May 29, 1962 O. E. MUSICK ET AL 3,036,541

DRAIN PLUG

Filed June 29, 1960

FIG. 1

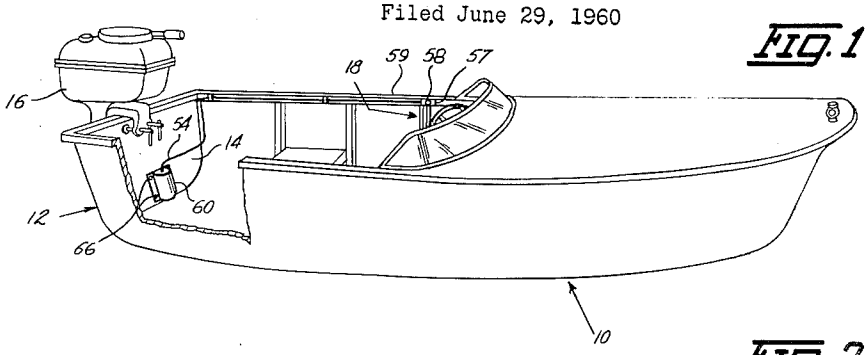


FIG. 2

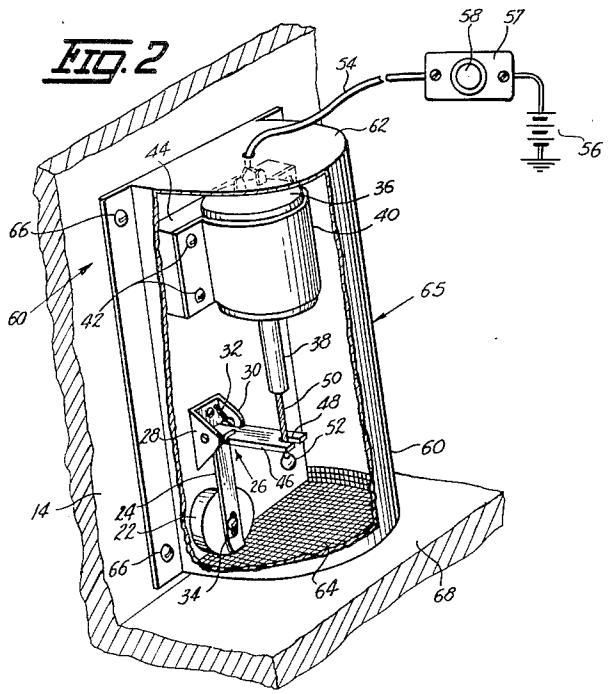
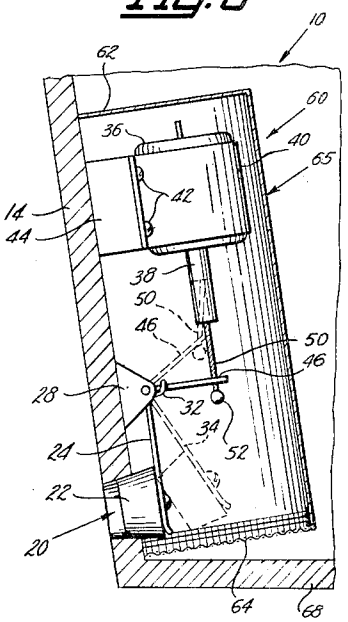


FIG. 3



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DRAIN PLUG

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Our invention relates to drain plugs and more particularly to apparatus for effecting the insertion and removal of such a plug in a drain hole from a remote location.

As a specific object of this invention it is our purpose to provide a drain plug in the stern of a boat which may be moved to open and closed position by control means easily accessible to the position in the boat normally occupied by the operator.

