March 22, 1960 P. L. VELTMAN 2,929,347

SELF BAILING BOAT

Filed March 2, 1956

FIG. 1

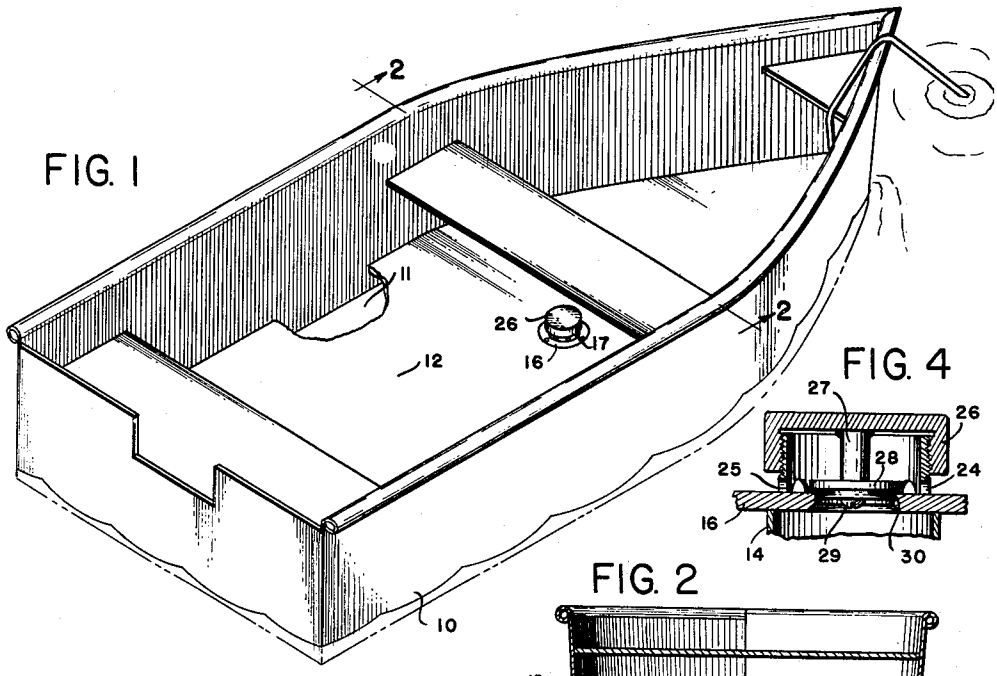


FIG. 4

FIG. 2

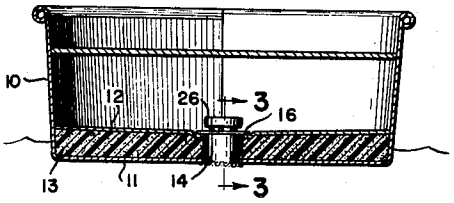
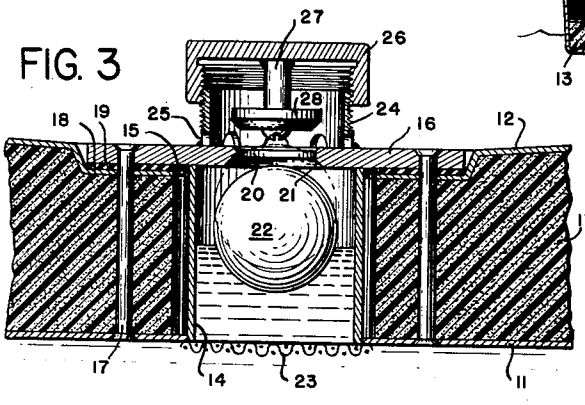


FIG. 3



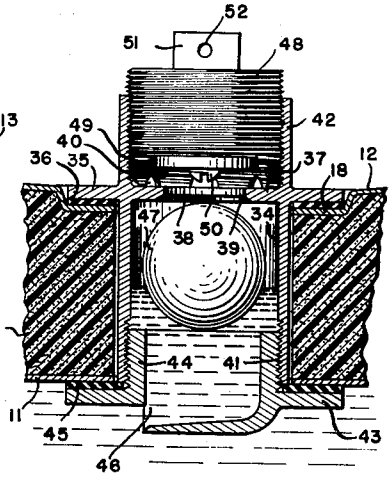
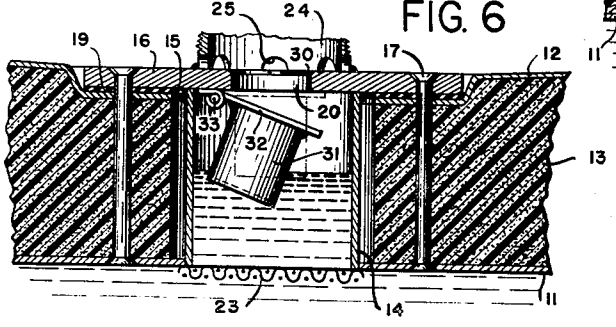


