporated. However, the upper dome in this embodiment is held in position by a plurality of stiffening ribs 57, which are inflated. The distance between the ribs 57 is spanned by a single layer wall 58, which when the ribs are inflated, form a tense smooth structure. The lower chamber likewise could utilize an inflatable stiffening rib concept as seen in 60, again bridged by stretched panels 62.

It is to be understood that for life raft purposes the entire structure should be made of flexible material such that it will be collapsed and stored in a small space. The various portions of the raft which are desired to be inflated may be inflated by compressed gas bottles, a hand pump, or any other well known means. When deployed from a ship or an airplane, it is desired to have an automatic means for inflating at least the basic bouyant ring and quite possibly the stabilizing unit such that by the time the occupants reach the raft it will be eady for stable occupancy.

The whole of the stabilizing unit has been described in detail with respect to a life raft but it is understood that the same principal could be used for a diving platform or the like which is permanently or semi-permanently fixed within a body of water. In a situation such as this, it is to be understood that the bouyant portion could well be made out of a closed cell plaster and the walls of the downwardly depending chamber may well be of a rigid or semi-rigid material capable of taking the abuse to which the structure is subjected.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A life supporting device comprising:

- a. peripheral flotation tube of a size large enough to support one or more persons when inflated and placed upon a body of liquid;
- b. means extending across the interior of the tube serving as a supportive floor when the device is supported by a liquid;
- c. flexible means of a dimension larger than that of the floor secured to the outboard portion of the tube, around the entire tube, and extending downwardly therefrom, said flexible means adapted to be formed into a downwardly extending hollow structure when in use and be spaced from the floor forming a chamber therebetween;
- d. means to move the flexible means away from and retain it away from the floor when in use;
- e. a plurality of holes extending through the lower surface of the hollow structure permitting restricted passage of water therethrough whereby the movement generated by the wave action is dampened by the inertia of the water within the chamber and by the controlled passage of water through the

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holes into and out of the space between the floor and the flexible means; and

f. means in communication with the atmosphere and the interior of the chamber permitting the rapid escape of air trapped within the chamber preventing excessive pressure buildup, thus permitting rapid entry of water into the chamber substantially filling the entire chamber whereby the life supporting device will be quickly stabilized.

2. A device as in claim 1 wherein the flexible means comprises a double wall structure adapted to be rigidified by placement of a fluid between the walls.

3. A device as in claim 1 wherein at least one of the holes includes a valve mechanism permitting liquid to flow into the chamber but restricts outward flow.

4. A device as in claim 1 wherein the peripheral flotation tube comprises a pair of substantially identical rings and the rings are secured together about a portion of the periphery permitting passage therebetween.

5. A stabilized inflatable float such as a life raft comprising:

bouyant means for floating on top of a liquid having a floor and inflatable flotation means surrounding said floor,

stabilizing means secured to the bottom of the bouy-

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ant means about the periphery thereof and extending downwardly therefrom, said stabilizing means comprising a flexible walled hollow chamber adapted to be filled with the supporting liquid, said chamber having a plurality of ports therein, resulting in a restricted inflow and outflow of the float-supporting liquid while creating inertia, and

hollow open-ended means extending from within the chamber to a point above the surface of the supporting fluid whereby fluid captured beneath the floor may be discharged upon the buildup of excessive pressure within the chamber.

6. A stabilized inflatable float as in claim 5 wherein at least one of the ports has a one-way valve permitting the inflow of water to a chamber, but preventing the outward flow therethrough.

7. A stabilized inflatable float as in claim 5 wherein the stabilizing means is retained in a position spaced from the bottom of the stabilized inflatable float by a plurality of inflatable ribs.

8. A stabilized inflatable float as in claim 5 wherein the stabilizing means comprises a bulbous double-walled projection held spaced from the bottom of the float by air injected between the walls of the chamber.

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