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DRAIN CHECK VALVES

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Fig. 3

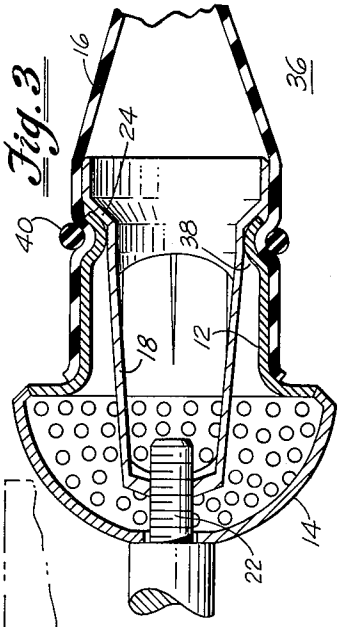


Fig. 1

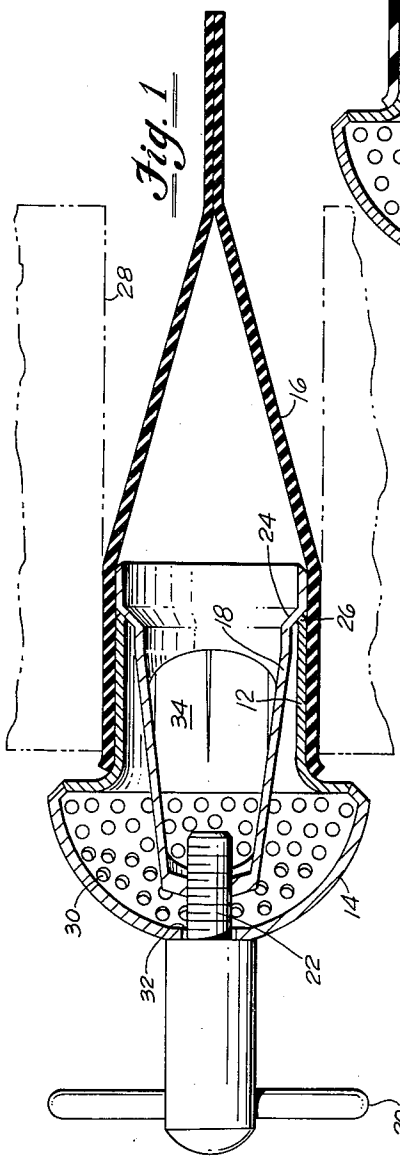


Fig. 2



LEON GUTA
INVENTOR.

BY S. A. Giarratana

attorney

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DRAIN CHECK VALVES

Leon Guta, 21 Harrison Place, Clifton, N.J.

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The present invention relates to a drain check valve and more particularly to a drain check valve adapted to automatically bail a boat.

At present most valve devices incorporated in boats to facilitate bailing are not automatic, since bailing does not occur whenever water accumulates in the boat. The few that are automatic are susceptible to malfunction due to the accumulation of debris in the valve which prevents suitable valve closing. In general, most boats, such as motorboats, launches, and the like, are provided with a drain aperture near the lower portion of the transom, usually just above the bottom of the boat, fitted with a drain plug. Whenever bailing is necessary, the boat is placed in motion and then in a planing attitude so that the transom, and especially the lower edge thereof, is elevated above the water. With the boat in a planing position, the drain plug is removed and the natural planing attitude of the boat plus the weight of the water within the boat, causes the water to flow out through the drain aperture. After the water has drained out, the drain plug is quickly replaced. Safety dictates that draining operations should be performed by two people, one to run the boat and the other to remove and replace the drain plug.

Presently used automatic bailing devices are fairly complex in construction and operation, and subject to inoperative periods due to the accumulation of debris which make them extremely unreliable and unsafe.

In addition, present bailing devices require extensive modification to the existent drain aperture provided by the manufacturer.

Accordingly, available automatic bailers are complex, unreliable, and costly to install and maintain.

The present invention in its preferred form comprises a drain check valve adapted for use in the drain aperture available in most boats, by merely substituting for the manufacturer's drain plug. The drain check valve is provided with a dilatable resilient member which automatically reacts to water in the boat, when the boat is moving or out of the water, to drain the water out without intervention from operator or passenger. The valve is formed with integral filter means, to prevent the accumulation of debris to thereby maintain continuous and reliable operation. Also, since the valve replaces the boat's drain plug without modification of the drain aperture, there are no installation expenses. Further, since the present valve consists of a few members economically produced and fabricated, and susceptible to quick and easy maintenance or replacement, a low cost unit is provided within the reach of most boaters.

An object of the present invention is to provide a drain check valve adapted for use in a boat's drain aperture for reliable automatic bailing.

Another object of the invention is the provision of a drain check valve adapted for automatic and continuous bailing operation without the danger of obstruction by debris.