FIG. 5

FIG. 6



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SELF BAILING BOAT

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5 Claims. (Cl. 114—183)

This invention relates to objects which will float in water and more particularly boats, especially small craft used by many persons in various ways including sports such as rowing, sailing, fishing and the like, and which may be left exposed to the elements for indefinite periods and consequently catch rain water which subsequently must be removed for the satisfactory use of the boat, especially in view of the fact that small boats of this kind are designed for shallow water and the hulls frequently are relatively flat although the hulls of some produce substantial displacement.

Water which has fallen or seeped into the bottom of a boat is a nuisance, interferes with the satisfactory use of the boat and causes delay in such use due to the time required for its removal.

It is an object of the invention to provide a simple, inexpensive and practical means by which water automatically will be discharged from the interior of a boat while the boat is unoccupied or when the weight of the contents of the boat is below a predetermined value and which will become inactive when the weight of the boat exceeds such predetermined value.

Another object of the invention is to provide an automatic drain for a boat with means for automatically closing the drain when the load in the boat reaches a predetermined value.

A further object of the invention is to provide a boat with an automatic drain, automatic means for closing the drain when weight within the boat reaches a predetermined value and manual means for positively closing the drain regardless of the weight within the boat.

Other objects and advantages of the invention will be apparent from the following description taken in conjunction with the accompanying drawing wherein:

Fig. 1 is a perspective of a boat having a buoyant bottom and a drain valve therein;

Fig. 2, a transverse section of a boat taken substantially on line 2—2 of Fig. 1 and showing the drain valve in elevation underneath the seat of the boat with a manually closed cap in sealing relation on the drain valve;

Fig. 3, an enlarged section taken substantially on line 3—3 of Fig. 2 and illustrating a ball type of float valve in its open or draining position and showing the manually operated closure in its open position;

Fig. 4, a fragmentary sectional view through the drain valve and mounting plate illustrating the manually operated closure in shut position;

Fig. 5, an enlarged sectional view, similar to Fig. 3, illustrating a modified form of ball type float valve with venturi outlet; and

Fig. 6, a section similar to Fig. 3 illustrating a further modified form of valve including a pivotally mounted float.

Briefly stated, a boat constructed in accordance with the present invention may have spaced bottom walls providing space for air or for buoyant material such as foam plastic with the boat so designed and constructed that

the waterline is between the spaced upper and lower walls of the bottom when the boat is not loaded and with a discharge opening through said upper and lower walls and the intermediate space therebetween through which water can pass so that water accumulating above the upper wall can drain downwardly. Alternatively, the boat bottom may be constructed of a homogeneous buoyant material with a discharge opening therethrough. To assure such drain remaining open as long as the waterline is below the upper wall of the bottom of the boat, said drain being designed and intended to close automatically when the weight within the boat causes the boat to submerge partially with resultant rise in water level, means is provided for closing the drain, such means desirably being in the form of a float valve. This float may comprise a ball, a float on a lever pivoted to the boat, or other form of float member and additional means also can be provided for the manual closing of the drain such as a separate valve or means for holding the valve closed.

The present invention comprises a self-bailing device which is capable of being embodied in boat hull designs of both relatively flat planing types and displacement types, the former being constructed to cause the bottom to literally lift out of the water as the forward speed is increased while the displacement type rides somewhat deeper in the water and pushes the water aside as it moves forward.

This invention is directed to boats which are self-bailing when they are not loaded by a particular arrangement of buoyancy factors as related to total weight distribution, a valve being provided to permit the out-flow of water when the boat is not in use or not loaded and to prevent the in-flow of water when the boat is loaded. In order to obtain these objectives, specific design and combination of features and materials are required. It is well known that a floating object is buoyed up by the weight of water displaced and that the weight of water displaced is essentially equal to the weight of the object in the air. A boat in accordance with the present invention is designed so that the flotation ability of its bottom is in excess of that required merely to float the boat and, further, the disposition of the incremental volume is so arranged that the boat floats in a manner such that water will drain from the boat through a valve or valves when the boat is not in use.

In the present invention, the drain valve is an integral part of the boat. It is designed to be open when the inside surface of the boat bottom is above the water level and designed to close automatically when the boat is loaded and the inside surface of the boat bottom is below the water line. The valve may be operated manually but most desirably functions automatically when the boat is put in service and, desirably, a manual positive closure may be provided as a safety measure.