The use of a drain plug in a boat is a well known expedient and the removal of such plug from the drain hole when the boat is afloat, permits water to drain out if the boat is underway at a given speed. Such plugs as are now used generally require manual application for insertion and removal and unless secured in some way are susceptible of becoming lost or damaged. Because of the manual handling required, a sole occupant of a boat may find it highly inconvenient or impractical at times to remove the plug when the situation requires. In addition, current changes in boat styling are presenting many types of closed motor wells at the stern so that access to the drain plug is exceedingly difficult and inconvenient. With the increasing number of power operated pleasure boats and crafts, the use of remote steering and controls is fast becoming an accepted and common part of the boat and accordingly it is one of the features of this invention to provide an electrically operated drain plug controllable from a position within easy and convenient access to the steering and motor control apparatus.

Another object herein contemplates the provision of a drain plug as characterized which includes screen means to keep the drain hole free of foreign matter.

Further objects and the more obvious advantages of the invention will be mentioned or else appear plainly from the description which follows.

This invention consists of novel parts and combination of parts to be hereinafter described whereby the objects set forth are attained, as pointed out in the claims and illustrated in the accompanying drawings, in which:

FIG. 1 is a perspective view of a boat illustrating the mounting of this invention in the stern,

FIG. 2 is an enlarged perspective view of this invention with a portion of the outer housing cut away to more clearly illustrate the construction thereof, and

FIG. 3 is a side view of the device shown in FIG. 2 with the broken lines representing the open position of the drain plug.

Referring to the drawings a boat is designated generally by the numeral **10** and at the stern **12** includes the transom **14** which supports an outboard motor **16**. Steering and control apparatus are represented generally at **18**, the same being located at a point remote from the stern **12**. It will be understood, however, that boat **10** as shown, is merely illustrative and that this invention may be applied to other types and models of boats of both the outboard and inboard variety.

The drain hole **20** is shown in the lower portion of the transom **14** and a suitable plug **22** for use in hole **20** is mounted to one arm **24** of a bell crank or mounting member **26**, such crank being pivotally attached between spaced ears **28** and **30** which are secured to the transom **14** on the inside of the boat. Because of tension supplied by spring **32**, plug **22** will normally be seated in sealing engagement with hole **20** from the inside of the boat and a slot **34** in crank arm **24** permits a limited adjustment of

plug **22** so that after ears **28** and **30** are mounted to the transom of a boat, the plug **22** can be moved longitudinally of crank arm **24** for proper seating relationship with hole **20**. A solenoid **36** with a spring loaded retractable actuating arm **38** normally in extended position, is securely mounted to the transom **14** above hole **20** by means of a suitable bracket **40**, the same being attached by screws or bolts **42** either directly to the transom or to a small block **44** affixed to the transom for this purpose. The mounting of the solenoid **36** is in spaced relationship to ears **28** and **30** so that arm **38** extends toward but not to the free end of crank arm **46**.

The free or outer end of crank arm **46** is provided with a relatively deep notch **48**, which may be a hole if desired, and a flexible link such as a short length of cable or wire **50**, is secured to the solenoid arm **38** so as to project through notch **48**. The free end of link carries a small bead or ball or the like having a size incapable of passing through notch **48** and thus serves as a stop for engaging and acting against the crank arm **46** when the solenoid **36** is actuated. The solenoid **36** is electrically connected as at **54** to a source of electric power **56** which may be a separate battery for this purpose, or any battery already installed on the boat for starting the motor, supplying lights, etc. A switch **57**, preferably in the form of a spring loaded button **58** normally held in open position is imposed in the circuit **54** and positioned so as to be conveniently and easily accessible to that part of the boat normally occupied by the operator. The exact location of switch **57** whether on the instrument panel if there is one, the gunwale **59** adjacent the operator's cockpit, on or near the controls **18**, or otherwise may be a matter of individual choice or preference so long as the operator can conveniently reach it from the operator's normal position.