A further object of the present invention is to provide a low cost automatic drain check valve adapted for use without costly installation and maintenance.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawing in which like reference numerals designate like parts throughout the figures thereof and wherein:

FIGURE 1 is a cross-sectional view of a preferred embodiment of the invention;

FIGURE 2 is an exploded view of the device of FIGURE 1; and

FIGURE 3 is a cross-sectional view of a modification of the device.

Referring now to the drawing, there is shown in FIGURE 1 a preferred embodiment **10** comprising an expanding split sleeve **12** provided with a filter housing **14** at one end and a flap valve **16** suitably mounted at the other end. An expander cone **18** is coaxially mounted within the split sleeve **12** and operatively coacts therewith to expand the sleeve.

A manually operated handle **20** is formed with an integral screw member **22** threadedly engaging the expander cone, so that rotation of the handle will draw or axially slide the cone toward the handle and effectuate the coaction of a flanged portion **24** of the cone with an inwardly protruding end portion **26** of the split sleeve **12** to expand the sleeve and secure the valve in a suitable drain aperture **28** of the boat.

The filter housing **14** and the split sleeve **12** may be separate members suitably connected, as shown in FIGURE 1; however, if desirable, the members can be fabricated as an integral structure to further simplify the construction of the embodiment **10**. The filter housing is formed with a semisphere configuration for maximum strength and support for the interaction of the handle **20** and the expander cone. The surface of the filter housing is provided with a plurality of apertures **30** of a size to allow maximum flow of the particular size of the semisphere utilized and to prevent the passage of debris which would affect the operation of the dilatable member **16**. An axial aperture **32**, much larger than the apertures **30**, is provided on the housing **14** for the screw member **22** operatively connecting the handle and the expander cone.

The expander cone **18** is formed with a number of openings **34** permitting unobstructed flow from the filter housing through the dilatable member in draining the boat. The flap or dilatable member is fabricated of a suitable resilient material which is impervious to oil, gasoline, or the like, usually found in the water near motor boats. In addition, the resilient material is also resistant to the abrasive action of any debris that may be minute enough to pass through the apertures **30**.

In the operation of the preferred embodiment **10**, when the boat is riding at planing speeds, the water within the boat will automatically drain by gravity through the drain check valve. After the draining operation is completed, the dilatable member **16** of the valve closes automatically. As a matter of fact, the valve automatically closes when the water within the planing boat has completely drained or when the dilatable member submerges below the water surface—in either case, the valve requires no attention from the operator. In the bailing process, any debris within the boat will be kept from obstructing the proper operation of the dilatable member **16** by the filter housing **14**. Any debris against the apertures **30** can be removed at the operator's discretion.

To place the valve in operation, the operator merely installs it in any existing bailing plug aperture and adjusts the valve to the aperture by turning the handle **20** until the axial movement of the cone **18** expands the split sleeve **12** sufficiently to secure it within the drain aperture **28**. In operation, the flow path is through the filter housing apertures **30**, the cone openings **34**, and through the dilatable member **16** opened by the gravity flow of water. It will be obvious that when the boat is at anchor, the dilatable member is maintained closed

by external water pressure and sealed against any leakage into the boat.

FIGURE 3 illustrates a modification **36** of the embodiment **10**, wherein the flange **26** of the expanding split sleeve **12** is replaced by a circumferential groove **38**, which coacts with the expander cone flange **24** to expand the sleeve. In addition, an O ring **40** is provided to assist in securely maintaining the dilatable member **16** on the split sleeve. Hence, in addition to the pressure between the split sleeve and the drain aperture **28**, the O ring will provide an added measure of safety in some applications of the present drain check valve. It will be obvious that the operation of the modification **36** is similar to that of the preferred embodiment **10**.

In brief, the present drain check valve when placed in a transom drain aperture will allow the water to drain when the boat is under way or out of the water without danger of reentry. The valve is completely automatic once placed in the drain plug aperture, and easy to keep clean and to maintain in operative condition. Also, the valve is susceptible to production techniques, such as stamping the parts of the valve, which results in a low cost device ready for immediate application in a boat's drain plug aperture.

It should be understood, of course, that the foregoing disclosure relates to only a preferred embodiment of the invention and that it is intended to cover all changes

and modifications of the examples of the invention herein chosen for the purposes of the disclosure, which do not constitute departures from the spirit and scope of the invention as set forth in the appended claims.

What is claimed is:

1. A drain check valve comprising a filter housing having a plurality of apertures, an expanding split sleeve connected to said housing, an expander cone coaxially mounted within said sleeve to coact therewith, handle means supported on said housing and threadedly engaging said cone, so that suitable rotation of said handle axially slides said cone relative to said sleeve to expand it, and a dilatable member mounted on said sleeve to permit the gravity flow of water therethrough.

2. A drain check valve adapted for use in a drain plug aperture comprising a filter housing having an expanding split sleeve, an expander member operatively coacting with said sleeve to secure the valve within the drain plug aperture, manual means coupled to said expander member to actuate said sleeve, a resilient valve member mounted on said sleeve and actuated by water flow through said filter housing.

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