In a boat of small displacement the valve is intended and designed to operate on small water level differentials. If preferred, a type of valve may be used which utilizes a floating ball which lies on the surface of the water in a manner to engage the valve seat to check the in-flow of water. This structure can be made in relatively small dimensions and can be contained within the required dimensions of the hull bottom. For example, in the simple boat illustrated in the drawing, the bottom may be approximately four feet by six feet in surface area and two inches thick. The complete boat so constructed will weight about 125 pounds and therefore when not loaded will float with one inch submersion of its bottom (two cubic feet displacement which equals 125 pounds). The valve is illustrated in the open position and rain and water otherwise entering the boat will flow towards and be drained through the valve. When

the boat is loaded and the displacement accordingly increased, the ball type valve illustrated will float on the surface of the water and close the drain. Further loading will simply increase the draft of the boat. However, when the load is removed, the valve again will open and the boat will be self-draining or bailing. If desired, instead of the lightweight foam plastic illustrated, such as styrofoam, which offers physical rigidity and safety, the foam plastic may be omitted so that only spaced walls on the top and bottom surfaces of the boat bottom provide an air chamber therebetween for buoyancy. It is obvious, however, that a wide choice of structural materials may be utilized whether foam plastic, plywood, glass cloth or the like, by which a composite bottom can be provided having a density of approximately 15 pounds per cubic foot although these figures are only suggestive and in no manner limitive. The six feet by four feet bottom of the boat in the disclosure having a thickness of two inches would therefore weigh about four times 15 pounds per cubic foot or 60 pounds and therefore account for approximately one-half of the assumed 125 pound total weight of the boat. The basic requirements for obtaining the desired result are previously indicated and this example is by way of further illustration.

Upon more detailed reference to the drawing, a boat **10** is shown having a bottom with lower and upper walls **11** and **12**, a bayonet substance such as foam plastic **13** between such walls, with a drain opening therethrough, lined by a tubing **14** secured by a weld **15** or other fastening means to a disc **16** adapted to be secured in position by means of rivets **17** or the like passing through said lower and upper spaced walls **11** and **12**, the upper wall having a depressed flange portion **18** with a gasket **19** thereon for sealing the disc **16** with a watertight joint, the ends of the rivets **17** also being sealed to exclude water and countersunk to avoid objectionable roughness.

The disc **16** is provided with a centrally located aperture **20** including a valve seat **21** cooperating with a buoyant valve body or ball **22** so that when the ball is buoyed upward and contacts the valve seat, the valve is closed and passage of water therethrough is prevented.

If desired, a screen **23** may be secured over the lower end of the tubing **14** to retain the valve body **22** therein and to exclude foreign matter which might interfere with the operation of the valve, the screen permitting free passage of water into or out of the drain or tube **14**. Above the opening **20** an upstanding externally threaded sleeve **24** having openings **25** around its lower periphery is secured to disc **16** by welding or the like, such sleeve receiving a cap **26** and to which a depending rod or stem portion **27** is secured with a valve head **28** removably attached thereto as by means of a screw or other fastener **29** to permit removal or replacement of the valve body **28**. The disc **16** immediately surrounding the opening **20** is provided with an annular valve seat **30** against which the valve head **28** carried by cap **26** is adapted to seat when the cap **26** is screwed down to the position shown in Fig. 4 to positively prevent passage of water at all times.

Instead of the buoyant hollow ball **22**, a valve body or float **31** (Fig. 6) may be employed. Such valve body may be in the form of a cup with an end plate **32** closing the cup, this end plate being pivotally connected to the disc **16** by means of a hinge or pivot **33**, the plate **32** sealing against the lower surface of the disc **16**. If desired, a suitable resilient gasket or washer may be provided between the end plate **32** and the disc to assure a watertight seal.

The modified form of valve structure illustrated in Fig. 5 of the drawings is readily installed or removed without any necessity for rivets, welding, or the like. As illustrated, the boat bottom includes spaced lower and upper walls **11** and **12** with a suitable buoyant substance **13** therebetween. The upper wall **12** is provided with a depressed flange portion **18** and the drain opening, which it will be understood desirably is located centrally of the boat bottom and at the lowermost level thereof in the event that the interior surface of the boat bottom is not flat, extends through said depressed flange portion, buoyant material and lower wall **11**.