The entire assembly of the solenoid **36**, crank arm **26** and plug **22** is enclosed in a suitable cover **60** having a closed end **62**, a mesh screen end **64**, and a top **65** connecting ends **62** and **64**. Cover **60** is secured to the transom **14** by screws **66** or the like so as to encase the solenoid and plug assembly as shown in FIG. 2. Screen **64** in this arrangement is intermediate the drain hole **20** and the bottom **68** of the boat for the purpose of keeping foreign matter out of hole **20**.

In the operation of this device it will be noted that link **50** is of sufficient length that stop **52** is normally spaced slightly beyond the free end of crank arm **46** and will of necessity travel a limited distance before acting against arm **46**. The effect of this is to provide an impact contact of member **52** against arm **46** to assure that the crank arm **26** is pivoted or rocked on ears **28** and **30** when the button **58** is depressed and arm **38** is retracted by actuation of solenoid **36** to thereby move plug **22** in an arcuate path away from the drain hole **20** to a position where it is completely removed from the drain hole so as to leave the hole free of any obstructions for the free flow of bilge water from the boat. Upon release of button **58**, circuit **54** is automatically opened and spring **32** will act against the crank arm **26** to seat plug **22** in the hole **20**.

It should be mentioned that while switch **57** may be in the form of an off-on switch requiring manipulation for each position, we prefer the button type **58** described because of its particular adaptation for use on boat drain plugs. In this way, an operator is required to keep the button depressed to keep hole **20** open and normally the time required to drain an accumulation of water will not be too long. However, since one of the advantages and purposes of this device is to permit the operator to drain the boat when afloat, it is important that if the operator's attention should be diverted or distracted for any purpose requiring the use of his hands while the hole **20** is

open, such hole will immediately become closed when button 58 is released. With an off-on switch, the possibility of hole 20 being accidentally or unintentionally left open is completely eliminated. While an open hole 20 would be of no serious consequences when the boat was underway, and could, if forgotten, be quickly closed when afloat as soon as the intake of water was noticed, it should not be overlooked that such water intake may not be noticed as a boat is docked and could thus easily result in the boat filling and sinking at the dock. These and many other obvious reasons dictate the desirability of using the button switch 58 indicated.

We have shown the position of the drain hole 20 in the bottom of the transom 14 but since some craft manufacturers place such a hole in the bottom 63, it will be appreciated that this device may be employed in such instances with equal efficiency. Also while we preferably use this invention for drain holes on boats, the same may be utilized without change in any situation where the opening and closing of an opening from a remote location is desired.

It is submitted that the invention shown and described is aptly suited to achieve the purposes intended and is characterized by a combination of highly useful and mutually cooperating elements that combine their respective and proportionate functions in accomplishing the objects sought to be obtained.

It will be understood that the phraseology employed herein is for the purpose of description and not for limitation and that modifications and changes in the construction and arrangement of this invention can be made within the scope of what is claimed, without departing from the spirit and purpose thereof. It is thus intended to cover by the claims, any modified forms of structure or mechanical equivalents which may be reasonably included within their scope.

We claim:

1. In a boat having a drain hole, the combination therewith of a drain plug, a spring loaded mounting member movably attached to said boat and carrying said drain plug so as to place it and normally hold it in sealing engagement with said drain hole from the inside of said boat, means remote from said drain hole and connected to said mounting member for moving the same so as to move said drain plug out of sealing engagement and out of axial alignment with said drain hole, and said mounting member automatically returning said drain plug to sealing engagement with said drain hole when said means is rendered ineffective.

2. In a boat having a drain hole, the combination therewith of a drain plug, a spring loaded bell crank pivotally attached to said boat, a first arm on said bell crank carrying said drain plug positioned so as to place it and normally hold it in sealing engagement with said drain hole from the inside of said boat, said first arm being disposed perpendicular to the axis of said drain hole, means to adjust said drain plug longitudinally of said first arm to effect a proper sealing engagement between said drain plug and drain hole, and means remote from said drain hole and connected to a second arm on said bell crank for pivoting the same so as to move said drain plug in an arcuate path out of sealing engagement with said drain hole and leave said drain hole free of any obstruction.

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