A tubular valve housing **34** is positioned within said drain opening, said housing including an outwardly extending flange **35** located intermediate the extremities thereof. This flange is receivable within the depressed portion **18** of the upper wall **12**, a sealing gasket **36** being interposed between said flange and depressed portion, with the upper surface of the flange in substantial alignment with the upper wall of the boat bottom.

The valve housing extends beneath the flange **35** a distance substantially coinciding with the thickness of the boat bottom and said housing extends above the flange a sufficient distance to receive manually operable valve sealing means or closure plug as will be described more fully hereafter.

An internal web **37** having a centrally located aperture **38** therein is provided within the valve housing, in substantial alignment with the flange **35**, the lower periphery of said aperture comprising a tapered valve seat **39**. Immediately above said internal web the valve body is provided with a plurality of spaced apertures or ports **40** whereby any water within the boat may flow into the valve body and drain therethrough. Desirably, the valve body is internally threaded at the lower and upper extremities thereof, as illustrated at **41** and **42** respectively, for the reception of suitable closure elements.

To secure the valve housing within the boat there is provided a bottom closure plate **43** having an upstanding externally threaded tubular extension **44** intended for engagement within the complementarily threaded portion **41** of the valve housing, a sealing gasket **45** being interposed between the closure plate **43** and the bottom wall **11** of the boat bottom. This closure plate includes a rearwardly directed Venturi passage **46** providing direct communication through the tubular extension **44** with the interior of the valve housing.

The structure thus described lends itself to particularly convenient assembly, the bottom closure plate **43** serving as retention means to prevent inadvertent displacement of a ball-type valve **47** positioned within the valve housing and functioning in a manner identical to that previously described in connection with the valve body **22** to close the drain passage automatically when the weight of the boat exceeds a predetermined value and the exterior water level rises above the level of the upper wall **12** of the boat bottom.

Suitable manual closure means is provided for the drain thus described, the embodiment thereof illustrated including an externally threaded plug **48** intended for engagement within the internally threaded portion **42** at the upper extremity of the valve housing **34**. A disk **49**, desirably formed from suitable flexible or resilient material, is detachably mounted beneath the closure plug by any suitable means such as a machine screw **50**, or the like, for ready replacement. It will be obvious that when the closure plug is adjusted manually to its lowermost position, the disk or valve **49** will engage with the upper surface of the internal web **37**, located within the valve housing, and effectively seal the boat drain, preventing any passage of water therethrough in either direction. For convenient operation, the closure plug **48** may be provided with an operating handle or extension **51** including a transverse aperture **52**.

The application of the Venturi-tube principle to the drain of the present invention provides means for automatically draining or bailing the boat when in motion in the event of the depositing therein of undesired water, the forward movement of the boat, generally accompanied by a lifting of the bow in accordance with the speed of travel, providing suction through the Venturi-

tube outlet of the drain whereby upon opening of the closure plug 48 automatic bailing will result.

It will be obvious to those skilled in the art that various changes may be made in the invention without departing from the spirit and scope thereof and therefore the invention is not limited by that which is illustrated in the drawing and described in the specification, but only as indicated in the appended claims.

What is claimed is:

1. A sporting boat constructed from relatively thin sheet material to provide maximum interior volume and having relatively closely spaced walls defining the bottom thereof, said boat being so constructed as to have buoyancy such that the waterline is between said spaced walls whereby the upper of the two walls is above the waterline when the boat is not loaded, a vertically disposed tube extending through said spaced walls and providing a passageway for draining said boat, a horizontally disposed disk extending across the upper extremity of said tube and having an aperture communicating therewith, the under-surface of said disc immediately surrounding said aperture providing an annular valve seat, a depressed flange portion in the upper wall of said bottom surrounding said passageway and providing a recess for the reception of said disc whereby the upper surface thereof is substantially flush with the surrounding surface of the boat bottom, an upwardly extending sleeve secured to said disk in surrounding relation with respect to the aperture therein, said sleeve having a plurality of spaced drainage openings immediately adjacent the lower edge thereof providing communication between the interior of the boat and said passageway, and valve

means located within said tube for closing said passageway automatically when the boat is so loaded that the waterline is above the upper of the spaced walls of the bottom of said boat.

2. In a sporting boat as set forth in claim 1, a threaded closure for said sleeve, a depending valve member carried by said closure, and an annular valve seat on the upper surface of said disk whereby manual operation of said threaded closure will prevent passage of water through said tube in either direction.

3. A boat as set forth in claim 2 where said valve means comprises a buoyant ball.

4. A boat as set forth in claim 2 where said valve means comprises an element pivotally mounted in said tube.

5. A boat as set forth in claim 2 where said tube is provided with a bottom closure terminating in a rearwardly directed Venturi tube.

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